EL IMPACTO DEL TIEMPO DE CLASES EN EL RENDIMIENTO ESCOLAR: ¿MÁS HORAS, MEJORES RESULTADOS?

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Research article

THE IMPACT OF CLASS TIME ON ACADEMIC PERFORMANCE: MORE HOURS, BETTER RESULTS?

EL IMPACTO DEL TIEMPO DE CLASES EN EL RENDIMIENTO ESCOLAR: ¿MÁS HORAS, MEJORES RESULTADOS?

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ABSTRACT
The present article analyzes the relationship between class time dedicated to Physics and school performance in students of 1st Unified General High School (1BGU) in Ecuadorian institutions, the objective was to determine the significant correlation between class time and grade point average, as well as the dispersion of these grades. A quantitative approach was adopted, with a non-experimental and cross-sectional design. Data were obtained from educational institutions with different types of support and time load in Physics, having a sample composed of five institutions selected by a non-probabilistic sample by convenience. The data obtained were analyzed by means of a parametric statistical test using Pearson's bivariate correlation to determine the relationship between class time and performance variables. The results indicate a strong and significant negative correlation between time and dispersion, but a positive correlation with reduced significance between time and averages, which leads to the conclusion that class time contributes to school performance, although it is not the only determining factor.
KEYWORDS: Education, performance, society

RESUMEN
El presente artículo analiza la relación entre tiempo de clase dedicado a la materia de Física y el rendimiento escolar en estudiantes de 1ro Bachillerato General Unificado (1BGU) en instituciones ecuatorianas, el objetivo fue determinar la correlación significativa entre tiempo de clase y el promedio de calificaciones, así como su dispersión. Se adoptó un enfoque cuantitativo, con un diseño no experimental y transversal. Se obtuvieron datos de instituciones educativas con diferencias tipos de sostenimiento y carga horaria en la materia de Física, teniendo una muestra compuesta por cinco instituciones seleccionadas por un muestro no probabilístico por conveniencia. Los datos obtenidos se analizaron mediante una prueba estadística paramétrica mediante la correlación bivariada de Pearson para determinar la relación entre tiempo de clase y las variables de rendimiento. Los resultados indican una correlación negativa fuerte y significativa entre tiempo y dispersión, pero una correlación positiva con significancia reducida entre tiempo y promedios, lo que permite concluir que el tiempo de clase aporta al rendimiento escolar, aunque no es el único factor determinante.
PALABRAS CLAVE: *Educación, rendimiento, sociedad*

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INTRODUCTION

In developed countries, especially in Europe and Asia, the time load in their educational systems is slightly less than in our country. However, their academic performance is superior to ours, even though they dedicate less time to teaching in direct contact between teacher and student. In Ecuador, the teaching load of physics in high school has been reduced. This reduction in the weekly time devoted to the subject generates uncertainty as to its impact on students' academic performance, which could prevent the implementation of optimal educational practices that ensure an adequate balance between academic load and student performance.

One of the theoretical bases of the topic of study is school performance. In the words of Gil and Monroy (2019), school performance is defined as "a system of achievements, which builds knowledge through educational didactic interventions and that these are evaluated through qualitative and quantitative methods in a subject, whose objectivity is based on grade evaluation" (p. 68). However, Lamas (2015) notes that a differentiation of terms for performance should be created, being academic performance an exclusive term for higher education and school performance for when it is handled within basic education.

As is well known, education is one of the most important aspects in the world, which is why it is one of the main focuses of economic investment by different countries. However, in its human nature, education is a process of constant change and evolution. "The educational landscape in the world has achieved progress with respect to educational quality in recent years, but there is still a strong lag that prevents its achievement" (Rubiano & Martínez, 2024, p. 5249), due to this, it is necessary to understand the relationship that could exist between the time allocated to the teaching of a subject and the performance reflected in students.

In this sense, Colomo et al. (2016) presents the fact that more hours of instruction do not guarantee better academic performance, mentioning the cases of Finland and Austria that have better results compared to those countries that dedicate more time than them to classes in direct contact.

In addition, Gaeta and Cavazos (2016) examine the relationship between study time, self-regulation of learning and academic performance of university students, finding that students with better performance dedicate more time to study through self-regulation strategies.

At the Ecuadorian level, it is essential to understand what students' school performance depends on, since, based on this knowledge, improvements can be made to the education system. Villaruel et al. (2020) identifies the factors that affect the school performance of high school students in Ecuador taking as a source of study the results of the Ser Bachiller exam in the 2016-2017 period, which allowed him to determine some key factors to explain academic performance.

Asencios et al. (2024) mention the following: "In recent years, the prediction and analysis of student performance has become an area of growing interest to researchers and educators, with the goal of better understanding the factors that contribute to academic success or failure" (p. 118).

Therefore, when considering this perspective, it is essential to understand whether there is a relationship between class time and school performance, and if not, to find the factors that could have a greater impact on student performance.

Based on this, the following questions are posed:

Is there a significant correlation between class time per week and students' partial evaluation average?

Is there a significant correlation between class time per week and the dispersion in students' partial evaluation?

METHODOLOGY

The methodological framework was based on the positivist paradigm, with a quantitative approach and a non-experimental design, the latter understood as a typology in which variables are not manipulated in any way (Chacma-Lara & Laura-Chávez, 2021). The selection of this approach is based on what was established by Hernández Sampieri et al. (2014), who emphasize that this type of study allows the observation and analysis of variables without the need to intervene directly on them. The study was a cross-sectional documentary study, in addition to the descriptive analytical intention due to the fact that a multivariate analysis was performed throughout the statistical process.

To structure the research process, the methodological model proposed by Creswell and Creswell (2018) was adopted, who state that all quantitative research must follow a structured sequence to ensure the validity and reliability of the results. In this sense, the following was complied with: analysis of academic sources and previous studies that address the relationship between class time and school performance, in order to delimit the problem and formulate the research objectives; identification of the study variables; selection of the institutions, which was given for convenience, in attention to the willingness to support by providing relevant data for the study, considering educational centers with different hourly loads in the administration of the subject of Physics, with class hours between 2 and 4, with each hour being 40 or 45 minutes depending on the institution; creation of a broader study scenario by examining public, fiscomisional (public-private) and private institutions; determination of the units of analysis, which was composed of all subject grades of students enrolled in 1BGU in the selected educational institutions, during the school year analyzed (Creswell and Creswell, 2018).

The selection of the data was by criterion, based on a set of conditions for their inclusion: belonging to the first year of high school, taking the subject of interest and having the corresponding grade record. The selected data corresponds to all the available grades of the students in the first year of high school in the subject of Physics during the first partial of the 2024-2025 school year. This approach ensures that the selection is representative of all accessible data, according to the available records (Martínez-Corona et al., 2023). Due to ethical principles, the names of the institutions and the identity of the students are kept anonymous.

Data analysis: a statistical analysis was performed using a normality test with the Shapiro-Wilk test and the application of Pearson's bivariate correlation to examine the relationship between class time and performance variables, for which the SPSS 30.0.0.0.0 program was used. The studies of Villaruel et al. (2020) and Asencios et al. (2024), who used similar designs to analyze the impact of different variables on academic achievement, were used as a reference for this type of analysis. Finally, the findings were interpreted and compared with previous studies on the influence of instructional time on academic achievement, highlighting similarities and differences with other educational contexts.

RESULTS AND DISCUSSION

Once the ratings for each of the institutions were obtained, key statistical data were obtained for the respective analysis through the average of the partial evaluation, the standard deviation of each group and the time of dedication; the results obtained from these units of analysis are shown in Table 1.

Table 1: Units of analysis by educational institution

Educational Institution	Nature	Units of analysis		
		Time spent in minutes	Average partial evaluation	Partial evaluation dispersion
Educational Unit 1	Público	80	7.10	2.73
Educational Unit 2	Público – privado	90	7.20	2.50
Educational Unit 3	Público	120	9.00	2.05
Educational Unit 4	Público – privado	135	8.85	1.98
Educational Unit 5	Privado	160	8.20	1.64

Using the data obtained, we sought to determine the relationship between class time (independent variable) and school performance, measured by the average evaluation and the deviation of partial evaluations (dependent variables).
Using the SPSS 30.0.0.0.0 program, the normality test of the variables was calculated to determine the method to be used to determine the relationship between class time and school performance. The results of the application of the normality test for the partial evaluation average variable are presented in Table 2, and the results for the partial evaluation deviation variable in Table 3.

Table 2: Normality test with the average of the partial evaluation.

Test of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Average partial evaluation	,235	5	,200*	,865	5	,249

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 3: Normality test with the deviation of the partial evaluation.

Test of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Partial evaluation dispersion	,218	5	,200*	,959	5	,800

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Being a sample with five data, the significance considered was obtained within the Shapiro-Wilk test, since this test is used for samples with fifty or less data. Analyzing what Luzuriaga et al. (2023) mentioned, since the significance values are greater than 0.05, then there is not enough evidence to affirm that the data of both variables deviate significantly from a normal distribution. In this case, a parametric statistical method should be used, being Pearson's bivariate correlation the indicated one due to the small sample size. Fiallos (2021) defines this method as “Pearson's coefficient (also called the product-moment correlation coefficient), is represented by the symbol r and provides a numerical measure of the correlation between two quantitative variables” (p. 2495).

RELATIONSHIP BETWEEN CLASS TIME AND PARTIAL EVALUATION AVERAGES

When analyzing the variables class time and partial evaluation averages, the results shown in Table 4 are obtained.

Table 4: Pearson's correlation between class time and partial evaluation performance

Correlations			
		Class time in minutes	Average partial evaluation
Class time in minutes	Pearson Correlation	1	,700
	Sig. (2-tailed)		,188
	N		5
Average partial evaluation	Pearson Correlation	,700	1
	Sig. (2-tailed)	,188	
	N	5	5

When analyzing the relationship between class time and partial evaluation averages, the Pearson correlation model yields a result of 0.700, indicating a moderate positive relationship. This value indicates the possibility that, as class time increases, the results of the partial evaluation should have an increasing trend. However, since the value obtained is far from the maximum that determines a strong positive relationship (1), it means that this parameter is not sufficient to determine a significant relationship between the variables.

The significance value is 0.188, which is far from the generally accepted typical value ($\alpha = 0.05$), implying that there is not enough evidence to affirm the correlation mentioned above. However, the main cause of this value is the sample size (N = 3), which was small in scope due to the private and sensitive nature of the information obtained for data analysis, in addition to the fact that priority was given to obtaining data with educational institutions that do not occupy the same amount of time dedicated to the subject, so that all possible different options were covered.

RELATIONSHIP BETWEEN CLASS TIME AND DISPERSION IN PARTIAL ASSESSMENT

Table 5 shows the results of the Pearson correlation analysis of the variables class time and dispersion in the partial evaluation.

Table 5: Pearson correlation between class time and dispersion of partial evaluation

Correlations			
		Class time in minutes	Partial evaluation dispersion
Class time in minutes	Pearson Correlation	1	-0,990**
	Sig. (2-tailed)		0,001
	N	5	5
Partial evaluation dispersion	Pearson Correlation	-0,990**	1
	Sig. (2-tailed)	0,001	
	N	5	5

**. Correlation is significant at the 0.01 level (2-tailed).

The analysis between class time and the dispersion of partial evaluation yields a Pearson correlation coefficient of -0.991. This value reveals a very strong negative relationship by largely approaching the lower limit of the range of values that can be taken by the coefficient used (-1). This indicates that as the time devoted to teaching the subject increases, the dispersion in the results of the partial evaluation tends to decrease almost to perfection.
As for the significance value, the value obtained was less than 0.001, which is not only within the generally accepted margin, but has a value incredibly close to 0, which shows that this result has extreme and precise validity, favoring the idea that there is a relationship between the two variables considered at this point.

OVERALL COMPARISON OF CASES AND SIGNIFICANCE OF CORRELATION

Comparing the time dedicated to classes and the evaluation averages, the descriptive results of the institutions reflect interesting patterns. In the public institution, students have a low performance average (7.10), considering that this group also presents the shortest class time, with only 80 minutes. On the other hand, another institution also of a public nature shows the best average performance (9.00) with a slightly longer class time (120 minutes). Finally, in the private institution, students have an average of 8.20, slightly higher than the group with the least time spent, despite having the longest class time, with 160 minutes, and still having a distance on average from the one with the best.
The results obtained in the Pearson correlation analysis revealed a strong negative relationship between class time and the dispersion of partial evaluations ($r = -0.991$). This finding suggests that, as the time devoted to teaching increases, student grades tend to be more uniform, which can be interpreted as a greater degree of equity in learning. The statistically significant relationship ($p < 0.001$) incorporates the idea that this homogeneity is not random but is directly associated with the duration of class sessions, allowing students a more uniform understanding of the content addressed.
On the other hand, the moderate positive correlation between class time and average performance on evaluations ($r = 0.700$) did not reach statistical significance ($p = 0.188$). This indicates that, although there is a tendency for students to perform better on assessments when classes are longer, this relationship is not consistent enough to be considered significant within this analysis. This result could be attributed to the influence of other uncontrolled variables, such as the quality of instruction, student motivation, or even the design of the assessments.
From these findings we infer that there is a relationship between class time and school performance. However, it is not strong or consistent enough to be statistically significant in the context studied. Furthermore, it is interpreted that, although class time is an important factor, it is not sufficiently predicted of school performance. This highlights the need to explore other variables that could influence the results, such as the pedagogical strategies employed by teachers and the conditions of the different educational institutions.
Given the above, the combination of the results allows us to infer that class time has a stronger effect on the contraction of learning inequalities than the direct increase in average achievement. Previous reasoning and evidence have pointed out how prolonged instruction can create more space for weaker students to reinforce concepts and explore doubts.
The correlation analysis between class time and the dispersion of partial assessment scores shows that extending the time dedicated to teaching a subject benefits individual learning and promotes greater homogeneity in students' school results. This is interpreted as a better distribution of performance, where students, regardless of their initial levels of understanding, seem to benefit from longer teaching times. This finding is relevant, as it reinforces the importance of designing school schedules that allow adequate time for the deepening of the topics addressed.

EDUCATIONAL IMPLICATIONS

The study provides significant elements for the design and planning of school timetables. The correlation between class time and performance in partial evaluations implies that increasing class time could increase academic performance, at least in those subjects where it is necessary to go more deeply into the explanation of concepts or problem solving. “Time spent in different time slots does tend to intervene directly in academic performance” (Amo et al., 2023, p. 44). This finding underscores the need to reevaluate traditional time blocks and formats that facilitate slower, more reflective learning should be adjusted.

The negative relationship identified between class time and grade dispersion suggests that longer classes favor greater homogeneity in learning, closing the gaps between students with different abilities. This fact could be interpreted as a beneficial effect of extended classes, as it gives teachers the opportunity to provide more personalized, step-by-step attention and reinforce tutoring.

In this sense, implementing longer sessions can be a decisive strategy to address educational equity and ensure that the most backward students are not left behind. “The results found highlight how attendance to face-to-face classes, both theoretical and practical, play a relevant role in passing the subject under study” (Rodríguez & Herrera, 2009, p. 9).

The findings also have practical implications for curriculum design. Schools could consider the reorganization of teaching according to the needs of less or more interaction in the subject. Santillán (2021) mentions that the lack of didactic activities that stimulate students' active participation may also affect student performance. In general, a more efficient distribution of class time could maximize student performance and enrich the interactive experience for all students.

STATISTICAL SIGNIFICANCE AND LIMITATIONS OF THE STUDY

The statistical results, even with all sample limits, indicate key relationships, specifically, a strong negative correlation between class time and standard deviation in partial evaluations ($r = -0.991$) with an extremely high significance ($p < 0.001$), suggesting that such dependence is not random. It is possible, therefore, to validate the statistical model and demonstrate that the time allocated to classes is a relevant educational planning factor to achieve more homogeneous grades among students.

On the other hand, although the positive correlation between class time and average final performance in partial evaluations is moderate ($r = 0.700$), it was not extremely significant ($p = 0.188$), which represents a limitation with respect to being able to affirm that the relationship between these two variables is consistent.

In this case, the reduced value of the reliability is due to the nature of the Pearson correlation with the presence of repeated data in one of the analysis variables, and increasing the sample of cases with hourly loads equal to those already presented does not ensure that the significance is improved.

The statistical significance in this study highlights the importance of modifying statistical designs according to the needs of the analysis. The (p) values and correlation coefficients are useful for identifying patterns, however, they should not be isolated. Significant findings, such as the relationship between class time and dispersion, open the door to further exploration, while less conclusive results, such as the relationship with overall average, highlight the need for more detailed and contextualized future analysis.

As for the limitations of the study, sample size is the main limitation of this article, since we have worked with data from only five university institutions. Although the heterogeneity of the class schedules taught was taken into consideration to ensure the representativeness of the analysis, the number of observations is small and, therefore, it is not possible to generalize the results to other institutional contexts.

A larger sample would have made it possible to obtain statistically more solid relationships, with less sensitivity to individual variations and, consequently, a reduction in the probability that the correlations reported are random.

Another important limitation is related to the nature of the variables analyzed, in view of the dependence of reported data and institutions on class times and partial evaluations. There could be uncontrolled factors influencing the results, including the quality of teaching, the pedagogical strategies used by teachers, or the level of student motivation, allowing for potential biases. The lack of direct control over such variables may have restricted the ability to isolate the effects of class time on performance outcomes.

Additionally, another shortcoming of the study is the absence of a qualitative analysis of the use of time during classes and the pedagogical approach of teachers. Based on the quantitative data collected, it is impossible to determine whether extended time in the classroom allows for a more participatory and student-centered educational process, making it impossible to confirm whether time is used in a meaningful way or simply constitutes a traditional practice of little benefit to the student.

The study also does not evaluate the levels of depth of learning achieved by the students, which makes it impossible to create a generalization. As mentioned above, the variables make it possible to create performance quantification indicators but make it impossible to know whether learning is subject to traditionalist teaching based on rote learning or to adequate contemporary teaching based on understanding, application and criticality. This is a considerable limitation for evaluating the real quality of learning in the central subject of this study.

The selection of educational institutions for the development of the study may also have generated small conflicts in obtaining results. Differences in resources, educational approaches, and socioeconomic characteristics of the participating institutions may have caused an impact on the results, creating difficulties in the overall interpretation of the findings. “Nevertheless, the results obtained in said contingency analysis alone do not provide sufficient arguments to denote whether or not the predictive variables contemplated are independent of subject overcoming” (Rodríguez & Herrera, 2009, p. 5).

RELATIONSHIP WITH THEORETICAL MODELS

The results of this study can be interpreted through Carroll (1963) learning model, which establishes that academic achievement is a direct function of the time dedicated to learning and an inverse function of the time required to master a content. In this sense, Cervini (2001) mentions that the opportunity to learn is located precisely in this space of influence, reflecting not only the initial conditions of the students, but also the pedagogical practices and school resources available. According to Carroll model, students who have more time available for instruction tend to have better opportunities to achieve learning objectives, which is consistent with the observed relationship between class time and decreased dispersion in midterm assessment scores. This reinforces the idea that time is a critical factor in equalizing learning opportunities within a heterogeneous group of students.

From the point of view of constructivism, the meaningful learning proposed by Ausubel (1963) also supports the findings obtained. This approach emphasizes that learning occurs most effectively when students can connect new knowledge with their pre-existing cognitive structure, a process that requires time and reflection.

Zamora et al. (2023) mentions “meaningful learning differs from rote learning, as it focuses on deep and critical understanding of concepts and their application in real situations” (p. 224). Increasing class time, in this context, could not only facilitate the acquisition of new concepts, but could also allow students to consolidate and relate information in a deeper way, thus reducing differences in their understanding and performance.

Furthermore, the relationship between class time and homogeneity in results can be associated with Bronfenbrenner's (1979) ecological model, which highlights how contextual factors, such as time organization and educational resources, influence student development. Romero (2023) mentions the following:

> School space and school time are not independent factors but are interconnected. For example, the arrangement of furniture in the classroom can affect the amount of time the teacher spends explaining and the amount of time the student has to work in groups or alone (p. 122).

In this framework, longer classes can provide a more favorable environment for learning, where students have the necessary time to interact with teachers, participate in meaningful activities and clarify doubts. Razo (2016) mentions, “School time is important, but taking advantage of it is essential” (p. 635). This underscores the importance of considering time as a key resource in the design of pedagogical strategies that promote both equity and educational quality.

SUGGESTIONS FOR EDUCATIONAL POLICIES

To optimize the impact of class time on academic performance, it is suggested that educational policies encourage a comprehensive review of school schedules. This involves not only extending the length of classes in key subjects but also ensuring that this additional time is used effectively. “The extension and better use of school time is one of the most important changes affecting the pedagogical culture and management of schools” (Martinic, 2015, p. 482).

Strategies could include the design of more flexible curricula that prioritize depth over quantity of content, allowing teachers to devote more time to activities that promote meaningful learning, such as critical analysis, problem solving and practical application of knowledge. Regarding this, Mello & Hernández (2019) mention that “it is recommended to evaluate the national curriculum design for the Mathematics area from its capacity to intervene in different facets, from cognitive competencies to attitudes, well-being and inclination towards student learning” (p. 9).

An important point to implement effective policies is the investment in resources and the improvement of school conditions. Ensuring adequate infrastructure, access to quality teaching materials, and inclusive and well-equipped learning environments is essential for optimal use of class time.

In addition, an optimal space plays an important role in the student's perception of their learning process, as Quesada (2018) mentions, “a comfortable and positive environment must then be created where the student wants to spend almost a third of the day to learn and share with all the agents involved in the educational environment” (p. 6). These improvements should also include strengthening communication and collaboration between teachers, students, and families, fostering a community approach that supports learning inside and outside the classroom.

Along the same lines, it is recommended that educational policies consider the continuous evaluation of the reforms implemented, using clear indicators such as academic performance, student participation and equity in results. These evaluations should include feedback from teachers and students to adjust strategies according to emerging needs. Villamizar et al. (2020) mentions that evaluations should not be massive or decontextualized, but should be formative, continuous and varied with the purpose of evaluating the student and not the educational system.

In this way, policies will not only ensure the effectiveness of class time but also contribute to the development of more adaptive and resilient education systems in the face of changing societal challenges. Homework also plays a key role, as Liu et al. (2023) found that spending extra time on homework in a subject can improve school performance, especially for low-achieving students.

IMPACT OF OTHER FACTORS ON SCHOOL PERFORMANCE

Although the parametric method of Pearson's correlation showed a moderate positive correlation ($r = 0.7$) between class time and evaluation average, the lack of statistical significance ($p = 0.188$) suggests that other factors may play a more decisive role in school achievement. As Razo (2016) mentions, “more time in school will not imply increased achievement in students if it is not used in meaningful learning experiences and quality interactions between students and teachers” (p. 626).

From the very nature of the concept of achievement, Gonzales (1988) mentions that school achievement is directly related to the concept of education and its foundation in broader psycho-pedagogical, ideological and social models. These elements can amplify or reduce the impact of teaching time on average student achievement.

The role of the teacher is a critical factor in improving performance. Teachers with active and student-centered strategies tend to maximize class time, providing opportunities for meaningful learning and the development of applicable skills. Gabalán and Vásquez (2017) mention “perhaps we teachers must guarantee learning environments that make each academic encounter a unique and unrepeatable experience” (p. 23).

However, when classes focus solely on the transmission of information, the positive impact of the additional time is diluted. This fact could explain why, although a positive trend in the correlation was observed, a statistically significant relationship was not reached. Another point of view may be that of Liu (2022), which mentions “academic performance does not need to impose more requirements on the amount of study time, and the main point is to improve learning skills” (p. 414).

Under the above perception, the focus for the improvement of the educational system would not be the increase of hours in direct contact with the teacher, but the adequate teaching of skills that allow the student to learn independently of class time. Even Wagner et al. (2021) initially proposed the idea that the time of day has more impact than class time itself but found that there is no such impact and that it is the teacher who really affects performance.

Another key element is the design of assessments. While additional teaching time may provide more opportunities to practice and deepen content, the type of assessment used has an important weight on school averages. Carriazo et al. (2020) considers that “the educational planning process has to encompass all levels of the organization, to carry out the teaching and learning process in an efficient and effective way that allows achieving quality education” (p. 91).

This underscores the importance of a comprehensive educational strategy that encompasses both the content and context of assessments. Assessments that prioritize memorization rather than critical analysis or practical application of knowledge may limit the true reflection of student learning, regardless of the time spent on instruction.

The personal factor also occupies an important pillar in student performance. Borja et al. (2021) defines personal factors as “fundamental elements in academic performance, as students' aptitudes, attitudes, motivation and expectations can significantly influence their academic results” (p. 56).

CONCLUSIONS

The study of how class length impacts academic performance within the Ecuadorian educational environment has uncovered two main findings. Initially, there is a robust and statistically significant inverse relationship between class length and variance in outcomes, indicating that longer instruction generally produces more consistent results. This suggests an advantage for educational equity, as low-achieving students may gain more opportunities to reinforce learning in extended class periods.

However, the moderate link between class hours and habitual performance was not statistically notable. Consequently, it cannot be inferred that extended periods are associated with superior outcomes. This underscores the complex nature of academic achievement, shaped by numerous interconnected elements beyond the length of class hours.

The study did not address the teaching methodologies implemented during classroom sessions. Subsequently, it is not specified whether supplemental time is allocated for contemporary learning or traditional education. The study did not incorporate measures to assess depth of learning, such as critical thinking skills, problem-solving skills, or understanding of conceptual frameworks. Therefore, no definitive statements can be made about the quality or significance of the learning that took place.

The results indicate the need for educational planning that focuses not only on the length of instruction but also on the pedagogical approaches adopted by teachers. To improve productivity in education and ensure that the time allotted is used effectively, it is essential to implement teaching strategies that promote deep, meaningful, and equitable learning experiences.

Finally, the data infers that teaching time does not allow for an increase in the maximum score but rather allows for a smaller difference in the score between students. This reinforces the idea that time is necessary but not sufficient for equity in learning. The obstacle is to ensure that the additional time is complemented by adequate and non-traditional teaching, properly structured feedback and strategies to respond to the whole group of students.

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- Alejandro David Guato Valarezo: Principal author, Conceptualization, Formal analysis, Research, Methodology, Resources, Writing - original draft, Drafting.
- Yajaira Lizbeth Valdiviezo Valdiviezo: Formal analysis, Research, Methodology, Resources.
- Carmen Siavil Varguillas Carmona: Methodology, Validation, Visualization, Writing and Academic Writing.

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STATEMENT OF DATA AVAILABILITY: The authors declare that the data used in the study were provided by educational institutions under conditions of anonymity, guaranteeing the confidentiality of the information. Due to this restriction, the data is not publicly available. However, for any further verification or consultation, please contact the authors of the study, who will be able to provide guidance on access to the information within the relevant ethical and legal guidelines.

REFERENCIAS BIBLIOGRÁFICAS

Amo, D., Gutiérrez, L. F., & Robledo, F. (2023). Entendiendo el impacto de los horarios de estudio en el rendimiento académico universitario en línea. *UTE Teaching & Technology (Universitas Tarraconensis)*, *2*, 43-61. https://doi.org/10.17345/ute.2023.3656

Asencios, L., Asencios, L., La Rosa, C., & Gallegos, D. (2024). Study Hours vs. Exam Results: Academic Success of Students through Performance Prediction. *International Journal of Engineering Trends and Technology*, *72*(7), 118-123. https://doi.org/10.14445/22315381/IJETT-V72I7P113

Ausubel, D. P. (1963). *The psychology of meaningful verbal learning*. Grune & Stratton.

Borja, G. M., Martínez, J. E., Barreno, S. N., & Haro, O. F. (2021). Factores asociados al rendimiento académico: Un estudio de caso. *Revista Educare*, *25*(3), 54-68. https://doi.org/10.46498/reduipb.v25i3.1509

Bronfenbrenner, U. (1979). *The ecology of Human Development*. Harvard University Press.

Carriazo, C., Pérez, M., & Gaviria, K. (2020). Planificación educativa como herramienta fundamental para una educación con calidad. *Utopía y Praxis Latinoamericana*, *25*(3), 87-95. https://doi.org/10.5281/zenodo.3907048

Carroll, J. B. (1963). A model of school learning. *Teachers College Record, 64*(8), 723-733. https://doi.org/10.1177/016146816306400801

Cervini, R. A. (2001). Efecto de la "Oportunidad de aprender" sobre el logro en matemáticas en la educación básica argentina. *Revista Electrónica de Investigación Educativa*, *3*(2), 1-22. https://redie.uabc.mx/redie/article/view/39

Chacma-Lara, E., & Laura-Chávez, T. (2021). Investigación cuantitativa: buscando la estandarización de un esquema taxonómico. *Revista médica de Chile*, *149*(9), 1382-1383. https://doi.org/10.4067/S0034-98872021000901382

Colomo, E., Cívico, A., Gabarda, V., & Cuevas, N. (2016). La influencia del tiempo escolar en el rendimiento académico: un estudio comparativo en sistemas educativos de Europa y Latinoamérica. *Cuestiones Pedagógicas*, (25), 11-22. https://doi.org/10.12795/CP.2016.i25.01

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage Publications. https://n9.cl/fz7ud

Fiallos, G. (2021). La Correlación de Pearson y el proceso de regresión por el Método de Mínimos Cuadrados. *Ciencia Latina*, *5*(3), 2491-2509. https://doi.org/10.37811/cl_rcm.v5i3.466

Gabalán, J., & Vásquez, F. E. (2017). Rendimiento académico universitario y asistencia a clases: Una visión. *Revista Educación*, *41*(2), 16-32. https://doi.org/10.15517/revedu.v41i2.18477

Gaeta, M., & Cavazos, J. (2016). Relación entre tiempo de estudio, autorregulación del aprendizaje y desempeño académico en estudiantes universitarios. *CPU-e. Revista de Investigación Educativa*, (23), 142-166. https://doi.org/10.25009/cpue.v0i23.2166

Gil, M. E., & Monroy, M. O. (2019). Tecnología y motivación para el desempeño académico de alumnos en educación básica. En A. Cotán Fernández (Coord.), *Nuevos paradigmas en los procesos de enseñanza-aprendizaje* (pp. 66-74). Adaya Press. https://n9.cl/1fvs8m

Gonzales, A. J. (1988). Indicadores del rendimiento escolar: relación entre pruebas objetivas y calificaciones. *Revista de Educación*, (287), 31-54. https://n9.cl/6023f

Hernández Sampieri, R., Fernández Collado, C., & Baptista Lucio, P. (2014). *Metodología de la investigación* (6ª ed.). McGraw-Hill. https://n9.cl/xtpdq

Lamas, H. (2015). Sobre el rendimiento escolar. *Propósitos y Representaciones*, *3*(1), 313-386. https://doi.org/10.20511/pyr2015.v3n1.74

Liu, A., Wei, Y., Xiu, Q., Yao, H., & Liu, J. (2023). How Learning Time Allocation Make Sense on Secondary School Students' Academic Performance: A Chinese Evidence Based on PISA 2018. *Behavioral Sciences*, *13*(3), 237. https://doi.org/10.3390/bs13030237

Liu, M. (2022). The Relationship between Students' Study Time and Academic Performance and its Practical Significance. *BCP Education & Psychology*, *7*, 412-415. https://doi.org/10.54691/bcpep.v7i.2696

Luzuriaga, H. A., Espinosa, C. A., Haro, A., & Ortiz, H. D. (2023). Histograma y distribución normal: Shapiro-Wilk y Kolmogorov Smirnov aplicado en SPSS. *LATAM*, *4*(4), 596-607. https://doi.org/10.56712/latam.v4i4.1242

Martínez-Corona, J., Palacios-Almón, G., & Oliva-Garza, D. (2023). Guía para la revisión y el análisis documental: propuesta desde el enfoque investigativo. *Revista RA XIMHAI*, *19*(1), 67-83. https://doi.org/10.35197/rx.19.01.2023.03.jm

Martinic, S. (2015). El tiempo y el aprendizaje escolar la experiencia de la extensión de la. *Revista Brasileira de Educação*, *20*(61), 479-499. https://doi.org/10.1590/S1413-24782015206110

Mello, J. D., & Hernández, A. (2019). Un estudio sobre el rendimiento académico en Matemáticas. *Revista Electrónica de Investigación Educativa*, *21*(9), 1-10. https://doi.org/10.24320/redie.2019.21.e29.2090

Quesada, M. J. (2018). Condiciones de la infraestructura educativa en la Región Pacífico Central: los espacios escolares que promueven el aprendizaje en las aulas. *Revista Educación*, *43*(1), 293-311. https://doi.org/10.15517/revedu.v43i1.28179

Razo, A. E. (2016). Tiempo de aprender. El aprovechamiento de los periodos en el aula. *Revista Mexicana de Investigación Educativa*, *21*(69), 611-639. https://n9.cl/1w5dq

Rodríguez, C., & Herrera, L. (2009). Análisis correlacional-predictivo de la influencia de la asistencia a clase en el rendimiento académico universitario. Estudio de caso en una asignatura. *Revista de Currículum y Formación de Profesorado*, *13*(2), 1-13. https://n9.cl/ja66ld

Romero, G. (2023). Análisis del modelo ecológico de Bronfenbrenner, su aplicación en la percepción del tiempo dentro del aula. *Perspectivas*, *8*(23), 120-133. https://doi.org/10.26620/uniminuto.perspectivas.8.23.2023.120-133

Rubiano, S. S., & Martínez, J. C. (2024). El desempeño académico como un comportamiento en el proceso de enseñanza aprendizaje. *Ciencia Latina*, *8*(2), 5247-5261. https://doi.org/10.37811/cl_rcm.v8i2.10941

Santillán, A. S. (2021). ¿Más horas en la escuela incrementan el logro escolar? Evidencia para el nivel secundaria del Programa de Escuelas de Tiempo Completo en México. *Revista Electrónica de Investigación Educativa*, *23*(4), 1-15. https://doi.org/10.24320/redie.2021.23.e24.3540

Villamizar, G., Araujo, T. Y., & Trujillo, W. J. (2020). Relación entre ansiedad matemática y rendimiento académico en matemáticas en estudiantes de secundaria. *Ciencias Psicológicas*, *14*(1), e-2174. https://doi.org/10.22235/cp.v14i1.2174

Villaruel, R., Tapia, K., & Cárdenas, J. (2020). Determinantes del rendimiento académico de la educación media en Ecuador. *Revista Economía y Política*, (32), 173-190. https://doi.org/10.25097/rep.n32.2020.08

Wagner, S. C., Garippo, S. J., & Lovaas, P. (2021). Class Time of Day: Impact on Academic Performance. *Transactions on Computational Science and Computational Intelligence*, 327-336. https://doi.org/10.1007/978-3-030-70873-3_23

Zamora, S. M., Segarra, S. R., González, S. A., & Vitonera, M. M. (2023). El aprendizaje significativo en la educación actual: una reflexión desde la perspectiva crítica. *Revista Educare*, *27*(1), 218-230. https://doi.org/10.46498/reduipb.v27i1.1896

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