Academic performance and competency profile in primary education: a predictive study

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Abstract
Assessment is one of the elements with the greatest presence in educational research, identified as the fundamental tool that acts as a driving force for learning, with the qualification being the qualitative expression (in this case, of competences) or quantitative expression (in this case, of academic subjects) of the evaluation or value judgement that is issued on the achievements attained by the students (assessment criteria). On this basis, the aim was to analyse the relationship between the academic subject grades and the competence profile of primary school pupils at the end of the academic year. A total of 971 schoolchildren (6-12 years old; $\bar{X}$= 8.46; SD = 2.61) participated in the research. Data were analysed using ANOVA, Pearson's correlation test and multiple linear regression technique. Among the main results, it is highlighted that: I) all academic subjects show a high degree of correlation with curriculum competencies ($p \leq .05$, for all), II) the academic subjects with the highest correlation coefficient with competencies are the core areas with respect to the specific subjects ($p \leq .05$, for all) and, III) As for the predictive models, a close relationship is generally observed between the areas and the related competencies (e.g., Mathematics with Mathematical Competence and Basic Competencies in Science and Technology, Spanish Language with Literature and Linguistic Communication or Social Sciences with Social and Civic Competencies). Adequate teaching practice in primary education with respect to the normative guidelines for the marking of competences can be drawn from this study.
Keywords: assessment; marking; competences; academic subjects; primary school.

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Rendimiento académico y perfil competencial en educación primaria: un estudio predictivo

Resumen
La evaluación es uno de los elementos con mayor presencia en la investigación educativa, identificada como la herramienta fundamental que actúa como motor del aprendizaje, siendo la calificación la expresión cualitativa (en este caso, de competencias) o cuantitativa (en este caso, de materias académicas) de la valoración o juicio de valor que se emite sobre los logros alcanzados por los escolares (criterios de evaluación). Sobre esta base, el objetivo era analizar la relación entre las calificaciones de las materias académicas y el perfil competencial del alumnado de primaria al final del curso académico. Participaron en la investigación 971 escolares (6-12 años; $\bar{X}$ = 8,46; DE = 2,61). Los datos se analizaron mediante ANOVA, test de correlación de Pearson y técnica de regresión lineal múltiple. Entre los principales resultados, se destaca que: I) todas las materias académicas muestran un alto grado de correlación con las competencias del currículo ($p \leq .05$, para todas), II) las materias académicas con mayor coeficiente de correlación con las competencias son las áreas troncales respecto a las materias específicas ($p \leq .05$, para todas) y, III) En cuanto a los modelos predictivos, se observa en general una estrecha relación entre las áreas y las competencias relacionadas (por ejemplo, Matemáticas con Competencia Matemática y Competencias Básicas en Ciencia y Tecnología, Lengua Castellana con Literatura y Comunicación Lingüística o Ciencias Sociales con Competencias Sociales y Cívicas). De este estudio se puede extraer una adecuada práctica docente en educación primaria con respecto a las directrices normativas para la calificación de las competencias.
Palabras clave: evaluación; calificación; competencias; áreas académicas; educación primaria.

Desempenho acadêmico e perfil de competências no ensino fundamental: um estudo preditivo

Resumo
A avaliação é um dos elementos de maior presença na pesquisa educacional, identificada como a ferramenta fundamental que impulsiona a aprendizagem, sendo a qualificação a expressão qualitativa (neste caso, de competências) ou quantitativa (neste caso, de disciplinas acadêmicas) da avaliação ou juízo de valor emitido sobre o desempenho dos alunos (criterios da avaliação). Com base nisso, o objetivo deste estudo foi analisar a relação entre as notas das disciplinas acadêmicas e o perfil de competências de alunos do ensino fundamental ao final do ano letivo. Participaram da pesquisa 971 escolares (6-12 anos; média = 8,46; desvio padrão = 2,61). Os dados foram analisados por meio de ANOVA, teste de correlação de Pearson e regressão linear múltipla. Entre os principais resultados, destacam-se: I) todas as disciplinas acadêmicas apresentam alto grau de correlação com as competências curriculares ($p \leq 0,05$ para todas); II) as disciplinas acadêmicas com maior coeficiente de correlação com as competências são as áreas centrais em relação às disciplinas específicas ($p \leq 0,05$ para todas); e III) quanto aos modelos preditivos, observa-se, de modo geral, uma estreita relação entre as áreas e as competências correspondentes (por exemplo, Matemática com Competência Matemática e Competências Básicas em Ciências e Tecnologia, Língua Espanhola com Literatura e Comunicação Linguística ou Ciências Sociais com Competências Sociais e Cívicas). A partir deste estudo, podem ser extraídas diretrizes adequadas para o ensino fundamental, considerando as normas para a avaliação de competências.
Palavras-chave: avaliação; qualificação; competências; áreas acadêmicas; ensino fundamental.

INTRODUCTION

The assessment of academic subjects and competences

Socrates, in the 5th century B.C., is recognised as the first author who began to use evaluative instruments in his practices, and since then evaluation has been a natural process that has been used for different purposes in human beings (Alcaraz Salarirche, 2015). This author indicates that, in the educational framework, evaluation has been modified through different conceptualisations; orienting itself from Tyler (in 1930), who established the concept of educational evaluation, to decision-making to improve teaching.

At present, both nationally and internationally (see PISA, TIMMS or PIRLS reports), assessment is one of the elements with the greatest presence in educational research, identified as the fundamental tool that acts as a driver of learning (Ortiz-Revilla; Greca; Adúriz-Bravo, 2021; Pérez-Pueyo; Hortigüela-Alcalá; Gutiérrez-García; Hernando Garijo, 2019; Carrillo-López; Hortigüela-Alcalá, 2022; Guzmán-Simón; Torres-Gordillo; Caballero, 2020). Evaluation is a systematic process of collecting information that aims to make an objectively based value judgement in relation to the educational objectives and intentions that are intended to be achieved (Hortigüela-Alcalá; Pérez-Pueyo; González-Calvo, 2019).

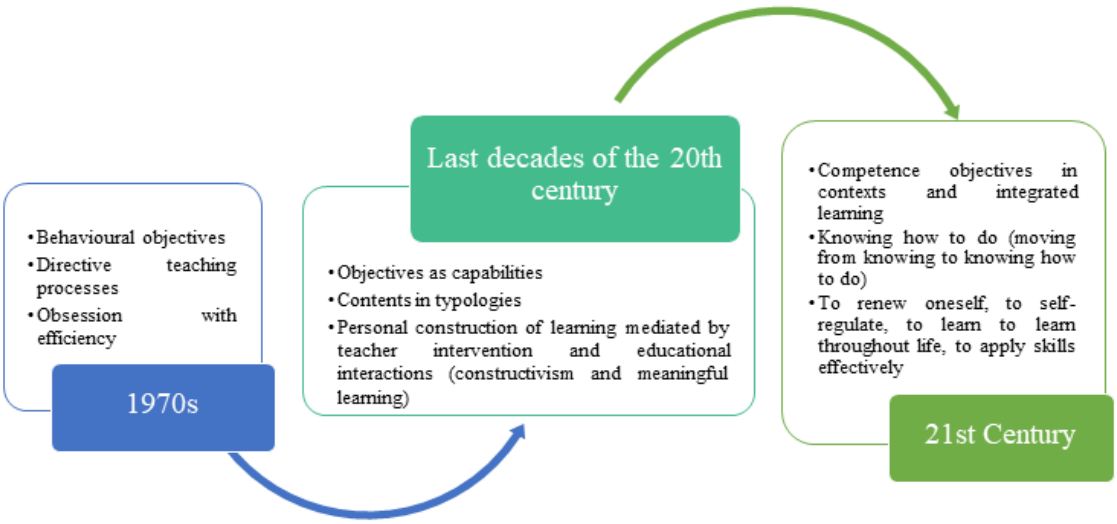
Depending on the content to be evaluated, one or another type of evaluation can be used (López-Pastor; Pérez-Pueyo, 2017). It also has the following principles: systematic, continuous, global, integrated, formative, regulated, comprehensive, meaningful, complex, flexible, feedback, intentional, cooperative, individual, personalised, scientific and tridirectional: teacher-children-school (Méndez Alonso; Méndez Giménez; Fernández-Rio, 2015; González-López; Ramírez-García; Moral López, 2013; Hortigüela-Alcalá; Abella-García; Pérez-Pueyo, 2015).

These types of assessment allow us to answer how and what to assess (to know what and how much students learn) and, most importantly, for whom we assess. When factors such as self-regulation of work, autonomy or metacognition come into play, it is essential that the assessment is transparent, clear, and that it allows the decision of all the agents that support it (Hortigüela-Alcalá; Abella-García; Pérez-Pueyo, 2014). It does not depend so much on how much instrumental content has been acquired in a given course, but on what one is able to do with it. To this end, the different assessment techniques make it possible to be aware of the degree of acquisition of what has been learned in terms of the perception of others and their own (the

students') perception, and more importantly, of the way in which they can apply it outside the classroom (López-Pastor; Sicilia-Camacho, 2017).

Since the 21st century, the use of the term authentic or competency-based assessment has been in vogue, carried out through procedures, systems, experiences or activities, in learning situations that are as similar as possible to the real life of the student (Cañadas, 2021). To this end, the evaluator generates a didactic situation in which a well-contextualised problem is presented, having previously established the medium for the students' responses and a system for collecting information, in order to assess the reasoning and accuracy of their actions. Subsequently, the person being assessed does, creates or produces the process, the result or both for a period of time, demonstrating their competences (Scriven, 2016). When it comes to teaching by competences, one concept must be clarified, and that is that according to Ferrández (1997, p. 32) "it is one thing to be capable and quite another to be competent". In other words, competence does not lie in the resources (capacities), but in the use and mobilisation of resources themselves; therefore, competences are observable in the daily reality of the activity itself (and in assessment situations). Figure 1 shows a brief summary of the evolution of the education system in terms of learning and how it is applied in relation to competences.

Figure 1 - Evolution of competences



Source: The authors (2025).

This evaluative orientation, the competency-based one, helps to innovate in teaching and learning processes insofar as it articulates theory with practice,

contextualises education, guides the organisation of content, promotes holistic training (integrates knowing how to know with knowing how to do and knowing how to be) and establishes permanent and rigorous evaluation mechanisms based on performance in context situations (Hortigüela-Alcalá; Abella-García; Pérez-Pueyo, 2016).

The development of competences is achieved through the methodology (how you carry out the tasks), in the interaction with the students. Therefore, the teacher is urged to be the creator of the learning environment, focusing teaching on the learner and not on the teacher. However, one study analysed the main reasons why teachers admit that they do not get involved in assessment systems, concluding that: a) it is easier and less traumatic for them to take sole responsibility for marking; b) it means less workload for them as marking is the main way to act; c) they feel they have greater control of the classroom as they are the ones who make all the assessment decisions (López-Lozano; Solís; Axcárate, 2018). These aspects clearly denote a logic of tradition and culture (Hortigüela-Alcalá; Abella-García; Pérez-Pueyo, 2016).

In this sense, there is still a need for further training in this new competency-based approach to teaching, learning and assessment, since among the possible recommendations that would facilitate the inclusion of competencies in the Primary Education curriculum, teacher training guided towards pedagogical models adapted to the reality of the current teacher could be highlighted (Meroño; Calderón; Arias-Estero; Méndez-Giménez, 2019). The results show that teachers have adequate knowledge of certain aspects of competence assessment, although they are less able to undertake assessment processes based on this new curricular element. This change in the model of in-service teacher training is revealed as a requirement of the new educational policies (Ramírez-García, 2016).

In this sense, the information provided by the assessment must be used to adjust the teaching intervention, and not only to evaluate the progress of the students, but also to orientate and guide the teaching and learning process as established by current legislation (LOMLOE). Bearing this aspect in mind, competence assessment will have a different character, depending on the moment at which it is carried out: I) at the beginning of the process (initial), in order to know the possibilities of each student and to adapt the programme to their needs, II) during the process (formative), to detect successes and errors. In this process, reciprocal evaluation or co-evaluation

would take place and, III) at the end of the process (summative), to check the development of skills (López-Pastor; Pérez-Pueyo, 2017).

Summative assessment is generally transformed into points or grades that are a reference for students. In this sense, the term assessment is still often confused with the term grading. This confusion, which seems to be of little consequence, leads to a series of actions in the classroom that are not entirely pedagogical (Pérez-Pueyo; Pedraz; Hortigüela-Alcalá, 2019). In this study, it is pointed out that everything that can be assessed should be assessable, but not everything that can be assessed needs to be assessable. This sentence perfectly reflects the differences between assessment and grading, the latter being understood as the delimitation of a numerical mark at the end of a process; although, as required by the educational administration, in the end it is inevitable to establish a coherent relationship between the two. As mentioned, this qualification in academic subjects and competences is legally obligatory for teachers; therefore, it must be assigned by guaranteeing coherent evaluative preconditions, hence the importance of having developed the evaluation as a leap prior to the explanation of the objective qualification.

Grading of academic subjects and competencies

The assessment criteria for each subject respond to the question "What are we going to assess and grade? In the case of Spain (2015) and, specifically, of the Autonomous Community of the Canary Islands (Canarias, 2014) it is noted that the assessment criteria play a nuclear function. They should therefore be the starting point and reference point for planning the teaching process, for designing learning situations and for their assessment and marking".

These criteria function as a basis for comparison to situate and interpret student performance with respect to their learning progress. Royal Decree 126/2014 states that the learning standards are the specifications of the assessment criteria that define the learning outcomes, and that specify what students should know, understand and know how to do in each subject; they must be observable, measurable and assessable and allow the performance or achievement attained to be graded. Under the protection of educational legislation, procedures are required that allow the assessment criteria to be visibly and objectively assessed, hence the document of the resolution of 13 May 2015 establishing the rubrics of the assessment criteria for the

second cycle of Pre-school and Primary Education in order to guide and facilitate the objective assessment of pupils in the Autonomous Community of the Canary Islands.

Article 7 of Order ECD/65/2015 (Spain, 2015) states that the level of performance in academic subjects and competences will be measured by achievement indicators. Thus, the level of performance of students in each competence will be graded from "Poor" to "Excellent". The results of the grading of academic subjects will be expressed in numerical grades from 1 to 10 without decimals and with the associated categorisation from insufficient to outstanding. Article 7.3 of the aforementioned Order ECD/65/2015 (Spain, 2015) states that the assessment of the degree of acquisition of competences must be integrated with the assessment of content, insofar as being competent involves mobilising knowledge, skills, attitudes and values to respond to the situations posed, providing learning with functionality and applying what is learned from an integrated approach.

In this sense, the final grade for each subject is obtained by adding up the grade obtained in each evaluation criterion worked on up to that term. As indicated in article 5 of Order ECD/65/2015 (Spain, 2015), all areas must contribute to the development of competences. Thus, the set of assessment criteria of the different areas that are related to the same competence will give rise to the competence profile of the area.

The study of competence assessment has a long history of research. However, in recent years, both this concept and its theoretical scaffolding have raised some relevant questions that need to be considered. How much do academic subjects contribute to the competence profile of primary school pupils at the end of the school year? It should be noted that no studies have been found in the scientific literature on primary school students that analyse the association between these variables from a quantitative point of view.

Therefore, in order to answer the research question, the aim of this study was to analyse the relationship between the grade obtained in academic subjects and performance in primary school curriculum competencies at the end of a school year. The alternative hypothesis (H_1) is that academic subject grades are positively related to competence grades, and that core subjects contribute more to competences than specific subjects.

METHOD

This research is empirical, quantitative, cross-sectional and *ex post facto* based on a non-experimental design, as there is no manipulation of the independent variable. This design has been selected as the ideal one for this research as it allows predicting the grade obtained in the competences by means of predictive models based on the performance of the academic subjects.

Participants

A total of 971 schoolchildren (first cycle (n = 290 (30%)), second cycle (n = 297 (31%)), and third cycle (n = 384 (39%)) belonging to the Autonomous Community of the Canary Islands (South of Tenerife), aged between 6 and 13 years (M ± SD: 8.46 ± 2.61 years) participated in the study on a voluntary basis. Sampling was non-probabilistic, non-random and convenience sampling (access to the sample). Two public schools were selected. Both public schools have a medium socio-economic level. In previous meetings held with the school principals and legal guardians of the schoolchildren, they were informed of the study protocol and informed consent was requested so that the schoolchildren could participate. Inclusion criteria were considered to be between 6-13 years of age and regular school attendance (90% of classes during the months of the current academic year). The following exclusion criteria were also considered: I) Failure to provide informed consent to participate in the research.

Variables

As a predictor variable, academic performance is considered, assessed by means of the grade obtained by students in the final assessment carried out in all subjects of the curriculum (first, second and third assessment) of the 2022-2023 academic year (see Figure 2). This score obtained in each area (between 1-10 points) derives from the total assessment of the learning established in the assessment criteria described in the Resolution of 13 May 2015 establishing the rubrics of the assessment criteria in Primary Education in the autonomous community of the Canary Islands, which emanate from Royal Decree 126/2014, of 28 February. These assessment criteria are the fundamental reference for the assessment and marking of pupils. It is prescriptive to highlight that we chose to assess academic performance through the average score of academic subjects instead of standardised tests, as the scientific

literature reflects that these are more valid and reliable results as they avoid external factors such as fatigue, sensitisation, contrast or learning adaptation during the performance of standardised tests (Sanz Ponce; Serrano Sarmiento; González Bertolín, 2020).

The dependent or response variable is the competences described in the current curriculum regulations (*Linguistic Communication* (LC), *Mathematical Competence and Basic Competences in Science and Technology* (MCCST), *Digital Competence* (DC), *Initiative and Entrepreneurship* (IE), *Learning to Learn* (LL), *Social and Civic Competences* (SCS) and *Cultural Awareness and Expressions* (CAE)) (See Figure 2). The evaluation criteria for each subject explained above serve as a reference to assess the progressive degree of acquisition of each competence. The score ranges from 1 (not very adequate) to 4 (excellent) points. This score is assigned by the tutor of each group once it has been agreed with the educational team of that group (Spain, 2015).

Procedure

This study was carried out during the academic year 2022/2023. School heads and representatives of parents' associations were informed of the purpose and protocol of the research at a meeting in September. The working team consisted of a principal investigator and two collaborating doctoral researchers (teachers specialising in Primary Education). The team of doctoral researchers extracted the data from the *Pincel Ekade* app.

This research was carried out in accordance with the ethical standards recognised by the Declaration of Helsinki (2013 revision), following the recommendations of Good Clinical Practice of the EEC (document 111/3976/88 of July 1990) and the current Spanish legal regulations governing clinical research on humans (Royal Decree 561/1993 on clinical trials).

Statistical analysis

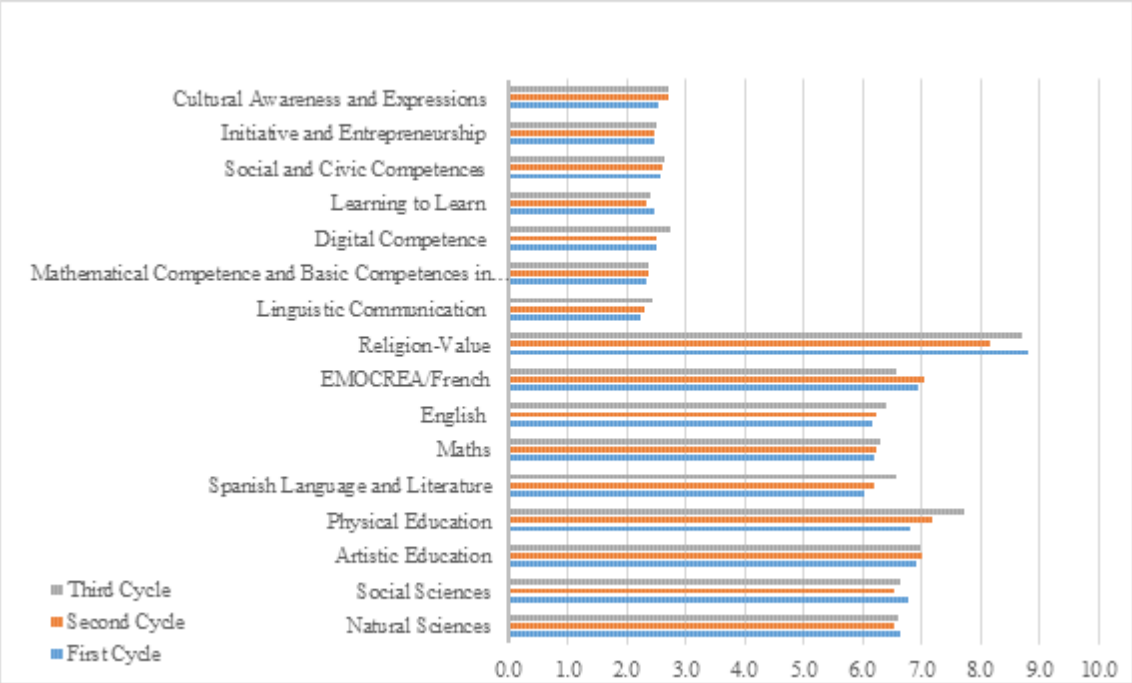
Prior to conducting this research, the sample size was calculated in order to ensure robust results (Quispe; Pinto; Huamán; Bueno; Valle-Campos, 2020). After jointly estimating the υ (in reference to the number of variables) and f^2 (effect size in linear regression models) statistics, it was obtained that the minimum sample had to be a total of 669 subjects in order to carry out the linear regression technique, something

that is fulfilled since we have a total sample of 971 students. Since we observed a normal distribution of the values recorded (Kolmogorov Smirnov and Levene statistics), we opted for a parametric analysis. First, a differential analysis was carried out. The ANOVA test was used to test for significant differences between groups (*first v. second v. third cycle*). The initial analysis indicated no significant differences between the groups (see Figure 2); consequently, all analyses were carried out jointly according to the subjects in each cycle (1-2th Cycle: EMOCREA; 3rd Cycle: French). This aspect implies obtaining greater statistical power. Next, a bivariate correlation analysis (Pearson's correlation coefficient, since it follows a normal distribution) was carried out between the competences and the academic subjects. Subsequently, in order to calculate the predictive value of the subjects as a whole on the competences, the multiple linear regression technique was carried out using the step-by-step method for each of the competences. Thus, a total of seven predictive models were estimated, one for each competence in the curriculum. Before interpreting the coefficients, goodness of fit and model assumptions were assessed. In all models the F-test was significant, thus confirming the relevance of the multiple linear regression technique. In addition, the adjusted R^2 and the effect size of the model using the f^2 statistic have been used to assess the goodness of fit. An effect size is considered small at a value between 0.02 and 0.15, medium between 0.15 and 0.35 and large at values above 0.35 (Cohen, 1988; Raschka; Mirjalili, 2019). SPSS (version 23), Excel (Version 13) and R, version 4.1.2 (pwr package) (Champely, 2018) were used for data analysis and representation, with the significance level set at 5% ($p \leq .05$).

RESULTS

Figure 2 shows the mean score achieved in competences and academic subjects considering the educational cycle. No significant differences are observed in either the competences or the academic subjects ($p \geq .05$), however, the Bonferroni post hoc test shows a tendency towards significance in the subjects of Physical Education ($p = .052$) and Religion/Values ($p = .059$).

Figure 2 - Differential analysis in the average score achieved in competences and academic subjects considering the educational cycle



Note: (*) $p < .05$. EMOCREA (first and second cycle); French (third cycle).
Source: The authors (2025).

Table 1 shows the different bivariate correlations observed by score between competences and academic subjects. It should be noted that all the competences are significantly related to all the academic subjects. In general, it can be observed that the academic subjects with the highest correlation coefficient with the competences are the core subjects (*Mathematics, Spanish Language and Literature, Natural Sciences, Social Sciences and English*) with respect to the specific subjects (*Physical Education, Art Education, Religion/Values, French and EMOCREA*).

Table 1 - Bivariate correlations between competences and academic subjects

		Natural Sciences	Social Sciences	Artistic Education	Physical Education	Spanish Language.	Math	English	Religion/ Value	French	EMOCREA
LC	1-2nd Cycle	,798**	,780**	,613**	,486**	,916**	,852**	,770**	,491**	-	,649**
	3rd Cycle	,764**	,710**	,644**	,476**	,875**	,726**	,746**	,484**	,694**	-

Continua

Conclusão

MCCST	1-2nd Cycle	,764**	,734**	,540**	,448**	,847**	,918**	,743**	,452**	-	,614**
	3rd Cycle	,696**	,679**	,581**	,436**	,784**	,906**	,618**	,421**	,621**	-
DC	1-2nd Cycle	,635**	,625**	,490**	,409**	,626**	,610**	,511**	,444**	-	,566**
	3rd Cycle	,605**	,571**	,619**	,457**	,675**	,606**	,588**	,464**	,557**	-
LL	1-2nd Cycle	,792**	,757**	,549**	,479**	,825**	,805**	,698**	,484**	-	,660**
	3rd Cycle	,715**	,706**	,672**	,470**	,787**	,744**	,694**	,479**	,688**	-
SCS	1-2nd Cycle	,676**	,714**	,583**	,486**	,652**	,620**	,560**	,485**	-	,711**
	3rd Cycle	,649**	,740**	,639**	,465**	,644**	,555**	,566**	,487**	,583**	-
IE	1-2nd Cycle	,771**	,748**	,554**	,509**	,768**	,741**	,658**	,554**	-	,693**
	3rd Cycle	,631**	,680**	,654**	,470**	,713**	,659**	,587**	,441**	,587**	-
CAE	1-2nd Cycle	,682**	,681**	,677**	,511**	,655**	,592**	,578**	,534**	-	,664**
	3rd Cycle	,630**	,627**	,761**	,490**	,657**	,575**	,599**	,494**	,629**	-

Note: (*) $p < .05$. (**) $p < .001$.
Source: The authors (2025).

Table 2 shows the final predictive model for *Language Communication* competence. Of the nine variables introduced in the model, four are statistically significant (*Spanish Language and Literature and English* for the whole primary stage). It is worth noting, above the rest of the subjects, that for each point that the grade obtained in *Spanish Language and Literature* increases, the *Linguistic Communication* competence will increase by 0.372 (1-2th Cycle) and 0.333 (3rd Cycle). In terms of goodness of fit, this model explains approximately 85% and 80%, respectively, of the variance of performance in Linguistic Communication, which refers to a large effect size (Cohen, 1988).

Table 2 - Linear regression statistics (Linguistic Communication)

	1-2nd Cycle	**3rd Cycle**
	B (SE)	B (SE)
Intercept	0.495 (0.100)**	0.517 (0.140)**
Spanish Language and Literature	0.372 (0.023)**	0.333 (0.026)**
Mathematics	0.042 (0.020)*	NS

Continua

Conclusão

English	**0.061 (0.015)****	**0.101 (0.017)****
French	NS	0.053 (0.018)*
Adjusted R-squared	0.847	0.799
f^2	0.355	0.325
RMSE	1.728	1.694
Statistical power	93%	90%

Note: (*) $p < .05$. (**) $p < .001$. Not significant = NS
Source: The authors (2025).

Table 3 shows the predictive model for *Mathematics and Basic Competences in Science and Technology*. In relation to the coefficients, it is worth noting that for each point increase in Mathematics, performance in this competence increases by around 0.4 points. However, for each point increase in Social Sciences, performance decreases by 0.047 points. In terms of goodness of fit, this model explains approximately 85% of the variance in *Mathematics* performance, which refers to a large effect size. As for the RMSE, its value is low, which indicates a low prediction error, with a statistical power of 92%.

Table 3 - Linear Regression Statistics (Mathematical Competence and Basic Competences in Science and Technology)

	1-2nd Cycle	**3rd Cycle**
	B (SE)	B (SE)
Intercept	0.355 (0.100)**	0.415 (0.136)**
Social Studies	-0.047 (0.023)*	NS
Spanish Language and Literature	NS	0.057 (0.025)*
Mathematics	0.413 (0.020)**	0.394 (0.019)**
English	0.056 (0.015)**	NS
Adjusted R-squared	0.848	0.823
f^2	0.372	0.368
RMSE	1.650	1.550
Statistical power	92%	92%

Note: (*) $p < .05$. (**) $p < .001$. Not significant = NS
Source: The authors (2025).

The final model of performance in *Digital Competence* consists of a single significant variable in Cycle 1-2 (*Natural Sciences*) and two variables for Cycle 3 (*Art Education and Spanish Language and Literature*) (see Table 4). Specifically, it is worth highlighting the value of the coefficient for the 3rd Cycle, where it is indicated that for each point that the score in *Art Education* or *Spanish Language and Literature*

increases, this type of competence will increase by 0.12 points. In terms of goodness of fit, this model explains approximately 75% of the variance of the criterion variable, the effect size being medium. The prediction error is low (≤ 1.532) and the statistical power is considered acceptable.

Table 4 - Linear Regression Statistics (Digital Competence)

	1-2nd Cycle	**3rd Cycle**
	B (SE)	B (SE)
Intercept	0.743 (0.129)**	0.340 (0.173)*
Natural Sciences	0.077 (0.28)*	NS
Art Education	NS	0.124 (0.029)**
Spanish Language and Literature	NS	0.128 (0.032)**
Adjusted R-squared	0.434	0.507
f^2	0.201	0.268
RMSE	1.212	1.532
Statistical power	71%	78%

Note: (*) $p < .05$. (**) $p < .001$. Not significant = NS
Source: The authors (2025).

The final model of performance in the *Learning to Learn* competence is made up of a total of four significant variables in the 1st Cycle (*Natural Sciences, Spanish Language and Literature, Mathematics and English*) and four significant variables in the 3rd Cycle (*Spanish Language and Literature, Mathematics, English and French*) (see Table 5). In relation to the coefficients, it is worth noting that for each point that the student's score in *Spanish Language and Literature* increases, performance increases by 0.14 points. In terms of goodness of fit, this model explains approximately 70% of the variance of the criterion variable, and the effect size is high. Finally, the RMSE is low (≤ 1.841) and the statistical power of the analysis is high (≥ 82%).

Table 5 - Linear regression statistics (Learning to Learn)

	1-2nd Cycle	**3rd Cycle**
	B (SE)	B (SE)
Intercept	0.209 (0.126)*	0.733 (0.175)**
Natural Sciences	0.110 (0.028)**	NS
Spanish Language and Literature	0.144 (0.029)**	0.147 (0.032)**
Mathematics	0.101 (0.025)**	0.091 (0.025)**
English	0.043 (0.019)*	0.071 (0.022)*

Continua

Conclusão

French	**NS**	**0.063 (0.022)***
Adjusted R-squared	0.713	0.694
f^2	0.345	0.327
RMSE	1.841	1.602
Statistical power	85%	82%

Note: (*) $p < .05$. (**) $p < .001$. Not significant = NS
Source: The authors (2025).

Table 6 shows the final predictive model for the competence *Social and Civic Competences*. Of the nine variables entered in the model, one is statistically significant for the entire primary school stage (social studies). It is worth noting that for each point increase in Social Studies, the *Social and Civic Competences* competence will increase by 0.137 (1-2th Cycle) and 0.245 (3rd Cycle). Likewise, the predictive power of the subject *EMOCREA* stands out for the 1-2nd Cycle, where for each point that the grade obtained in this subject increases, the competence *Social and Civic Competences* will increase by 0.216 points. In terms of goodness of fit, this model explains approximately 56% and 58%, respectively, of the variance of performance in social and civic competences, which refers to a large effect size (Cohen, 1988).

Table 6 - Linear regression statistics (Social and civic competences)

	1-2nd Cycle	**3rd Cycle**
	B (SE)	B (SE)
Intercept	0.381 (0.147)*	0.246 (0.180)*
Social Science	0.137 (0.033)**	0.245 (0.029)**
EMOCREA	0.216 (0.032)**	NS
Arts Education	NS	0.126 (0.030)**
Mathematics	NS	0.061 (0.026)*
Adjusted R-squared	0.564	0.587
f^2	0.229	0.284
RMSE	1.500	1.602
Statistical power	81%	84%

Note: (*) $p < .05$. (**) $p < .001$. Not significant = NS
Source: The authors (2025).

Table 7 shows the predictive model for the *Sense of Initiative and Entrepreneurship Competence*. Of the nine variables introduced in the model, four are statistically significant in Cycle 1-2 (*Natural Sciences, EMOCREA, Spanish Language and Literature and English*) and three in Cycle 3 (*Social Sciences, Art Education and Spanish Language and Literature*). In terms of goodness of fit, this

model explains approximately 60% of the variance of the *Sense of Initiative and Entrepreneurship Competence*, which refers to a large effect size. As for the RMSE, its value is low, which indicates a low prediction error, and its statistical power is high.

Table 7 - Linear Regression Statistics (Sense of Initiative and Entrepreneurship)

	1-2nd Cycle	**3rd Cycle**
	B (SE)	B (SE)
Intercept	0.160 (0.126)*	0.513 (0.189)*
Natural Sciences	0.108 (0.028)**	NS
Social Science	NS	0.102 (0.030)**
EMOCREA	0.115 (0.027)**	NS
Art Education	NS	0.146 (0.032)**
Spanish Language and Literature	0.084 (0.029)**	0.140 (0.035)**
English	0.043 (0.019)**	NS
Adjusted R-squared	0.652	0.578
f^2	0.284	0.212
RMSE	1.721	1.564
Statistical power	83%	81%

Note: (*) $p < .05$. (**) $p < .001$. Not significant = NS
Source: The authors (2025).

The final model of performance in *Cultural Awareness and Expressions* is made up of four significant variables in Cycle 1-2 (*Natural Sciences, EMOCREA, Physical Education and Spanish Language and Literature*) and two variables for Cycle 3 (*Physical Education and Spanish Language and Literature*) (see Table 8). It should be noted above the rest of the subjects that, for each point that the grade obtained in *Physical Education* increases, the competence *Cultural Awareness and Expressions* will increase by 0.172 (1st and 2nd Cycle) and 0.279 (3rd Cycle). In terms of goodness of fit, this model explains approximately 60% of the variance of the criterion variable, the effect size being medium. The prediction error is low (≤ 1.714) and the statistical power is considered acceptable.

Table 8 - Linear Regression Statistics (Cultural Awareness and Expressions)

	1-2nd Cycle	**3rd Cycle**
	B (SE)	B (SE)
Intercept	0.075 (0.123)*	0.372 (0.162)*
Natural Sciences	0.097 (0.027)**	NS
EMOCREA	0.070 (0.027)*	NS

Continua

Conclusão

Physical Education	**0.172 (0.023)****	**0.279 (0.027)****
Spanish Language and Literature	0.063 (0.028)*	0.066 (0.030)*
Adjusted R-squared	0.573	0.620
f^2	0.244	0.288
RMSE	1.582	1.714
Statistical power	89%	87%

Note: (*) $p < .05$. (**) $p < .001$. Not significant = NS
Source: The authors (2025).

DISCUSSION

The aim of this study was to analyse the relationship between the grades obtained in academic subjects and performance in primary school curriculum competencies at the end of a school year. The main findings obtained show that, I) all academic subjects show a high degree of correlation with the competences of the curriculum and; II) the academic subjects with the highest correlation coefficient with the competences are the core subjects (*Mathematics, Spanish Language and Literature, Natural Sciences, Social Sciences and English*) with respect to the specific subjects (*Physical Education, Artistic Education, Religion/Values, French and EMOCREA*).

Given that no studies have been found in the scientific literature on Primary School students that analyse the association between these variables from a quantitative perspective, this prevents us from making direct comparisons. In this sense, the studies that analyse the relationship between subject grading practices and competences are very scarce in primary school students, hence the original focus of our study.

In turn, these results take on greater importance as they show that primary school teachers carry out the marking process in line with the provisions of the current regulations; article 5 of Order ECD/65/2015, which states that all areas and subjects must contribute to the development of competences. In this way, the set of assessment criteria of the different areas that are related to the same competence give rise to the competence profile of the area, thus observing how it contributes to the joint achievement of the competences. Likewise, there is a greater relationship between competences and core subjects. This may be due to the greater teaching load of these core subjects with respect to the specific subjects. In this sense, it is logical

to obtain that those subjects with a greater teaching load contribute to a greater extent to the mark obtained in the competences.

However, these results found may be due to a fictitious, random and particular relationship, according to a book chapter developed by Pérez-Pueyo, Casado Berrocal and Hortigüela-Alcalá (2019). It indicates that the standards and the development of competency profiles have accentuated the understanding of the contribution to competences in a fully inductive manner from each area, making the transversely that should favour competences, not only anecdotal, but impossible, artificial and perverse. The worst thing, the study points out, is that it plays with the goodwill of teachers by making them believe that the enormous work involved in assessing them is of any use whatsoever. The most striking thing, the study points out, is that when teachers are asked, the vast majority know that it is useless, as the relationship between the areas established in the profiles is non-existent..., although paper can take anything. Similarly, it is pointed out that teachers still do not evaluate by competences, even though a value is given to the standard in Excel so that with the relationship established with the competences (competence profiles) a value between 1 and 4 is given to the competence.

In turn, a study showed that primary school teachers require training in line with the new tasks required of them, as expressed by the fact that they do not feel fully prepared to undertake, for example, a process of operationalising competences (Ramírez García, 2015). In turn, in this sense, it is pointed out that teachers support in-school training, as opposed to the traditional courses given in teacher training centres. They also state that it is necessary to generate new training models, in which training is conceived not only as a right, but also as a duty of the teacher. In this sense, there is still a need for further training in view of this new competency-based approach to teaching, learning and assessment, since among the possible recommendations that would facilitate the inclusion of competencies in the Primary Education curriculum, teacher training guided towards pedagogical models adapted to the reality of today's teachers could be highlighted (Meroño; Calderón; Arias-Estero; Méndez-Giménez, 2019; Ortiz-Revilla; Greca; Adúriz-Bravo, 2021).

In turn, these results disagree with the findings of the study by Méndez Alonso, Méndez Giménez and Fernández-Rio (2015), where they show that teachers with a specialist profile claim to work with greater reference to competences than tutors. Those competences linked to instrumental areas have been shown to be more

relevant than those of a more cross-cutting nature. However, specialist teachers considered transversal competences to be more important than tutors, who placed greater emphasis on instrumental competences. The problem is that this work is often carried out without the support of adequate training, which makes it a difficult task to carry out successfully. This study points out that it is contradictory that a high percentage of teachers report that they are working on competences, yet they perceive that less than half of their colleagues have changed their methodology and daily work. This suggests that there is a long and costly road ahead to achieve the full development of competence work in schools.

With regard to the predictive models found in this study, it is observed that, at a general level, I) *Linguistic Communication* competence is mainly explained by the area of *Spanish Language and Literature*; II) the subject with the greatest predictive power in *Mathematical Competence and Basic Competences in Science and Technology* is *Mathematics*; III) *Digital Competence* is made up of a single subject in the 1st Cycle (*Natural Sciences*) and two subjects for the 3rd Cycle (*Art Education and Spanish Language and Literature*); IV) the Learning to Learn competence is explained in the 1-2. Cycle by four subjects (*Natural Sciences, Spanish Language and Literature, Mathematics and English*) and another four in the 3rd Cycle (*Spanish Language and Literature, Mathematics, English and French*); V) *Social and Civic Competences* is mainly explained by the subject of *Social Sciences*; VI) the *Sense of Initiative and Entrepreneurship Competence* is predicted by four subjects in the 1-2. VI) the *Sense of Initiative and Entrepreneurship Competence* is predicted by four subjects in the 1-2 Cycle (*Natural Sciences, EMOCREA, Spanish Language and Literature and English*) and three for the 3rd Cycle (*Social Sciences, Art Education and Spanish Language and Literature*) and, finally, the *Sense of Initiative and Entrepreneurship Competence* is predicted by four subjects in the 3rd Cycle (*Social Sciences, Art Education and Spanish Language and Literature*) and, finally, VII) *Cultural Awareness and Expressions* competence is predicted by four subjects in Cycle 1-2 (*Nature Sciences, EMOCREA, Physical Education and Spanish Language and Literature*) and two subjects for Cycle 3 (*Physical Education and Spanish Language and Literature*).

These results may be due to the greater load of specific content in these subjects with respect to the competences. For example, it is logical to obtain that those subjects that have a higher content load related to a competence contribute to a greater extent to the mark obtained in this competence. For example, the

development of mathematical thinking contributes to a greater extent to mathematical competence and basic competences in science and technology because it makes possible a better understanding and a more accurate description of the environment (Canarias, 2014). In turn, it is logical to think that the area of *Spanish Language and Literature* or Foreign Language contribute directly to the acquisition of competence in Linguistic Communication due to the use of language as an instrument that allows the development of social tasks and implies that students must handle oral and written skills in their double aspect of comprehension and production (expression and interaction). In this way, a series of linguistic and sociolinguistic skills and knowledge necessary for real and effective communication are stimulated and deployed.

These results are partially in line with the study provided by Méndez Alonso, Méndez Giménez and Fernández-Rio (2015), which indicates that teachers in lower cycles are those who have implemented the work on competences the most, as in the first cycles it is observed that a greater number of subjects predict the mark for a competence. It is worth highlighting the fact that in general, older teachers tend to teach in higher cycles. In conclusion, they point out that almost all teachers are complying with the administrative task of integrating competences into their programming; however, the percentage of teachers who are actually working under this paradigm drops considerably. Aspects in line with a study with *Physical Education* teachers, where the results show how this research method was positively valued and led to changes in the performance and training of teachers to teach by competences (Zapatero Ayuso; González Rivera; Campos Izquierdo, 2017).

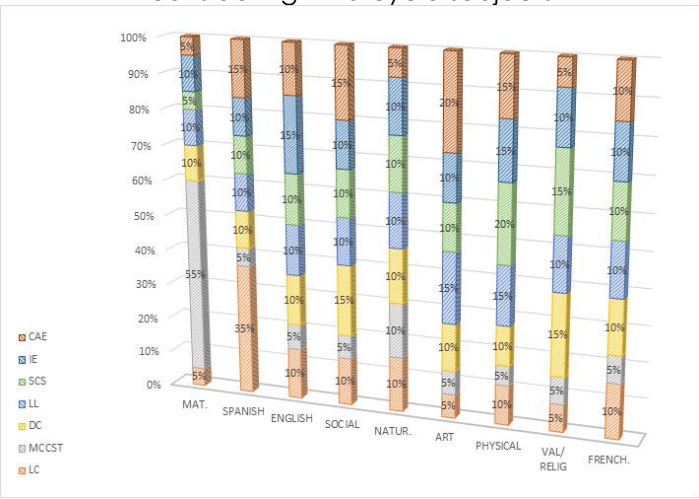
In this sense, there is a need to establish guidelines, designs, implementations and instrumental developments to determine the impact of competency-based learning as a way of evidencing the appropriation of complex comprehensive knowledge (Franco-Mariscal; Blanco-López; España-Ramos, 2016; Joya-Rodríguez, 2020; Moreno-Olivos, 2021). At the same time, the challenge of competency-based assessment practice must be taken up by incorporating the main actors in the teaching and learning process in order to carry out a more participatory and democratic assessment (Ríos-Muñoz; Herrera-Araya, 2017).

The assessment of competences is necessary, above all as an instrument at the service of the improvement of educational processes, however, teachers are unaware of the multiplicity of tools available to carry out this work, reducing their work

to the use of traditional instruments, although attention is being paid to qualitative assessment processes (González-López; Ramírez-García; Moral López, 2013; Hortigüela-Alcalá; Abella-García; Pérez-Pueyo, 2014), opening up the need to rethink the curricular contents and methods applied to assess competence in primary school (Guzmán-Simón; Torres-Gordillo; Caballero, 2020).

Based on these precedents, the present study aims to provide an overview of how much each subject should contribute to the competence qualification. The percentage shown in Figure 3 is drawn from the analysis of the focus of the contents of each subject. In this sense, an indicative percentage is established in which each area contributes to the achievement of each competence according to the contents related to each competence. Therefore, the mark obtained by students in each competence is a consequence of the percentage in which each subject contributes to each competence. This percentage must be previously agreed upon by the teaching staff. Thus, the proposed distribution by subject and competence for the third cycle is as follows:

Figure 3 - Example of how to contribute to the qualification of students' competences considering third cycle subjects



Source: The authors (2025).

CONCLUSION

On the basis of the results obtained, it is concluded that: I) all academic subjects show a high degree of correlation with the competences of the curriculum, II) the academic subjects with the highest correlation coefficient with the competences are the core areas with respect to the specific subjects, III) With regard

to the predictive models, a close relationship is generally observed between the areas and related competences (e.g. *Mathematics* with *Mathematical Competence and Basic Competences in Science and Technology, Spanish Language with Literature* and *Linguistic Communication or Social Sciences with Social and Civic Competences*). From this study, an adequate teaching praxis in primary education with regard to the normative guidelines for the qualification of competences can be extracted.

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