

RELACIÓN ENTRE RENDIMIENTO ACADÉMICO Y CONDICIONES SOCIOECONÓMICAS DE ESTUDIANTES DE LA FACULTAD DE CIENCIAS POLÍTICAS Y ADMINISTRATIVAS DE LA UNIVERSIDAD NACIONAL DE CHIMBORAZO

RELATIONSHIP BETWEEN ACADEMIC PERFORMANCE AND SOCIOECONOMIC CONDITIONS OF STUDENTS FROM THE FACULTY OF POLITICAL AND ADMINISTRATIVE SCIENCES OF THE NATIONAL UNIVERSITY OF CHIMBORAZO

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RESUMEN: El rendimiento académico universitario constituye un indicador clave para medir la calidad educativa, suele estar condicionado por factores socioeconómicos y familiares que generan desigualdades entre los estudiantes. En la Facultad de Ciencias Políticas y Administrativas de la UNACH esta problemática se evidencia en diferencias de desempeño asociadas al ingreso, recursos disponibles y apoyo institucional, lo que plantea la necesidad de analizar sus determinantes. Este estudio tuvo como objetivos caracterizar los modelos explicativos del rendimiento académico universitario, comparar dicho rendimiento y sus variables socioeconómicas, familiares e institucionales por carrera en la Facultad de Ciencias Políticas y Administrativas, y finalmente, identificar los determinantes específicos del desempeño académico para los estudiantes de esta facultad. La metodología empleada fue cuantitativa, centrándose en el análisis de 2,007 observaciones mediante la aplicación de modelos Logit y Probit, seleccionando este último por su superioridad demostrada a través de los criterios AIC y BIC. El modelo Probit permitió evaluar el impacto de diversas variables como la situación de ingresos, los costos educativos percibidos, el nivel educativo de los padres, el acceso y los recursos educativos en el hogar, el apoyo docente, el ambiente familiar, la situación laboral y la propia carrera académica. En conclusión, los resultados revelaron una compleja interacción de factores: Mientras que algunos determinantes como el efecto negativo de trabajar o el impacto positivo de los recursos educativos en el hogar y el ambiente familiar se alinean con la literatura general, se observaron hallazgos contraintuitivos significativos, como la asociación negativa de una mejor situación de ingresos o un mayor acceso a recursos educativos con un rendimiento académico superior, y la no significancia del nivel educativo parental. Estas particularidades sugieren dinámicas específicas en la población estudiantil analizada, lo que subraya la necesidad de un enfoque diferenciado en futuras investigaciones y en la implementación de políticas de apoyo.

Palabras clave: Determinantes, estudiantes universitarios, factores socioeconómicos, modelo probit y rendimiento académico

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ABSTRACT: University academic performance is a key indicator for measuring educational quality, but it is often conditioned by socioeconomic and family factors that generate inequalities among students. At the Faculty of Political and Administrative Sciences of UNACH, this problem is evident in differences in performance associated with income, available resources, and institutional support, which raises the need to analyze its determinants. This study aimed to characterize the explanatory models of university academic performance, compare performance and its socioeconomic, family, and institutional variables by program in the Faculty of Political and Administrative Sciences, and finally, identify the specific determinants of academic performance for students in this faculty. The methodology employed was quantitative, focusing on the analysis of 2,007 observations through the application of Logit and Probit models, selecting the latter for its demonstrated superiority using the AIC and BIC criteria. The Probit model allowed for the evaluation of the impact of various variables such as income status, perceived educational costs, parents' educational level, access to and resources at home, teacher support, family environment, employment status, and the academic program itself. In conclusion, the results revealed a complex interaction of factors: While some determinants, such as the negative effect of working or the positive impact of educational resources at home and in the family environment, are consistent with the general literature, significant counterintuitive findings were observed, such as the negative association of higher income status or greater access to educational resources with higher academic performance, and the nonsignificance of parental educational level. These particularities suggest specific dynamics in the student population analyzed, underscoring the need for a differentiated approach in future research and in the implementation of supportive policies.

Keywords: Determinants, university students, socioeconomic factors, probit model, and academic performance

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INTRODUCTION

The academic performance of university students constitutes a central indicator to evaluate both the quality of the educational process and the efficacy of the institutional policies. In the context of the Faculty of Political and Administrative Sciences of the National University of Chimborazo, understanding the variations in the academic performance acquires particular relevance because it permits identifying academic and socioeconomic obstacles that affect the formative trajectory of future professionals in areas linked with the governance, the public management, and the

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social investigation. In addition, analyzing the performance beyond the qualifications incorporating economic, family, social, individual, and institutional dimensions makes possible designing more integral and pertinent interventions to the local characteristics of the student population.

The literature about academic performance presents multiple explanatory approaches: economic models that emphasize the cost-benefit relation and the investment in human capital; psychological perspectives that highlight the motivation, the study habits, and the self-control; sociological approximations that underline the social capital and the support networks; and organizational analyses that point to the influence of the teaching staff, the infrastructure, and the institutional policies. These theoretical frameworks, when they are integrated, permit constructing a multifactorial model that recognizes the complexity of the phenomenon and avoids simplistic explanations. In the case of the National University of Chimborazo, it is precise to adapt and contrast said models with the local reality to identify which factors have greater weight in the performance by career within the faculty.

The academic performance of the university students is a multifactorial construct, profoundly influenced by their socioeconomic conditions. For the Faculty of Political and Administrative Sciences of the National University of Chimborazo, understanding this interaction is crucial to design effective support strategies and foment the equity. The recent literature demonstrates consistently how factors such as the family income, the schooling of the parents, the access to technological resources, and the conditions of habitability impact directly in the capacity of the students to dedicate themselves to the study and reach their maximum potential.

Diverse quantitative studies have explored the direct relation between the family income and the academic success. For example, in an investigation that utilized a correlational design and surveys to 300 university students in a public university in Peru, (1) found that a greater family income correlated significantly with higher averages of qualifications, suggesting that the economic stability reduces the necessity to work and permits greater dedication to the study. In the same line, (2), through a multivariate regression analysis with data of 500 students of social sciences in Colombia, demonstrated that each increase in the quintile of family income per capita was associated with a probability 1.5 times greater of approving all the inscribed subjects in the semester.

The schooling of the parents also emerges as a critical factor, influencing not only the academic support in the home but also the expectations and the educational investment. (3) realized a multiple case study with in-depth interviews to 40 students and their parents in Chilean universities, revealing that the students with parents with superior education manifested greater confidence in their academic abilities and accessed more complementary educational resources. Complementarily (4), by means of a quasi-experimental design that compared groups of students with different levels of parental schooling in a sample of 600 Mexican university students, concluded that the schooling of the parents acted as a significant predictor of the university persistence, even controlling by the current socioeconomic status.

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The access and the competence in the use of the Information and Communication Technologies (ICT) are equally determinant in the digital era. A transversal study of (5), applying a questionnaire to 450 students of political sciences in an Argentine university, reported that the access to high-speed internet and the possession of personal devices (laptop/tablet) related positively with the active participation in virtual learning platforms and the use of digital libraries. On the other hand, (6), utilizing a mixed method with surveys and focus groups with students of administration of an Ecuadorian university, identified that the lack of advanced digital skills or the connectivity gap in the home resulted in lesser opportunities of completing online tasks and of accessing updated bibliographic material, affecting their performance in courses with high technological demand.

The conditions of habitability, including the quality of the housing, the access to basic services, and an adequate study environment, also have a substantial impact. (7), in an investigation that combined census data and surveys to 350 students in urban zones of Brazil, found that the overcrowding in the home and the lack of a tranquil space for the study were associated with elevated levels of stress and a lesser performance in subjects that required high concentration. In a similar form, (8), by means of a longitudinal study that followed 200 students during two years in a Peruvian university, observed that those who reported improvements in their housing conditions (e.g. access to sanitation, reduction of environmental noise) experienced an average improvement of 5% in their final qualifications, highlighting the importance of the physical environment.

Beyond the direct economic factors, the family support and the perception of the parental expectations exercise a notable influence (9), through semi-structured interviews to 50 first-year students of social sciences in Ecuador, revealed that the perception of a strong emotional and academic support on the part of their families, independently of their level of incomes, contributed to a greater motivation and resilience in the face of the university challenges. In contrast, (10), in an exploratory factorial analysis of a scale of parental expectations applied to 700 students in Colombia, concluded that the high academic expectations, when they were not accompanied by resources or effective support, could generate anxiety and, paradoxically, a negative impact in the performance.

The labor insertion during the studies is another socioeconomic variable with a double edge (11), in a correlational study with 400 students who worked while studying in universities of Chile, identified that those who worked more than 20 weekly hours showed a significant decrease in their average of qualifications and a greater rate of abandonment. However, (12), through an analysis of variance in a sample of 300 university students in Argentina, highlighted that the part-time work (less than 15 hours/week) could, in some cases, improve the development of soft skills and the time management without affecting negatively the performance, especially if the employment was related with their area of study.

The geographic origin and the networks of social support in the new university environment are also relevant socioeconomic aspects (13), in a comparative study

between rural and urban students of the same university in Bolivia, found that the students of rural zones faced greater challenges of adaptation and performance, often due to the lack of initial support networks and the limited familiarity with the university resources (14), in a case study of 30 first-generation university students in El Salvador, concluded that the participation in mentoring programs and the creation of support networks among peers were crucial to mitigate the negative impact of the socioeconomic disadvantages, promoting the integration and the academic success.

The socioeconomic conditions of the students —family income, employment, access to scholarships, and material resources— have a direct impact in their time of study, permanence in the university, and academic performance. In equal manner, the family capital and the domestic environment (emotional support, expectations, and responsibilities) can favor or hinder their performance, affecting the qualifications, the failing, and the continuity in the careers.

In the institutional context, factors such as the quality of the teaching, the size of the classrooms, the academic resources, and the support policies (tutorings and scholarships) can reduce or intensify these inequalities. The analysis by career shows internal differences that guide specific interventions to improve the academic management. The results of this investigation will provide local evidence that will permit the National University of Chimborazo to develop policies and strategies that strengthen the equity, the progression, and the academic success, especially for the students who face greater socioeconomic disadvantages.

Income: The factors that a student presents upon entering the educational system such as the socioeconomic conditions, the previous academic performance, the personal characteristics, and the institutional support have a direct impact in their posterior performance (15). Bronfenbrenner argues that the family incomes are determinant for the access to educational resources of quality (technology, books, tutors), which favors the preparation for the university (16).

In this sense, the income is defined as the economic flow that permits maintaining the education, either through family resources or external aids (scholarships, employments, institutional supports). A stable income diminishes the labor pressure and increases the student retention, while the scholarships and financial supports are fundamental to mitigate inequalities and assure the equity in the access to an education of quality (17), (18).

Schooling of the parents: The education of the parents, understood as the academic level reached by the progenitors, presents itself as a solid indicator of the performance and academic trajectory of the children, upon influencing in the available resources, the family expectations, and the support practices in the home (19); (20). In the Latin American context, this aspect relates with inequalities in the access to learning opportunities and in the academic aspirations, which puts into evidence the necessity of articulating institutional strategies with the family support (21).

The educational level of the parents, from the primary education until the superior, impacts directly in the academic achievements of the students, in such a manner that lower levels of schooling associate with an inferior academic performance, while the

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teachers play a complementary role in the reduction of these gaps (22). In addition, the parents with a higher formation tend to transmit the importance of the academic effort and to create environments where the educational achievements are recognized and reinforced, acting as positive models that inspire the children to reach their maximum potential (23).

Access to the information and communication technologies: The access to the ICT includes the availability of devices, the connectivity, and the digital skills necessary to integrate them in the learning processes. The educational digital gap creates disadvantages among the students who count with limited technological resources, which affects their performance and academic participation. Recent investigations demonstrate that having devices and an adequate connection is related with better learning opportunities (24) and that the digital literacy, together with the institutional support, are fundamental to take maximum advantage of their potential (25).

In this context, the ICT are a key element in the university formation, since they facilitate the access to resources, foment the collaboration, and potentiate the investigation, which has a positive impact in the academic performance (26). In addition, they promote the interaction among students, teachers, and educational communities through forums, videoconferences, and social networks, creating spaces of exchange and feedback that reinforce the learning (27).

Conditions of habitability: The conditions of habitability encompass the material and environmental aspects of the living environment such as housing, sanitation, security, and access to basic services that impact directly in the capacity of the students to learn and perform academically. An adequate environment favors the concentration, the attendance to classes, and the participation in formative activities, while precarious conditions generate stress, absenteeism, and low performance.

In this sense, it has been demonstrated that a stable and secure housing relates with better educational results (28) and that the access to basic services and to a domestic space propitious for the study contribute to the educational equity (29). Likewise, the habitability constitutes a key factor in the economic and academic development, since an appropriate environment permits rest, concentration, and continuity in the learning process, while deficient conditions represent significant barriers (30). Elements such as the illumination, the noise, the temperature, and the ventilation influence in the capacity of concentration, equally as the availability of basic services, whose absence limits both the academic performance and the essential tasks of the daily life (31).

Conceptualization of the institutional variables (teachers, classroom size, scholarships) that influence in the academic performance

In the sphere of the factors that influence in the academic performance, the institutional variables play a crucial role. The investigations indicate that the participation of the teachers has a significant impact in the academic performance of the students, and that the interest of the parents also plays a positive role.

In addition, the institutional factors, such as the favorable learning facilities and the proportion between teachers and students, correlate positively with the academic

performance of the students. It has been demonstrated that the large size of the classes influences negatively in the academic performance of the students, which limits their learning opportunities, while a good psychological environment in the classes improves the academic results.

Teachers: The implication of the educators has a crucial effect in the academic performance of the students, even surpassing factors such as the institutional management. The individual benefits provided to the teachers such as the selection of students, permits, recognition, economic incentives, and non-monetary rewards reinforce their commitment and participation, which impacts in a positive manner in the student performance both in the short and in the long term (32).

The quality of the teaching, the qualifications, the experience, and the pedagogical methods utilized affect directly the learning and the motivation of the students. Studies demonstrate that the well-trained teachers and who employ attractive teaching strategies, timely feedback, and additional support improve the comprehension and the academic results (33). In equal manner, the establishment of positive relations, an effective communication, and a support environment in the classroom relate with greater levels of participation and academic success, consolidating the teaching labor as a fundamental pillar in the educational trajectory (34).

Classroom size: The size of the class and the management of the classroom have a direct impact in the academic performance. Studies highlight that the more reduced classes promote a personalized attention, a greater participation, and an effective interaction between students and teachers, which is translated into a better academic performance. In contrast, in numerous classes the individualized attention and the learning opportunities are reduced, creating environments...

MATERIALS AND METHODS

To address the objective of this quantitative study, primary data were collected from 2,007 students from the Faculty of Political and Administrative Sciences at UNACH during the 2024-25 academic term. A survey instrument consisting of 24 closed-ended questions describing the various dimensions of academic performance was administered.

The dimensions included Economic Factors, with 5 items exploring perceptions of income, technology access, and educational costs; Social Variables, with 4 items analyzing the influence of relationships, family environment, and social support; Institutional Variables, with 5 items focused on teaching quality, resources, and faculty support; Family Variables, with 5 items investigating parental education level and household climate; and finally, Individual Variables, with 5 items addressing study habits and personal well-being.

Data processing was conducted using an Ordinal Logit or Probit model, where the dependent variable—representing cumulative grade point average (GPA)—is ordinal in nature and categorized into four specific levels: Category 1 encompasses GPAs between 6.1 and 7; Category 2 includes GPAs between 7.1 and 8; Category 3 comprises GPAs between 8.1 and 9;

and Category 4 represents GPAs above 9. The explanatory variables were operationalized across the 5 dimensions mentioned above.

Mathematical Expression of the Model

Let Y_i be the observed ordinal dependent variable for individual i (cumulative GPA), with K ordered categories. We assume that cumulative GPA is a categorization of an unobserved continuous latent variable, Y_i^* .

The relationship between the latent variable and the explanatory variables is defined as follows:

$$Y_i^* = \beta_0 + \beta_1 X_{1,i} + \beta_2 X_{2,i} + \beta_3 X_{3,i} + \beta_4 X_{4,i} + \beta_5 X_{5,i} + \beta_6 X_{6,i} + \beta_7 X_{7,i} + \beta_8 X_{8,i} + \beta_9 X_{9,i} + \beta_{10} X_{10,i} + \beta_{11} X_{11,i} + \beta_{12} X_{12,i} + \beta_{13} X_{13,i} + \beta_{14} X_{14,i} + \beta_{15} X_{15,i} + \beta_{16} X_{16,i} + \beta_{17} X_{17,i} + \beta_{18} X_{18,i} + \beta_{19} X_{19,i} + \beta_{20} X_{20,i} + \beta_{21} X_{21,i} + \beta_{22} X_{22,i} + \beta_{23} X_{23,i} + \beta_{24} X_{24,i} + \varepsilon_i$$

Where:

- Y_i^* : is the latent variable (cumulative GPA) for individual i .
- β_j : are the coefficients to be estimated for each explanatory variable.
- ε_i : is the random error term.

X (Explanatory / Independent Variables): Each $X_{j,i}$ represents one of the independent variables for student i , which are:

Variable	Description
$X_{1,i}$	Income status
$X_{2,i}$	Education quality
$X_{3,i}$	Class size
$X_{4,i}$	Access to educational resources
$X_{5,i}$	Faculty support
$X_{6,i}$	Infrastructure support
$X_{7,i}$	Parents' education level
$X_{8,i}$	Household emotional climate
$X_{9,i}$	Parental involvement in university education
$X_{10,i}$	Household culture
$X_{11,i}$	Household size effect
$X_{12,i}$	Income effect
$X_{13,i}$	Schedule frequency
$X_{14,i}$	Study time
$X_{15,i}$	Concentration level
$X_{16,i}$	Sleep quality
$X_{17,i}$	Exercise frequency
$X_{18,i}$	Educational resources available at home
$X_{19,i}$	Employment effect
$X_{20,i}$	Educational cost effect

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$X_{21,i}$	Peer effect
$X_{22,i}$	Family environment effect
$X_{23,i}$	Teacher effect
$X_{24,i}$	Social pressure effect

RESULTS

Marginal effects of the Probit model by performance categories

Regarding the access to educational resources for each category it is interpreted:

- Category 1 (Average 6.1-7): An increase in the access to educational resources is associated with an increase of approximately 2.84 percentage points in the probability that a student has an average in this range.
- Category 2 (Average 7.1-8): An increase in the access to educational resources is associated with an increase of approximately 4.91 percentage points in the probability that a student has an average in this range.
- Category 3 (Average 8.1-9): An increase in the access to educational resources is associated with a decrease of approximately 4.50 percentage points in the probability that a student has an average in this range.
- Category 4 (Average >9): An increase in the access to educational resources is associated with a decrease of approximately 3.25 percentage points in the probability that a student has an average in this range.

Regarding the effects of the cost of the education for each category it is interpreted:

- Category 1 (Average 6.1-7): An increase in the perceived effects of the cost of the education is associated with an increase of approximately 1.73 percentage points in the probability that a student has an average in this range.
- Category 2 (Average 7.1-8): An increase in the perceived effects of the cost of the education is associated with an increase of approximately 2.98 percentage points in the probability that a student has an average in this range.
- Category 3 (Average 8.1-9): An increase in the perceived effects of the cost of the education is associated with a decrease of approximately 2.73 percentage points in the probability that a student has an average in this range.
- Category 4 (Average >9): An increase in the perceived effects of the cost of the education is associated with a decrease of approximately 1.98 percentage points in the probability that a student has an average in this range.

The income situation reflects that:

- Category 1 (Average 6.1-7): An increase in the income situation (assuming that a higher value is a better situation) is associated with an increase of approximately 1.75 percentage points in the probability that a student has an average in this range.
- Category 2 (Average 7.1-8): An increase in the income situation is associated with an increase of approximately 3.02 percentage points in the probability that a student has an average in this range.

- Category 3 (Average 8.1-9): An increase in the income situation is associated with a decrease of approximately 2.77 percentage points in the probability that a student has an average in this range.
- Category 4 (Average >9): An increase in the income situation is associated with a decrease of approximately 2.00 percentage points in the probability that a student has an average in this range.

While in the variable educational resources in the home, it is interpreted that:

- Category 1 (Average 6.1-7): An increase in the educational resources in the home is associated with a decrease of approximately 1.74 percentage points in the probability that a student has an average in this range.
- Category 2 (Average 7.1-8): An increase in the educational resources in the home is associated with a decrease of approximately 2.99 percentage points in the probability that a student has an average in this range.
- Category 3 (Average 8.1-9): An increase in the educational resources in the home is associated with an increase of approximately 2.74 percentage points in the probability that a student has an average in this range.
- Category 4 (Average >9): An increase in the educational resources in the home is associated with an increase of approximately 1.99 percentage points in the probability that a student has an average in this range.

DISCUSSION

The general literature, represented by (1) and (2), postulates a direct and positive relation between a greater family income and a better academic performance, suggesting that the economic stability facilitates the dedication to the study. However, the results of their Probit model present a notable contradiction: the variable "Income situation" shows a negative coefficient, indicating that an increase in the incomes (or a better situation) is associated with a greater probability of being in inferior categories of performance. Similarly, the "Effects of the educational costs" perceived also associate negatively with the performance. This divergence is a critical finding that suggests a particular dynamic in their population, where socioeconomic factors apparently advantageous do not translate into a better academic performance, which requires a profound review of the underlying hypotheses or of the coding of the variables.

Authors such as (3) and (4) emphasize consistently the crucial role of the parental schooling as a positive predictor of the performance and the university persistence, influencing in the support and the expectations in the home. In contrast, their Probit model found that the variable "Educational levels of the parents" was not statistically significant. This absence of significance in a factor so traditionally influential is one of the most striking divergences with the literature, suggesting that, for their specific population, other factors could be mediating or annulling the direct effect of the educational level of the progenitors.

The literature of (5) links the access to ICT with a greater participation and performance, while (6) highlights the negative impact of the lack of digital skills. Their

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results show an interesting duality: the variable "Access to educational resources" presents a negative coefficient, which, equally as the income, associates counterintuitively with a greater probability of lower performances. This differs directly from Dávila and López and suggests that the simple access does not guarantee an effective use, or even could imply distractions. Nevertheless, the variable "Educational resources in the home" does show a positive and significant coefficient, aligning with the idea that a family environment with available study materials favors the performance.

The investigation of (7) and (8) highlights the influence of the housing conditions in the well-being and academic performance. Their model, although it does not include a direct variable of "overcrowding", does show that "Educational resources in the home" and a positive "Family environment effect" associate with a better performance, which aligns with the importance of a propitious environment for the study and the emotional well-being. Regarding the family support, (9) underline the importance of the emotional support. In consonance, their model validates the positive significance of the "Family environment effect". However, the variable "Peer effect" resulted negative, which could contradict the notion of positive support networks, and the non-significance of the "emotional climate of the home" or "involvement of the parents" also merits a reflection. On the other hand, the prediction of (10) about the potential negative of high parental expectations not supported does not have a direct confirmation in their model with a significant variable.

Regarding the labor insertion, (11) indicate a negative impact with high loads of work. Their model corroborates it upon finding that the "Effect of working" has a negative and significant coefficient, which validates the notion that the employment during the studies is a factor that can compromise the performance. In relation with the geographic origin, (13) highlights the challenges for rural students, while (14) emphasize the positive role of mentoring programs. Their model does not include direct variables for the geographic origin, but the implications of the support networks (although the "Peer effect" is negative) and the family environment are indirectly relevant. The "career" also emerges as a negative factor, suggesting that certain disciplines or academic trajectories can present greater challenges for the success.

CONCLUSIONS

The analysis confirmed that the academic performance in the Faculty of Political and Administrative Sciences of the UNACH responds to a multifactorial model in which socioeconomic, family, institutional, and individual variables interact. The Probit model demonstrated greater explanatory capacity than the Logit, evidencing that this type of statistical tools are pertinent to study complex educational phenomena and avoid simplistic interpretations.

The results showed that, although factors such as the work during the studies reduce the performance and the educational resources in the home together with the family environment potentiate it, also counterintuitive findings emerged. A better income situation or a greater access to resources did not always translate into a superior

performance, which indicates that the socioeconomic conditions do not act in a linear manner and require a differentiated analysis by career and context.

Key determinants were identified as the negative effect of the work and of the educational costs, as well as the positive effect of the educational resources in the home, the teacher support, and the family environment. These findings permit concluding that the academic performance does not depend uniquely on the economic incomes, but on the interaction between family capital, study conditions, and institutional accompaniment, which demands from the university to design more focalized support policies to attend to students in situation of vulnerability.

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