



Relationship between Vocation in Mathematics Education and Emotional Repair Capacity in Teachers

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Summary

The objective of this study is to analyze the relationship between vocation in mathematics education and emotional repair capacity in teachers, using a simple linear regression econometric model. 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 repair capacity had a mean of **32.59** on a maximum scale of 40 points.

The estimated econometric model, represented by the equation $Y=B_0+B_1X_1+u$ $= B_0 + B_1X_1 + u$, revealed that vocation in mathematics education significantly influences the capacity for emotional repair ($B_1 = 1.7181$, $p < 0.05$). Likewise, the intercept ($B_0 = 17.1581$, $p < 0.05$) was statistically significant, indicating that the capacity for emotional repair presents a baseline level independent of vocation in mathematics education. However, the adjusted coefficient of determination (**adjusted $R^2 = 0.06387$**) suggests that the model explains approximately **6.3% of the variability** in emotional repair capacity, indicating that there are other factors that may influence this emotional capacity.

The statistical tests applied confirmed the validity of the model. The **GVLMA** test indicated that the model meets the assumptions of simple linear regression ($p = 0.27516$); the **Ramsey RESET** test verified that the model has a correct functional specification ($p = 0.3514$); the **Rainbow test** confirmed the linearity of the model ($p = 0.6911$); the **Durbin-Watson test** ruled out autocorrelation in the residuals ($DW = 1.7702$, $p = 0.1753$); the **Breusch-Pagan** test verified homoscedasticity ($p = 0.9491$).

These results suggest that a greater vocation in mathematics education is associated with an increase in the capacity for emotional repair, 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 repair; linear regression

Received: 11 April 2024

Revised: 22 May 2024

Accepted: 02 June 2024

Introduction

The exercise of teaching, especially in the field of mathematics education, not only requires a technical mastery of the discipline, but also emotional skills that allow them to face the challenges of the classroom in a balanced and effective way. One of the key aspects of teachers' emotional regulation is **the capacity for emotional repair**, defined as the ability to recover from negative emotional states and reconfigure the affective state in a positive way (Salovey & Mayer, 1990). This ability is fundamental in the teaching of mathematics, where teachers often face stressful situations derived from the complexity of the content, the learning difficulties of the students, and the pressure to ensure a successful training process (Extremera & Fernández-Berrocal, 2016).

On the other hand, vocation **in mathematics education** refers to the degree of commitment, motivation and satisfaction that a teacher experiences towards the teaching of this discipline. Previous studies have shown that teachers with a well-defined vocation tend to experience lower levels of emotional exhaustion, greater resilience, and better management of their emotions in challenging educational contexts (Vallejo & González, 2022). However, the relationship between vocation in mathematics education and the capacity for emotional repair has not yet been widely explored from a quantitative approach based on statistical models.

Although the literature on teacher well-being has identified factors such as self-efficacy, intrinsic motivation, and institutional support as elements that influence the emotional stability of teachers (García & Mendoza, 2021), it is still necessary to empirically evaluate to what extent vocation in mathematics education can act as a protective factor against emotional exhaustion. In this sense, the present research seeks to provide empirical evidence on the relationship between vocation in mathematics education and emotional repair capacity through the application of an econometric model of simple linear regression.

This approach will allow estimating the magnitude of the effect of vocation in mathematics education on the capacity for emotional repair, providing objective data that could be used in the formulation of strategies for training and emotional support in the educational field. It is hoped that the findings of this study will contribute to the understanding of the factors that influence the emotional regulation of teachers and in the design of vocational strengthening and emotional well-being programs in mathematics teachers.

Part Two: Theoretical Approaches

The relationship between vocation in mathematics education and the capacity for emotional repair can be analyzed from different theoretical approaches in educational psychology and emotional intelligence. The main conceptual frameworks that underpin this study are presented below.

1. Teaching Vocation and Intrinsic Motivation

The teaching vocation has been widely studied in the field of educational psychology and is associated with commitment, intrinsic motivation and professional satisfaction (Day & Gu, 2014). From the **Theory of Self-Determination** (Deci & Ryan, 2000), it is established that teachers with a stronger vocation tend to experience greater emotional well-being, since they find a purpose in their work and feel that their work contributes significantly to the development of their students. In the context of mathematics education, this vocational commitment can influence the way teachers face the challenges of teaching, promoting more effective strategies of emotional regulation and recovery of affective balance after negative experiences in the classroom.

Previous studies have found that teachers with high levels of vocation have lower levels of emotional exhaustion and higher job satisfaction rates, which favors their capacity for emotional repair (Vallejo & González, 2022). This suggests that vocational engagement not only impacts the quality of teaching, but also the psychological well-being of teachers.

2. Emotional Intelligence and Emotional Repair

The concept of **emotional intelligence**, introduced by Salovey and Mayer (1990) and expanded by Goleman (1996), argues that the ability to manage emotions effectively is fundamental for personal and professional well-being. Within this model, **emotional repair** is considered an essential element, as it allows individuals to recover from adverse emotional experiences and maintain a positive affective state.

In the educational field, emotional repair has been identified as a determining factor in the prevention of teacher burnout and the development of effective coping strategies for work-related stress (Extremuera & Fernández-Berrocal, 2016). Teachers with a greater capacity for emotional repair can interpret negative experiences more constructively and generate adaptive responses that favor their emotional stability in the classroom.

3. Teaching Self-Efficacy and Emotional Regulation

Bandura's (1997) Self-Efficacy Theory postulates that confidence in one's own abilities influences the way people face challenges and regulate their emotions. In the educational context, teacher self-efficacy is directly related to emotional regulation, since teachers who perceive that they have a high level of competence to teach mathematics also tend to manage stress better and to maintain a positive attitude in the face of difficulties in the teaching-learning process.

Previous research has shown that self-efficacy in teaching mathematics is associated with greater emotional stability and a lower risk of professional burnout (Skaalvik & Skaalvik, 2018). From this perspective, the vocation in mathematics education could act as a factor that reinforces the teacher's self-efficacy and, consequently, the capacity for emotional repair.

4. Relationship between Vocation in Mathematics Education and Emotional Reparation

Although the literature has extensively addressed the impact of teaching vocation and emotional intelligence on teachers' well-being, there are few studies that have explored the specific relationship between vocation in mathematics education and the capacity for emotional repair from a quantitative approach. Previous research has shown that teachers with a clear vocational identity have higher levels of resilience and more effective coping strategies in the face of stressful situations in the classroom (Extremuera & Fernández-Berrocal, 2016; Pekrun, 2017).

The present study seeks to contribute to this line of research through the application of a simple linear regression model, which will allow quantifying the influence of vocation in mathematics education on the capacity for emotional repair. Based on these findings, it will be possible to develop teacher training and accompaniment strategies aimed at strengthening the professional vocation and improving emotional management in the exercise of teaching.

Methodology

Study Design and Approach

This study adopted a **quantitative** approach with a **correlational** design, applying a **simple linear regression econometric model** to examine the relationship between vocation in mathematics education (independent variable) and emotional repair capacity (dependent variable). The choice of this design is based on the need to quantify the impact of vocation in mathematics education on emotional repair, thus allowing conclusions to be drawn based on empirical evidence (Hernández, Fernández & Baptista, 2018).

The econometric equation used in the analysis is as follows:

$$Y=B_0+B_1X_1+u \quad Y = B_0 + B_1X_1 + u$$

Where:

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

Sample and Data Collection Procedure

The sample consisted of **64 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 Reparation Scale:** adapted from emotional intelligence models, with a **maximum score of 40 points**, assessing teachers' ability to recover from negative emotions and maintain an affective balance.

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 the capacity for emotional repair 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. **GVLMA (Global Validation of Linear Model Assumptions) test:** allowed simultaneous evaluation of the assumptions of normality, homoscedasticity, functional specification and linearity (**p = 0.27516**).
2. **Ramsey RESET test:** verified that the model has a correct functional specification (**p = 0.3514**).
3. **Rainbow Test for Linearity:** confirmed that the relationship between vocation in mathematics education and emotional repair is linear (**p = 0.6911**).
4. **Durbin-Watson test for autocorrelation:** ruled out the presence of significant autocorrelation in the residuals (**DW = 1.7702, p = 0.1753**).
5. **Breusch-Pagan test for Homoscedasticity:** confirmed that the residuals have constant variance (**p = 0.9491**).

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, the capacity for emotional repair registered an average of **32.59** on a maximum scale of **40 points**, which suggests that most teachers have a moderately high capacity to recover from negative emotional states. To visualize these trends, the evolution graphs of both variables are presented (see Figure 1 and Figure 2).

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

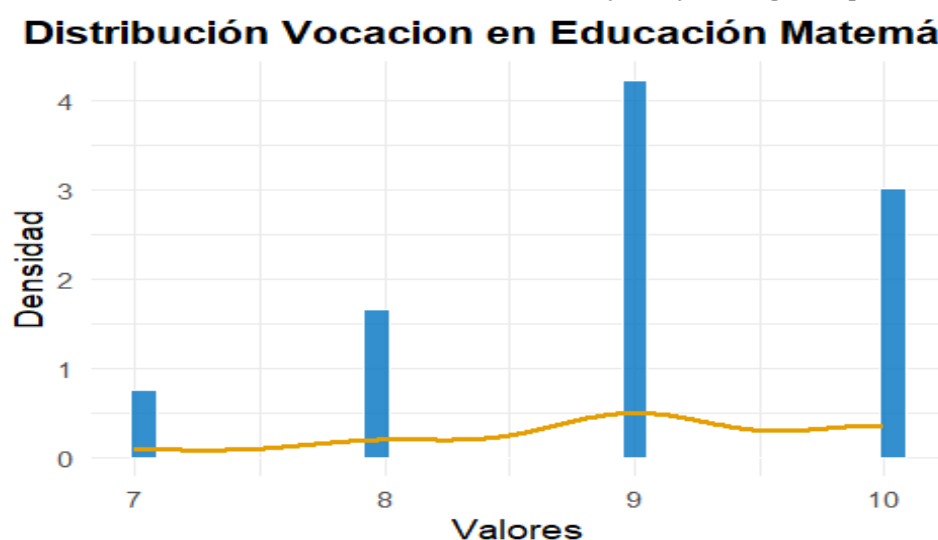
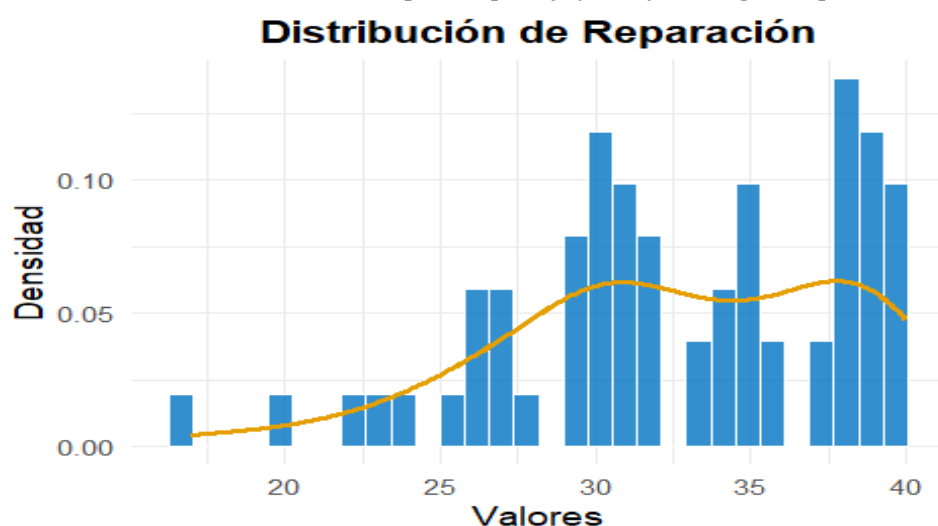


Figure 2 Evolution of the Emotional Repair Capacity (N=64). in original Spanish language



Econometric Model Estimation

The application of the econometric model of **simple linear regression** allowed estimating the relationship between vocation in mathematics education and the capacity for emotional repair. The estimated coefficient **$B_1 = 1.7181$ ($p < 0.05$)** indicates that, for each unit that increases vocation in mathematics education, an average increase of **1.7181 points** in emotional repair capacity is expected. Likewise, the

intercept $B_0 = 17.1581$ ($p < 0.05$) was statistically significant, suggesting that emotional repair presents an important baseline level, even in the absence of a high vocation in mathematics education.

The **adjusted coefficient of determination (adjusted $R^2 = 0.06387$)** indicates that the model explains approximately **6.3% of the variability** in emotional repair capacity. This suggests that, although the vocation in mathematics education influences emotional repair, there are other additional factors that can intervene in the development of this emotional capacity.

Model Validation

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

- **GVLMA (Global Validation of Linear Model Assumptions) test**: validated that the model meets the assumptions of normality, homoscedasticity, and functional specification ($p = 0.27516$).
- **Ramsey RESET test**: verified that the model has a correct functional specification ($p = 0.3514$).
- **Rainbow Test for Linearity**: confirmed that the model correctly fits the relationship between the variables ($p = 0.6911$).
- **Durbin-Watson test for autocorrelation**: ruled out the presence of autocorrelation in the residuals ($DW = 1.7702$, $p = 0.1753$).
- **Breusch-Pagan test for Homoscedasticity**: verified that the residuals have constant variance ($p = 0.9491$).

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

Discussion

The results obtained in this study show that vocation in mathematics education significantly influences teachers' capacity for emotional repair. The econometric analysis showed that for each additional unit in the vocation in mathematics education, the capacity for emotional repair increases by **1.7181 points** ($p < 0.05$), which confirms the existence of a positive relationship between both variables. These findings support the initial hypothesis of the study and reinforce the idea that teachers with a stronger vocation in their discipline have a greater ability to manage and recover their emotional balance after negative experiences in the classroom.

From the **Self-Determination Theory** (Deci & Ryan, 2000), it is proposed that intrinsic motivation and professional commitment have a direct impact on emotional stability. In this context, vocation in mathematics education can act as a protective factor against emotional exhaustion, since teachers who find deep meaning in their educational work tend to develop more effective strategies to cope with the stress and difficulties of teaching (Ryan & Deci, 2017). This finding is consistent with previous studies that have shown that teaching vocation is associated with higher levels of resilience and a lower propensity for emotional exhaustion (Vallejo & González, 2022).

Likewise, the **Theory of Emotional Intelligence** by Salovey and Mayer (1990) maintains that the capacity for emotional repair is a fundamental skill for the regulation of emotions. In this sense, teachers with a clear vocation in mathematics education may experience greater emotional self-awareness, which allows them to interpret teaching challenges more constructively and apply more effective coping strategies (Extremera & Fernández-Berrocal, 2016).

However, the adjusted coefficient of determination (**adjusted $R^2 = 0.06387$**) suggests that vocation in mathematics education explains only **6.3% of the variability** in emotional repair capacity. This indicates that other factors also influence this capacity, such as training in emotional management, institutional support, teaching experience, and the socioeconomic context in which the educational work is carried out.

(García & Mendoza, 2021). Consequently, although vocation in mathematics education is a relevant factor in the emotional regulation of teachers, it is not the only determinant of the capacity for emotional repair.

Methodologically, the validity of the econometric model was confirmed by rigorous diagnostic tests. The **GVLMA test** ensured compliance with the linear regression assumptions, the **Ramsey RESET test** verified the correct functional specification of the model, and the **Breusch-Pagan test** confirmed homoscedasticity in the residuals. These results ensure that the model used in this study is statistically robust and that the findings can be interpreted with confidence.

In practical terms, these results have important implications for the training and professional development of mathematics teachers. It is recommended that teacher training programs include strategies aimed at strengthening the professional vocation, as well as the development of emotional regulation skills. The implementation of workshops on stress management, emotional intelligence and teacher well-being could contribute to improving teachers' capacity for emotional repair and, consequently, optimize the quality of the teaching-learning process.

Finally, future research should explore the relationship between vocation in mathematics education and emotional repair in larger samples and with more complex methodological designs, such as multivariate regression models or longitudinal studies. It would also be pertinent to analyze how other variables, such as organizational climate, social support, and job satisfaction, can mediate or moderate this relationship. In this way, it will be possible to obtain a more complete overview of the factors that influence the emotional stability of teachers and their impact on mathematics education.

Conclusions

The results obtained in this study show that vocation in mathematics education significantly influences teachers' capacity for emotional repair. The estimated econometric model revealed that an increase in vocation in mathematics education is associated with an increase in emotional repair capacity ($B_1 = 1.7181$, $p < 0.05$), suggesting that teachers with a high commitment to teaching this discipline have a greater predisposition to regain their emotional balance after stressful situations in the classroom.

From a theoretical perspective, these findings are aligned with the **Self-Determination Theory** (Deci & Ryan, 2000), which postulates that intrinsic motivation and a sense of purpose in the profession contribute to emotional well-being and the effective regulation of emotions. In addition, the results support the **emotional intelligence** model of Salovey and Mayer (1990), in which the capacity for emotional repair is one of the key dimensions to manage stress and promote psychological well-being.

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 $R^2 = 0.06387$)** indicates that vocation in mathematics education explains approximately **6.3% of the variability** in emotional repair capacity, which suggests the existence of other relevant factors that also influence this ability. Variables such as training in emotional regulation, institutional support and teaching experience could play a determining role in the development of emotional coping strategies.

From a practical perspective, these findings underscore the importance of strengthening the vocation in mathematics education as a strategy to improve the emotional stability of teachers. It is recommended that educational institutions implement professional development programs focused on vocational identity and emotional intelligence, promoting the psychological well-being of teachers and optimizing the quality of the teaching-learning process.

Finally, future research should expand this analysis by incorporating multivariate regression models and longitudinal methodologies that allow examining the evolution of emotional repair capacity in teachers over time. It would also be pertinent to explore the impact of contextual factors, such as the institutional environment and social support, on the relationship between vocation in mathematics education and

emotional stability. This will contribute to the design of more effective educational policies for teacher training and well-being.

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