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The Dynamics of Teacher and Student Well-Being and Their Influence on Mathematics Well-Being: A Systematic Literature Review

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Abstract: Teacher and student well-being is increasingly regarded as an integral part of healthy and effective mathematics education. Although the concept of well-being in education has developed rapidly, the dynamic and mutually influential relationship between teacher and student well-being, and their synergistic effects on well-being in mathematics learning, remain relatively new areas of research. This study aims to present a structured synthesis of the latest empirical evidence (2021–2025) regarding the dynamics of the reciprocal relationship between teacher and student well-being, and its contribution to the mathematics learning climate (Mathematics Well-Being). A systematic search was conducted across three databases ScienceDirect, ERIC, and Springer in accordance with the PRISMA 2020 protocol. The search string utilized Boolean operators with the following keywords: ("teacher well-being" OR "teaching well-being") AND ("student well-being" OR "student wellbeing") AND ("mathematics education" OR "math well-being" OR "mathematical well-being"). Following a stepwise screening process, 16 empirical articles met the inclusion criteria and were analyzed using thematic synthesis. The synthesis identified three main pathways of reciprocal relationships: emotional, social, and cognitive. Teacher well-being plays an active role in enhancing students' emotional engagement, motivation, and positive attitudes towards mathematics. Conversely, student well-being enhances job satisfaction, teaching effectiveness, and professional fulfillment among teachers, forming a reciprocal and mutually reinforcing cycle between teacher and student well-being. This two-way relationship forms the foundation of integral mathematical well-being, namely a cohesive state of emotional, intellectual, and relational balance in mathematics learning. This review emphasizes the importance of an inclusive approach that integrates student and teacher well-being as interdependent variables in sustainable mathematics education. This approach not only supports academic success but also the resilience, motivation, and emotional well-being of both students and teachers.

Keywords: mathematics well-being, student, teacher, well-being, systematic literature review.

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INTRODUCTION

Over the past two decades, the issue of teacher and student well-being has been a key focus of research and policy in global education, particularly in Australia, the UK, Asia and the Americas (Hunter & Hill, 2024; Hill & Hunter, 2024; Hill et al., 2021; Campbell & Bean, 2025), including within the context of mathematics learning. In the context of mathematics education, academic outcomes are not the sole indicator of success; rather, a well-being-oriented approach is required, emphasizing a balance between cognitive, emotional, social, and professional aspects. The concepts of teacher well-being and student well-being are currently regarded as essential prerequisites for creating an effective, meaningful, and sustainable

learning process (Campbell & Bean, 2025; Hill & Seah, 2023).

Within this framework, Mathematical Well-Being (MWB) is defined as a state in which an individual feels comfortable and can function effectively in learning and teaching mathematics, encompassing the components of 'feeling good' and 'functioning well' (Hill & Seah, 2023). MWB comprises seven main dimensions: Accomplishment, Cognition, Engagement, Meaning, Perseverance, Positive Emotions, and Relationships (Hill et al., 2021). This MWB framework does not focus solely on anxiety or achievement, but rather emphasizes the experiences of students and teachers as the core of the quality of mathematics education.

In this context, teacher well-being encompasses job satisfaction, emotional stability, and professional resilience, whilst student well-being relates to emotional engagement, a sense of competence, and positive experiences in mathematics learning (Hunter & Hill, 2024; Nwoko et al., 2023). Several studies indicate that teacher well-being directly fosters a positive classroom climate, enhances motivation to learn, and increases students' emotional engagement (McLean et al., 2023; Bansilal et al., 2022; Hettinger et al., 2023). Furthermore, teacher self-efficacy for student engagement has a significant influence on student-perceived emotional support, which ultimately enhances students' interest in mathematics. These findings confirm that teacher well-being, particularly professional confidence and emotional support, is a crucial prerequisite for students' well-being and mathematical interest (Hettinger et al., 2023).

Conversely, when students possess good emotional and academic well-being, this enhances teachers' job satisfaction and teaching effectiveness (Kavitha & Kareem, 2024). This reciprocal relationship indicates that teacher and student well-being reinforce one another and operate dynamically. In mathematics learning, teachers' emotional balance correlates with students' levels of math anxiety and helps boost students' self-confidence in tackling learning challenges (Hill et al., 2021; Hill & Seah, 2023). Mathematics anxiety is multidimensional in nature, involving both domain-specific factors (such as past negative experiences with mathematics) and domain-general factors (such as general anxiety and neuroticism). Both of these factors need to be addressed and managed simultaneously in efforts to alleviate such anxiety (Szczygie³ et al., 2025).

Socio-cultural aspects and gender issues also complicate these dynamics. Research from various countries indicates that whilst the achievement gap in mathematics between girls and boys has narrowed over the past few decades, the 'confidence gap' persists (Paulsen & Xenofontos, 2025; Raabe & Block, 2024). On average, female students achieve the same maths scores as male students, yet female students have lower self-confidence in their mathematical abilities. This phenomenon is influenced by gender stereotypes communicated both consciously and unconsciously by teachers, parents, and the social environment (Raabe & Block, 2024). Furthermore, alignment of cultural values between teachers and students plays a crucial role in fostering engagement and meaningful learning. The collectivist values held by students from the Pacific region, compared to the more individualistic Western education system, can influence how they learn and understand the subject matter (Hunter & Hill, 2024).

Awareness of the importance of well-being in adulthood is growing, and many people are taking an interest in it. Systematic research examining the dynamics of the reciprocal relationship between teacher well-being and student well-being in mathematics learning remains limited. Previous studies, such as those by Alakoski et al. (2024), Lee and Morgan (2025), and Szczygie³ and colleagues (2025), have shown that mathematical resilience, emotional regulation, and supportive teacher-student relationships are key determinants

of well-being in mathematics classrooms. Teachers who can manage stress effectively and maintain their professional well-being will be better equipped to foster empathetic, student-centered learning. Conversely, students who have positive learning experiences will demonstrate increased intrinsic motivation and active participation, which ultimately creates a reciprocal relationship that strengthens teachers' psychological well-being (Hunter & Hill, 2024).

Teachers who possess psychological well-being will contribute to the creation of well-being in learning, including mathematics learning. The concept of Mathematical Well-Being (MWB) holds that a person feels comfortable and can perform well when learning mathematics. This concept encompasses seven dimensions: achievement, cognition, engagement, meaning, perseverance, positive emotions, and social relationships (Hill et al., 2021; Hill & Seah, 2023). Research in Australia, China, and New Zealand (Hunter & Hill, 2024; Hill & Hunter, 2024) indicates that positive social relationships, support from teachers and peers, and relevant learning materials are key factors in shaping students' MWB. A positive school environment, such as interactions between teachers and students, is a key factor in the development of students' MWB.

Based on this background, this study aims to synthesize the latest empirical findings (2021–2025) on the bidirectional dynamics between teacher and student well-being and on how their interaction influences mathematical well-being. Specifically, this study addresses the following four research questions:

1. How is the dynamic between teacher and student well-being explained in the context of mathematics learning?
2. What factors influence the relationship between teacher and student well-being in mathematics learning?
3. How does the interaction between teacher and student well-being contribute to the development of mathematical well-being?
4. What are the practical implications for the development of sustainable, empathetic, and well-being-oriented mathematics teaching?

METHOD

Research Design

This study employed a Systematic Literature Review (SLR) design in accordance with the PRISMA 2020 guidelines (Page, M. J. et al., 2021). The SLR design was chosen because it provides a structured, clear, and easy-to-follow framework for identifying, evaluating, and synthesizing empirical evidence on the predetermined research topic. This study examines the relationship between teacher and student well-being in the context of mathematics education. This design was deemed appropriate given the exploratory and conceptual nature of the research, which aims to map patterns of interrelationships, influencing factors, and the implications arising from these relationships, rather than test specific hypotheses.

Search Strategy

A systematic literature search was conducted across three major academic databases: ScienceDirect, SpringerLink, and ERIC. These databases were selected because they encompass a wide range of scholarly publications in education, psychology, and mathematics education. The search was restricted to articles published between 2021 and 2025 to ensure the relevance and currency of the included studies. The search strategy utilized a combination of Boolean operators with controlled vocabulary. The complete search strings applied to each database are presented in the following table:

The search string was applied to the title, abstract, and keyword fields across all databases

Table 1. Systematic search strings for each database and number of initial results

Database	Complete Search String	Number of Initial Results
ScienceDirect	("teacher well-being" OR "teacher wellbeing") AND ("student well-being" OR "student wellbeing") AND ("mathematics education" OR "math well-being" OR "mathematical wellbeing")	40
SpringerLink		28
ERIC		12
Total		80

used. The article selection process followed the four-stage PRISMA 2020 flowchart, as shown in Figure 1.

The article selection process followed the four-stage PRISMA 2020 flowchart, as summarized in Figure 1 below.

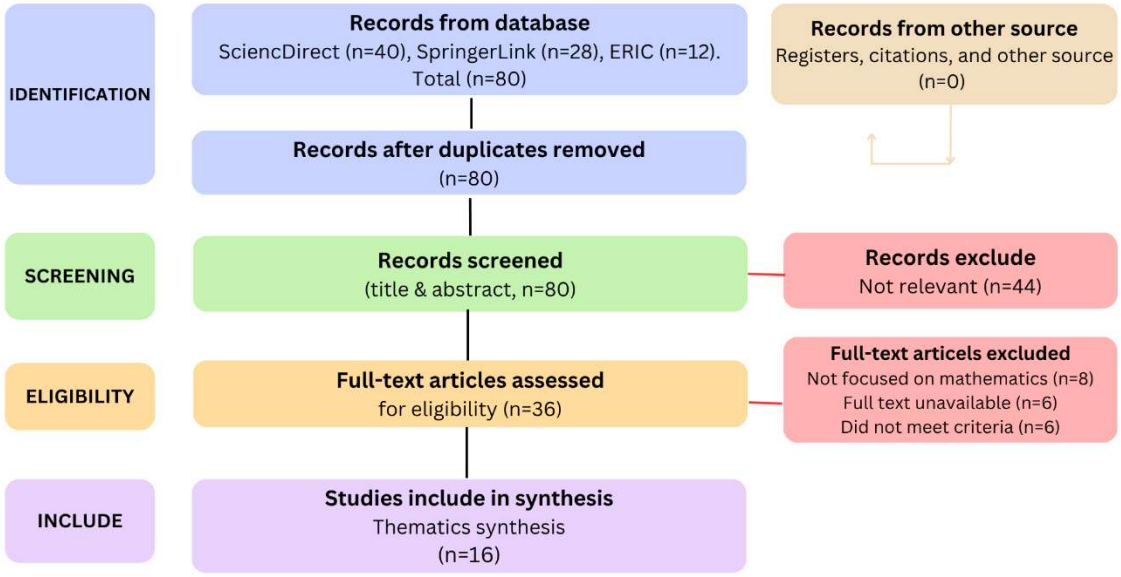

Figure 1. PRISMA diagram showing the data collection process

Although the number of included articles is relatively small (16), this reflects the novelty of the topic at the intersection of teacher and student well-being, with mathematics well-being treated as an integrated construct. This number is consistent with systematic literature reviews (SLRs) on emerging topics in education; by way of comparison, Hill et al. (2021), who first introduced MWB as a scientific construct, also based their framework on a limited number of studies rich in conceptual content. Furthermore, the strict focus on three reputable databases with standardized inclusion criteria ensures the high methodological quality of each analyzed article.

Inclusion and Exclusion Criteria

Articles included in this SLR met all of the following criteria: (1) they addressed teacher and/or student well-being in the context of mathematics education; (2) the studies were written in English or Indonesian; (3) the study was published between 2021 and 2025; and (4) the study describes the relationship or influence between teacher well-being and student well-being in mathematics learning. Conversely, articles were excluded if they did not focus on mathematics, were not available in full text, or did not specifically address the intersection of teacher and student well-being.

The decision to include review articles alongside empirical articles was based on the recognition that research on the intersection of teacher well-being, student well-being, and MWV as an integrated construct remains very limited in the primary empirical literature. The included review articles are considered supplementary sources that help enrich contextual understanding, rather than primary data of equal importance. This approach aligns with the PRISMA 2020 guidelines, which permit the inclusion of various study types in a systematic review with clear justification (Page et al., 2021). Following a staged screening process involving a review of titles and abstracts, followed by a reading of the full text, 16 articles were found to meet all inclusion criteria and were retained for further analysis (see supplementary files).

Data Analysis Techniques

Data analysis was conducted using the thematic synthesis approach outlined by Thomas and Harden (2008), comprising three main stages.

Table 2. Thematic synthesis: stages of data analysis

Stage	Process	Analytical Activities	Representative Article
Stage 1 Identification	Identification ofkey concepts andfindings fromeach study	• Reading each article in full • Extracting main constructs: teacher WB, student WB, MWB • Noting empirical findings • Coding study context (culture, grade level, method)	• McLean et al. (2023) • Bansilal et al. (2022) • Hill & Hunter (2024) • Alakoski et al. (2024) • Lee & Morgan (2024)
Stage 2 Grouping	Grouping of findingsinto themes andsub-themes describingpatterns of factorinterrelationships	• Grouping codes into themes: personal, contextual, pedagogical • Identifying subthemes: emotional, social, cognitive • Cross-article comparison • Triangulating convergent findings	• Kavitha & Kareem (2024) • Hunter & Hill (2024) • Seah & Hill (2022) • Campbell & Bean (2025) • Hill et al. (2021–2024)
Stage 3 Mapping	Mapping of relationshipsbetween themes toexplain dynamics ofteacher student WB in mathematics learning	• Building conceptual framework • Mapping factor → outcome paths: emotional, social, cognitive • Constructing MWB ecosystem • Formulating implications for well-being pedagogy	• Hyland & O'Shea (2021) • Hill & Hunter (2023) • McLean et al. (2023) • Lee & Morgan (2024) • Campbell & Bean (2025)

*Note: The 'Representative Article' column indicates examples of articles that contributed significantly to each stage of the analysis, not exclusive sources. All 16 articles were analyzed inductively at each stage. Coding was carried out to ensure inter-rater reliability, and coding discrepancies were resolved through consensus discussions.

In the first stage, key concepts and findings were extracted from the 16 included articles. This stage involved an in-depth reading of each article to identify the main constructs, namely, teacher well-being, student well-being, and mathematics well-being, along with the empirical findings related to each of these constructs. In the second stage, these findings were grouped into broad themes and subthemes that describe identifiable patterns of interrelationships among the factors. Themes were constructed inductively from the data and contrasted with cross-study findings to ensure convergence and internal consistency.

In the third stage, the relationships among the emerging themes were mapped to more comprehensively explain the dynamics of teacher and student well-being in the context of mathematics learning. This thematic mapping enabled the development of a structured conceptual framework that represents how interactions between teacher and student well-being contribute to the formation of a healthy, well-being-oriented mathematics learning climate. This framework integrates the findings through three pathways: the emotional, social, and cognitive. The entire analysis process was systematically documented to ensure transparency and reproducibility in accordance with SLR methodological standards.

■ RESULTS AND DISCUSSION

Based on the thematic synthesis conducted, the following discussion presents the main findings on the dynamics of the relationship between teacher and student well-being in the context of mathematics learning.

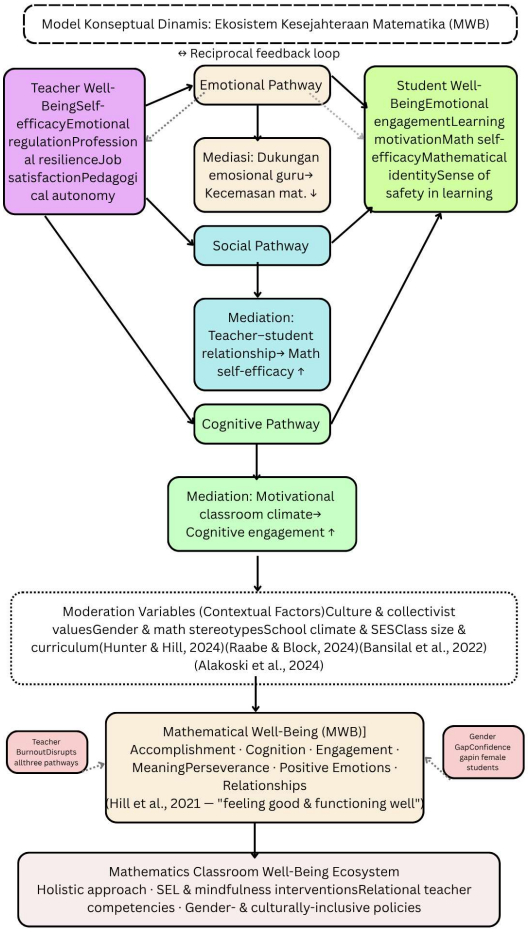

Figure 2. Conceptual model of the dynamic reciprocal relationship between teacher well-being and student well-being, and their contribution to Mathematical Well-Being (MWB). Mediation and moderation pathways synthesized from 16 empirical articles (2021–2025).

The Dynamics of the Relationship Between Teacher and Student Well-being in Mathematics Education

The relationship between teacher and student well-being is reciprocal and mutually reinforcing in the context of mathematics learning. Several studies indicate that teachers' emotional well-being plays a significant role in enhancing student engagement in the classroom. McLean et al. (2023) found that teachers' mental health is positively correlated with student engagement, particularly in environments with high social or economic pressure. When a teacher is in a healthy emotional state, such as being able to manage crucial emotions (Weinhandl et al., 2023), they are better able to create a supportive learning environment, thereby enhancing student motivation and participation.

This is also consistent with Wang & Fei (2024), who demonstrated that the teacher-student relationship acts as a mediator between perceived teacher support and students' mathematics anxiety. Specifically, when students perceive emotional support from their mathematics teacher, a positive interpersonal relationship is formed, which ultimately enhances mathematical self-efficacy and reduces anxiety. Wang & Fei (2024) state that the mediation chain from teacher support to relationship quality, which influences self-efficacy and mathematical anxiety, is statistically significant. This confirms that teacher well-being not only directly impacts students but also operates through complex relational mechanisms.

Conversely, student satisfaction with the learning experience positively impacts teacher well-being. Bansilal et al. (2022) demonstrate that students who are motivated and actively engaged in learning can strengthen teachers' sense of meaningfulness and job satisfaction. This is further supported by Hunter and Hill (2024), who state that positive interpersonal relationships between teachers and students are a consistent factor supporting MWB across various cultural contexts.

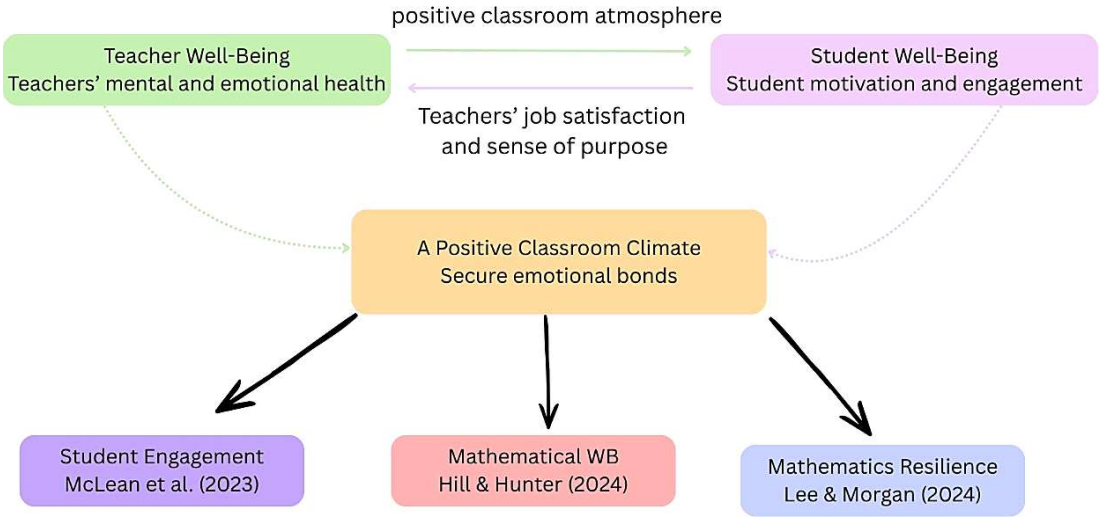

Figure 3. The dynamics of teacher well-being "! student well-being in the context of mathematics education

Each component and causal relationship in this model (Figure 3) is based on convergent findings from several articles, as summarised below:

Empirical evidence regarding the direction of this reciprocal relationship is further reinforced by a review finding that students' perceptions of teacher support enhance academic engagement,

Table 3. Empirical support from the literature for each component and causal relationship in the teacher and student well-being dynamics model

Relationships in the Model	Empirical Support from the Corpus
Teachers' emotional well-being → Students' emotional engagement	McLean et al. (2023); Hettinger et al. (2023); Wang & Fei (2024)
Teacher support → Relationship quality → Mathematical self-efficacy	Wang & Fei (2024); Lee & Morgan (2025)
Student satisfaction → Teacher job satisfaction	Bansilal et al. (2022); Hunter & Hill (2024)
Active student engagement → Teacher professional resilience	Campbell & Bean (2025); Hunter & Hill (2024)
Teacher burnout → Decline in the quality of learning	Teacher burnout → Decline in the quality of learning

From the perspective of teachers' institutional well-being, there are four key factors of teachers' professional well-being: personal capabilities (self-efficacy, resilience, autonomy), socio-emotional intelligence, coping with workload, and the quality of professional relationships (Nwoko et al., 2023). This confirms that high levels of teachers' self-efficacy result in better teaching quality, positive emotions, and lower levels of burnout. This implies that safeguarding teachers' well-being is not merely a personal issue, but a structural investment that directly impacts the mathematics learning climate in the classroom.

Furthermore, cultural and social values can influence the relationship between well-being and mathematics. Hunter & Hill (2024) emphasize that alignment between teachers' and students' values, such as collectivist values among students from the Pacific region and individualistic values within Western school education systems, plays a crucial role in fostering engagement and the meaning of learning. Furthermore, gender differences and academic achievement also influence MWB. Female students report lower levels of well-being compared to males, whilst good mathematical achievement is positively correlated with MWB (Campbell & Bean, 2025). These findings confirm that well-being in mathematics learning results from the interaction among personal, social, cultural, and pedagogical factors.

The gender dimension of mathematical well-being requires deeper understanding. The research findings indicate that whilst the mathematics achievement gap between girls and boys has narrowed significantly over the past few decades, the confidence gap remains persistent (Paulsen & Xenofontos, 2025). In other words, female students, on average, achieve mathematics scores equivalent to those of male students, yet have lower confidence in their mathematical abilities. This phenomenon is influenced by gender stereotypes communicated both consciously and unconsciously by teachers, parents, and the social environment (Raabe & Block, 2024). Consequently, teachers need to actively create a classroom climate that neutralizes gender stereotypes and fosters mathematical self-efficacy in all students, regardless of their gender. These findings confirm that well-being in mathematics learning results from the interaction among personal, social, cultural, and pedagogical factors.

This relationship forms what is known as the 'well-being cycle', in which teachers who feel satisfied and receive emotional support can foster students' motivation, sense of security, and engagement. Conversely, active and well-engaged students also enhance teachers' sense of

achievement and professional fulfillment (Campbell & Bean, 2025). Thus, teacher and student well-being are not only interdependent but also mutually reinforcing, creating a positive cycle that contributes to a healthy and sustainable mathematics learning environment.

This positive cycle can also be disrupted by teacher burnout. A review by Yao & Abdullah (2025) notes that teacher burnout has a direct impact on a decline in teaching quality, lower student motivation, and increased teacher absenteeism. In the context of mathematics learning, emotional burnout reduces teachers' capacity to provide affective support, which leads to increased maths anxiety among students. Socially, burnout diminishes the quality of teacher-student relationships and reduces the sense of security in exploring mathematics. Cognitively, burnout leads to a decline in the quality of conceptual explanations and a reduction in the formative feedback provided to students (Yao & Abdullah, 2025; Nwoko et al., 2023). Therefore, burnout prevention programs for mathematics teachers must be regarded as a key strategy in maintaining the quality of MWB in the classroom.

Factors Influencing the Relationship between Teacher and Student Well-being in Mathematics Learning

Based on the results of various studies, four main factors were identified that influence the relationship among teacher well-being, student well-being, and mathematics well-being.

Contextual and learning environment factors

Contextual and learning environment factors also play a significant role, as explained by Alakoski et al. (2024) and Zhang (2025), who state that an innovative learning environment and positive social relationships can support teacher efficacy and student cohesion. Furthermore, Bansilal et al. (2022) demonstrated that teacher work-related stress, class size, and school location significantly influence students' mathematics achievement, whilst also showing that structural factors affect the quality of academic well-being.

For comparative context, Wu (2025), using PISA 2022 data, found that school-level factors such as disciplinary climate, resource availability, and teacher job satisfaction significantly moderate the relationship between students' socio-economic status and mathematics achievement. These findings align with and reinforce the conclusions of articles in the corpus, particularly Bansilal et al. (2022) and Alakoski et al. (2024), which consistently identify school structural conditions as active variables shaping the quality of teacher-student interactions.

Structural factors also include class size and administrative demands. Agyapong et al. (2022) suggest that excessive workload, high administrative demands, and a lack of pedagogical autonomy are key predictors of stress and burnout among school teachers. In the context of mathematics, a subject with generally stricter and more standardized curricular demands, this burden can be even greater. Awareness of these structural factors is crucial for headteachers and policymakers in designing working conditions that support the professional well-being of mathematics teachers.

Quality of interpersonal relationships and emotional support

Lee & Morgan (2025) emphasize that warm and empathetic relationships can reduce maths anxiety and enhance mathematical resilience. Meanwhile, Hunter & Hill (2024) add that alignment of cultural values between teachers and students enhances participation and well-being. This mechanism operates through what Wang & Fei (2024) term a 'multiple chain mediation' (chain mediation), whereby teacher support influences the quality of the teacher-

student relationship, thereby impacting mathematical self-efficacy and mathematical anxiety. In a study in China by Wang & Fei (2024), it was found that emotional support from teachers has a significant mediating effect through the intimacy of the teacher-student relationship in reducing mathematical anxiety. This implies that interventions that focus solely on cognitive aspects of the curriculum, without considering the quality of the teacher-student relationship, will be less effective at building sustainable MWB.

Gökta^{o} & Kayat (2023) also found that the quality of teacher-student relationships has a moderate to large correlational effect on academic achievement, and identified that relationships between teachers and the school community have a very large effect, thereby highlighting the importance of a broader relational ecosystem, not just teachers and students, in supporting MWB. These findings have practical implications: professional development programs for mathematics teachers need to include relational competencies, not just mathematical content competencies.

Motivational climate and teaching practices

Kavitha & Kareem (2024) state that engagement in mathematics and science acts as a mediator between attitudes towards STEM (Science, Technology, Engineering and Mathematics) and subjective well-being. In agreement with this, Bansilal et al. (2022) also demonstrate that a motivational climate emphasizing autonomy support can strengthen students' self-confidence and engagement in learning mathematics. Mandez (2024) further highlights that teachers who recognize, understand, and interpret students' feelings, behaviors, and interactions can foster positive, mutually respectful relationships.

Teachers' emotional competencies, including self-regulation, empathy, and stress management, can be enhanced through training programs that integrate social and emotional learning (SEL), mindfulness techniques, and virtual simulations (Aponte et al., 2025). The relevance to mathematics learning is that emotionally trained mathematics teachers are better able to detect and respond to students' maths anxiety in a timely and non-stigmatizing manner. Sammallahti et al. (2023) found a moderate average effect size for reducing maths anxiety and an equivalent effect for improving maths achievement. Interventions focusing on cognitive support and emotional regulation have proven effective for both. Interestingly, interventions that actively involve teachers as facilitators of emotional well-being, rather than merely as content instructors, can produce greater and more enduring effects. This confirms the importance of integrating well-being into the professional identity of mathematics teachers.

Individual and gender aspects

Campbell & Bean (2025) demonstrate gender differences in mathematical well-being. Female students tend to have lower levels of well-being than male students, even though their achievements are comparable. Taken together, these findings suggest that well-being in mathematics learning results from a complex interaction among socio-cultural factors, the quality and nature of interpersonal relationships, the teaching climate, and the individual characteristics of both students and teachers.

This phenomenon of the 'confidence gap' in mathematics has been extensively studied. Raabe & Block (2024) found that whilst there were no significant differences in mathematical competence between female and male students, female students consistently reported lower levels of confidence. This phenomenon is attributed to peer influence and culturally learned gender stereotypes. Boys appear to use mathematical performance as a validation of their gender identity, whilst girls are more vulnerable to

negative social influences that undermine their self-confidence.

Bohrnstedt et al. (2024) suggest that although mathematical motivation models apply equally to both boys and girls, female students reported lower levels of motivation (except for interest) at both measurement points, and this decline occurred in parallel from Year 9 to Year 12. The implication for mathematics teachers is a gender-sensitive approach, such as emphasizing effort-focused praise rather than talent-based praise. This can help narrow the self-confidence gap without fundamentally changing the curriculum.

Contributions to Mathematical Well-Being

Mathematics learning is not just about numerical ability, but about emotional and cognitive balance, as well as the relationship between teacher and student. If a teacher possesses resilience and is supported by a positive work environment, this will positively impact students, leading to increased motivation, engagement, and self-confidence in learning mathematics (Szczygie³ et al., 2025). Conversely, psychological pressure or negative teacher-student relationships can trigger hidden math anxiety, which may hinder the development of mathematical concepts and students' positive beliefs regarding their mathematical abilities.

This construct of hidden math anxiety is important to understand in greater depth. Szczygie³ et al. (2025) identified that math anxiety has predictors that are both domain-specific (such as past negative experiences with mathematics) and domain-general (such as general anxiety traits and neuroticism). These findings suggest that interventions for mathematical anxiety need to be multimodal, addressing both traumatic experiences of learning mathematics and building general emotional regulation. Teachers with good emotional well-being are better able to detect signs of this hidden anxiety and respond ina supportive, non-stigmatizing manner.

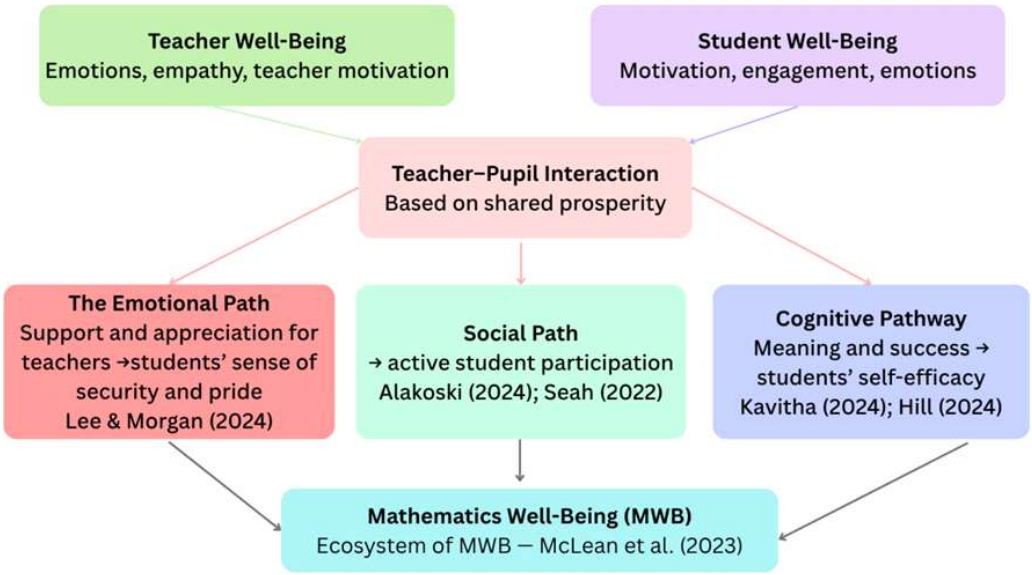

Figure 4. The contribution of teacher-pupil interaction to mathematics well-being (MWB)

In this context, MWB is understood as a combination of 'feeling good' and 'functioning well' in the mathematics teaching and learning process (Hill & Seah, 2023). There are seven main dimensions of MWB: Accomplishment, Cognition, Engagement, Meaning, Perseverance,

Positive Emotions, and Relationships (Hill et al., 2021; Campbell & Bean, 2025). Among these factors, positive social relationships are the strongest influence on MWB in countries such as New Zealand, China, and the United States.

These seven dimensions of MWB can be conceptually enriched through the PERMA model (Seligman, 2011), which has been adapted for the educational context. The alignment between the PERMA model and these MWB dimensions is not merely conceptual but is also reflected in the empirical findings of the articles analysed directly: the Positive Emotions element in PERMA corresponds with the findings of Hill & Seah (2023) regarding positive emotions as a significant dimension of MWB; the Relationships element aligns with the findings of Hunter & Hill (2024), who identified social relationships as the strongest cross-cultural factor of MWB; the Engagement element corresponds with the findings of McLean et al. (2023) regarding the relationship between teachers' mental health and student engagement; and the Accomplishment element aligns with the findings of Campbell & Bean (2025) regarding academic achievement as a contributor to students' sense of efficacy. This conceptual alignment strengthens the theoretical foundation of MWB as a scientific construct. It creates opportunities to use internationally validated well-being measurement instruments in future MWB research.

Within the classroom well-being ecosystem, mathematical learning identity serves as a mediating variable between contextual factors (culture, gender, teacher-student relationships) and long-term MWB outcomes. Paulsen & Xenofontos (2025) found that sociocultural factors, including gender stereotypes, parental expectations, and cultural narratives about 'who is good at maths', shape female students' mathematical identity differently from that of male students. Students with a positive mathematical identity demonstrate greater resilience in the face of failure and a greater willingness to engage with challenging mathematical tasks. Within the proposed well-being ecosystem framework, a positive mathematical identity reinforces students' active engagement on social and emotional pathways, which in turn provides positive feedback for teachers' professional well-being. Teachers who actively foster positive mathematical identities in their students, for example, by explicitly recognizing thought processes rather than just correct answers, contribute significantly to students' long-term MWB.

For a teacher, MWB is evident in instructional flow, professional satisfaction, and the ability to adapt to curriculum changes and prevailing pedagogical demands (Hyland & O'Shea, 2021). The professional well-being of mathematics teachers is influenced by the availability of adequate work resources, including peer support, pedagogical autonomy, and continuous professional development, which significantly predict teacher well-being, even when job demands are high (Renshaw & Jimerson, 2023). This implies that a supportive institutional environment can act as a buffer against heavy work demands, enabling teachers to maintain the quality of their teaching and a positive emotional engagement with pupils. Thus, the well-being of teachers and pupils mutually supports the creation of a healthy, meaningful, and sustainable mathematics learning environment.

Implications for Mathematics Education Practice

Based on an analysis of 16 selected articles, four main points serve as references for developing mathematics teaching practices focused on well-being.

Application of a holistic approach

The well-being of teachers and students must be prioritized in curriculum design and pedagogical training. Thus, well-being is not merely an add-on, but a key indicator of the

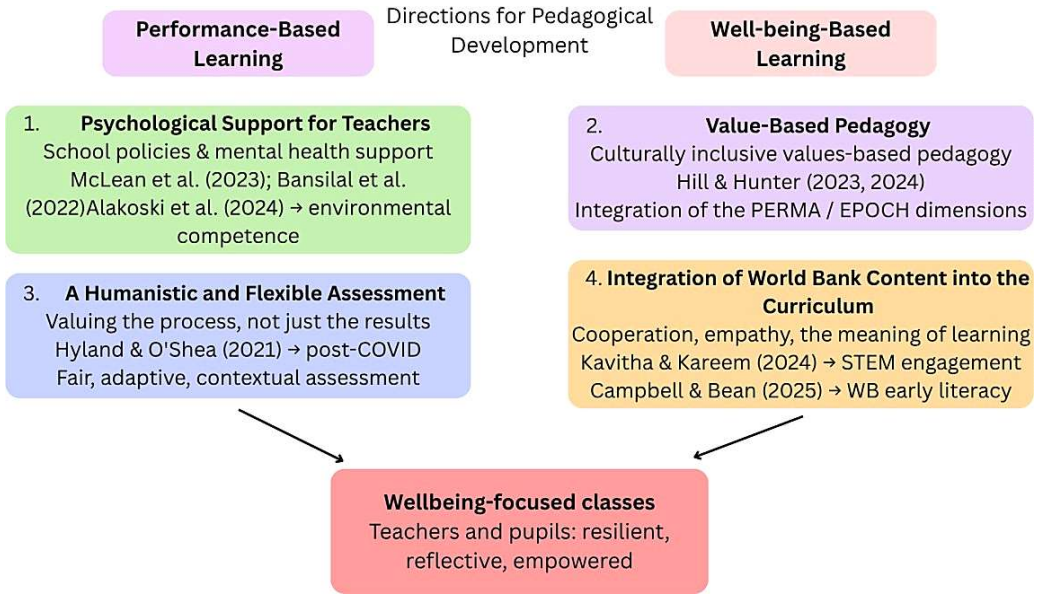

Figure 5. Implications of sustainable and well-being-oriented mathematics teaching practices

success of mathematics education alongside academic achievement. This approach emphasizes the importance of a balance between cognitive, emotional, and social aspects in the learning process.

The connection between the findings from the analyzed articles and broader educational policy is also reflected in the OECD TALIS report (2025), which confirms that positive teacher-student relationships are a core component of an effective school culture. Specifically, findings from Hunter & Hill (2024), McLean et al. (2023), and Wang & Fei (2024) consistently show that the quality of teacher-student relationships is a strong predictor of MWB, which aligns with TALIS findings at the macro-policy level. These findings note that over 97% of teachers in OECD countries believe that student well-being is important. However, its structural implementation still needs to be strengthened through concrete policies and the continuous development of teachers' capacities.

Creating a supportive classroom environment

Teachers are expected to create a positive learning climate by fostering empathy, collaboration, and mutual respect. A supportive environment enables students to engage emotionally and socially in learning, thereby reducing performance pressure and strengthening interpersonal relationships between teachers and students.

The development of this supportive classroom climate must take diversity into account. Wang & Fei (2024) state that perceived teacher support varies with students' demographic characteristics, including gender, socioeconomic status, and cultural background. High-achieving male students tend to perceive that they receive more teacher support, whilst teachers actually pay more attention to low-achieving students. This perception gap has implications, such as the need for teachers to explicitly and transparently communicate their support to all students, so that no group feels neglected within the mathematics learning ecosystem.

Implementation of preventive interventions

Programs focused on emotional well-being, such as mindfulness exercises and resilience training, have been shown to reduce mathematics

anxiety, increase motivation to learn, and strengthen the psychological resilience of both teachers and students. Integrating these interventions into learning activities can serve as a preventive strategy against the emergence of academic stress and a decline in learning engagement.

The evidence for the effectiveness of mindfulness-based interventions in education is becoming increasingly robust. Jobin et al. (2025) suggest that Mindfulness-Based Interventions (MBIs) for school-age adolescents have a positive impact on mental well-being, anxiety reduction, and improved emotional regulation skills. More specifically, in the context of mathematics, Sammallahti et al. (2023) found that emotional regulation interventions produced a moderate effect in reducing maths anxiety. The integration of mindfulness practices and resilience training has been shown to reduce maths anxiety and improve motivation to learn. Given the specific conditions faced by mathematics teachers, it is recommended that a standardized, tailored MBI protocol be developed for them, with clear components, duration, and outcome measures to enable more valid cross-study comparisons (Hidajat et al., 2023).

For teachers, mindfulness interventions have also proven effective. Hidajat et al. (2023) found promising evidence that MBI is effective in reducing stress and burnout and improving other psychological outcomes. However, this review also notes a lack of standardization in intervention components, duration, and outcome measures, which makes comparisons between studies difficult. A recommendation for the future is to develop a standardized MBI protocol specifically for mathematics teachers, taking into account the unique stress contexts they face.

Strengthening the principles of fairness and cultural inclusion

The design of classroom learning innovations requires a framework that accounts for students' cultural values, making the learning process more meaningful and relevant. An approach that is sensitive to cultural diversity can enhance a sense of ownership, broaden student participation, and foster positive attitudes towards mathematics learning (Hunter & Hill, 2024).

The principle of inclusivity in mathematics education also encompasses responsiveness to gender gaps. Chan (2022), in a cross-cultural study in China, found that gender stereotypes regarding mathematics remain strong and influence students' career choices, particularly in countries with lower gender equality indices. Interventions based on gender-responsive pedagogy, such as the use of female role models in mathematics and science, as well as process-based assessment that minimizes gender-based competition, have proven effective in enhancing girls' self-efficacy and interest in mathematics. Mathematics teachers who are aware of these dynamics can act as agents of cultural change within their classrooms.

Overall, these four points demonstrate that developing mathematical well-being requires integrating emotional, social, and cultural dimensions into teaching practice. Teachers, educational institutions, and policymakers need to collaborate to build a learning ecosystem that supports the well-being of both educators and learners.

■ CONCLUSION

A systematic review of 16 empirical articles and reviews (2021–2025) demonstrates that the relationship between teacher well-being and student well-being is a bidirectional, mutually reinforcing one that forms the basis for the development of comprehensive mathematics well-being, as identified in emotional, social, and cognitive terms. Teachers who are in a state of well-being, both emotionally and professionally, have a greater capacity to foster motivation and a sense of security, and to encourage students to participate actively in the learning process. Meanwhile, students who feel happy, are

emotionally engaged, and have positive learning experiences will provide feedback that supports teachers' job satisfaction and emotional resilience. This two-way interaction forms a classroom well-being ecosystem that serves as the foundation for MWB, a cohesive state encompassing seven dimensions: achievement, cognition, engagement, meaning, perseverance, positive emotions, and social relationships. Among the various factors influencing this dynamic, the quality of teacher-student interpersonal relationships has been identified as the strongest predictor of MWB across cultures, whilst teacher burnout acts as a disruptor, simultaneously interrupting all three pathways of interaction. Furthermore, the 'confidence gap' among female students, where the confidence gap in mathematics is more persistent than the achievement gap, underscores that the gender dimension must be an explicit consideration in well-being-based interventions in mathematics classrooms.

The findings of this study have important implications for mathematics education policy and practice. In practical terms, teacher training programs need to expand their scope beyond mere mathematical content competence to include relational, emotional, and cultural competencies that support holistic well-being. At the institutional level, schools need to design working conditions that safeguard teachers' professional well-being as a structural investment in the quality of MWB within the classroom. Nevertheless, this study has several limitations, namely the relatively small number of articles analyzed (16), the search being conducted in only three databases, and the study covering only English- and Indonesian-language literature. These limitations limit the generalizability of the findings, particularly in cultural contexts and education systems not represented in the corpus. Further research is recommended to expand the scope of the databases and the time range, and to develop longitudinal studies that directly measure the reciprocal dynamics between teachers' and students' well-being in mathematics learning.

DECLARATION OF GENERATIVE AI USAGE IN THE WRITING PROCESS

During the writing and editing of this manuscript, the author utilized several AI-powered tools to support the writing process. ChatGPT (OpenAI) and Claude were used for brainstorming and refining ideas, and DeepL for translating text into English. All AI-generated output has been carefully reviewed, critically evaluated, and substantially revised by the author to ensure accuracy, coherence, and academic integrity. The author takes full responsibility for the content, interpretation, and conclusions presented in this manuscript.

REFERENCES

Agyapong, B., Obuobi-Donkor, G., Burback, L., & Wei, Y. (2022). Stress, burnout, anxiety and depression among teachers: A scoping review. *International Journal of Environmental Research and Public Health, 19*(17). https://doi.org/10.3390/ijerph191710706

Alakoski, R., Laine, A., & Hannula, M. S. (2024). Teaching mathematics in innovative learning environments: The entangled tensions between the learning environment and pedagogy. *European Journal of Education, 59*(3). https://doi.org/10.1111/ejed.12661

Aponte, M. L., Vargas Sánchez, A. D., & Vásquez, M. A. (2025). The effects of emotional intelligence training programmes on educators: A systematic review. *F1000Research, 14,* 842. https://doi.org/10.12688/f1000research.166190.1

Bansilal, S., Lephoto, T., North, D., & Zewotir, T. (2022). Exploring the association

between teacher-related factors and grade 9 mathematics achievement. *South African Journal of Education*, *42*(1). https://doi.org/10.15700/saje.v42ns1a2091

Bohrnstedt, G. W., Zhang, J., Li, M., Ikoma, S., Park, B. J., & Broer, M. (2024). Mathematics motivation and mathematics performance: Does gender play a role? *AERA Open, 10*(1), 1–17. https://doi.org/10.1177/23328584241298272

Campbell, T. G., & Bean, B. (2025). Factors influencing young children's mathematical wellbeing in the United States. *Social Indicators Research, 178*(1), 255–278. https://doi.org/10.1007/s11205-025-03581-2

Chan, R. C. H. (2022). A social cognitive perspective on gender disparities in self-efficacy, interest, and aspirations in science, technology, engineering, and mathematics (STEM): The influence of cultural and gender norms. *International Journal of STEM Education, 9*(1). https://doi.org/10.1186/s40594-022-00352-0

Fraser, B. J. (2012). Classroom learning environments: *Retrospect, context and prospect*. In B. J. Fraser, K. G. Tobin, & C. J. McRobbie (Eds.), Second international handbook of science education (pp. 1191–1239). Springer. https://doi.org/10.1007/978-1-4020-9041-7_79

Frenzel, A. C., Pekrun, R., & Goetz, T. (2007). Perceived learning environment and students' emotional experiences: A multilevel analysis of mathematics classrooms. *Learning and Instruction, 17*(5), 478–493. https://doi.org/10.1016/j.learninstruc.2007.09.001

Gökta^{o}, E., & Kaya, M. (2023). The effects of teacher relationships on student academic achievement: A second-order meta-analysis. *Participatory Educational Research, 10*(1), 275–289. https://doi.org/10.17275/per.23.15.10.1

Hettinger, K., Lazarides, R., & Schiefele, U. (2023). Motivational climate in mathematics classrooms: Teacher self-efficacy for student engagement, student- and teacher-reported emotional support and student interest. *ZDM – Mathematics Education, 55*(2), 413–426. https://doi.org/10.1007/s11858-022-01430-x

Hidajat, T. J., Edwards, E. J., Wood, R., & Campbell, M. (2023). Mindfulness-based interventions for stress and burnout in teachers: A systematic review. *Teaching and Teacher Education, 134*, 104303. https://doi.org/10.1016/j.tate.2023.104303

Hill, J. L., & Hunter, J. (2024). Diverse students' mathematical wellbeing. *New Zealand Journal of Educational Studies, 59*(1), 211–234. https://doi.org/10.1007/s40841-024-00318-6

Hill, J. L., & Seah, W. T. (2023). Student values and wellbeing in mathematics education: Perspectives of Chinese primary students. *ZDM – Mathematics Education, 55*(2), 385–398. https://doi.org/10.1007/s11858-022-01418-7

Hill, J. L., Kern, M. L., Seah, W. T., & van Driel, J. (2021). Feeling good and functioning well in mathematics education: Exploring students' conceptions of mathematical well-being and values. *ECNU Review of Education, 4*(2), 349–375. https://doi.org/10.1177/2096531120928084

Hunter, J., & Hill, J. L. (2025). Exploring mathematical wellbeing across cultures: insights from diverse students. J. Hunter et al. *Mathematics Education Research Journal*, *37*(3), 529–556.

Hyland, D., & O'Shea, A. (2021). The student perspective on teaching and assessment

during initial COVID-19 related closures at Irish universities: Implications for the future. *Teaching Mathematics and Its Applications, 40*(4), 455–477. https://doi.org/10.1093/teamat/hrab017

Jobin, K., Ashok, L., Manjula, M., JJ, T. A., Mathias, E. G., & Krishnan, P. (2025). Mindfulness-based interventions for enhancing adolescent mental health and well-being: A scoping review. *Clinical Epidemiology and Global Health*, *32*, 101961.

Kavitha, R. N., & Kareem, J. (2025). The mediating role of mathematics and science engagement in the relationship between attitude towards STEM education and the subjective well-being of adolescents. *Science Education International, 36*(1), 48–56. https://doi.org/10.33828/sei.v36.i1.5

Lee, C., & Morgan, J. (2025). Remembering learning mathematics: We can run but we can't hide. *Teacher Development, 29*(1), 167–186. https://doi.org/10.1080/13664530.2024.2360134

McLean, L., Granger, K. L., & Chow, J. C. (2023). Associations between elementary teachers' mental health and students' engagement across content areas. *Contemporary Educational Psychology* , *75*, 102231.

Mendez, J. A., & van Es, E. A. (2025). Examining teachers' relational noticing: promoting equity through positive interactions in mathematics education. *Journal of Mathematics Teacher Education*, *28*(7), 1541–1566.

Nwoko, J. C., Emeto, T. I., Malau-Aduli, A. E. O., & Malau-Aduli, B. S. (2023). A systematic review of the factors that influence teachers' occupational wellbeing. *International Journal of Environmental Research and Public Health, 20*(12). https://doi.org/10.3390/ijerph20126070

OECD. (2025). *Results from TALIS 2024: Professional relationships in school communities*. OECD Publishing. https://www.oecd.org/en/publications/2025/10/results-from-talis-2024_28fbde1d

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, S., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372. https://doi.org/10.1136/bmj.n71

Paulsen, R., Støve, M. B., & Xenofontos, C. (2025). 'You have to want it yourself': How gender and socioeconomic status shape girls' mathematical identities. *International Journal of Adolescence and Youth, 30*(1). https://doi.org/10.1080/02673843.2025.2581509

Raabe, I. J., & Block, P. (2024). The gendered maths confidence gap, social influence and social integration. *European Societies, 26*(5), 1596–1631. https://doi.org/10.1080/14616696.2024.2349217

Renshaw, T. L., & Jimerson, S. R. (Eds.). (2023*). Handbook of school psychology: Ecological perspectives.* Springer.

Sammallahti, E., Finell, J., Jonsson, B., & Korhonen, J. (2023). A meta-analysis of math anxiety interventions. *Journal of Numerical Cognition, 9*(2), 346–362. https://doi.org/10.5964/jnc.8401

Seligman, M. E. P. (2011). Flourish: A visionary new understanding of happiness and well-being. Free Press.

Szczygie³, M., Hunt, T. E., & Sarý, M. H. (2025). Domain-specific and domain-general predictors of math anxiety in adolescents and adults. *Contemporary Educational Psychology*, 102400.

Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology, 8,* 1–10. https://doi.org/10.1186/1471-2288-8-45

Wang, C., Xu, Q., & Fei, W. Q. (2024). The effect of student-perceived teacher support on math anxiety: Chain mediation of teacher–student relationship and math self-efficacy. *Frontiers in Psychology, 15*. https://doi.org/10.3389/fpsyg.2024.1333012

Weinhandl, R., Mayerhofer, M., Anðiæ, B., & Große, C. S. (2024). An interplay of enjoyment, engagement, and anxieties: The characteristics of upper secondary school mathematics students. *Investigations in Mathematics Learning, 16*(1), 36–51. https://doi.org/10.1080/19477503.2023.2267936

Wu, Y. (2025). Unlocking mathematics success: Global lessons on student achievement, teacher satisfaction, and school environments. *International Electronic Journal of Mathematics Education, 20*(2). https://doi.org/10.29333/iejme/15900

Yao, J., & Abdullah, M. N. L. Y. (2025). Five decades of teacher burnout research (1970–2024): A comprehensive bibliometric analysis. *Acta Psychologica, 259*, 105318. https://doi.org/10.1016/j.actpsy.2025.105318

Zhang, Q., Fang, H., & Tang, X. (2025). Modelling mathematical well-being among undergraduates: An exploratory study in mainland China. *International Journal of Educational Research Open, 9*. https://doi.org/10.1016/j.ijedro.2025.100507