University admission scores as predictor of academic performance in the first year of university: Education VS Social Services Oriented Degrees[1]

La nota de acceso a la universidad como predictor del rendimiento en el primer año de carrera: grados de Magisterio versus otras carreras asistenciales

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Abstract

Several research studies have shown that admission scores seem to be a good predictor of academic performance during the undergraduate degree. It is a fact that the first year of the undergraduate program is the one in which most

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students drop out of the program. Considering this idea, the general objective of this study is to identify the access profile (previous academic performance) and predict the future performances of the students at the Universidad Complutense de Madrid (UCM). The study involves first year students who enter the Education Programs, as well as those who enter Degrees with a Social Service Orientation. To address this objective, a secondary analysis of the UCM census' data in the 2018/2019 academic year is carried out where the total sample is 2018 students. Several regression models are considered aiming to determine the effect of previous academic performance on the success rate (% of ECTS credits passed) at the end of the first academic year. The results show that the Education Degrees where admission scores have an impact on the success rate are those related to Primary Education. Furthermore, a differentiated profile was observed between Education Degrees compared to Degrees with a Social Service Orientation when explaining the success rate in the first year. In light of these results, it can be concluded that admission scores are a predictor of the academic performance achieved in the first year of the degree program, affecting in a differently students who pursue Education Degrees versus Social Services Oriented Degrees.

Key words: Education degree, social services-oriented degrees, academic performance, credits, regression models

Resumen

Diversas investigaciones demuestran que la nota de acceso a la universidad parece ser un buen predictor del rendimiento académico obtenido durante la carrera. Es un hecho que el primer curso de carrera es en el que se produce el mayor abandono. Partiendo de esta idea, el objetivo general que se plantea en este trabajo es conocer el perfil de acceso (rendimiento previo) y su efecto sobre el rendimiento en el primer año de carrera de los estudiantes de la Universidad Complutense de Madrid (UCM) que acceden a las titulaciones del grado de magisterio, así como de aquellos que acceden a otras carreras de carácter asistencial. Para dar respuesta a este objetivo se realiza un análisis secundario de los datos censales de la UCM en el curso 2018/2019 donde la muestra total es de 2018 estudiantes. Se plantean varios modelos de regresión con la finalidad de conocer el efecto del rendimiento previo sobre la tasa de éxito (% de créditos ECTS aprobados) al final del primer curso académico. Los resultados muestran que las titulaciones de magisterio donde la nota de acceso tiene un impacto sobre la tasa de éxito son las relativas a la etapa de Educación Primaria. Asimismo, se observa un perfil diferencial entre las titulaciones de magisterio y otras titulaciones de carácter asistencial, a la hora de explicar la tasa de éxito en el primer curso. A la vista de estos resultados se puede concluir que la nota de acceso a la universidad es un predictor del rendimiento académico obtenido en el primer año de carrera que afecta de manera diferente a los estudiantes que cursan carreras de magisterio versus otras carreras asistenciales.

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Palabras clave: Titulaciones de magisterio, titulaciones asistenciales, rendimiento académico, créditos, modelos de regresión

Introducción

The causes associated to dropout rates in the first year of university studies are a concern that has sought to be analysed in recent decades (Organisation for Economic Co-operation and Development, 2008; Rooij, et al., 2017). As such, several research projects have focussed on studying the variables that may be associated with academic success during the first university year and that, as a result, could explain a substantial part of the university dropout rate (García, 2014; Fonteyne et al., 2017; Hepworth et al., 2018; Respondek et al., 2017).

Academic performance depends on a range of factors, the identification and effect of which could provide a more comprehensive overview that allows decisions to be made that improve the quality of education. In this regard, Schneider & Preckel (2017) identified in their meta-analysis a total of 105 variables in two areas related to students themselves or with the education process that could affect academic performance. Furthermore, Garbanzo (2007), established 26 factors arranged into three categories: personal determinants, social determinants and institutional determinants.

Despite the fact that all the variables identified appear to have an effect on academic performance, several national and international studies (Cerdeira, et al., 2018; Danilowicz-Göselea, et al., 2017; Fernández-Mellizo & Constante-Amores, 2020; Gallegos & Campos, 2019; Jiménez-Caballero et al., 2015) suggest that the university entry or admissions grade, a personal determinant according to Garbanzo (2007), is the best indicator for predicting the academic performance of students during the first degree year. Jiménez-Caballero et al. (2015) concluded, in a study undertaken at the University of Sevilla with 572 students enrolled on the first year of the finance and accounting course, that the entry grade is an explanatory factor in academic performance, implying on average an additional point in every subject grade. Gallegos & Campos (2019) arrived at the same conclusion, indicating not only a positive and

significant effect on academic performance in the first year, but also that they observed the same effects in the fourth degree year.

Furthermore, Fernández-Mellizo & Constante-Amores (2020), in a study on determinants of academic performance, which included 10,720 students at the Complutense University of Madrid, concluded that the university entry grade is the most important predictor of students' academic performance. Other authors, such as Danilowicz-Göselea et al. (2017), in a study conducted with 12,000 students on different degree courses at Göttingen University, which included humanity, social science and technical degrees, confirmed that although the magnitude of the effect depends on the degree course studied, the grade obtained in pre-university studies has a significant and positive effect, so much so that those who enter with lower grades are much less likely to graduate than those with higher grades.

Cerdeira et al. (2018) did a similar analysis in Portugal, analysing different factors, among them the entry grade and the final grade obtained in secondary education of 23,632 students. These authors found that the entry grade and the final grade obtained in secondary education can be used to significantly predict the final degree grade. Furthermore, on including other variables in the analysis, the explication did not change. As such, these two variables are by far the ones with the greatest predictive value in terms of the grades obtained at the end of university studies. Rodríguez et al. (2004) and Tejedor (2003) suggest that this important effect of the entry grade can be explained as being a reflection of other academic achievements in which other personal, social and institutional determinants also have an influence.

Admissions profile of students on teaching and care-related degrees

The large-scale international educational evaluation programmes, such as PISA, TIMSS and PIRLS, have shown the situation in terms of educational achievement of the different participating countries. In all of them in which the relative position is unsatisfactory, as is the case of Spain, social and political actions have taken place with the aim of adopting measures to remedy the shortfalls perceived. As a result of this increased focus on possible corrective measures, some international reports (OECD, 2017) show the importance of the qualifications and efficiency of teachers and,

therefore, the impact that their training has on the academic results of their students.

The fundamental role of teachers in the quality of the education given is a fact backed by sufficient empirical evidence (Ponce et al., 2020; Rus et al., 2019; Vaillant & Rodríguez, 2018). However, the characteristics of those who study degrees corresponding to the teaching profession are not determined and neither standardised tools nor procedures exist for selecting those who aspire to be teachers or professors, a fact that heightens the concerns of governments in improving the quality of academic staff. In this regard, Hanushek (2016) concluded that students who have had for one year professors or lecturers with a relative efficiency position in the 90th percentile or higher, learn the corresponding material 150% more than students taught by professors or lecturers in the 10th percentile or lower (Hanushek et al., 2016). Furthermore, the McKinsey report affirms "the quality of an education system cannot exceed the quality of its teachers" (Barber & Mourshed, 2007, p.13).

As in the studies previously mentioned, prior performance also seems to be a predictor of subsequent academic performance in teaching degrees. In this regard, Belvis et al. (2009) conducted a study on academic success with 2,476 students on pedagogy, psycho-pedagogy, teaching and social education degrees at seven different Spanish universities. In the study they found that, among other factors that affect student success in higher education, the prior academic preparation of students has a very direct impact on their subsequent results. Also in this study, as well as in that of Barahona (2014) and Cortés & Palomar (2008), the university entry grade is considered as another factor that predicts subsequent academic performance.

In addition to the grades obtained by students, the credits passed and the study hours accumulated are two further indicators generally used to operationalise academic performance. As such, the Ministry of Science, Innovation and Universities used the credits passed as an indicator to calculate performance and success rates (Integrated University Information Systema [SIIU], 2019).

Taking into account, on the one hand, the effects of academic staff efficiency and, on the other, the importance prior performance seems to have as a predictor of students' academic futures, knowing the student profiles interested in university degrees linked to the teaching profession appears particularly relevant. In 2006, the PISA programme (OECD,

2008) surveyed students from several countries about which profession they thought they would be working in at the age of 30. Only 5% of those surveyed saw themselves working as teachers or professors. Among the males surveyed, no more than 3% aspired to be teachers, while this figure rose to 6% among females (OECD, 2015). However, the biggest concern, regardless of gender, related to students whose mean grade in reading and maths skills was below the average. The major concern is that, in most countries, the low skill level of those who aspire to become teachers also coincides with low performance rates, obtained by working teachers in similar tests, as shown in the *Survey of Adult Skills* of the PIAAC (Programme for the International Assessment of Adult Competencies) (OCDE, 2016).

Camina & Salvador (2007) found a great variability in the characteristics of students on different teaching degrees. On more specialised degree courses, such as physical education, music education and foreign languages, there was a great variability in terms of age. Furthermore, students on pre-school education and physical education degrees, largely came from vocational training. In terms of academic performance, most of those who started said studies obtained in entrance exams scores of between 5 and 6 points. Similarly, between 20% and 50% would have preferred to have studied something else, which suggests that not all had a real interest in teaching.

All the foregoing is of particular concern considering that prior performance, as previously mentioned, is a predictor of subsequent academic performance. Therefore, a low entrance skill level allows us to predict a low performance on the degree course, ultimately affecting the quality of teachers and, therefore, the education provided.

In addition to teaching degrees, knowing the student profile of other degrees that prepare individuals for similar professions, due to their care or service-to-society nature, is of interest. Care professions are those with a common social purpose that are linked to contextualised degrees in the social, healthcare and educational field. In this study, degrees linked to the care professions in the database of the Student Observatory (*Observatorio del Estudiante*) of the Complutense University of Madrid have been considered as such, which include: dual degree in psychology-speech therapy, degree in speech therapy, degree in psychology, degree in social education, degree in pedagogy, degree in social work, degree in occupational therapy.

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The aim of this study is to discover the university entry or admissions profile (prior academic performance) and its effect on performance in the first degree year of students at the Complutense University of Madrid (UCM) on the single and dual degree courses in teaching (in pre-school education and in primary education), as well as of those who study other care-related degrees. To specify the general objective, the following specific objectives have been established:

– To comparatively study the impact of the entry grade in studies that provide access to the teaching profession.
– To study if the effect of the university entry grade determines, in a different manner according to the degrees considered, academic performance in the first year (percentage of credits passed over those enrolled on).

Method

This study used a quantitative methodology, specifically, a non-experiment design in which a secondary analysis of the UCM census data was conducted for the 2018/19 year, provided by the Student Observatory of said university.

Participants

The participants in this study were students who first accessed the different teaching and care-related degree courses at UCM in academic year 2018/2019, which entailed a total of 2,018 subjects, of which 643 were students on the teaching degrees of the Faculty of Education and Teacher Training Centre and 1,375 students on degree courses linked to care professions.

Table I sets out in further detail the teaching and care-related degrees, the sampling distribution of participating students, as well as the mean and standard deviation in each degree of the university entry grade and of the centred entry grade regarding the mean of the degrees considered.

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TABLE I. Sampling distribution according to the type of degree (teaching or care-related)

Degree		Frequency	Percentage	Mean entry grade (Standard dev.)	Centred mean entry grade (Standard dev.)
Teaching (31.8%)	Dual degree in pre-school education - primary education teaching	54	8%	10,421 (.888)	1,164 (.888)
	Dual degree in pre-school education teaching - pedagogy	47	7%	9,811 (1137)	.554 (1137)
	Dual degree in primary education teaching - pedagogy	48	8%	11,082 (.951)	1,824 (.951)
	Degree in primary education teaching	258	40%	9,055 (1194)	-.202 (1194)
	Degree in pre-school education teaching	236	37%	8,319 (.763)	-.938 (.763)
Care-related (68.2%)	Dual degree in psychology-speech therapy	50	3.6%	10,615 (.891)	1,358 (.891)
	Degree in speech therapy	56	4.1%	8,900 (.720)	-.357 (.720)
	Degree in nursing	267	19.4%	11,022 (1211)	1,764 (1211)
	Degree in psychology	408	29.7%	9.4185 (1102)	.161 (1102)
	Degree in social education	93	6.8%	9,451 (1009)	.194 (1009)
	Degree in pedagogy	90	6.5%	8,776 (.726)	-.481 (.726)
	Degree in social work	340	24.7%	7,855 (1028)	-1,402 (1028)
	Degree in occupational therapy	71	5.2%	9,460 (.856)	.203 (.856)

The average age of students is 20, in both teaching and care-related degrees, ($SD_{teaching}$= 2.88; $SD_{care\text{-}related}$=3.97), with 18 and 52 being the lowest and highest age, respectively, in the teaching degrees and 58 the highest in the care-related degrees. 17.9% of the students are male and 82.1% female in the teaching degrees, a trend also reflected in the care-related degrees, where 15.3% are male and 84.7% female. As regards the nationality of students, 97% and 95.5% on the teaching and care-related degrees, respectively, are Spanish.

The university admissions route for the teaching degrees was: further education (*bachillerato*): 72.5%; VT: 26.1%; over 25s: 6%; graduates:

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6%; over 45s: 2%. As regards care-related degrees: further education (*bachillerato*): 80.6; VT: 17.2%; graduates: 4%; over 25s: 1.3%; over 40s 3%; and over 45s: 2%.

Process

The data used in this study was sourced from the anonymous information that the Complutense University of Madrid (UCM) reports each year to the Integrated University Information Systema (SIIU) and that has been provided by the Student Observatory of the UCM. Specifically, the data used for this analysis correspond to academic year 2018/19.

As regards the variables used in this study, the dependent variable relates to academic performance, understood as the rate of ECTS credits passed in the first year. On the teaching degrees, the average rate is 84% and, on care-related degrees, 79.5%.

As predictor variables, the type of degree (categorised as teaching or care-related degrees, Table I) and the university entry or admissions grade, understood as the total of the further education (*bachillerato*) grade (60%), results in the entrance exams (40%) and an additional 10% or 20% for the best grades obtained in the voluntary phase, depending on the degree course chosen, are the variables used. In order to facilitate the interpretation of the regression equation constant, the university entry grade has been centred on the mean entry grade of the students accepted onto the degrees in this study (teaching and care-related). As such, the value of the constant allows us to find the value of academic performance when the value of the university entry grade corresponds to the mean. Information on said variables is provided in Table II.

TABLE II. Descriptive statistics of the university entry grade variable.

	Degree type	N	Minimum	Maximum	Mean	Standard deviation
University entry grade	Teaching degrees	643	5.29	13.33	9,106	1,307
	Care-related degrees	1375	5.00	13.33	9,328	1,509
University entry grade centred on the mean entry grade of the sample used (centred entry grade)	Teaching degrees	643	-3.97	4.07	-.151	1,307
	Care-related degrees	1375	-4.26	4.07	-.071	1,509

To meet the first specific objective –comparatively studying the impact of the entry grade in teaching studies–, a simple regression was undertaken comparing the teaching degrees (degree in primary education teaching, degree in primary education teaching (*sic.*), dual degree in pre-school education - primary education teaching, dual degree in pre-school education teaching - pedagogy, dual degree in primary education teaching - pedagogy) and using the entry grade as a predictor and the success rate in the first degree year (number of credits passed/number of credits enrolled on) as the criterion.

To meet the second specific objective –studying the differential effect between the entry grade and the type of degree on academic performance in the first year, different according to teaching or care-related degrees–, three regression models were undertaken, which will be represented with the corresponding equation in the results section: the null model used as a reference model to demonstrate any improvement in the predictor-related models that are going to be estimated; model 1, which is going to study the effect of the university entry grade, and model 2, which analyses the differential effect of the entry grade, type of degree and the relationship between them.

The stepwise method was used to select the variables, which Pardo & Ruiz (2013) say is a combination of the forward and backward methods, where first the variable that more closely correlates with the dependent variable is chosen, followed by the variable with the highest partial correlation coefficient.

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To study the adjustment of the model, the residual is calculated, and the error reduction of the models with predictors is studied with regard to the null model. Therefore, the ratio between the difference of the deviance of the reference model and that of the proposed model and the deviance of the reference model is calculated (Pardo & Ruiz, 2013). Furthermore, R^2 is calculated, which is the quotient between the explained variation and the total variation. Finally, AIC and BIC are used, which are modifications of the deviance, very common in both nested and non-nested comparison models (Montesinos, 2011). Furthermore, in all the predictor models, the size of the effect is calculated with Cohen's d formula, where values around .20 indicate a small effect size, values around .50 a medium effect size and values around .80 and higher a large effect size (Cohen, 1992).

To guarantee the validity of the linear regression models, the residual independence assumptions, through the Durbin-Watson test statistic, and the non-collinearity assumptions, through tolerance and VIF estimations, were verified. The Durbin-Watson test values were within the range of 1.5 and 2.5, which allows us to accept the assumption of independence between the residuals (Durbin & Watson, 1971). In terms of the non-collinearity assumption, the tolerance of the models reflects values that exceed the minimum of .200 (Menard, 2002), which allows us to rule out collinearity and multi-collinearity issues. The variance inflation factors (VIF) once again allows us corroborate compliance of the non-collinearity assumption, given that the values reached in both do not exceed the limit of 10 (López, 1998).

For the statistical analysis, the SPSS program version 25.0 (IBM ® SPSS® Statistics 25) and the G*Power 3.1 program (to calculate the size effect) were used.

Results

The results section is arranged in two blocks, one for each research objective proposed in this study, where the different estimated regression models and the adjustment corresponding to each one are set out and interpreted.

Study comparing the impact of the entry grade on teaching studies

Firstly, Table III shows, for each teaching degree, the descriptive statistics of the variable considered for the study: academic performance (understood as the percentage of ECTS credits passed in the first year) and centred university entry grade. As can be seen, the highest percentage of ECTS credits passed in the first year corresponds to the dual degree in pre-school education teaching - pedagogy, while the lowest corresponds to the degree in pre-school education teaching. As regards the university entry grade, the students on the dual degree in primary education teaching and pedagogy obtained the highest grade (1.846 points above the mean of participants), while the lowest entry grade was obtained, once again, by those on the degree in pre-school education teaching (.802 points below the mean grade).

TABLE III. Descriptive statistics of the simple regression model

Degree	Variables	Mean	Standard deviation
Dual degree in pre-school education - primary education teaching	ECTS passed/enrolled on	88,338	22,145
	Centred entry grade	1.1750	.9287
Dual degree in pre-school education teaching - pedagogy	ECTS passed/enrolled on	93,650	11,613
	Centred entry grade	.6424	.929
Dual degree in primary education teaching - pedagogy	ECTS passed/enrolled on	90,044	20,770
	Centred entry grade	1,846	.949
Degree in primary education teaching	ECTS passed/enrolled on	81,870	21,874
	Centred entry grade	.1095	1,254
Degree in pre-school education teaching	ECTS passed/enrolled on	81,138	26,525
	Centred entry grade	-.802	.804

The results obtained in the simple regression analysis are set out in Table IV, where teaching degrees and the impact that entry grades in said

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degree courses have on the success rate in the first year are compared. The results suggest that in three teaching degrees the university entry grade has a significant influence on the success rate.

TABLE IV. Estimation of the effects of the simple regression analysis.

							Confidence interval	
Degree	**Parameter**	**Estimate**	**Standard error**	**df**	**t**	**Sig.**	**Lower limit**	**Higher limit**
Dual degree in pre-school education - primary education teaching	Intercept	78,674	4,870	47	16,154	.000	68,877	88,472
	Centred entry grade	8,224	3,264	47	2,519	**.015**	1,657	14,791
Dual degree in pre-school education teaching - pedagogy	Intercept	92,275	2,181	40	42,301	.000	87,867	96,684
	Centred entry grade	2,140	1,946	40	1,100	.278	-1,793	6,074
Dual degree in primary education teaching - pedagogy	Intercept	72,399	6,078	45	11,913	.000	60,158	84,640
	Centred entry grade	9,557	2,933	45	3,257	**.002**	3,647	15,465
Degree in primary education teaching	Intercept	81,219	1,543	178	52,642	.000	78,174	84,264
	Centred entry grade	5,947	1,228	178	4,840	**.000**	3,522	8,372
Degree in pre-school education teaching	Intercept	84,687	3,369	121	25,138	.000	78,018	91,357
	Centred entry grade	4,424	2,972	121	1,488	.139	-1,460	10,307

In the case of the dual degree in pre-school and primary education teaching, as can be seen in the regression equations (Eq.1), for every point the university entry grade of these students increases, an 8.2% increase would be seen in the credits passed in the first year.

$$\hat{Y} = 78.674 + 8.224X_1 \qquad \text{Eq.1}$$

The greatest increase corresponds to the dual degree in primary education teaching - pedagogy (Eq.2), where for every point the university entry grade increases, a 9.5% increase would be seen in the credits passed in the first year.

$$\hat{Y} = 72.399 + 9.556X_1 \qquad \text{Eq.2}$$

With regard to the degree in primary education teaching, the increase is somewhat lower (Eq.3), as for every point the university entry grade increases, a 5.9% increase would be seen in the credits passed by those students in the first year.

$$\hat{Y} = 81.219 + 5.947X_1 \qquad \text{Eq.3}$$

A more intuitive way of interpreting these results would be to transform the percent of credits passed into the study hours dedicated by the students, using as a reference the guidelines of the European Higher Education Area, which establishes that the ECTS credits entails approximately 25 study hours (European Commission, 2017).

In the majority of the degrees, the most frequent distribution of the number of ECTS credits per academic year is usually 60 ECTS, accepting this datum as the total of the enrolled-on credits, we could affirm that the students on the degree in primary education teaching that have an entry grade 1 point higher than the average, would pass 3.54 ECTS credits (5.9%), which would equate to 88.5 study hours.

The dual degrees correspond to approximately 80 ECTS in the first year. As such, in the case of the dual degree in pre-school and primary education teaching, the students that have a university entry grade 1 point above the average, would pass 6.56 ECTS credits (8.2%) more than the other students, equating to 164 study hours by the students; on the dual degree in primary education teaching - pedagogy, the students would pass 7.68 ECTS credits more than the other students that is, 192 study hours.

Lastly, it is worth mentioning the existence of another two degrees where the university entry grade does not have a significant influence on the number of credits passed in the first year. These are: the dual degree in pre-school education teaching - pedagogy, and the degree in pre-school education teaching.

In terms of the adjustment of the model (Table V), it is exclusively presented for the three cases in which the university entry grade has a significant influence on the success rate. In said degrees, the residual is reduced, achieving an explanatory power of 15%, 31% and 18%, respectively, with large effects in all cases (d=.844; d=1.352; d=.944, respectively). As regards AIC and BIC, lower values are observed in the dual degree in primary education teaching - pedagogy, which suggests that the simple regression model adjusts better.

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TABLE V. Adjustment of the simple regression model

Degree	Residual	Residual reduction	Explanatory power	R2	AIC	BIC	Cohen's d
Dual degree in preschool education - primary education teaching	441,249	78,557	15.1%	.151	429,207	431,057	Large effect (.844)
Dual degree in primary education teaching - pedagogy	356,871	162,935	31.3%	.313	401,761	403,568	Large effect (1.352)
Degree in primary education teaching	425,210	94,595	18.2%	.182	1595.336	1598.518	Large effect (.944)

Differential effect between the entry grade and the type of degree

Table VI is a summary of the descriptive statistics of the variables that are going to be used in the estimated regression models: success rate (percentage of ECTS credits passed in the first year), centred university entry grade and type of degree (teaching and care-related).

The results show a higher percentage of ECTS credits passed in the first year on the teaching degrees, while the university entry grade is higher in care-related degrees (specifically, .3 points above the average entry grade).

TABLE VI. Descriptive statistics of the multiple linear regression models

Variables	Mean	Standard deviation
ECTS passed/enrolled on	80,913	24,212
Centred entry grade	.296	1,394
ECTS passed/enrolled on (teaching)	84,377	22,799
Centred entry grade (teaching)	.2095	1,336
ECTS passed/enrolled on (care-related)	79,467	24,644
Centred entry grade (care-related)	.332	1,417

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To meet the second specific objective, which consists of studying the differential effect of the entry grade, the type of degree and the relationship between both, the three regression models in Table VII were considered.

TABLE VII. Estimation of the effects of the multiple linear regression analysis

							Confidence interval	
Model	**Parameter**	**Estimate**	**Standard error**	**df**	**t**	**Sig.**	**Lower limit**	**Higher limit**
Null model	Intercept	80,913	.625	1496	129,301	.000	79,686	82,141
Model 1	Intercept	80,143	.632	1495	126,657	.000	78,902	81,384
	Centred entry grade	2,599	.443	1495	5,855	.000	1,728	3,470
Model 2	Intercept	78,890	.750	1493	105,094	.000	77,417	80,362
	Centred entry grade	1,734	.515	1493	3,481	.001	.7226	2,746
	[Type of degree=teaching]	4,401	1,368	1493	3,215	.001	1,716	7,086
	[Type of degree= care-related]	0[b]	0	.	.	.	.	.
	[Type of degree=teaching] *Entry grade	3,452	.991	1493	3,481	.001	1,506	5,397
	[Type of degree=care-related] *Entry grade	0[b]	0	.	.	.	.	.

Dependent variable: ECTS passed/enrolled on (success rate).
b. This parameter is established on zero as it is redundant.

Regarding the results of model 1, the university entry grade has a significant influence on the academic performance (understood as a percentage of the credits passed in the first year). Said influence is represented in the following regression equation (Eq.4), where for each point the university entry grade increases, the students in the sample would increase by 2.59% the credits passed in the first year.

$$\hat{Y} = 80.913 + 2.599X_1 \qquad \text{Eq.4}$$

Model 2 adds, to the study of the effect of the entry grade, the type of degree (considering two categories: teaching and care-related) and the relationship between both factors.

The regression equation (Eq.5) represents the model.

$$\hat{Y} = 78.890 + 1.734X_1 + 3.452X_2 + 4.401X_3 \qquad \text{Eq.5}$$

From it, it is worth mentioning that:

- Regardless of the type of degree, for each point the university entry grade increases, the credits passed in the first year would increase by 1.73%.
- Considering the two types of degree, the students on the teaching degrees would increase by 4.40% the credits passed in the first year compared with the students on the degrees in the care-related category.
- Finally, the effect of the relationship between both variables indicates that for each point the university entry grade increases of students on teaching decrees, the credits passed in the first year would increase by 3.45%.

As a result, model 2 allows us to interpret that for every point the university entry grade of the teaching degree students increases, the credits passed in the first year would increase by 9.6% (1.73% effect of the university entry grade + 4.40% for belonging to the teaching degree group + 3.45% of the cross effect of the entry grade and teaching degree).

Lastly, the adjustment is shown of each of the estimated models with respect to the null model. In Table VIII, it can be seen how in model 1, which includes the centred university entry grade as a predictor, the residual is reduced, achieving an explanatory power of 2.2% and a small effect size (d= .2993). With regard to model 2, greater explanatory power, specifically of 3.8%, and a medium effect size can be seen, which is higher than in the previous model (d=.4). Despite there being an improvement in explanatory power in model 1 over model 2, the R^2 is moderate, due to the fact that there are many other variables that may affect the success

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rate in the first year. Finally, AIC and BIC have lower values in model 2, which suggests, once again, that this model has a better adjustment.

TABLE VIII. Adjustment of the multiple linear regression models

Model	Residual	Residual reduction	Explanatory power	R2	AIC	BIC	Cohen's d
Null model	586,226				13789.841	13795.151	
Model 1	573,467	12,759	2.2%	.022	13755.706	13761.015	Small effect (.299)
Model 2	563,948	22,278	3.8%	.038	13724.426	13729.735	Medium effect (.397)

Conclusions

The results obtained in relation to the first objective formulated in this study allow us to confirm that there are differences as regards the impact that entry grades have on the percentage of credits passed according to the teaching degree studied. As has been observed, the degrees in which entry grades have an effect on the success rate are those relating to primary education teaching, specifically dual degrees in pre-school education teaching with primary education teaching and primary education teaching with pedagogy, as well as the degree in primary education teaching. No impact has been observed in the degree in pre-school education teaching or the dual degree in pre-school education teaching and pedagogy. It is interesting that the entry degree has an influence on the results of students on primary education degrees but not on those on pre-school education degrees. That would be, therefore, the first conclusion of the study: that the students in classrooms in the first year of primary education degrees at the UCM may be less [*sic*.] influential in terms of success rates than those on pre-school education degrees, where the grade with which they were accepted at the university appears to have no influence. Of course, this assertion should be accepted with caution, given that one of the limitations of this study is, without doubt, the use of success rates as the sole indicator of academic performance in the first year. The number of credits passed at the end of the first

university year in degrees where the success rate is traditionally high, cannot give rise to categorical conclusions given that, as it is a transversal study, the differences found between students on both degrees could be due to other factors unrelated to the university entry grade.

Despite a lack of studies in the literature that delve into the characteristics of the teaching student profile according to degree, similar results may be seen in the study conducted by Belvis et al. (2009) with students in the first and final year of pedagogy, psycho-pedagogy, teaching and social education degrees, given their conclusion that the factors relating to the prior academic record and the entry grade are significantly linked to performance.

This study also had a second objective, which was related to the differential effect on university entry grades between the teaching degrees and other care-related studies at the Complutense University of Madrid. The results show that the entry grade alone, regardless of the type of degree studied, has an influence on the success rate, which is something completely coherent with the studies conducted on prior performance as a predictor of academic performance. Similarly, the fact of studying a degree linked to the teaching profession also appears to have an influence on the success rate. Are they easier than other care-related degrees? Are the students more vocation-oriented and perhaps more motivated, which could lead to a higher success rate? Lastly, a considerable influence seems to exist when both aspects converge: entry grade and teaching studies.

These differences in the predictive capacity of entry grades on performance according to the studies undertaken are found in other research, such as that of Garbanzo (2007), who finds a differentiation between degrees, in this case, according to demand, concluding that the entry grade is an important predictor of academic performance in high-demand degrees, but not in those of low demand.

In any case, this relationship has been emphasised in many other studies, as seen in the meta-analysis of Richardson et al. (2012) or the work of Gallegos & Campos (2019), Cerdeira et al. (2018), Barahona (2014), Ukpong & George (2013) and Cortés & Palomar (2008), which show very similar results.

The study of Fernández-Mellizo & Constante-Amores (2020) suggests that entry grades explain more than 6% of the performance variance in universities and it is by far the variable with the greatest predictive

capacity of performance out of the 11 considered. Danilowicz-Göselea et al. (2017) supports this idea by suggesting that the entry grade is the best predictor of final grades and of the likelihood of finishing university studies. The study by Jiménez-Caballero et al. (2015) also indicates the impact of the entry grade on performance, suggesting that every point increase in the entry grade translates to around one additional point in the grades of degree studies, in this case with students in the first year of the degree in finance and accounting.

However, this study, as previously stated, has a number of limitations. The results are from one single university, the Complutense University of Madrid, and a sole cohort of students, which does not guarantee the external validity of the study. Furthermore, the explanatory power of the models is moderate, which means that other variables would have to be considered that allow the residual variance to be explained. Thus, we should be cautious and prudent in interpreting these results due to factors such as the level of difficulty of each degree, the size of the sample of each degree and the care-related degrees selected, which entail important limitations.

Therefore, replicating this study with data from other universities and more cohorts is deemed important in order to establish comparisons. In this regard, it is considered appropriate that future studies take into account other variables that the literature deems influential in academic performance. For example, Fernández-Mellizo & Constante-Amores, (2020) studied the effect of eleven variables grouped into three factors: demographic, socio-economic and academic, of which four of them (university entry grade, type of centre in secondary education, sex and autonomous community of the family) were statistically significant in the final model. Another noteworthy study is that of Richardson et al. (2012) in which five distinct but conceptually overlapping research domains were identified: personality traits, motivational factors, self-regulatory learning strategies, students' approaches to learning, and psychosocial contextual influences. Finally, another variable that would be interesting to explore, due to having shown that it is influential in academic performance, is the branch of further education (*bachillerato*) to which the prior studies of university students belong, differentiating from STEM and non-STEM studies. Studies such as Perez-Felkner et al. (2012) and Henoch et al. (2015) highlight the existence of cognitive and personal differences

among students whose studies belong to the STEM or non-STEM group and that these can affect in a different way academic performance.

In conclusion, this study, albeit with limitations, points to the idea that students on teaching degrees (particularly those linked to the stage of primary education) with a high university entry grade have many possibilities of obtaining a high success rate in the first university year. Discovering the profile of students that drop out of teaching degrees in the first year would be interesting so as to contrast hypotheses such as those on vocation, degree admissions grades and the level of degree difficulty.

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