Revista Educación, 2026, 50(1), enero-junio

ISSN: 0379-7082 / e-ISSN 2215-2644

Revisión bibliográfica

DOI: http://doi.org/10.15517/revedu.v50i1.3531

Negative Teachers' Experience with Mathematics: Literature Review 2010-2024

Experiencias Negativas de Profesores con las Matemáticas: Revisión de la literatura 2010-2024

Blanca Yareli Pérez Torres
Universidad Autónoma de Guerrero
Chilpancingo de los Bravo, Guerrero, México
16454309@uagro.mx (Correspondencia)
https://orcid.org/0009-0007-3076-2056

Yuridia Arellano García
Universidad Autónoma de Guerrero
Acapulco de Juárez, Guerrero, México
19452@uagro.mx
https://orcid.org/0000-0002-7841-1470

Recepción: 28 de marzo de 2025
Aceptado: 6 de agosto de 2025

¿Cómo citar este artículo?

Pérez Torres, B. Y., & Arellano García, Y. (2026). Negative Teachers' Experience with Mathematics: Literature Review 2010-2024. *Revista Educación*, *50*(1). http://doi.org/10.15517/revedu.v50i1.3531

Revista Educación, 2026, 50(1), enero-junio ISSN: 0379-7082 / e-ISSN 2215-2644

ABSTRACT

A comprehensive survey of existing literature on the adverse experience of teachers with mathematics was undertaken to assess current research. The literature review included studies published from 2010 to 2024. The PRISMA methodology was used to conduct a search across four databases which identified twenty-one articles that met the predetermined selection criteria. Throughout the review process, the concept of "mathematical redemption" emerged, providing a promising outlook for individuals who have previously struggled with mathematics during their educational journey. According to the findings, most research on negative mathematical experiences has focused on elementary teachers, which is also the educational level where the most significant negative experiences are reported. Interest in the investigation of instructor mathematical experiences increased significantly in 2022, particularly in Italy which published the highest volume of research. Nevertheless, the literature review identified a lack of studies specifically examining Mathematical Redemption. Instructors frequently encounter ongoing, unresolved negative experiences related to mathematics, which adversely affect their teaching methods and the mathematical understanding of their students. Therefore, it is recommended that future research consider examining the initial mathematical experience of teachers more comprehensively, in order to identify possible pathways for resolving their unfavorable experience. Such an approach would contribute to enhancing the conceptual and practical importance of mathematical redemption within the domain of mathematics education.

KEYWORDS: Systematic review, Negative experiences, Mathematical redemption, Teachers in training, Teachers in service.

RESUMEN

Se realizó una revisión sistemática de la literatura sobre las experiencias negativas del profesorado con las matemáticas para identificar su estado actual en la investigación, para esto se consideró el período que comprende del 2010 al 2024. Se utilizó el método PRISMA y la búsqueda de estudios se realizó en cuatro bases de datos donde 21 artículos cumplieron los criterios de selección. Durante el proceso, se encontró un fenómeno denominado Redención Matemática, el cual es esperanzador para quienes vivieron experiencias negativas con la disciplina durante su etapa estudiantil. Además, en lo que respecta a las experiencias negativas, se concluye que la investigación se centra en el profesorado de primaria, el mismo nivel en el que se reportan las experiencias más destacadas. En 2022, aumentó el interés por investigar las experiencias escolares con las matemáticas, siendo Italia el país donde estos estudios se han desarrollado con mayor frecuencia. Además, se confirma la ausencia de investigaciones centradas en la redención matemática. El principal hallazgo indica que el profesorado mantiene experiencias negativas persistentes que no han sido resueltas, lo que socava de manera considerable tanto sus prácticas de enseñanza como la calidad del

aprendizaje matemático de los estudiantes. Se recomienda que futuras investigaciones profundicen en las experiencias tempranas del profesorado con las matemáticas, a fin de reconocer posibles procesos de redención que fortalezcan el significado del fenómeno de la redención matemática en la educación matemática.

PALABRAS CLAVE: Revisión sistemática, Experiencias negativas, Redención matemática, Profesores en preservicio, Profesores en servicio.

INTRODUCTION

Over the years, people have come to categorize mathematics as a complex discipline, and in some cases as uninteresting or boring, due to various factors preventing a positive experience with it. Mathematical experiences are present for both teachers and students, and each experiences them differently, teachers especially experience them from two perspectives, as they were once students themselves, and these experiences could have been either pleasant or unpleasant. In this sense, within mathematical education, the study of teachers' school experiences with mathematics has been a topic of interest for research in the affective domain, particularly regarding negative experiences with the discipline and how these relate to their teaching practice.

In the literature, studies address various types of past school experiences of pre-service and in-service teachers with mathematics. However, systematic reviews have not been found that provide an overview of the current state of the topic, to show what the focus and direction, if any, of these research programs has been.

A systematic literature review often guides other researchers when tackling a research topic. Furthermore, it is essential to presenting a comprehensive overview of the current state of knowledge on a specific subject within a particular field. It also aims to pose and answer questions that non-systematic studies may not address (Page et al., 2021). In this case, a systematic literature review on teachers' negative school experiences would provide an overview on a relevant topic for the affective domain in mathematics education.

Regarding this, research on the emotional dimension of teachers (Coppola et al., 2012, 2013; Di Martino & Sabena, 2011; Di Martino et al., 2013; Lutovac & Kaasila, 2011) has explored the school experiences with mathematics reported by pre-service primary school teachers (generalist teachers) during their time as students. These studies show that most participants refer to negative experiences with mathematics, which in some cases undermine their resilience or, in others, trigger math anxiety. This often leads to a lack of self-reflection on these negative experiences and an avoidance of the process of mathematical redemption, which is understood as the desire to face the challenge of teaching mathematics later, based on a personal reconstruction of their relationship with the discipline (Di Martino et al., 2013).

Revista Educación, 2026, 50(1), enero-junio ISSN: 0379-7082 / e-ISSN 2215-2644

In this purport, authors such as Coppola et al. (2012, 2013) and Di Martino y Sabena (2011) highlight the importance of reversing the negative experiences with mathematics among future or in-service teachers. These experiences could impact their teaching practices and become a negative model for their students. The various emotional reactions an individual may have toward mathematics often stem from their learning experiences. These reactions tend to significantly influence people's beliefs and behavior toward mathematical tasks (De Faria, 2008) and foster a negative attitude toward the discipline, which is frequently triggered by poor experiences with mathematics due to interactions with bad teachers (Legañoa et al., 2017). This indicates that if a teacher experienced repeated negative encounters with mathematics during their time as a student, they are likely to reflect these experiences onto their students, ultimately affecting the teaching-learning process (Mora & Barrantes, 2008).

In his study, Gamboa-Araya (2016) presents, in descending order, what participants consider necessary to define a good teacher. The results (1) establishing a positive emotional environment, (2) having pedagogical training, (3) possessing suitable characteristics for classroom work, and (4) being competent in mathematics highlight the high value placed on teachers' socio-emotional skills. This suggests that a teacher's difficulty in creating a positive emotional environment in the classroom, stemming from their own negative experiences with mathematics, could lead to their students feeling aversion or fear toward the subject (Vieytes, 2009) producing negative experiences with mathematics for the students, as their attitudes and behaviors toward the subject are often shaped by emotional experiences (Quintanilla & Gallardo, 2020). If the emotional experience is negative, it can create a barrier that hinders mathematics´s the cognitive dimension (learning; Evans, 2000), perpetuating a cycle.

For this reason, it is essential to analyze teachers' emotional experiences and ensure they become aware of those they have lived through with mathematics. For example, elementary school teachers, who are generalists, typically do not specialize in teaching mathematics, even though they will need to teach this subject to their students, especially those who experienced failure during their time as students, as failure is both a cognitive and emotional construct (Lutovac, 2019). These negative experiences may influence how teachers approach the teaching of mathematics, reflecting their struggles in their instruction.

A characteristic case influenced by emotional experiences is attitudes toward mathematics (Quintanilla & Gallardo, 2020). If an individual's attitude toward a task is negative, they will likely avoid it (Stramel, 2010). Therefore, if it considered the task of teaching mathematics with a negative attitude, it can be inferred that the teacher will not enjoy it and will seek to avoid it at all costs.

In conclusion, the role of teachers' negative experiences is crucial for understanding the instructional practices of in-service teachers and the expectations of pre-service teachers. Therefore, as a starting point, it is necessary to conduct a literature review to provide a comprehensive overview of the last 14 years of research on teachers' emotional experiences with mathematics, both in pre-service

Revista Educación, 2026, 50(1), enero-junio ISSN: 0379-7082 / e-ISSN 2215-2644

and in-service contexts. This aims to answer the question: What is the current state of the literature on teachers´ negative school experiences with mathematics in pre-service and in-service contexts? To achieve this, the following objectives are established:

1. Identify the Type of research and data collection instruments used in these studies.
2. Recognize the countries, years, and participants targeted by the research.
3. Synthesize the main findings of the studies.
4. Identify advancements or proposals related to reflective processes that are functional when addressing negative experiences with mathematics.

METHOD

This review was conducted using the PRISMA method and followed three key stages: Literature selection (This included identification, initial screening, and eligibility assessment), Organization and analysis of literature (The literature was analyzed based on the established objectives), and presentation of results (The findings were compiled and presented in the results section).

Literature selection

Identification

Four databases were consulted to search specialized literature: SCOPUS, ERIC, Taylor and Francis, and Google Scholar. The search strategy utilized the following keywords in Spanish and English: Negative experiences in mathematics, failure in mathematics, resilience stories in mathematics, and mathematical redemption. These terms were chosen as they are likely to appear in studies about experiences with mathematics, focusing on negative experiences and the individual's ability to overcome such events, emphasizing the resolution of these negative experiences. Boolean operators AND and OR were used to combine these keywords effectively.

This phase is part of the first filter. For the identification of relevant documents, emphasis was placed on the title and keywords of the articles. The title had to include at least one of the keywords considered in the search or have relevance and coherence with the main topic of the review. Based on this, 58 documents were selected from Google Scholar, 23 from the ERIC database, and 14 from Taylor and Francis; meanwhile searching in SCOPUS returned no matches, as detailed in Figure 1.

Initial scanning

In this phase, the second filter, the abstract, introduction, and references were reviewed, following these inclusion criteria:

1. Temporality: Studies conducted between 2010 and 2024.
2. Disciplinary relevance: Focused on Mathematics Education, specifically regarding individuals' relationships with mathematical content.

Revista Educación, 2026, 50(1), enero-junio ISSN: 0379-7082 / e-ISSN 2215-2644

3. Thematic delimitation: Publications documenting a negative experience with mathematics.
4. Population and context: teachers in pre-service or in-service at any educational level.
5. Documentation sorting: research articles.
6. References: If a source in the review of the bibliographic references meets the previous criteria, it will be included based on the references, rather than the criteria from section *Identification*.

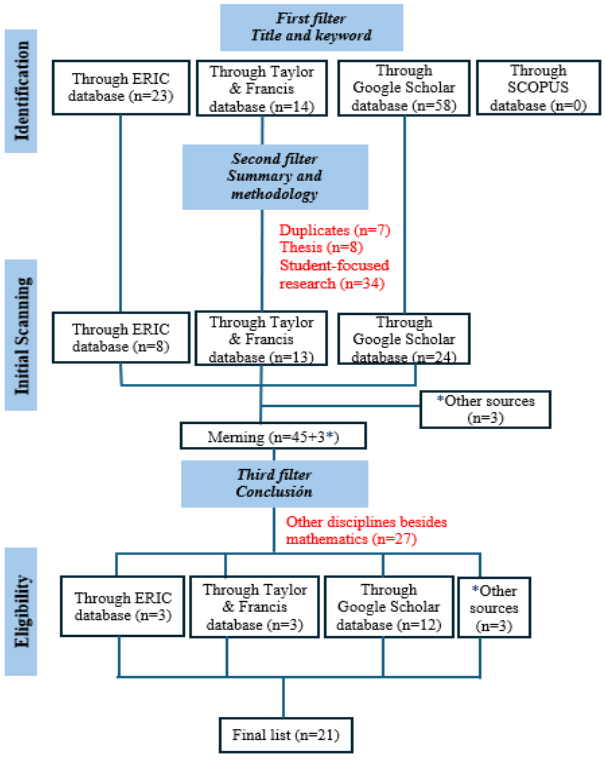
After this review, seven duplicated studies, eight thesis works, and 34 studies that focused on students as the population were excluded. Additionally, three references were included based on criterion 6 (Coppola et al., 2012; Di Martino et al., 2013; Lutovac, 2019). As a result, 24 documents from Google Scholar, eight from ERIC, and 13 from Taylor and Francis remained (see Figure 1).

Eligibility

This review emphasizes the relevance of the research report for mathematics education, as the central focus is on negative experiences with discipline. Figure 1 shows the distribution of the 21 articles that were deemed eligible.

Figure 1.

Literature selection flow-chart



Source: Developed by authors.

Revista Educación, 2026, 50(1), enero-junio ISSN: 0379-7082 / e-ISSN 2215-2644

Organization and literature analysis

A detailed reading of the selected articles was carried out according to the criteria. For this phase, the data from each article was organized in an Excel table by: Author(s), Year, Title, Research Problem and Justification, Objectives, Theoretical Framework, Methodology, Key Findings, and Conclusions. A second table was then created: Year, Country of origin of the data, Education level of the teachers who participated in the studies, Type of negative experience reported, and Research approach. From the process of constructing the previous tables, the information was gathered to answer the research question through the objectives of each study.

RESULTS

The methodological approach allowed for answering the question: What is the current state of the literature on teachers' negative school experiences with mathematics in pre-service and in-service contexts? The systematic review included 21 articles, which collectively highlight concerns regarding the relationship that both pre-service and in-service teachers, primarily at the primary education level (66.6% of the studies focus on this level), have had with mathematics. These teachers often had a predominantly negative relationship with the subject during their school years, and such negative experiences could be reflected in their teaching practice when delivering mathematics lessons.

The studies primarily focus on four types of negative experiences with mathematics: mathematical anxiety, crucial events, failure, and embarrassment. The data collection instruments used were mostly narrative, and Italy has been the country where these studies have been most frequently conducted. It is noted that the studies focus more on describing negative experiences than on reversing them. However, they do emphasize the impact and relevance of such a change.

First objective: Type of research and data collection tools

Qualitative-focused research is predominant, with 86% (n = 18) of the studies, while 14% (n = 3) use a mixed-methods approach. One of the justifications for using qualitative approaches is that they are favorable for this type of research, as they study the mental events of teachers, recognizing their experiences with mathematics throughout their school years. Additionally, they allow for identifying the appropriate tools to qualify these experiences. On the other hand, the mixed-method approach helps to study negative experiences' impact on teachers during their teaching practice.

For data collection instruments, narratives are used most frequently (n = 13), followed by semi-structured interviews (n = 8), and, in third place, questionnaires (n = 5). One of the justifications for using narratives is that they allow the interviewee-narrator to speak freely, and the interviewer can delve deeper into the informants' narratives to gain a broader and more detailed view of how mathematics has influenced the individual's life.

Revista Educación, 2026, 50(1), enero-junio ISSN: 0379-7082 / e-ISSN 2215-2644

Other instruments, such as Likert scales, collective dialogue, graphic and oral autobiography, drawings and metaphors, are also used but with a smaller percentage, as shown in **Table 3**.

Second objective: Countries, years and participants on whom the research focused

Italy has the most published studies on negative experiences with mathematics, with five publications. Finland and the USA each have three publications, Australia has two, and there is one report from each of the following countries: Germany, China, Indonesia, Mexico, New Zealand, Portugal, Turkey, and Chile.

In terms of participants, 67% (n = 14) are pre-service elementary school teachers, and 28% (n = 6) are future teachers studying for a degree specializing in mathematics. Lastly, one publication focuses on in-service middle school teachers. These studies are distributed across the publication years as shown in Figure 2. There is an increase in the number of studies published on negative experiences with mathematics among teachers between 2022 and 2023, with a rise in publications focused on future mathematics teachers at the higher education level. In the Table 1 shows each one of the authors, associated to the country where these researches were carried out, attached to each topic arranged.

Table 1.

Estadísticos descriptivos de la Escala Grit-O

Authors	Country	Topic arranged
Bekdemir (2010)	Turkey	Anxiety
Lutovac & Kaasila (2022)	Finland	Failure
Lutovac & Flores (2021)	Finland	Failure
Lutovac (2019)	Finland	Failure
Coppola et al. (2012)	Italy	Process of reflection or Mathematical redemption
Morselli & Cusi (2022)	Italy	Process of reflection or Mathematical redemption
Di Martino et al. (2013)	Italy	Process of reflection or Mathematical redemption
Coppola et al. (2013)	Italy	Process of reflection or Mathematical redemption
Carotenuto et al. (2022)	Italy	Process of reflection or Mathematical redemption
Wilson (2015)	Australia	Anxiety
Sanders et al. (2019)	Australia	Anxiety

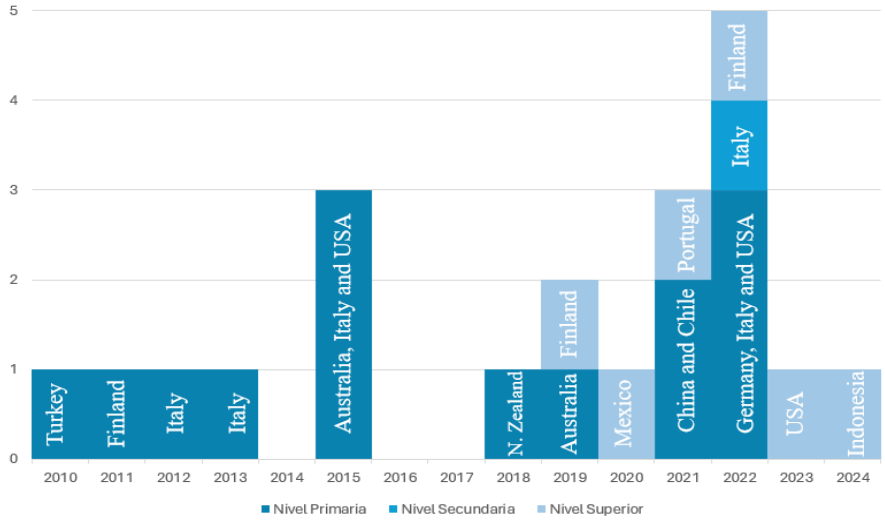
Revista Educación, 2026, 50(1), enero-junio ISSN: 0379-7082 / e-ISSN 2215-2644

Stoehr & Lawrence (2022)	USA	Anxiety
Stoehr (2015)	USA	Anxiety
Skultety et al. (2023)	USA	Crucial events
Ingram et al. (2018)	New Zealand	Crucial events
García-González & Martínez-Sierra (2020)	Mexico	Anxiety
Lo (2021)	China	Crucial events
Haas-Prieto & Reyes-Santander (2021)	Chile	Process of reflection or Mathematical redemption
Lutovac & Flores (2021)	Portugal	Failure
Jenßen et al. (2022)	Germany	Shame
Simamora & Darmayasa (2024)	Indonesia	Failure

Source: Developed by the author

Figure 2.

Articles about negative experiences with mathematics of teachers published in the 2010-2024 span



Source: Developed by authors.

Third objective: Main results summary

Four themes were identified in the reviewed articles that encompass the types of negative experiences studied:

Revista Educación, 2026, 50(1), enero-junio ISSN: 0379-7082 / e-ISSN 2215-2644

Crucial events

These events are the first negative encounters with mathematics that a person faces during their student years. They are crucial because they remain significant in the emotional component of the person who experiences them.

Mathematical anxiety

This refers to a set of negative emotions that manifest as a notably uncomfortable state, with associated physical symptoms like heart rate, in response to situations involving mathematical tasks.

Mathematical shame

These are social exposure events a person experiences in mathematics, which can cause isolation in the relationship between the individual and mathematics due to discomfort in the face of such exposure.

Failures in mathematics

These are unpleasant situations that can make a person feel inferior. Examples include failing an exam or competing with classmates in mathematical games. These situations, in turn, trigger negative emotions like disappointment and sadness.

The process of reflection or redemption

This process emerges when individuals experience adverse events with mathematics during their school years, leading to an aversion to the subject. Over time, these individuals may begin to reverse these negative experiences by reflecting on their relationship with mathematics.

Table 2 shows the distribution of these negative experiences across the studies by year of publication. It highlights that in 2022, there was an increase in publications about negative experiences, with crucial events and mathematical anxiety being the most frequently mentioned. The research has primarily focused on identifying negative experiences, with less emphasis placed on the concept of mathematical redemption, which is part of the reflection process.

Table 2.

Negative experiences sorting and publishing year

Year	Crucial events	Anxiety	Failure	Shame	Reflection process	Total
2010		1				1
2011	1					1
2012					1	1
2013	1					1
2015	1	2				3
2018	1					1
2019		1	1			2

Revista Educación, 2026, 50(1), enero-junio ISSN: 0379-7082 / e-ISSN 2215-2644

2020		1				1
2021	1		1		1	3
2022		1	1	1	2	5
2023	1					1
2024			1			1
Total	6	6	4	1	4	21

Source: Developed by authors.

Table 3 classifies the negative experiences and findings from the studies analyzed. It also describes the findings related to the teachers' reflection processes, which occur after having lived through negative experiences with mathematics during their school years. Within this process, the phenomenon of mathematical redemption emerges.

Table 3.

Mathematical redemption and negative experiences findings

Negative experiences	Research objectives
Anxiety	Level measurement, identifying causes, insight and comfort

Findings

Teachers enter their teacher training with high levels of mathematical anxiety (Wilson, 2015), with the leading cause being negative classroom experiences due to the behavior of previous teachers or their teaching approaches (Bekdemir, 2010), as well as a lack of knowledge in mathematical content (García-González & Martínez-Sierra, 2020). Anxiety is, for some teachers, associated with fear (Stoehr, 2015). Chalkboard classrooms, serve as learning spaces that help alleviate anxiety (Sanders et al., 2019), along with emotional coaching (García-González & Martínez-Sierra, 2020) and personal narratives about their past relationship with mathematics (Stoehr & Lawrence, 2022).

Failure	Identifying experiences, insight and causes

Early failures with mathematics affect teachers' identities (Lutovac & Flores, 2021). Some understand failure in the context of assessment, such as poor academic performance in mathematics, retaking exams, failing the subject, or receiving grades lower than others or unfair grades (Lutovac & Kaasila, 2022). Others perceive it as experiencing disappointment, sadness, regret or shock in mathematics (Simamora & Darmayasa, 2024), or the unattainability of good grades with little effort (Lutovac, 2019). In response to student failures, future elementary school teachers express the need to focus on the goals and expectations of the students, rather than their own (Lutovac, 2019).

Revista Educación, 2026, 50(1), enero-junio ISSN: 0379-7082 / e-ISSN 2215-2644

Crucial events	Ascertain what the interviewees considers as crucial events and how to overcome them

Narratives serve as a tool to address critical events (Lutovac & Kaasila, 2022). Participants often associate these events with their primary school years, which are intensely charged with emotions (Coppola et al., 2013). According to interviewees, these critical events were triggered mainly by their teachers at that time (Lo, 2021). Healing mathematical wounds is possible (Skultety et al., 2023). However, future teachers are often unaware of the significant impact their relationship with mathematics can have on their students (Ingram et al., 2018).

Shame	Identify negative emotional experiences

Experiences of shame are identified as stemming from social exposure or competitive games. These experiences influence the choice to engage with mathematics, but this effect is observed only in early courses (Jenßen et al., 2022).

Reflection processes Mathematical redemption	How can the reflection process be activated through autobiography using personal reflections, identifying the phenomenon of mathematical redemption?

Mathematics produces negative emotions in many future primary school teachers, with their former teachers being the primary cause of these experiences. However, they do not want to become negative role models for their future students (Di Martino et al., 2013; Coppola et al., 2012). In some cases, experiences that caused crises, distrust, and uncertainty were transformed into challenges, leading to redemption (Carotenuto et al., 2022). Autobiography serves as a trigger for reflection to address negative past experiences (Haas-Prieto & Reyes-Santander, 2021), and for individual reflection on future teaching performance (Morselli & Cusi, 2022).

Source: Developed by the author.

Table 4 shows the types of negative experiences, and the instruments used in each study. It highlight the frequent use of multiple data collection instruments in these investigations, and the variety of instruments employed, though narrative methods are the most common. The table also reflects the predominance of crucial events and mathematical anxiety as the main negative experiences studied.

Table 4.

Data collection instruments and types of negative experiences studied

Kinds of experiences	Crucial events	Anxiety	Failure	Shame	Process of reflection
Incidence	6	6	4	1	4

Revista Educación, 2026, 50(1), enero-junio ISSN: 0379-7082 / e-ISSN 2215-2644

Tools Number of articles	Only one		Interviews	Mathematical anxiety scale	Questionnaires	Others
	1	2	Focal group	R-MARS	1	
Narratives	2	2	Graphical and oral autobiography	MANX + narrative reflection test	Interview	In-class observation and students' interviewing
Interviews	1			A-MARS	1	Likert type scale
Questionnaires	1					
	Metaphors, drawing and graphical autobiography about their relationship with mathematics					
Others	Collective dialogue					

Source: Developed by the author.

DISCUSSION

The findings from this literature review reveal that research has predominantly adopted a qualitative approach, aiming to identify and understand the emotional component of teachers. This focus provides insights into phenomena such as mathematical anxiety, failures in mathematics, or mathematical redemption, shedding light on how negative experiences influence teaching practices

In the 21 studies reviewed, 67% focus on participants who are pre-service elementary education teachers, while 28% focus on future teachers specializing in mathematics. In the first group, the literature reports evidence of a negative relationship with mathematics during their school years. This is particularly relevant when these participants, who are not specialists in mathematics, emphasize their dislike for the subject. It has been observed that this population has experienced the need for mathematical redemption, which involves transitioning from negative experiences with mathematics to a desire to rebuild their relationship with the subject, thereby teaching it more effectively. According to reports, elementary school teachers have had more negative experiences with mathematics during their school years (Coppola et al., 2012, 2013; Hodgen & Askew, 2007; Lutovac & Kaasila, 2011; Pérez-Torres & García González, 2024), and these experiences lead to a harmful teaching practice with the subject.

One of the main reasons they choose to pursue a career in mathematics is their passion for the subject and their desire to become mathematics teachers (Vicario-Mejía et al., 2018). Unlike elementary

Revista Educación, 2026, 50(1), enero-junio ISSN: 0379-7082 / e-ISSN 2215-2644

school teachers, specialists may teach at the middle or higher education levels, and this population tends to have a positive attitude towards the subject. Regarding participants not from elementary teaching, the data also emphasize their negative experiences with mathematics during their school years and the potential impact they foreshadow on their future teaching practice.

However, the literature has yet to report the phenomenon of mathematical redemption in this population, as the focus has been on general education teachers.

Geographically, European countries, specifically in Italy, are central to research on negative experiences with mathematics. Authors such as Coppola et al. (2012, 2013), Di Martino and Sabena (2011), and Di Martino et al. (2013) are from Italy. They are deeply committed to the development of these studies within Mathematics Education. Their research focuses on the emotional and attitudinal components of both pre-service and in-service teachers, as well as students. Another researcher who deepens into the affective domain is Lutovac (2019), who, along with his research team, has significantly contributed to understanding emotions in mathematics. It is essential to highlight that these authors have deepened and advanced the understanding of mathematics-related emotional experiences. They also warn of the significant impact these experiences have on teaching practices and suggest the possibility of reversing them.

In this regard, studies on negative experiences with mathematics should be conducted more frequently across different countries worldwide to pave the way for research on mathematical redemption. Notably, the reached hypothesis is that this phenomenon of mathematical redemption exists in a significant percentage of specialist and non-specialist mathematics teachers globally.

In recent years, there has been an increasing emphasis on the socio-emotional dimension in education, as reflected in the rise of publications on this topic. However, regarding negative experiences, the trend has been irregular over the last 14 years. It is assumed that between 2019 and 2020, there was a decline due to the COVID-19 pandemic. Despite this, the need research teachers' emotional component, particularly their emotional experiences with mathematics, has persisted. As a result, some theoretical models, such as the three-dimensional model (Di Martino & Zan, 2001) and the TMAT (Coppola et al., 2012), have been established and reinforced, and have continued to evolve as research progresses.

Mathematical redemption is a necessary phenomenon, even for those who do not teach mathematics. According to the literature, the teacher is not the only factor that influences a student's aversion to the subject; classmates and family also play a role (Carotenuto et al., 2022; Coppola et al., 2013; Di Martino et al., 2013; Pérez-Torres & García González, 2024). However, it is emphasized that among the factors that trigger negative experiences with mathematics are the mathematics teachers themselves, who acted as negative role models when they did not teach the content effectively or efficiently, and in some cases, resorted to verbal or physical violence. Initially, this leads to a disruption in the

Revista Educación, 2026, 50(1), enero-junio ISSN: 0379-7082 / e-ISSN 2215-2644

student-teacher connection, creating an adverse classroom climate. As an indirect consequence, the student associates this negativity with the subject, leading to an aversion to mathematics. However, other teachers are also mentioned as positive role models when they overcome these episodes.

Another factor reported in the literature contributing to math anxiety is the lack of mathematical knowledge in specific discipline areas, which undermines teaching practice. However, Whyte and Anthony (2012) make an interesting statement regarding anxiety, considering it a condition that is learned through various factors. Therefore, this condition can also be unlearned, which provides insight into the possibility of reversing negative experiences with mathematics. One alternative is through guided self-reflection led by a specialist or emotional coaching (García-González & Martínez-Sierra, 2020), where both the emotional and cognitive (learning) dimensions related to mathematics are worked on.

Therefore, it is considered possible to promote mathematical redemption in teachers, either autonomously, by introspecting on their relationship with mathematics from an early stage, reflecting on and learning from those past wounds, or in a guided manner, with the help of a coach, tutor, or mentor who specializes in these matters and acts as a guide and support in their redemption process.

Based on these findings, we urge the educational community, especially in mathematics, to prioritize two actions. First, research should focus on the emotional aspects of teachers. A key hypothesis from this study suggests that addressing negative mathematical experiences can begin by supporting those teaching the subject from early grades. Second, following this research, practical professional development courses should be implemented. These programs should empower teachers, particularly from elementary through higher education, to overcome their own negative mathematical experiences, which frequently arise from insufficient mathematical knowledge or emotional factors.

CONCLUSIONS

Qualitative studies have highlighted this phenomenon among pre-service teachers by examining their negative experiences with mathematics during their school years and their perspectives on teaching mathematics in the future (Coppola et al., 2013; Di Martino et al., 2013). On the other hand, mixed-method studies have been used to analyze mathematical anxiety, measure its levels, and assess the impact of these negative experiences on future elementary school teachers. These mixed-method studies reveal the challenges teachers face in their teaching practice.

Regarding data collection instruments, the results highlight researchers' need to triangulate information using various qualitative tools to enrich the data, uncover greater interrelations, and ensure coherence in participants' narratives about their relationship with mathematics during their school years. Additionally, it was found that narratives are a frequently used instrument because they allow participants to reflect on their past, enabling the construction of a coherent story, mainly focusing on the relationships shaped by their negative experiences with mathematics.

Revista Educación, 2026, 50(1), enero-junio ISSN: 0379-7082 / e-ISSN 2215-2644

Narratives are suggested in literature as a tool for exploring teachers' school life stories related to mathematics. However, various instruments were reported among the 21 studies reviewed. These instruments have provided substantial information to detail and construct the life history of teachers' experiences with mathematics. Additionally, semi-structured interviews allow respondents to feel encouraged and comfortable expressing their thoughts, feelings, and experiences regarding mathematics (Kaasila, 2007).

From the negative experiences with mathematics identified during their school years, it can be concluded that teachers make decisions regarding their relationship with mathematics in two main ways. The first approach is to reject the subject entirely during their time as students, leading to future experiences of math anxiety, feelings of failure, and shame. This, in turn, makes it likely that these mental events will be reflected in their teaching practice. Since they do not have a positive emotional disposition towards mathematics, they act as negative role models for their students, encouraging students to reject mathematics. The second approach stems from reflecting on the inevitability of experiencing negative situations, as this is an involuntary human reaction based on personal evaluations of the environment and anything that affects their well-being.

However, once the experience is lived, the individual can work on its reversal, turning that experience into an opportunity for growth. In other words, they can redeem themselves from their past negative experiences and begin a personal reconstruction with the discipline (Coppola et al., 2013; Di Martino et al., 2013; Lutovac & Kaasila, 2009, 2011, 2022). To facilitate this, the literature reports several tools that researchers can use to help individuals reconstruct their relationship with the discipline. Once the reconstruction is achieved, it can be concluded that the individual has undergone the phenomenon of mathematical redemption.

REFERENCES

Bekdemir, M. (2010). The pre-service teachers' mathematics anxiety related to depth of negative experiences in mathematics classroom while they were students. *Educational Studies in Mathematics*, *75*, 311-328. https://doi.org/10.1007/s10649-010-9260-7

Carotenuto, G., Coppola, C., Di Martino, P., & Pacelli, T. (2022). Turning moments: the crossroads of the prospective secondary teachers' attitude towards mathematics. In C. Fernández, S. Llinares, A. Gutiérrez, y N. Planas (Eds.), *Proceedings of the 45th Conference of the International Group for the Psychology of Mathematics Education. Vol. 2* (pp. 99-106). PME. https://web.ua.es/it/pme45/documents/proceedings-pme-45-vol2.pdf

Coppola, C., Di Martino, P., Pacelli, T., & Sabena, C. (2012). Primary teachers' affect: a crucial variable in the teaching of mathematics. *Nordic Studies in Mathematics Education*, *17*(3-4), 107-123. https://doi.org/10.7146/nomad.v17i3-4.148477

Coppola, C., Di Martino, P., Pacelli, T., & Sabena, C. (2013). Inside teachers' affect teaching as an occasion for math-redemption. In M. S. Hannula, P. Portaankorva-Koivisto, A.

Revista Educación, 2026, 50(1), enero-junio ISSN: 0379-7082 / e-ISSN 2215-2644

Laine & L. Näveri (Eds.), *Proceedings of MAVI 17 Conference* (pp. 203-215). Finnish Research Association for Subject Didactics.

De Faria, E. (2008). Creencias y matemáticas [Beliefs and mathematics]. *Cuadernos de Investigación y Formación en Educación Matemática*, *3*(4), 9-27. https://revistas.ucr.ac.cr/index.php/cifem/article/view/6900/6586

Di Martino, P., Coppola, C., Mollo, M., Pacelli, T., & Sabena, C. (2013). Pre-service primary teachers' emotions: The math-redemption phenomenon. In A. M. Lindmeier & A. Heinze (Eds.), *Proceedings of the 37th Conference of the International Group for the Psychology of Mathematics Education* (Vol. 2, pp. 225-232). Kiel: PME.

Di Martino, P., & Sabena, C. (2011). Elementary pre-service teachers' emotions: shadows from the past to the future. In K. Kislenko (Ed.), *Current state of research on mathematical beliefs XVI* (pp. 89-105), Tallin University. https://hdl.handle.net/2318/35440

Di Martino, P., & Zan, R. (2001). Attitude toward mathematics: Some theoretical issues. In M. van den Heuvel-Panhuizen (Ed.), *Proceedings of the 25th conference of the IGPME* (Vol. 3, pp. 351–358). Freudenthal Institute, Faculty of Mathematics and Computer Science.

Evans, J. (2000). *Adults' Mathematical Thinking and Emotions: A Study of Numerate Practice*. Routledge. https://doi.org/10.4324/9780203185896

Gamboa-Araya, R. (2016). ¿Is it necessary to analyze the relationship between mathematics teacher and the shaping of attitudes and the beliefs toward this discipline? *Uniciencia*, *30*(1), 57-84. https://doi.org/10.15359/ru.30-1.4

García-González, M. S., & Martínez-Sierra, G. (2020). The history of a teacher's relief of his mathematics anxiety: The case of Diego. *Educational Studies in Mathematics*, *103*, 273–291. https://doi.org/10.1007/s10649-020-09941-8

Haas-Prieto, V., & Reyes Santander, P. (2021). Autobiography as an activating strategy for teacher reflection: challenges and opportunities. *Zona Próxima*, (34), 49-77. https://doi.org/10.14482/zp.34.371.1

Hodgen, J., & Askew, M. (2007). Emotion, Identity and Teacher Learning: Becoming a Primary Mathematics Teacher. *Oxford Review of Education*, *33*(4), 469-487. http://www.jstor.org/stable/20462350

Ingram, N., Linsell, C., & Offen, B. (2018). Growing Mathematics Teachers: Pre-Service Primary Teachers' Relationships with Mathematics. *Mathematics Teacher Education and Development*, *20*(3), 41-60. https://eric.ed.gov/?id=EJ1195996

Jenßen, L., Möller, R., Eilerts, K., & Rösken-Winter, B. (2022). Pre-service primary teachers' shame experiences during their schooling time: characteristics and effects on their subject-choices at university. *Educational Studies in Mathematics*, *110*, 435-455. https://doi.org/10.1007/s10649-021-10141-1

Kaasila, R. (2007). Using narrative inquiry for investigating the becoming of a mathematics teacher. *ZDM Mathematics Education*, *39*, 205-213. https://doi.org/10.1007/s11858-007-0023-6

Revista Educación, 2026, 50(1), enero-junio ISSN: 0379-7082 / e-ISSN 2215-2644

Legañoa, M. A., Báez, I., & García, J. (2017). Attitude toward mathematics: teachers' capacity to consider them. *Transformación*, *13*(1), 56-65.

Lo, W. Y. (2021). Pre-Service Teachers' Prior Learning Experiences of Mathematics and the Influences on Their Beliefs about Mathematics Teaching. *International Journal of Instruction*, *14*(1), 795-812. https://doi.org/10.29333/iji.2021.14148a

Lutovac, S. (2019). Pre-service mathematics teachers' narrated failure: Stories of resilience. *International Journal of Educational Research*, *98*, 237-244. https://doi.org/10.1016/j.ijer.2019.09.006

Lutovac, S., & Flores, M.A. (2021). 'Those who fail should not be teachers': Pre-service Teachers' Understandings of Failure and Teacher Identity Development. *Journal of Education for Teaching*, *47*(3), 379-394. https://doi.org/10.1080/02607476.2021.1891833

Lutovac, S., & Kaasila, R. (2009). Using narratives as innovative tools in mathematics education course in Finnish teacher education. In *International Conference-DECOWE: Development of Competencies in the World of Work and Education* (pp. 1-9). University of Ljubljana.

Lutovac, S., & Kaasila, R. (2011). Beginning a pre-service teacher's mathematical identity work through narrative rehabilitation and bibliotherapy. *Teaching in Higher Education*, *16*(2), 225-236. https://doi.org/10.1080/13562517.2010.515025

Lutovac, S., & Kaasila, R. (2022). Towards conceptualising failure in mathematics as an autobiographical experience. *European Journal of Teacher Education*, *45*(5), 689-706. https://doi.org/10.1080/02619768.2021.1892070

Mora, F., & Barrantes, H. (2008). ¿Qué es matemática? Creencias y concepciones en la enseñanza media costarricense. *Cuadernos de Investigación y Formación en Educación Matemática*, *3*(4), 71-81.

Morselli, F., & Cusi, A. (2022). Between past and future: stories of preservice mathematics teachers' professional development. In C. Fernández, S. Llinares, A. Gutiérrez, & N. Planas (Eds.), *Proceedings of the 45th Conference of the International Group for the Psychology of Mathematics Education* (Vol. 2, pp. 195-202). PME.

Page, M. J., McKenzie, J. E., Bossuyt, P. M. Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, E., … & Moher, D. (2021). Updating guidance for reporting systematic reviews: development of the PRISMA 2020 statement. *Revista Española de Cardiología*, *74*(9), 790-799. https://doi.org/10.1016/j.recesp.2021.06.016

Pérez-Torres, B. Y., & García González, M. del S. (2024). Factores que desencadenan la redención matemática en docentes de educación básica. En M. Sánchez Aguilar, M. del S. García González, & A. Castañeda (Eds.), *Perspectivas actuales de la Educación Matemática* (pp. 321-326). Editorial SOMIDEM. https://doi.org/10.24844/SOMIDEM/S3/2024/01-36

Quintanilla, V. A., & Gallardo, J. (2020). Identificar experiencias emocionales para mejorar la comprensión en matemáticas. *UNO*, *88*, 24-33. https://hdl.handle.net/10630/29251

Revista Educación, 2026, 50(1), enero-junio ISSN: 0379-7082 / e-ISSN 2215-2644

Sanders, S., Nielsen, W., Sandison, C., & Forrester, T. (2019). Maths Anxious Pre-Service Teachers' Perspectives of "Doing" Mathematics in a Whiteboard Room. *Mathematics Teacher Education and Development*, *21*(1), 145-168.

Simamora, R. E., & Darmayasa, J. B. (2024). How Repeatedly Failed Students Perceive the Mathematics Remediation Program and Their Failures. *Indonesia Matehmatics Education*, *7*(1),83-95. http://doi.org/10.30738/indomath.v7i1.102

Skultety, L., Saclarides, E. S., Bajwa, N. P., Brown, K., Poetzel, A., & Gerardo, J. M. (2023). Making sense of elementary pre-service teachers' mathematical wounds: A proposed framework for practice. *International Electronic Journal of Mathematics Education*, *18*(2), em0738. https://doi.org/10.29333/iejme/13170

Stoehr, K., & Lawrence A. (2022). Mathematics anxiety: Identity work in a gifted prospective elementary teacher's mathematics-related personal narratives. *Mathematics Teacher Education and Development*, *24*(2), 111-124. https://scholarcommons.scu.edu/tepas/104/

Stoehr, K. J. (2015). Building the wall brick by brick: one prospective teacher's experiences with mathematics anxiety. *Journal of Mathematics Teacher Education*, *20*, 119-139. https://doi.org/10.1007/s10857-015-9322-y

Stramel, J. (2010). *A naturalistic inquiry into the attitudes toward mathematics and mathematics self-efficacy beliefs of middle school students* [Unpublished doctoral thesis]. Universidad Estatal de Kansas.

Vicario-Mejía, M., Rivera-Abrajan, M., & Martínez-Sierra, G. (2018). Motivos para la elección de la carrera en matemáticas. *Acta Latinoamérica de Matemática Educativa*, *31*(2), pp. 1694-1701. https://funes.uniandes.edu.co/funes-documentos/motivos-para-la-eleccion-de-la-carrera-en-matematicas/

Vieytes, S. (2009). *Factores que afectan las actitudes hacia las matemáticas en los estudiantes de primer año del curso MATE 3001 de la Universidad de Puerto Rico en Utuado* [Tesis doctoral inédita]. Universidad de Puerto Rico.

Whyte, J., & Anthony, G. (2012). Maths anxiety: The fear factor in the mathematics classroom. *New Zealand Journal of Teachers' Work*, *9*(1), 6-15. https://doi.org/10.24135/teacherswork.v9i1.559

Wilson, S. (2015). "I Was in Year 5, and I Failed Maths": Identifying the Range and Causes of Maths Anxiety in First Year Pre-Service Teachers. In M. Marshman, V. Geiger, y A. Bennison (Eds.). *Mathematics education in the margins. Proceedings of the 38th annual conference of the Mathematics Education Research Group of Australasia* (pp. 643-650). MERGA.