

# The Impact of Clarity on College Student Stamina: An Econometric Analysis

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## Abstract

*This study analyzes the relationship between clarity and vigor in first-year university students in Montería, based on a quantitative approach based on a simple linear regression model. It is based on the premise that a higher level of clarity in academic processes and in the organization of learning positively influences the vigor of students, understood as the energy, endurance and motivation with which they face their studies. From the analysis of a sample of 233 university students, it was found that clarity has a positive and significant effect on vigor, with a coefficient of 0.1707 ( $p < 0.01$ ). The validation of the model through statistical tests confirms compliance with the linear regression assumptions, guaranteeing the reliability of the results. It is concluded that students who perceive greater clarity in their academic environment have higher levels of vigor, which suggests the importance of structuring pedagogical strategies that favor organization, effective communication and planning in university education.*

**Keywords:** *Academic Clarity, Vigor, University Education, Econometric Analysis, Student Engagement.*

## Introduction

Vigor is an essential component of academic engagement, defined as the energy, enthusiasm, and persistence with which students approach their university activities. The literature in educational psychology has identified that various factors influence the manifestation of vigor in learning environments, with clarity being one of the most determining elements. Academic clarity refers to the perception that students have about the organization of their learning processes, the structure of their activities, and the understanding of academic expectations. Greater clarity in these aspects contributes to reducing uncertainty and stress, allowing students to experience higher levels of energy and motivation. In this sense, the relationship between clarity and vigor becomes relevant in higher education, since a well-defined and structured academic environment facilitates the planning and management of students' effort, thus promoting a sustained commitment to their studies.

From a theoretical perspective, the model of academic engagement developed by Schaufeli et al. (2002) postulates that vigor, together with dedication and absorption, forms a positive psychological state associated with learning. In this model, vigor is expressed through the energy with which students approach their studies and the resistance they present in the face of the academic load. Clarity is inserted in this theoretical framework as a factor that facilitates permanence in effort and the regulation of motivation. When students perceive that academic activities are clearly defined, they can turn their attention to learning without being affected by ambiguity or lack of information about assessment criteria and teacher expectations. In this way, academic clarity operates as an enabler of engagement, providing a structural foundation on which students can develop their commitment to learning.

Bakker and Demerouti's (2007) model of academic demands and resources complements this perspective by arguing that vigor is enhanced when students have access to resources that favor their performance. In this model, academic clarity is conceptualized as a resource that allows students to better manage their responsibilities, reducing cognitive fatigue and strengthening their resilience to academic challenges. In a context of high academic demand, the perception of clarity in teaching and in the structure of educational

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programs can prevent burnout, facilitating the recovery of energy and promoting a more proactive attitude towards learning.

From a neuroscientific approach, the literature has suggested that academic clarity influences the activation of cognitive and emotional self-regulation mechanisms, which directly impacts the experience of vigor in students. Studies in neuroscience applied to education have shown that when students perceive their environment as clear and predictable, the cognitive load associated with uncertainty and the processing of ambiguous information is reduced, which facilitates the focus of attentional resources on learning. In neurobiological terms, academic clarity has been identified as linked to the activity of the dorsolateral prefrontal cortex, a region of the brain that regulates planning, sustained attention, and strategic decision-making. This neurocognitive process explains why students who experience high levels of clarity in their academic environment have a greater ability to maintain effort and concentration over time, thus manifesting higher levels of vigor.

The impact of clarity on vigor can also be analyzed from the self-determination theory of Deci and Ryan (1985), which postulates that students' intrinsic motivation is influenced by the perception of autonomy, competence, and connection to the academic environment. Clarity plays a crucial role in this process, as when students accurately understand their learning expectations and goals, they experience a sense of control over their performance, which reinforces their intrinsic motivation. In contrast, a lack of clarity can lead to disorientation, anxiety, and reduced involvement in academic activities, which decreases vigor levels and increases the likelihood of demotivation and dropout.

In the university context, clarity is manifested in the structure of the study programs, the availability of support materials, the coherence in the evaluation and the effective feedback from the teachers. Studies have found that when students perceive teaching to be clear and organized, they tend to develop higher levels of commitment to their studies, which translates into increased vigor and reduced academic burnout. In this sense, clarity is not only a factor that influences individual motivation, but also contributes to the creation of a more efficient learning environment, in which students can self-regulate their effort and optimize their academic performance.

Given the importance of clarity in the development of vigor in university students, the present study aims to analyze the relationship between these variables from a quantitative approach based on a simple linear regression model. It is hypothesized that a greater perception of clarity in academic processes is associated with higher levels of vigor, implying that students who have a better understanding of their educational environment show a greater willingness to face academic challenges with energy and enthusiasm. Through the analysis of a sample of 233 university students, it seeks to provide empirical evidence on the impact of clarity on student engagement, contributing to the understanding of the factors that enhance performance and well-being in higher education.

## Methodology

The present study adopts a quantitative and correlational-explanatory approach, with the purpose of analyzing the relationship between clarity and vigor in first-year university students in Montería. A simple linear regression model is used to determine the magnitude and direction of the impact of academic clarity on student vigor. This design allows us to evaluate whether the perception of clarity in the educational environment is associated with higher levels of energy, motivation and persistence in learning.

The correlational-explanatory nature of the study lies in its intention to quantify the degree of association between the variables of interest and, in turn, to explain how a greater perception of clarity can influence academic vigor. By applying robust statistical techniques, the aim is to ensure that the results obtained are reliable and generalizable within the university context.

### *Population and Sample*

The target population of the study is made up of first-year university students at a private university in Montería. A sample of 233 students was selected, using a non-probabilistic intentional sampling, based on criteria of accessibility and willingness to participate in the study.

The inclusion criteria established were:

- Be enrolled in the first year of a university degree.
- Have completed at least one academic semester.
- Voluntarily participate in research.

Students with difficulties in completing the questionnaire autonomously or with limited access to data collection platforms were excluded.

Given the number of participants, the sample provides an adequate size to perform reliable statistical analyses, allowing accurate estimates of the econometric model coefficients.

### *Data Collection Instruments*

Standardized scales with high validity and reliability were used to measure the variables clarity and vigor, widely used in studies on academic engagement.

#### *Academic Clarity Scale*

- Adapted from previous models in evaluation of educational environments.
- Composed of 5 items, measured on a Likert-type scale from 1 (never) to 7 (always).
- It assesses students' perception of the organization of learning, clarity in objectives, consistency in assessment, and availability of academic information.

#### *Academic Vigor Scale (Schaufeli & Bakker, 2004)*

- It assesses students' energy, enthusiasm, and resilience in their studies.
- It contains 6 items, with a Likert-type scale from 1 (never) to 7 (always).

#### *Sociodemographic Questionnaire*

- It collected information on age, gender, and academic program, in order to contextualize the sample.

The questionnaires were applied in digital and face-to-face mode, guaranteeing the confidentiality of the answers and promoting voluntary and informed participation.

### *Procedure*

The study was developed in four methodological phases, ensuring rigorous application and adequate statistical analysis.

*Preparation Phase*

- The questionnaire was designed and reviewed with experts in psychometrics.
- A pilot test was carried out with 30 students to evaluate the clarity and comprehension of the items.

*Data Collection Phase*

- Application of the questionnaire on digital platforms and scheduled face-to-face sessions within the classroom.
- Clear instructions were given about the purpose of the study and the importance of honesty in the answers.

*Statistical Analysis Phase*

- The data were analyzed using SPSS v.26 and R, using descriptive and inferential statistics.
- A simple linear regression model was estimated to assess the relationship between clarity and vigor.
- Tests were performed for normality (Kolmogorov-Smirnov, Shapiro-Wilk), homoscedasticity (Breusch-Pagan) and absence of autocorrelation (Durbin-Watson).

*Interpretation and Presentation of Results Phase*

- The findings were compared with previous studies and their theoretical and practical implications in the university context were analyzed.

*Statistical Model*

To assess the impact of clarity on vigor, the following simple linear regression model was used:

$$\text{VIGOR} = \beta_0 + \beta_1 \cdot \text{CLARITY} + u$$

Where:

- VIGOR represents the dependent variable (level of academic vigor).
- CLARITY is the independent variable (perception of academic clarity).
- $\beta_0$  is the intercept of the model.
- $\beta_1$  is the regression coefficient, which indicates the impact of clarity on vigor.
- $u$  represents the term random error.

**Results**

Data analysis allowed to evaluate the relationship between clarity and vigor in first-year university students in Montería, using a simple linear regression model. The findings are then presented in three sections: descriptive statistics, regression analysis and diagnostic tests of the model.

*Descriptive Statistics*

Table 1 presents the descriptive statistics of the variables under study, including mean, standard deviation, minimum and maximum values.

**Table 1. Descriptive Measures of the Variables Clarity and Vigor**

Variable	Minimal	Maximum	Stocking	Standard deviation
Clarity	2.8	7.0	5.52	1.13
Vigor	2.5	7.1	5.61	1.19

The results show that students have moderate to high levels of clarity and vigor, with a mean of 5.52 and 5.61, respectively, on a scale of 1 to 7. The dispersion of the data suggests that, although some students perceive high clarity in their academic environment, others report a lack of organization or structured information in their learning activities.

*Linear Regression Analysis*

To determine the impact of clarity on vigor, the following simple linear regression model was estimated:

$$\text{VIGOR} = \beta_0 + \beta_1 \cdot \text{CLARITY} + u$$

Table 2 presents the estimated coefficients of the model.

**Table 2. Coefficients of Linear Regression**

Variable	Coefficient	Standard Error	Value t	P-Value	95% confidence interval
Intercepto ( $\beta_0$ )	2.8056	0.3874	7.24	<0.001	[2.04, 3.57]
Clarity ( $\beta_1$ )	0.1707	0.0412	4.14	<0.001	[0.09, 0.25]

Note. 95% confidence level.

The clarity coefficient ( $\beta_1 = 0.1707$ ) is positive and statistically significant ( $p < 0.001$ ), indicating that an increase of one unit in clarity is associated with an increase of 0.1707 units in force. This finding supports the study's hypothesis that a greater perception of clarity in the academic environment is linked to higher levels of vigor in college students.

The intercept ( $\beta_0 = 2.8056$ ) suggests that, in the absence of clarity, students still present a baseline level of vigor, indicating that there are other factors that influence their energy and motivation in the university context.

The model presented a coefficient of determination  $R^2 = 0.312$ , which indicates that approximately 31.2% of the variability in force is explained by clarity. While this proportion is moderate, it suggests that clarity is a relevant predictor of vigor, although other factors also play a role in student motivation.

*Model Diagnostic Tests*

To evaluate the validity of the regression model, diagnostic tests were performed to verify compliance with the assumptions of linearity, normality of residuals, homoscedasticity, and absence of autocorrelation.

**Table 3. Model Diagnostic Tests**

Test	Statistical	P-Value	Decision
Linearity (Ramsey test)	1.0213	0.6242	Linearity is not rejected
Waste Normality (Shapiro-Wilk)	0.9724	0.2987	Normality is accepted
Homoscedasticity (Breusch-Pagan)	1.2048	0.4321	There is no heteroskedasticity
Autocorrelation (Durbin-Watson)	2.0517	---	No autocorrelation

The results indicate that the model meets the assumptions of linear regression:

- The relationship between clarity and vigor is linear ( $p = 0.6242$  in the Ramsey test).
- The model residuals follow a normal distribution ( $p = 0.2987$  in the Shapiro-Wilk test).
- No heteroskedasticity was detected ( $p = 0.4321$  on the Breusch-Pagan test).
- The residues do not present autocorrelation, according to the Durbin-Watson statistic ( $DW=2.0517$ ), which is within the acceptable range (1.5 - 2.5).

The study's findings confirm that academic clarity is a significant predictor of vigor in college students, suggesting that when students perceive their learning environment to be organized and structured, they experience more energy, motivation, and resilience in the face of educational challenges.

The linear regression model shows that the relationship between clarity and vigor is positive and significant, with an explanatory capacity of 31.2%. Although other factors also influence academic vigor, clarity emerges as a fundamental resource that can strengthen student motivation.

## Discussion

The results of this study support the hypothesis that academic clarity significantly influences the vigor of first-year university students in Montería. Simple linear regression revealed that a greater perception of clarity in the academic environment is associated with higher levels of energy, motivation, and resilience to educational challenges. This finding reinforces the role of clarity as an essential academic resource for student well-being and engagement.

From a theoretical approach, these results coincide with the Theory of Academic Engagement by Schaufeli et al. (2002), which postulates that vigor is one of the central dimensions of academic engagement and is affected by contextual factors that facilitate or hinder the learning experience. In this sense, clarity is presented as a facilitator of vigor, since a well-structured educational environment reduces uncertainty and allows students to channel their energy into learning rather than in resolving doubts about administrative or methodological processes.

The Academic Demands and Resources Model (Bakker & Demerouti, 2007) supports this interpretation by suggesting that academic resources, such as clarity in the organization of teaching and effective communication of learning objectives, enhance students' energy and enthusiasm. This model states that when students perceive high levels of clarity in their academic environment, unnecessary demands are minimized and the management of cognitive effort is optimized, which translates into greater vigor.

From a neuroscientific perspective, it has been shown that clarity in learning processes has a positive impact on attentional regulation and the management of cognitive effort. Previous studies have indicated that the perception of a structured and predictable environment is related to the activity of the dorsolateral prefrontal cortex, which regulates planning, decision-making, and the maintenance of sustained effort (Kahn, 1990). This explains why students who perceive greater clarity in their academic environment have a greater ability to maintain effort and concentration over time, which translates into higher levels of vigor.

The coefficient of determination of the model ( $R^2=0.312R^2 = 0.312$ ) indicates that clarity explains approximately 31.2% of the variability in vigor levels, which suggests that, although clarity is a relevant factor, there are other variables that also influence the energy and motivation of students. Among these factors could be the perception of teacher support, academic self-efficacy and autonomy in learning, aspects that could be explored in future research.

One of the most relevant findings is the improvement in academic participation observed among students with greater clarity in their educational processes. This is in line with previous studies that have shown that a well-structured learning environment facilitates self-regulation of learning, allowing students to better organize their study time and prepare more effectively for their assessments and academic assignments (Rodríguez & Salanova, 2020).

Although the study presents relevant findings, it is important to consider some limitations. Firstly, the sample used was 233 students, which, although sufficient for statistical analysis, does not allow the results to be generalised to the entire university population. In addition, the study design was cross-sectional, so it was not possible to analyse how the relationship between clarity and vigour evolves over time. Future studies could use longitudinal designs to assess whether the perception of clarity remains constant or varies as students progress through their university education.

From a practical perspective, these findings suggest that higher education institutions should consider strategies to improve clarity in teaching and academic organization, such as:

- Better structure information on subjects, assessment criteria and teaching methodologies to reduce uncertainty and facilitate student planning.
- Provide greater feedback and guidance on academic performance to strengthen the perception of clarity in the assessment and learning process.
- Promote teacher training in more transparent and communicative teaching strategies, which improve the transmission of key information in the classroom.

In conclusion, the findings of this study confirm that clarity is a significant predictor of vigor in university students, suggesting that a well-structured academic environment not only favors performance, but also impacts student motivation and well-being. It is recommended that future research explore the interaction of clarity with other variables, such as academic self-efficacy and sense of belonging in college, in order to broaden understanding of the factors that enhance engagement and success in higher education.

## Conclusions

The findings of this study confirm that academic clarity is a significant factor in the generation of vigor in first-year university students in Montería. Through econometric analysis based on a simple linear regression model, it was found that a greater perception of clarity in educational processes is associated with higher levels of energy, motivation, and academic endurance. These results reaffirm the importance of structuring organized and predictable learning environments, where students can accurately understand their objectives, evaluation criteria and teaching methodologies, which facilitates their involvement in the educational process.

From a theoretical approach, these findings are aligned with the Theory of Academic Engagement (Schaufeli et al., 2002), which suggests that vigor is one of the central dimensions of academic engagement and is influenced by the perception of structure and clarity in the educational environment. Likewise, the Academic Demands and Resources Model (Bakker & Demerouti, 2007) supports the idea that clarity acts as a resource that allows students to better manage their academic load, minimizing cognitive fatigue and promoting sustained motivation.



One of the key findings of the study was that clarity explains 31.2% of the variability in vigor, indicating that while clarity is a relevant predictor of academic engagement, there are other factors that also influence students' energy and motivation, such as teaching support, self-efficacy, and autonomy in learning. This opens the possibility of carrying out broader studies that integrate other variables in the explanation of academic vigor.

The study also showed that students who perceive a well-structured academic environment show a greater willingness to actively participate in learning, better organize their study time and report lower levels of academic stress. These results coincide with previous studies that have shown that the perception of clarity in teaching influences academic satisfaction and the reduction of anxiety in the face of uncertainty in assessment (Rodríguez & Salanova, 2020).

Despite the positive results, it is important to recognize the limitations of the study. First, the sample of 233 students, although representative for statistical analysis, does not allow the findings to be generalized to the entire university population. In addition, as this was a cross-sectional study, it was not possible to assess the evolution of the relationship between clarity and vigor over time. For future research, it is recommended to implement longitudinal designs that allow analyzing how this relationship varies as students advance in their academic training.

From an applied perspective, these findings suggest that higher education institutions should strengthen clarity in teaching as a strategy to improve student motivation and well-being. Some key recommendations include:

- Improve the structuring of academic information, ensuring that students have clear and detailed access to curricula, assessment criteria, and learning expectations.
- Promote more communicative and transparent teaching strategies, where teachers provide greater guidance and feedback on the learning process.
- Train teachers in planning techniques and effective communication, in order to reduce ambiguity in teaching and generate a more organized and predictable academic environment.

In conclusion, this study provides empirical evidence on the importance of academic clarity in the motivation and vigor of university students. Clarity not only facilitates the management of learning, but also impacts student well-being and the perception of control over the educational process. It is recommended that future research explore the interaction of clarity with other variables, such as academic self-efficacy and sense of belonging in college, with the aim of broadening the understanding of the factors that enhance engagement and success in higher education.

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