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Influence of performance in Spanish language and literature on physical education and music grades

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The aim of this research was to analyze the influence of performance in the subject of Spanish language and literature on the grades in the subjects of Physical Education and Music and whether there were differences by sex or not. The participating sample was made up by a total of 451 students (235 boys and 216 girls), aged between 10 and 13 years old, in the fifth and sixth grades of Primary Education. The results show, on the one hand, a positive correlation between the grades of the three subjects and, on the other hand, in terms of gender, significant differences only in the subject of Music whose grades are higher in girls compared to boys. Nevertheless, these statements should be considered taking into account that academic performance was measured only with one instrument and that the sample, besides being limited in size, was assessed with a non-probabilistic method. Based on these results, it is suggested that future studies could encompass different research methodologies and include, in turn, new variables as well as other collectives which are also concerned with this regard.

KEYWORDS

academic performance, qualification, reading skills, writing skills, student achievements

Introduction

Academic performance in the school context is a research topic of growing interest for groups such as: teachers, families, pedagogues, psychologists, sociologists (Bacon and Lord, 2021; Duric et al., 2021; Estrada et al., 2021; Chen et al., 2022). In this sense, examples of educational policies that invest in ensuring academic performance can be found in the PISA program (Programme for International Students Assessment) or in TIMSS (Trends in International Mathematics and Science Study), which periodically analyze the results obtained in educational centers at an international level. In this regard, Graus (2021) recently noted a downward trend in terms of academic performance.

According to [Cupani and Lorenzo \(2010\)](#), academic performance is a theoretical construct about which it is difficult to reach a universally accepted definition. Among the different definitions that have been made about academic performance, those of [Álvarez and Albuérne \(2001\)](#), [Alcalde \(2009\)](#), and [Campaña Preciado \(2019\)](#) could be highlighted. While in the first, authors understand academic performance as the set of educational actions that the educational system develop to value one student achievements, the second ([Alcalde, 2009](#)) defines it as the process to achieve the planned objectives and that can be registered through the execution of evaluation activities. More recently, [Campaña Preciado \(2019\)](#) defined it as the aptitudes that child show according to what they have learned in the different curricular areas, which will help them develop those required abilities and skills to overcome their personal challenges.

In more detail, there are many recent examples of previous research which have analyzed academic performance. However, [López Guillamón and Clares-Clares \(2019\)](#) remark that this research trend focuses on subjects such as Spanish language or Mathematics and, subsequently, studies about Physical Education or Music are still scarce. In this research, the focus is set in the combination of Spanish language, Music and Physical Education. Other examples of research in these disciplines are: in Mathematics and Spanish language ([Santillán and Vargas, 2022](#)), Physical Education ([García-Hermoso et al., 2021](#)) and Music ([Barrientos et al., 2019](#)). As the most notable skills linked to performance in the Language and Literature subject, [Chóez \(2022\)](#) pointed out reading and writing habits, as for Music, [León et al. \(2015\)](#) found that a greater development of critical thinking skills and intrinsic motivation contributes to higher grades in Music subject. As far as Physical Education is concerned, [Prada \(2022\)](#) demonstrated the positive influence of the practice of physical-sports activity on its grades. Other research pointed out how important motivation, satisfaction of psychological needs, responsibility and school social climate are so as to avoid studies' drop out, which is linked to low grades ([Manzano-Sánchez et al., 2021](#)).

The student's gender is also a variable that has been previously linked by other research with academic performance ([Meinck and Brese, 2019](#)). However, it should be noted that contradictory results have been found in this regard that do not allow rigorous conclusions to be drawn. For example, while [Hyde \(2014\)](#) suggests that the differences are not based on sex but on the cultural gender influence, [Echavari et al. \(2007\)](#) did find higher innate verbal skills in girls and higher mathematical skills in boys. In this sense, research that has given a more holistic treatment to academic performance, analyzing these three disciplines at the same time, is still scarce and, even less frequent, if the aim is

to know the influence of performance on one over the other.

Thus, the objective of this preliminary study was, on the one hand, to test whether there is a correlation between the grades obtained in the subject of Spanish Language and Literature and those of Physical Education and Music in Primary Education and, on the other, to analyze the possible differences according to the gender.

Materials and methods

Participants

A total of 545 students participated in this research although, after eliminating the cases of those who did not provide the grades of the three subjects, the resulting sample was 451 subjects (235 boys and 216 girls) aged between 10 and 13 years (11.49 ± 0.59) from the fifth and sixth grades of Primary Education in eight educational centers in the Region of Murcia, in Spain. Access to the sample was carried out through non-probabilistic incidental sampling ([Latorre et al., 2003](#), p. 82) "which is based on the selection of subjects to whom the researcher has access." Participation was voluntary, with no link to the grade in any subject, and anonymity was ensured at all times in the statistical treatment of the information collected.

Instruments

This is a cross-sectional, descriptive and *ex post-facto* type of research ([Thomas et al., 2022](#)) with the following study variables: gender, grades in the subjects of Spanish Language and Literature, Music and Physical Education.

Procedures

To carry out this study, firstly, its design was assessed by Ethical Committee of the University of Murcia, which approved it. Secondly, the participation of the educational centers was requested through a letter addressed to the directors. It informed the purpose of the investigation. Once consent was obtained, those tutors who voluntarily wanted to participate sent the requested information. Participants did not receive any reward.

Data analysis

For the statistical treatment of the data, the SPSS 24.0 program was used. So as to analyze the normality of the

TABLE 1 Grades in the three subjects for the whole sample and according to gender.

		Spanish language and literature grades		<i>p</i>	Music grades		<i>p</i>	Physical education grades		<i>p</i>
Sex	Boys	7.05 ± 1.97		0.231	8.59 ± 0.84	0.021	7.16 ± 1.56	0.445		
	Girls	6.75 ± 2.21			8.74 ± 1.01		7.25 ± 1.63			
Total		6.90 ± 2.09			8.66 ± 0.93		7.20 ± 1.59			

TABLE 2 Correlations between the grades of the three subjects.

Subject	Music	Physical education
Spanish language and literature	0.611**	0.762**
Music	–	0.639**

**Correlation is significant at $p \leq 0.01$.

data distribution, the test used was Kolmogorov Smirnov which reported a non-parametric distribution. To calculate the differences by gender, the Mann Whitney *U* test was used, while the Spearman rank test was applied for the correlation between the grades of the different subjects.

Results

Next, **Table 1** shows the descriptive statistics of the grades in the three subjects, for the total sample and distinguishing by gender, as well as the statistical significance of the differences.

In general, it is observed that the highest grade corresponds to the subject of music while, in terms of gender, statistically significant differences are only found in this same subject, with higher values among women compared to men.

On the other hand, in order to analyze the correlations between the qualifications, the results collected in **Table 2** are shown:

As can be seen from the table above, there is a positive correlation between the grades of the three subjects, in such a way that a higher grade in any one is associated with higher grades in the other two. In the opposite direction, the lowest grades are also associated between the different subjects.

Discussion

In this research, the influence of performance in the subject of Spanish language and literature on the grades in the subjects of Physical Education and Music has been studied and it has been analyzed if there are differences by sex.

The results obtained in this study provide evidence to affirm, in the first place, that the grades in the subject of Music are higher than those of Spanish Language and Physical Education, in line with those reported by [Oliver \(2015\)](#) and [Benítez Roca and Gómez-Mármol \(2019\)](#). It should be noted

in this regard that various studies have already shown the positive influence of music and the cognitive skills on the academic performance of schoolchildren. [Chong \(2006\)](#) has pointed out that structured musical activities can facilitate basic academic skills and motivate participation in tasks in low-achieving students, while [Jaschke et al. \(2018\)](#) have shown a long-term positive influence of music education in cognitive abilities such as inhibition and planning. These authors have also pointed out that the research on the effects of music interventions on cognitive abilities, while promising, still needs more randomized longitudinal studies to support a positive claim, especially as the results of some studies imply opposite conclusions. [Sala and Gobet \(2020\)](#), for example, concluded that researchers' optimism about the benefits of music training is unwarranted and possibly stems from a misinterpretation of empirical data. In addition, the idea of the positive influence of creativity (which is inherent to music according to [Serrano, 2009](#)) in the teaching-learning process, as well as its subsequent impact on the academic performance of students, seems to have already been confirmed ([Alonso et al., 2015](#); [Bernabeu and De la Peña, 2021](#); [López-Martínez and Lorca, 2021](#); [Manetti et al., 2022](#)). On the other hand, [Martín López and León del Barco \(2009\)](#) showed that there are positive correlations between the music grade and the understanding of emotional states, on the one hand, and, on the other, that students with low musical performance, that is, those who failed in music, also obtained the lowest scores in the expression, understanding and regulation of their emotions. Other investigations have also confirmed a positive trend or ergogenic effect of music on physical performance, both in aerobic and anaerobic activities ([Gallardo-Ríos and Conesa, 2016](#)). Moreover, it also seems to be evident that there is a positive relationship between academic performance and physical activity ([Prada, 2022](#)).

Secondly, the data analyzed in this research show that girls have higher grades in Music than boys, although, on the contrary, neither in Spanish Language nor in Physical Education are there statistically significant differences according to gender. This idea seems to be in tune with the data obtained in other studies. [Cárcamo et al. \(2020\)](#) have shown that girls perform better in language than boys, and that this higher performance is modulated by self-concept, performance expectations and age. However, other research supports the hypothesis of gender similarities and that the differences can be

explained socially and culturally and based on historical roles (Hyde, 2014).

Thirdly, a positive correlation has been found between the grades of the three subjects studied. In this regard, other research has found that good results in the area of music are relatively related to good results in the school environment in general, and vice versa (Serrano, 2005) with the exception of Physical and Plastic Education. However, it is necessary to reflect on the influence of receiving extracurricular classes, since it may happen that their taste for music is combined with socio-family and economic circumstances that are more favorable than the average, with a concern for their parents to participate in other complementary training activities.

With regard to limitations, a few must be considered for this study results' interpretation. First, possible external validity restrictions inherent to non-probability sampling and cross-sectional design. In this regard, the extrapolation of the data to the study population in general is compromised by the size of the sample and by sticking to a single sociocultural setting. Second, the use of a single indicator to measure a variable such as academic grades that, moreover, do not show all the knowledge included in the educational curriculum. In addition, the exclusive positioning in the positivist paradigm, excluding causal explanations that could emerge from studies that included qualitative methodologies such as interviews and discussion groups in which not only students but also their families, teachers and school-management teams were involved. Besides, the data collection included the results of the first trimester while the marks at the end of the grade could have been considered more representative of the academic performance of the whole academic year.

Finally, from the results achieved, it can be concluded that there is a positive correlation between performance in the subject of Spanish Language and Literature and grades in Physical Education and Music. Although, to the best of our knowledge, this study is a pioneer in the joint analysis of these three subjects, other studies confirm the two-to-two correlations between their grades. In addition, with regard to gender, a higher academic performance in the subject of Music by girls has been reported, with no differences in Spanish Language and Literature or Physical Education. In this sense, the literature does not allow a globally accepted position to be reached, as contradictory results have been concluded in this regard.

In this way, based on the above-mentioned, the possibility of carrying out new works that complement this scope opens up. Thus, future studies could analyze performance not only from the final grades but also from the results in specific tests linked to each subject or skills or, from a more holistic conception, involve teachers in research

in order to, from their opinion, determine if there are potential student profiles that support the existence of students with higher performance in all subjects and others with lower performance, equally, in all subjects. Another field of knowledge to keep on studying in is the potential relationship between the type of parental socialization and academic performance. Finally, to promote action-research, the design of intervention strategies that allow increasing academic performance, starting from the improvement of linguistic, musical or motor skills, is a field that still requires many more investigations.

Data availability statement

The datasets presented in this article are not readily available because this data must remain confidential. Requests to access the datasets should be directed to corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by the Universidad de Murcia. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

Both authors listed have made a substantial, direct, and intellectual contribution to the work, and approved it for publication.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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