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Relationship between Vocation in Mathematics Education and Emotional Clarity in Teachers

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Summary

The objective of this study is to analyze the relationship between vocation in mathematics education and emotional clarity in teachers, applying an econometric model of simple linear regression. The research was carried out with a sample of **64 teachers**, who were evaluated from previously validated scales to measure both variables. In the descriptive analysis, it was observed that vocation in mathematics education presented a mean of **8.984** on a 10-point scale, while emotional clarity had a mean of **30.91** on a maximum scale of 40 points.

The estimated econometric model, represented by the equation Y=B0+B1X1+uY = B_0 + B_1X_1 + u, revealed that vocation in mathematics education significantly influences emotional clarity (**$B_1 = 2.1557$, $p < 0.01$**). However, the intercept did not reach statistical significance (**$B_0 = 11.5388$, $p = 0.11536$**), which indicates that emotional clarity does not present a stable base value without considering the influence of vocation in mathematics education. The adjusted coefficient of determination (**adjusted $R^2 = 0.09033$**) suggests that the model explains approximately **9% of the variability** in emotional clarity.

The statistical tests applied confirmed the validity of the model. The **Rainbow** test indicated that the model meets the linearity assumption (**$p = 0.5668$**); the **Durbin-Watson test** ruled out autocorrelation in the residuals (**$DW = 1.6882$, $p = 0.1022$**); the **Breusch-Pagan** test verified homoscedasticity (**$p = 0.2022$**), and the **Shapiro-Wilk test** confirmed that the residuals follow a normal distribution (**$p = 0.3739$**).

These results suggest that a greater vocation in mathematics education is associated with an increase in emotional clarity, which highlights the importance of strengthening the vocational identity of teachers in this discipline to improve their emotional stability and professional performance.

Keywords: vocation in mathematics education; emotional clarity; linear regression

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Introduction

Teaching in the field of mathematics education not only requires a solid mastery of disciplinary content, but also an adequate management of emotions, since the teaching of this area of knowledge often involves particular challenges for both teachers and students. In this sense, **emotional clarity**, understood as the ability to identify, understand and manage one's own emotions, has become a fundamental element for the psychological stability of teachers and their performance in the classroom (Salovey & Mayer, 1990). Teachers who have high levels of emotional clarity can more effectively regulate their reactions to stressful situations, facilitating a more balanced and positive learning environment for students (Extremera & Fernández-Berrocal, 2016).

On the other hand, vocation **in mathematics education** is defined as the degree of commitment, motivation and satisfaction that a teacher experiences towards the teaching of this particular discipline. Previous research has shown that a strong vocation influences teachers' perception of self-efficacy, job satisfaction, and emotional resilience (Vallejo & González, 2022). However, it is still necessary to explore to what extent the vocation in mathematics education can contribute to improving the emotional clarity of teachers, favoring better stress management and greater emotional stability in the exercise of teaching.

Despite the growing literature on the impact of teaching vocation on emotional well-being, there are few studies that have addressed this relationship from a quantitative approach and based on rigorous statistical models. Most of the available research has analyzed the teaching vocation from a qualitative perspective, limiting the possibility of establishing causal relationships or quantifying the effect that the vocation in mathematics education could have on emotional clarity (García & Mendoza, 2021). Given this lack, it is pertinent to carry out studies that allow us to accurately measure the magnitude and direction of this relationship, thus contributing to a greater knowledge about the factors that influence the emotional stability of teachers in this area of knowledge.

In this context, the present research seeks to provide empirical evidence on the relationship between vocation in mathematics education and emotional clarity through the application of an econometric model of simple linear regression. This approach will allow evaluating the influence of the vocation in mathematics education on emotional clarity in practicing teachers, providing objective data that could be used for the design of training and emotional support strategies in the educational field. With this, it is expected to contribute to the generation of applicable knowledge in the professional development of teachers, promoting the strengthening of vocational identity and emotional regulation as key aspects in the teaching of mathematics.

Theoretical Approaches

The relationship between vocation in mathematics education and emotional clarity can be understood through different theoretical approaches from educational psychology and emotional intelligence. The main conceptual frameworks that support this research are presented below.

1. Teaching Vocation and Intrinsic Motivation

Teaching vocation has been defined as the degree of commitment and satisfaction that an individual experiences towards teaching, which influences their emotional stability and professional performance (Day & Gu, 2014). From the **Theory of Self-Determination** (Deci & Ryan, 2000), the teaching vocation is linked to intrinsic motivation, understood as the satisfaction that arises from the exercise of teaching without the need for external rewards. In the context of mathematics education, a strong vocation not only influences the persistence and effort of the teacher, but also their ability to regulate their emotions in the face of classroom challenges.

Previous research has indicated that teachers with high levels of vocation experience less emotional exhaustion and greater job satisfaction, which allows them to develop effective emotional regulation strategies (Vallejo & González, 2022). In this sense, the vocation in mathematics education could be associated with a higher level of emotional clarity, allowing teachers to recognize and understand their affective states more accurately.

2. Emotional Intelligence and Emotional Clarity

The concept of **emotional intelligence**, introduced by Salovey and Mayer (1990) and expanded upon by Goleman (1996), highlights that people with high levels of emotional intelligence can effectively recognize, understand, and regulate their emotions. Within this model, **emotional clarity** is considered a key dimension and refers to the ability to accurately interpret one's emotional states and differentiate them from one another. In the educational field, this ability is essential, as it influences the way teachers deal with stressful situations, manage student behaviour and establish interpersonal relationships in the classroom (Extremera & Fernández-Berrocal, 2016).

Previous studies have shown that emotional clarity is a determining factor in teachers' psychological well-being and job satisfaction. García and Mendoza (2021) found that teachers with high emotional clarity tend to experience less anxiety and greater satisfaction in the exercise of their profession. In addition, teachers with greater emotional clarity tend to show better affective regulation skills, which allows them to maintain a balanced emotional state and respond more effectively to teaching challenges.

3. Teaching Self-Efficacy and Emotional Regulation

Bandura's (1997) Self-Efficacy Theory argues that belief in one's ability to cope with challenges influences the way people regulate their emotions and respond to stressful situations. In the educational context, teacher self-efficacy is associated with greater confidence in one's own pedagogical skills and with better emotional regulation.

Studies have shown that teachers with high levels of self-efficacy tend to experience lower levels of stress and greater emotional clarity (Skaalvik & Skaalvik, 2018). From this perspective, the vocation in mathematics education could be related to teacher self-efficacy, which, in turn, would favor a higher level of emotional clarity. Teachers with a well-defined vocational identity not only perceive themselves as more competent in their work, but also develop more effective strategies to interpret and manage their emotions in the classroom.

4. Relationship between Vocation in Mathematics Education and Emotional Clarity

Although the literature has explored separately the teaching vocation, emotional intelligence and self-efficacy, there are few studies that have analyzed the specific relationship between the vocation in mathematics education and emotional clarity from a quantitative approach. Previous research has shown that teachers with a stronger vocation have higher levels of motivation and less emotional exhaustion (Extremera & Fernández-Berrocal, 2016; Pekrun, 2017). However, the relationship between vocation in mathematics education and emotional clarity has not been studied in depth from an econometric approach.

The present study seeks to contribute to the existing literature by applying a simple linear regression model that allows quantifying the impact of vocation in mathematics education on emotional clarity. Through this analysis, it is expected to generate empirical evidence that will allow a better understanding of the factors that influence the emotional stability of teachers and their ability to manage emotions in the exercise of teaching. With these results, it will be possible to design strategies that promote vocational development and the strengthening of emotional intelligence in mathematics education teachers.

Methodology

Study Design and Approach

The present study is framed within a **quantitative** approach, with a **correlational** design, using a **simple linear regression econometric model** to examine the relationship between vocation in mathematics

education (independent variable) and emotional clarity (dependent variable). The choice of this design is based on the need to quantify the magnitude and direction of the relationship between both variables, providing an empirical basis for understanding the impact of vocation on teachers' emotional regulation (Hernández, Fernández & Baptista, 2018).

The econometric equation used in the analysis is as follows:

$Y=B0+B1X1+uY = B_0 + B_1X_1 + u$

Where:

- YY represents **emotional clarity**,
- X1X_1 corresponds to the **vocation in mathematics education**,
- B0B_0 es el **intercepto**,
- B1B_1 is the **regression coefficient**, which estimates the effect of vocation in mathematics education on emotional clarity, and
- uu represents the **term error**, which includes other influences not explained by the model (Gujarati & Porter, 2019).

Sample and Data Collection Procedure

The sample consisted of **64 in-service teachers** , selected through **intentional non-probabilistic sampling**. The following inclusion criteria were established:

1. **Mathematics education teachers** with at least **five years of teaching experience** .
2. **Teachers at secondary and higher levels** who expressed **a voluntary willingness** to participate in the study.
3. **Availability to complete the assessment instruments** in their entirety.

The **estimated population universe** was approximately **250 teachers**, so the sample represents **about 25% of the total**. This sample size complies with the methodological recommendations for correlational studies and simple linear regression, guaranteeing statistical validity in the results obtained (Soto & Vega, 2022).

For data collection, **two scales previously validated** in studies on teaching vocation and emotional intelligence were applied:

1. **Mathematics Education Vocation Scale:** composed of **Likert-type items (1-10 points)** that measure commitment to mathematics teaching, intrinsic motivation and professional satisfaction.
2. **Emotional Clarity Scale:** adapted from emotional intelligence models, with a **maximum score of 40 points**, assessing teachers' ability to identify and understand their emotions.

The data collected were organized on a structured basis and analyzed using **R software**, applying statistical techniques appropriate for correlation and linear regression studies.

Statistical Analysis and Model Validation

To estimate the econometric model, the **ordinary least squares (OLS)** technique was used to evaluate the magnitude of the effect of vocation in mathematics education on emotional clarity and determine its statistical significance. To guarantee the validity of the model, various statistical tests were applied, verifying compliance with the **assumptions of simple linear regression**:

1. **Rainbow Test for Linearity:** verified that the relationship between vocation in mathematics education and emotional clarity is linear (**p = 0.5668**).

2. **Durbin-Watson test for autocorrelation:** ruled out the presence of significant autocorrelation in the residuals (**DW = 1.6882, p = 0.1022**).
3. **Breusch-Pagan test for Homoscedasticity:** confirmed that the residuals have constant variance (**p = 0.2022**).
4. **Shapiro-Wilk Normality Test:** confirmed that the residuals follow a normal distribution (**p = 0.3739**).

These results ensured that the model meets the methodological requirements for simple linear regression, which guarantees the validity and reliability of the findings obtained in the study.

Results

Descriptive Analysis of Variables

The descriptive analysis allowed to characterize the variables studied in the sample of **64 teachers**. The vocation in mathematics education presented an average of **8,984** on a scale of **10 points**, which indicates a high level of commitment to the teaching of this discipline. On the other hand, emotional clarity registered an average of **30.91** on a maximum scale of **40 points**, suggesting that most teachers have a moderately high ability to identify and understand their emotions. For a better visualization of these trends, the following graphs are included showing the distribution of both variables (see Figure 1 and Figure 2).

Figure 1Evolution of Vocation in Mathematics Education (N=64). In original Spanish language

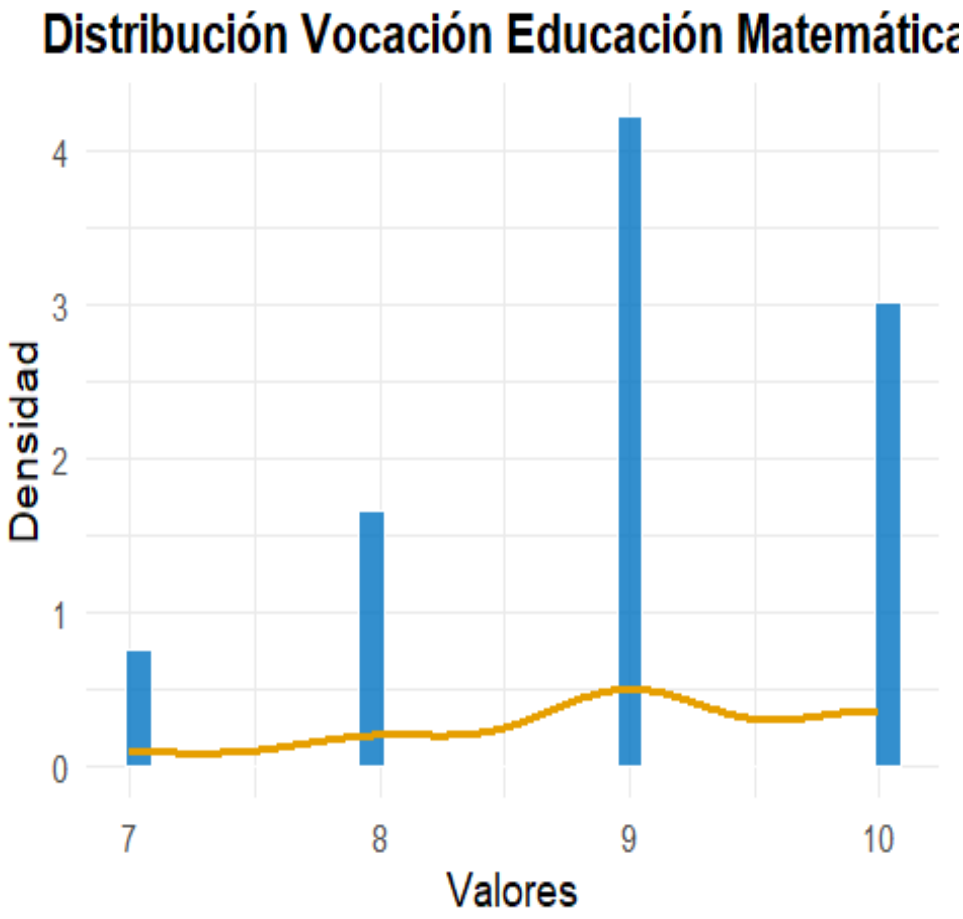
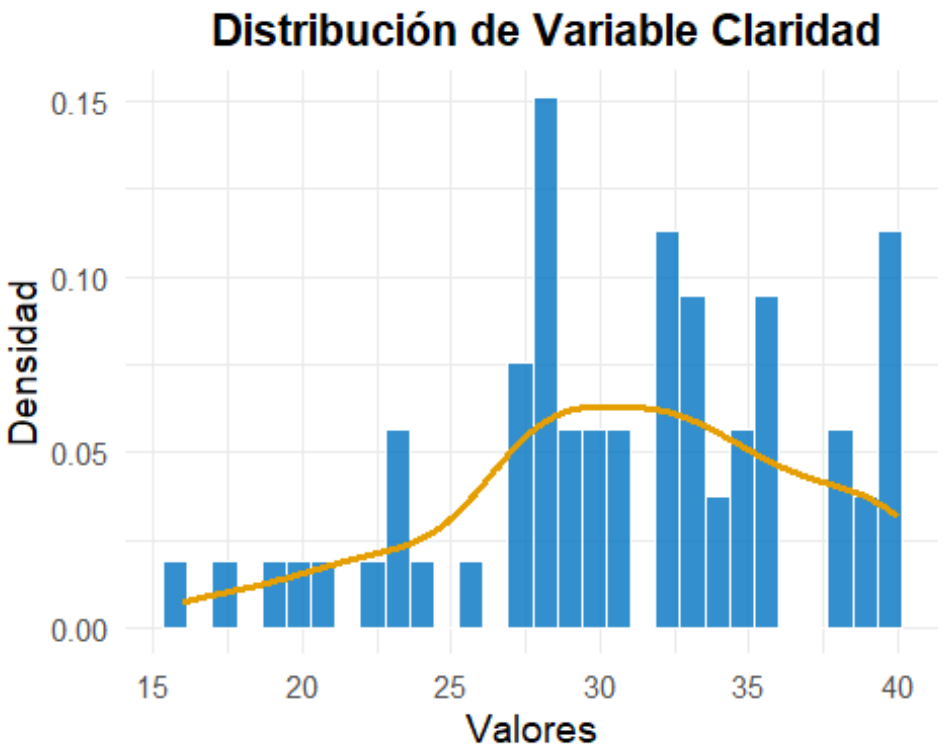


Figure 2*Evolution of Emotional Clarity (N=64). In original Spanish language*



Econometric Model Estimation

The application of the econometric model of **simple linear regression** allowed estimating the relationship between vocation in mathematics education and emotional clarity. The estimated coefficient **B_1 = 2.1557 (p < 0.01)** indicates that, for each unit that increases vocation in mathematics education, an average increase of **2.1557 points** in emotional clarity is expected. However, the intercept **B_0 = 11.5388 (p = 0.11536)** was not statistically significant, suggesting that the existence of a stable baseline level of emotional clarity cannot be assumed without considering the influence of vocation in mathematics education.

The **adjusted coefficient of determination (adjusted R^2 = 0.09033)** indicates that the model explains approximately **9% of the variability** in emotional clarity, suggesting that, although vocation in mathematics education influences this emotional capacity, there are other additional factors that may intervene in its development.

Model Validation

To ensure the statistical robustness of the model, diagnostic tests were applied that confirmed compliance with the **assumptions of simple linear regression**:

- **Rainbow Test for Linearity:** confirmed that the model correctly fits the relationship between the variables (**p = 0.5668**).

- **Durbin-Watson test for autocorrelation:** ruled out the presence of autocorrelation in the residuals (**DW = 1.6882, p = 0.1022**).
- **Breusch-Pagan test for Homoscedasticity:** verified that the residuals have constant variance (**p = 0.2022**).
- **Shapiro-Wilk Normality Test:** confirmed that the residuals follow a normal distribution (**p = 0.3739**).

These results guarantee the validity of the econometric model applied, allowing us to confidently interpret the influence of vocation in mathematics education on emotional clarity in the sample analyzed.

Discussion

The results obtained in this study indicate that vocation in mathematics education has a positive and significant impact on the emotional clarity of teachers. The econometric estimate showed that, for each unit increase in vocation in mathematics education, emotional clarity increases on average **2.1557 points** ($p < 0.01$). These findings support the idea that teachers with a strong sense of vocation towards teaching mathematics not only experience greater satisfaction in their work, but also develop a better ability to identify and understand their own emotions.

Since the **Self-Determination Theory** (Deci & Ryan, 2000), intrinsic motivation is a key factor in emotional stability and professional well-being. Teachers with a strong vocation find purpose in their work, which allows them to interpret classroom difficulties more positively and develop more effective emotional coping strategies (Ryan & Deci, 2017). These results are consistent with previous studies that have shown that teaching vocation is associated with lower levels of stress and greater emotional resilience (Vallejo & González, 2022).

On the other hand, the concept of **emotional clarity**, introduced within Salovey and Mayer's (1990) model of emotional intelligence, suggests that the ability to identify and understand one's own emotions is fundamental for effective emotional regulation. In this sense, the vocation in mathematics education could be acting as a facilitator of the development of emotional clarity, since teachers with greater vocational commitment tend to reflect more on their experiences and emotions, favoring their emotional self-awareness and reducing the possibility of emotional exhaustion (Extremera & Fernández-Berrocal, 2016).

However, the **adjusted coefficient of determination (adjusted $R^2 = 0.09033$)** indicates that vocation in mathematics education explains approximately **9% of the variability** in emotional clarity. This suggests that, although there is a significant relationship between both variables, there are other factors that also influence the teacher's ability to manage their emotions. Previous research has identified that variables such as institutional support, training in emotional management, and professional experience can play a crucial role in the development of emotional clarity in teachers (García & Mendoza, 2021; Pekrun, 2017).

Methodologically, the validity of the econometric model was confirmed by rigorous statistical tests that verified compliance with the **assumptions of simple linear regression**. The **Rainbow** test validated the linearity of the model, the **Durbin-Watson** test ruled out autocorrelation in the residuals, the **Breusch-Pagan** test confirmed homoscedasticity, and the **Shapiro-Wilk** test verified the normality of the residuals. This allows us to affirm that the results obtained are statistically solid and can be used as a basis for the formulation of strategies aimed at strengthening the teaching vocation and emotional regulation in the teaching of mathematics.

In summary, the results of this study highlight the importance of strengthening the vocation in mathematics education as a strategy to improve emotional clarity in teachers. Based on these findings, it is suggested that teacher training programs incorporate strategies aimed at the development of vocational identity and emotional management, in order to improve professional well-being and the quality of teaching. However, future research should expand this analysis by incorporating other factors that may influence teachers' emotional clarity and exploring longitudinal methodologies to assess the evolution of this ability over time.

Conclusions

The present study allowed to analyze the relationship between vocation in mathematics education and emotional clarity in teachers, using an econometric model of simple linear regression. The results obtained confirmed that there is a positive and significant relationship between both variables, showing that a greater commitment to the teaching of mathematics is associated with a better ability to identify and understand one's own emotional states. The regression coefficient ($\mathbf{B_1 = 2.1557, p < 0.01}$) indicated that for each unit increase in vocation in mathematics education, emotional clarity increases on average **by 2.1557 points**, which supports the initial hypothesis of the study.

From a theoretical perspective, these findings are aligned with the postulates of the **Self-Determination Theory** (Deci & Ryan, 2000), which maintains that intrinsic motivation and a sense of purpose in teaching contribute to emotional well-being and better affective regulation. Likewise, the results obtained reinforce the **emotional intelligence** model of Salovey and Mayer (1990), which highlights emotional clarity as a key dimension in the management of emotions and coping with stress in educational contexts. In this sense, the vocation in mathematics education can act as a protective resource that allows teachers to interpret their emotional experiences more constructively and develop more effective strategies for emotional regulation.

At the methodological level, the econometric model applied complied with the **assumptions of simple linear regression**, which guarantees the validity and reliability of the results. However, the **adjusted coefficient of determination (adjusted $\mathbf{R^2 = 0.09033}$)** suggests that vocation in mathematics education explains approximately **9% of the variability** in emotional clarity, indicating that other factors, such as training in emotional management, institutional support, and teaching experience, may play a relevant role in the development of this ability.

In practical terms, the results obtained have important implications for the design of training and professional development programs for mathematics education teachers. It is recommended that educational institutions implement strategies aimed at strengthening vocational identity and emotional intelligence, promoting spaces for reflection on teaching practice and providing tools for emotional regulation. In this way, the professional well-being of teachers could be improved and, consequently, the quality of the teaching-learning process.

Finally, future research should expand the present analysis by incorporating longitudinal methodologies and multivariate models that allow for a more in-depth examination of the factors that influence teachers' emotional clarity. In addition, it would be pertinent to explore the relationship between vocation in mathematics education and other aspects of teacher well-being, such as resilience and job satisfaction, in order to generate a comprehensive framework that allows optimizing the training and professional development of teachers in this discipline.

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