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Ensuring quality inclusive and equitable education by increasing emotional intelligence through positive attitudes in students' learning from mistakes

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Our study examines how teachers' affirmative responses to student errors can cultivate emotional intelligence and advance inclusive, equitable education in accordance with Sustainable Development Goal 4 (SDG4), while addressing the issue of error-related anxiety in high-stakes, performance-oriented educational systems that frequently diminish student resilience and engagement. We employed a mixed-methods design to survey 236 students (grades 5–8) and 46 teachers from urban and rural secondary schools in Romania, utilizing customized questionnaires (Cronbach's $\alpha = 0.82$ for students, 0.78 for teachers) that integrated Likert-scale items and open-ended questions. We used SPSS 20 to look at the quantitative data (descriptive statistics, Pearson correlations, ANOVA) and thematic coding to look at the qualitative data (Cohen's Kappa = 0.84 for inter-code reliability). The results showed that most students (56%) see mistakes as obstacles at first, but positive feedback from teachers can help students stay strong and motivated (for example, 48% said they were motivated by phrases like "Next time will be better"). Teachers' methods were different; 80% encouraged students to learn from their mistakes, while 15% used criticism, which had a big effect on how students felt (for example, 65% said they were anxious after getting harsh feedback). Hypotheses H1 and H2 were validated, affirming the constructive function of mistakes and the emotional influence of error management, whereas H3 was not supported, indicating no significant correlation between knowledge accessibility/error identification and teacher job satisfaction ($p > 0.05$). Therefore, study suggests that teachers should get specific training in emotional intelligence and how to make classrooms more welcoming for mistakes. This will help create supportive environments and give teachers practical ideas for how to teach fairly in settings with different resources.

KEYWORDS

inclusive education, emotional intelligence, teacher-student interactions, learning from mistakes, equitable education

1 Introduction

Mistakes are a normal part of learning, but how teachers react to those mistakes has a big impact on how students feel and how well they do in school. This study looks at how teachers' positive attitudes toward mistakes affect students' emotional intelligence in school settings (Harth, 2017). This is in line with the goals of SDG4 for fair and inclusive education (Goleman, 1995; Sánchez and Sebastián, 2024). In schools where grades are often the most important

thing, harsh criticism can make students afraid, which can lower their confidence and participation (Dweck, 1986; Tulis, 2013). On the other hand, when teachers see mistakes as chances to learn, they motivate students to keep going, which is an important but not always practiced practice (Leighton et al., 2022). The goal of this study is to turn classrooms into places where making mistakes helps students learn instead of making them anxious.

1.1 Errors and failures: factors influencing the learning process

From a constructivist perspective, errors transcend mere mistakes; they represent opportunities for students to enhance their understanding by reflecting on their missteps and seeking assistance (Darb and Abbood, 2021; Vogrinc and Zuljan, 2009). Errors can stimulate critical thinking in students and facilitate learning by prompting problem-solving (Akinoglu and Tandogan, 2007; Valerjev and Dujmović, 2019). If mistakes are not managed effectively, they may cause individuals to lose interest or develop negative sentiments toward subjects (Dweck, 1986; Turner et al., 2002). Recent research indicates that emotions influence learning, and the fear of making errors can impede progress, particularly among adolescents (Pekrun and Linnenbrink-Garcia, 2012). Students’ confidence may diminish upon making mistakes, adversely affecting their performance in practical learning activities (Liu et al., 2023). Cultural disparities influence behavior; certain systems promote risk-taking, whereas others emphasize perfection, thereby constraining emotional growth (Ellis et al., 2014; Horvath et al., 2020). We wanted to dig deeper into how these dynamics play out in real classrooms.

Cultural variations greatly influence error perceptions. Some educational systems encourage error-friendly cultures, supporting risk-taking and reflection (Ellis et al., 2014; Schleppenbach et al., 2007), while others prioritize performance and correctness, limiting emotional growth (Horvath et al., 2020). Social factors, such as peer interactions and family expectations, also shape students’ responses to errors (Isik et al., 2018; Homsma et al., 2009; Roth et al., 2009). For example, supportive parental practices correlate with adolescents’ willingness to learn from mistakes (Roth et al., 2009). Table 1 summarizes key factors influencing learning, drawn from literature.

This study examines how teachers’ attitudes toward errors can enhance emotional intelligence, addressing a gap in research on performance-driven education systems.

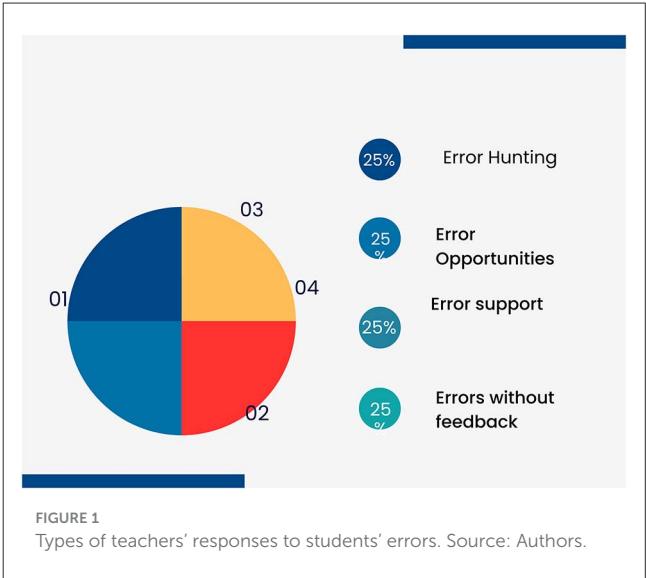
1.2 Teachers-student interactions

Teachers play a central role in creating classroom error cultures through their beliefs, goals, and approaches (Goetz et al., 2006; Shim et al., 2013; Ames, 1992). Supportive error-handling creates environments where students feel safe to take risks, boosting engagement and resilience (Harteis, 2006; Santagata, 2005; Schleppenbach et al., 2007; Church et al., 2001). Conversely, harsh responses, such as ridicule or penalties, heighten anxiety, undermining SDG4’s fairness goals (Seifried and Wuttke, 2010;

TABLE 1 Factors influencing learning.

Factor influencing learning	Author(s)
Self-efficacy in problem-based learning	Liu et al., 2023; Akinoglu and Tandogan, 2007; Hmelo-Silver, 2004
Individual, family, school, and social factors influencing motivation of ethnic minority students	Isik et al., 2018; Homsma et al., 2009; Roth et al., 2009
Co-creation and adjustable learning formats in entrepreneurial learning environments	Ilonen, 2021; Alt et al., 2023
Relative strength of normative and biased responses in meta-reasoning processes	Valerjev and Dujmović, 2019
Handed cooperative learning model to improve mathematics problem-solving	Demitra and Sulisworo, 2018; Fadillah et al., 2021; Çalik et al., 2007; Cobb et al., 2001

Source: Authors.



Black and Wiliam, 2009; Gonida et al., 2008). Studies show that teachers’ achievement goals influence their error-handling practices, with mastery-oriented teachers prioritizing learning over performance (Daniels et al., 2013; Wolters, 2004; Dresel et al., 2013; Meece et al., 2006). However, few studies delve into these dynamics in real classroom settings where teacher training often overlooks emotional intelligence and error management (Seifried and Wuttke, 2010).

We identify four teacher-specific approaches when addressing students’ errors, based on prior work and our observations (Harteis, 2006). The approaches were explained in Figure 1:

1. Error hunting: teachers’ openness to errors, noticing and correcting mistakes willingly.
2. Error opportunities: seeing errors as learning chances, discussed with students rather than penalized.
3. Error support: showing patience and helping student’s correct errors.

4. Errors without feedback: avoiding negative verbal or non-verbal reactions, such as anger or ridicule.

These novel methodologies indicate that educators require training to assist students in contemplating strategies for addressing errors (Daniels et al., 2013; Leighton et al., 2022; Butler and Shibaz, 2008; Metcalfe, 2017). Teachers can enhance the welcoming atmosphere of their classrooms by enrolling in courses centered on emotional intelligence (Brackett et al., 2021; Durlak et al., 2011). Cultural and systemic obstacles, such as prioritizing grades over the learning process, may hinder the implementation of these practices, necessitating further research (Horvath et al., 2020). This study poses three research questions: What are the perspectives of teachers and students regarding the significance of errors in the learning process? How do teachers' approaches to mistakes influence students' emotions? (3) What implications does this have for teacher training to ensure that all students can learn collaboratively? This study examines how effectively managing errors can enhance emotional intelligence, utilizing questionnaires from 236 students and 46 teachers in both urban and rural secondary schools. The findings aim to enhance teacher education by demonstrating the creation of mistake-friendly classrooms, addressing cultural barriers in performance-based systems, and advancing the vision of inclusive education outlined in SDG4 (UNESCO, 2020; OECD, 2023).

2 Methodology

2.1 Research design

Our study used a mixed methods approach to examine how teachers' attitudes toward students' mistakes shape emotional intelligence and inclusive education in urban and rural secondary schools, aligned with Sustainable Development Goal 4 (SDG4) (Creswell and Plano Clark, 2018). We used questionnaires to gather students' and teachers' perspectives on errors, pairing these with qualitative insights to add depth to our findings (Johnson and Onwuegbuzie, 2004).

Our approach tested three hypotheses:

- H1: Teachers and students see the value of mistakes in learning.
- H2: Teachers' error-handling practices influence students' emotional responses.
- H3: Accessibility of knowledge and error identification affect teachers' job satisfaction.

2.2 Participants

We worked with 46 teachers and 236 students from public secondary schools, chosen for their diverse communities and experienced staff (Cohen et al., 2017). Teachers included 40 with a first teaching degree, 5 with a second degree, and 1 with certification; most (40) were tenured, suggesting high professional stability (Skaalvik and Skaalvik, 2011). Students were from grades 5 ($n = 172$), 6 ($n = 86$), 7 ($n = 29$), and 8 ($n = 55$), aged 10–14 years.

Informed consent was gathered from all participants and approved by the Ethics Committee (4039/21.04.2024).

2.3 Instruments

We developed two questionnaires tailored to our goals. The student version had 20 questions, mixing 15 Likert-scale items with 5 open-ended ones, to explore how students see mistakes (as barriers or opportunities), their emotional reactions (like fear or shame), and their classroom experiences (such as bullying or teacher strictness). We drew on established scales (Pekrun and Linnenbrink-Garcia, 2012) and tested the questions with 30 students to ensure they were clear (Fowler, 2014). The teacher questionnaire included 15 items (10 Likert-scale, 5 open-ended) to assess their views on errors, their error-handling practices, and their job satisfaction, inspired by prior studies (Tulis, 2013; Leighton et al., 2022). We had experts review the questions for accuracy (DeVellis, 2016) and translated them into English, double-checking with back-translation (Brislin, 1970). Both questionnaires demonstrated strong internal reliability, with Cronbach's alpha (α) values of 0.82 for students and 0.78 for teachers, as assessed per Field (2018).

This statistical measure served to evaluate the extent to which the items within each questionnaire coherently measured the intended constructs, such as perceptions of mistakes, emotional responses, and job satisfaction. The process reflects a thoughtful effort to ensure the instruments were trustworthy tools for capturing the nuanced experiences of the participants.

For inter-coder reliability, we used Cohen's Kappa to assess the level of agreement between two or more coders when categorizing qualitative data, correcting for agreement that might occur by chance. It is particularly relevant for thematic analysis or coding schemes, as seen in the study's mention of kappa values (0.78 initially, 0.82 after refinement) to ensure consistency among coders. Kappa values range from 0 to 1, with 0.61–0.80 indicating substantial agreement and 0.81–1.00 indicating almost perfect agreement.

This was achieved by comparing identified themes with quantitative data (Likert-scale responses) to ensure consistency through triangulation. We also have reviewed and have refined the themes iteratively, discussing any differences to confirm they reflected the participants' perspectives accurately. After the initial coding round, we used the kappa results ($k = 0.76$) to identify and address discrepancies. We adjusted the coding scheme (e.g., clarifying definitions or categories) based on feedback from the first round to improve consistency. A second coding round was conducted with the refined scheme, resulting in a kappa of 0.84. This higher value confirmed that the adjustments improved agreement, reinforcing the reliability of the coding process. The items from questionnaires are in the Appendix.

2.3.1 H1: constructive role of mistakes

Questions for students focus on their perceptions of mistakes as learning opportunities, the impact of teacher feedback, and barriers like low grades or strictness, reflecting the 86% attentiveness and

97% participation rates. Teacher questions emphasize encouraging a positive view of mistakes and addressing age-related differences (e.g., grade 5 vs. grade 8 enjoyment).

2.3.2 H2: error-handling and emotional responses

Student questions target emotional reactions to feedback (e.g., anxiety from “Shame on you,” motivation from “Next time will be better”) and coping strategies (e.g., 42% seeking help), aligning with the 56% viewing mistakes as barriers. Teacher questions assess their feedback styles and challenges, mirroring the 80% supportive vs. 15% penalizing approaches.

2.3.3 H3: knowledge accessibility and job satisfaction

Student questions explore perceived teacher satisfaction linked to support and knowledge accessibility, based on qualitative insights (e.g., 28% disengagement concerns). Teacher questions focus on job satisfaction predictors (V2, V3) and challenges (e.g., information overload), reflecting the non-significant statistical findings.

2.4 Procedure

Data collection took place in spring 2024 over 2 weeks. Teachers completed questionnaires during staff meetings, and students during class sessions, with parental consent. Anonymity was ensured to encourage honest responses (Cohen et al., 2017). The process involved:

1. Explaining the study's purpose and ethical guidelines to participants.
2. Handing out paper-based questionnaires, completed in 20–30 min.
3. Collecting and storing responses securely, per GDPR regulations (European Union, 2016).

2.5 Data analysis

We analyzed using SPSS 20 (IBM Corp, 2011). Descriptive statistics summarize perceptions and emotional responses. Inferential analyses included:

- Pearson correlations to explore relationships between variables (e.g., error perceptions and emotional responses) (Field, 2018).
- ANOVA to assess group differences (e.g., teachers' job satisfaction by error identification) (Tabachnick and Fidell, 2019).

Qualitative responses were coded thematically to identify recurring themes (e.g., fear manifestations), following Braun and Clarke (2006), with inter-coder reliability ensured via Cohen's Kappa ($\kappa = 0.84$ after refinement). Triangulation ensured

robustness by blending quantitative and qualitative insights (Creswell and Plano Clark, 2018).

2.6 Conceptual framework

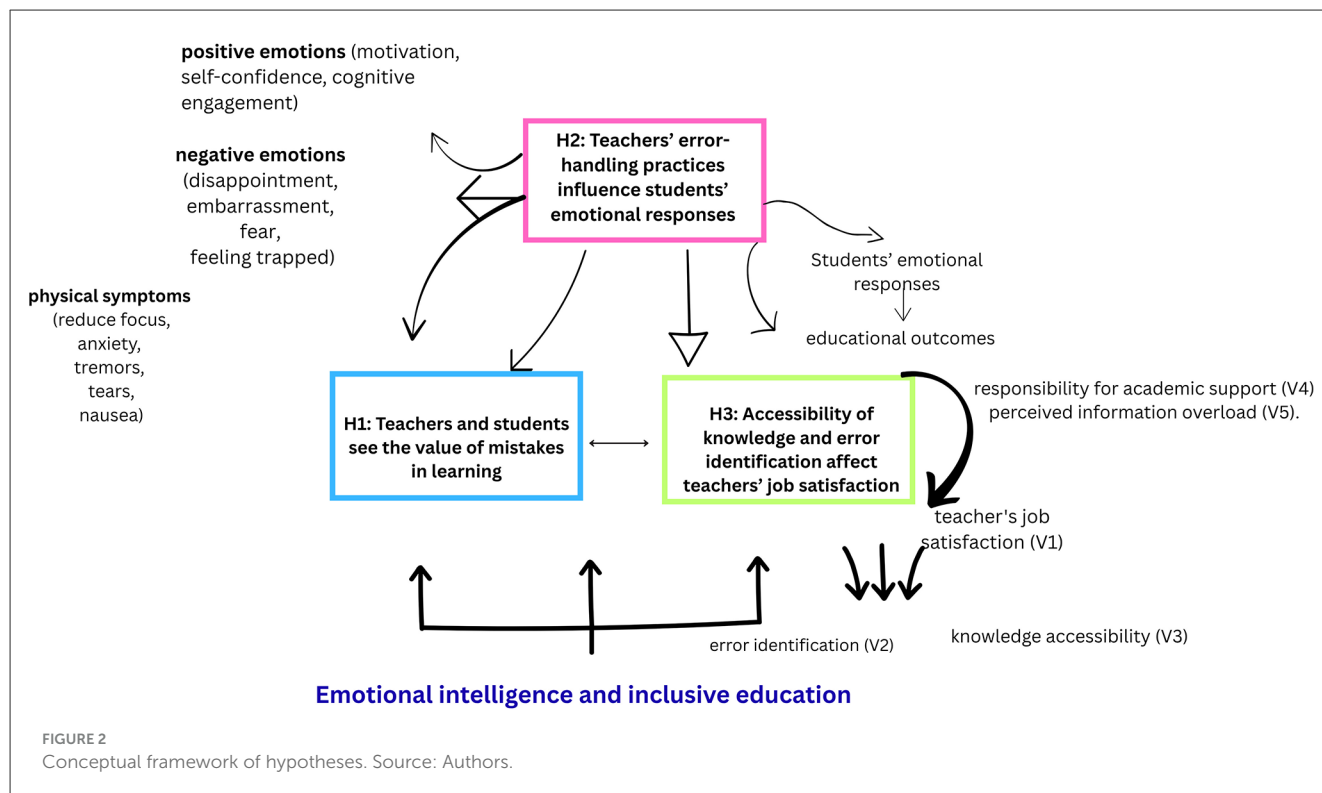
Figure 2 illustrates the study's hypotheses, linking teachers' error-handling approaches to students' emotional responses and educational outcomes. The diagram was crafted using original data, addressing the AI-generated content concern in the original figure (American Psychological Association, 2017).

3 Results

This section presents the insights from questionnaires gathered from 236 students and 46 teachers in urban and rural secondary schools, testing three hypotheses (H1, H2, H3) regarding the role of teachers' error-handling approaches in nurturing emotional intelligence and inclusive education. We used SPSS 20 to analyze the data, complementing it with descriptive statistics, Pearson correlations, ANOVA, and thematic analysis of open-ended responses (Field, 2018; Braun and Clarke, 2006). Results are organized by hypothesis, followed by contextual factors shaping outcomes.

3.1 H1: constructive role of mistakes

Students showed diverse views of school, with 24% ($n = 57$) reporting high enjoyment, 36% ($n = 85$) moderate, 24% ($n = 57$) average, and 16% low or no enjoyment (9% minimal, $n = 21$; 7% none, $n = 16$), reflecting varied motivational levels (Pekrun and Linnenbrink-Garcia, 2012). Enjoyment varied by grade, with younger students (grade 5: 30% high enjoyment, $n = 52$) more enthusiastic than older ones (grade 8: 18%, $n = 10$), possibly due to shifts in self-efficacy (Bandura, 1997; Gonida et al., 2008). Main reasons for valuing school included gaining knowledge (220 responses, 93%), connecting with peers (202, 86%), breaks (110, 47%), and caring teachers (98, 42%), aligning with studies on intrinsic motivation (Ryan and Deci, 2020; Barron and Harackiewicz, 2001; Bong, 2005). However, serious stressors hindered engagement: 80.5% ($n = 190$) feared physical violence, 59.7% ($n = 141$) cited strict teachers, 73.7% ($n = 174$) felt social isolation, and 80.1% ($n = 189$) noted low grades as barriers, consistent with research on classroom climate (Tulis, 2013; Anderson et al., 2004). Despite these challenges, 203 students (86%) remained attentive in class, and 230 (97%) favored active participation, suggesting resilience when supported. Qualitative responses underscored the value of helpful feedback, such as “Let's see why you went wrong” (103 responses, 44%) or “Next time will be better” (114, 48%), which sparked learning opportunities (Harteis, 2006). Only 73 students (31%) valued peers' opinions, while 52 (22%) were indifferent, pointing to a focus on self-image typical of adolescence (Greenwald and Farnham, 2000). These results back H1, showing that students see mistakes as valuable when teachers offer encouraging



guidance, though stressors like strictness and low grades pose challenges (Dweck, 1986, 2002).

3.2 H2: error-handling and emotional responses

Students frequently saw mistakes as barriers, with 132 responses (56%) indicating this view, particularly for low grades (206, 87%), tardiness (140, 59%), talking in class (165, 70%), and uncertainty in responding (129, 55%). Notably, 16 students (7%) viewed asking questions when confused as a mistake, suggesting a lack of perceived support, a concern echoed in studies on classroom inquiry (Seifried and Wuttke, 2010). Negative teacher feedback worsened emotional distress: “Shame on you” (61 responses, 26%) and “I didn’t expect that from you” (90, 38%) triggered disappointment (139, 59%), embarrassment (133, 56%), fear (66, 28%), and feeling trapped (32, 14%), aligning with studies on error-related anxiety (Pekrun and Linnenbrink-Garcia, 2012; Frenzel et al., 2021). Physical symptoms were common, including reduced focus (195, 83%), anxiety (154, 65%), tremors (123, 52%), tears (116, 49%), and nausea (41, 17%), underscoring the emotional and physiological toll of harsh error-handling (Goetz et al., 2006; Roth et al., 2009). Conversely, positive feedback, such as “Let’s see why you went wrong” (103, 44%) or “Next time will be better” (114, 48%), boosted motivation (98, 42%), self-confidence (41, 17%), and cognitive engagement (131, 56%), backing H2 that teachers’ error-handling shapes emotional responses (Leighton et al., 2022). However, 21% of students ($n = 50$) did not seek help after mistakes, pointing to disengagement, while 42% ($n = 99$) actively sought assistance, and 37% ($n = 87$) asked for explanations,

reflecting varied coping strategies (Elliot and Murayama, 2008). Teachers’ approaches were inconsistent: 37 (80%) saw errors as universal and encouraged improvement (21, 46%), but 7 (15%) penalized errors, and 2 (4%) considered questions as mistakes, revealing gaps in supportive practices (Tulis, 2013). Qualitative data showed that 122 students (52%) received answers to inquiries from multiple teachers, while 26 (11%) reported no support, reinforcing the need for consistent error support (Santagata, 2005; Sitzman et al., 2015). These results validate H2, showing that teachers’ approaches significantly influence students’ emotional and behavioral responses to mistakes.

3.3 H3: knowledge accessibility and job satisfaction

H3 suggested that knowledge accessibility and error identification predict teachers’ job satisfaction, measured through variables V1 (job satisfaction), V2 (error identification), V3 (knowledge accessibility), V4 (responsibility for academic support), and V5 (perceived information overload). Table 2 summarizes Pearson correlations, ANOVA, and regression analyses.

In this context, Job Satisfaction (V1) is primarily treated as the dependent variable because the hypothesis H3 posits that it is influenced or predicted by other factors (e.g., error identification, knowledge accessibility). We try to understand how these independent variables affect teachers’ job satisfaction, making V1 the outcome of interest in the statistical models. Error Identification (V2) is an independent variable because it represents a teacher’s ability to recognize and address students’ mistakes, which the study hypothesizes might impact job satisfaction.

TABLE 2 Statistical analysis for H3.

Analysis type	Dependent variable	Independent variable	Pearson correlation (<i>r</i>)	Sig. (2-tailed)	95% CI (lower, upper)	ANOVA <i>F</i>	ANOVA Sig.
Correlation	Job satisfaction (V1)	Error identification (V2)	0.107	0.486	(−0.193, 0.388)	–	–
Correlation	Job satisfaction (V1)	Knowledge accessibility (V3)	0.067	0.660	(−0.231, 0.354)	–	–
Correlation	Error identification (V2)	Knowledge accessibility (V3)	−0.055	0.721	(−0.343, 0.243)	–	–
ANOVA	Job satisfaction (V1)	–	–	–	–	0.238	0.869
ANOVA	Knowledge accessibility (V3)	–	–	–	–	0.760	0.523
ANOVA	Responsibility for academic support (V4)	–	–	–	–	1.099	0.360
Regression	Job satisfaction (V1)	Perceived information overload (V5)	–	–	–	0.571	0.637

Source: Authors using SPSS 20 (Field, 2018).

Knowledge Accessibility (V3) is an independent variable that shows how easy it is for a teacher to find resources or help that could make them happier. Responsibility for Academic Support (V4) is an independent variable in the ANOVA framework, which looks at how it affects different outcomes or differences between groups. Perceived Information Overload (V5) is an independent variable in the regression analysis, which looks at how it might affect job satisfaction. The way variables are classified as dependent or independent matches the causal direction that H3 suggests. The researchers want to explain job satisfaction, which is the dependent variable. The other variables are possible predictors based on theoretical assumptions (for example, better error detection or easier access to resources may make people happier). However, in the ANOVA analyses, V3 and V4 are also treated as dependent variables to explore group differences, reflecting a bidirectional exploratory approach to understand their roles within the dataset.

Correlations were weak and non-significant ($p > 0.05$), with wide confidence intervals suggesting high variability in responses (Tabachnick and Fidell, 2019). For example, the correlation between job satisfaction (V1) and error identification (V2) was 0.107 ($p = 0.486$), indicating no strong link. Similarly, knowledge accessibility (V3) showed a negligible correlation with job satisfaction (0.067, $p = 0.660$). ANOVA results revealed no significant group differences (V1: $F = 0.238$, $p = 0.869$; V3: $F = 0.760$, $p = 0.523$; V4: $F = 1.099$, $p = 0.360$), and regression analysis testing V5's impact on V1 was non-significant ($F = 0.571$, $p = 0.637$), failing to back H3. These results may stem from the small sample size (46 teachers), which limited statistical power, or from diverse error-handling approaches, as noted in similar studies (Cohen, 1992; Shim et al., 2013). Qualitative responses provided context: 13 teachers (28%) expressed concerns about student disengagement, 12 (26%) noted conflicts, and 11 (24%) cited classroom disorder, reflecting challenges in maintaining supportive environments (Hoffmann et al., 2009; Roeser et al., 1996). Fear of errors was widespread, with 22 teachers (48%) reporting moderate student fear, 14 (30%) severe, and 5 (11%) constants, while only one

teacher noted no fear, suggesting a pervasive issue (Frenzel et al., 2021). Teachers with higher qualifications observed greater student fear (first degree: $M = 3.38$; second degree: $M = 3.67$; certification: $M = 3.0$), possibly due to stricter expectations or greater awareness of emotional cues (Skaalvik and Skaalvik, 2011). These insights indicate that knowledge accessibility and error identification do not strongly predict job satisfaction in this context, pointing to the need for targeted teacher training to address classroom challenges (Daniels et al., 2013).

3.4 Contextual factors

Student performance varied slightly by setting, with urban students ($M = 4.32$, $SD = 0.73$) slightly outperforming rural students ($M = 4.28$, $SD = 0.74$), likely due to better access to educational resources and infrastructure (Horvath et al., 2020; OECD, 2023). The overall mean was 4.29 ($SD = 0.74$, $N = 2,405$), with consistent variability across groups ($SD \approx 0.73$ – 0.74). Performance scores were drawn from questionnaire responses assessing engagement and error perceptions, though the small difference (0.04) suggests limited practical significance (Cohen, 1992). These insights, while not central to H1–H3, highlight contextual influences on educational outcomes, supporting the need for fair resource distribution to achieve SDG4's goals of inclusive education (UNESCO, 2020). Further exploration of urban-rural disparities could guide policy and teacher training initiatives (Ellis et al., 2014).

4 Discussion

Our study explored how teachers' attitudes toward students' mistakes shape emotional intelligence and inclusive education in urban and rural secondary schools aligned with Sustainable Development Goal 4 (SDG4). The results validated H1 and H2,

showing that teachers and students see the value of mistakes and that error-handling approaches influence emotional responses, but failed to back H3, indicating that knowledge accessibility and error identification do not significantly predict teachers' job satisfaction. This section interprets these insights, discusses implications for teacher education, and addresses limitations and future research directions.

4.1 Interpretation of findings

The validation of H1 reveals that students, particularly younger ones, view mistakes as learning chances when guided by helpful feedback, such as "Let's see why you went wrong" (44% of responses), consistent with constructivist theories emphasizing errors as catalysts for cognitive development (Darb and Abbood, 2021; Zuljan et al., 2021). However, stressors like fear of violence (80.5%) and low grades (80.1%) hinder engagement, aligning with studies on adverse classroom climates (Tulis, 2013; Anderson et al., 2004). The variations observed (higher enjoyment in grade 5 vs. grade 8) reflect declining self-efficacy in adolescence, calling for tailored support (Bandura, 1997; Gonida et al., 2008).

H2's validation shows that teachers' error-handling approaches significantly shape students' emotional responses, with negative feedback like "Shame on you" (26%) triggering anxiety and disengagement, while positive feedback nurtures motivation and resilience (Pekrun and Linnenbrink-Garcia, 2012; Leighton et al., 2022). The prevalence of physical symptoms (e.g., 65% anxiety, 52% tremors) underscores the emotional toll of harsh approaches, consistent with studies on error-related stress (Frenzel et al., 2021; Roth et al., 2009). The inconsistency in teachers' practices—80% view errors as universal, but 15% penalize them—reflects a lack of standardized training, where performance-focused cultures often dominate (Horvath et al., 2020).

The non-significant results for H3, as shown in Table 2, suggest that knowledge accessibility and error identification do not strongly predict job satisfaction, likely due to the small sample size (46 teachers) and high variability in responses (Cohen, 1992; Shim et al., 2013). Qualitative data pointing to concerns disengagement (28%) and student fear (48% moderate) highlight systemic challenges, such as limited resources and classroom conflicts, which may overshadow the variables tested (Hoffmann et al., 2009). These insights contrast with studies linking teacher efficacy to satisfaction (Skaalvik and Skaalvik, 2011), pointing to context-specific factors.

The findings did not corroborate H3, which posited that teachers' job satisfaction could be anticipated based on the accessibility of information and the identification of errors. The limited sample size of 46 teachers may have hindered support acquisition due to diminished statistical power and significant variability in responses, as indicated by the extensive confidence intervals (Cohen, 1992; Shim et al., 2013). A more detailed explanation of why these variables exhibited a weak correlation would be beneficial. Alongside systemic and contextual factors such as school culture, workload, and resource availability, personal factors including resilience, work-life

balance, and intrinsic motivation may also be significant. Qualitative data indicating teachers' concerns regarding student disengagement (28%) and classroom disorder (24%), along with potential personal stressors such as burnout or familial obligations, underscore the necessity for a comprehensive approach (Hoffmann et al., 2009).

4.2 Implications for teacher education and practice

The results show that teacher education programs need to focus on emotional intelligence and how to deal with mistakes, which is in line with SD4's goal of providing education to everyone (UNESCO, 2020). To help students become more emotionally resilient, teachers should learn how to use helpful error-management techniques, such as giving constructive feedback and encouraging open communication (Brackett et al., 2021; Durlak et al., 2011). Workshops on emotional intelligence may help teachers find and address students' fear and disengagement, especially in systems that focus on performance (Skaalvik and Skaalvik, 2011). For instance, training modules might include role-playing situations to practice responses like "Let's look at your mistake" instead of harsh comments. This would reduce anxiety and encourage learning (Santagata, 2005).

Schools should make rules that encourage environments where mistakes are okay. For example, they could include socio-emotional learning in their curricula and offer professional development focused on inclusive teaching (OECD, 2023). In systems where there are long-lasting differences in resources between cities and rural areas (Horvath et al., 2020), giving rural teachers focused help may lead to more fair results. Students may be able to deal with their emotions better and feel more confident in their abilities if they learn how to cope with problems, like by having reflective discussions about their mistakes (Elliot and Murayama, 2008; Ryan and Deci, 2020).

4.3 Limitations and future research

The findings indicate that teacher training programs ought to emphasize emotional intelligence and strategies for addressing errors. This aligns with the objective of SDG4 to ensure universal access to education (UNESCO, 2020). Educators ought to acquire effective error-management strategies, such as providing constructive feedback and fostering open communication, to enhance students' emotional resilience (Brackett et al., 2021; Durlak et al., 2011). Educators might address students' anxiety and disengagement by participating in emotional intelligence workshops, particularly in performance-oriented systems (Skaalvik and Skaalvik, 2011). For instance, training modules may incorporate role-playing scenarios in which individuals rehearse phrases such as "Let us examine your error" rather than exhibiting hostility. This would reduce stress and enhance individuals' desire to learn (Santagata, 2005). Educational institutions ought to implement regulations that permit the acceptance of errors.

For example, they could incorporate socio-emotional learning into their curricula and provide professional development that emphasizes inclusive teaching methods (OECD, 2023). In systems characterized by enduring disparities in resources between urban and rural areas (Horvath et al., 2020), providing rural educators with specialized assistance may yield more equitable outcomes. Students who learn to address challenges through reflective discussions of their mistakes (Elliot and Murayama, 2008; Ryan and Deci, 2020) may enhance their emotional regulation and bolster their self-efficacy.

5 Conclusions

This study has demonstrated the significance of the relationships between teachers and students in enhancing emotional intelligence and promoting inclusive education in both urban and rural secondary schools. This aligns with the objectives of Sustainable Development Goal 4 (SDG4). The confirmation of H1 and H2 demonstrates that effective error-handling can enhance students' resilience and emotional wellbeing, particularly when criticism is substituted with constructive feedback. H3 did not establish a robust correlation between job satisfaction, knowledge accessibility, and error identification; however, this finding suggests an alternative perspective: teacher satisfaction may be more influenced by unexamined factors such as personal resilience or institutional support.

Our study identified various methods for addressing errors and their differential impact on students. This information can facilitate the development of innovative teacher training programs centered on emotional intelligence and adaptive teaching methodologies (Çalik et al., 2007). These findings necessitate further investigation into long-term effects and cross-cultural comparisons. They also implore policymakers and educators to develop interventions that foster error-tolerant learning environments and tackle systemic inequalities, thereby advancing the global initiative for equitable education.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found below: <https://osf.io/uhe9s/>.

Ethics statement

The studies involving humans were approved by Ethics Committee of National University of Science and Technology POLITEHNICA from Bucharest (4039/21.04.2024). The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declare that no Gen AI was used in the creation of this manuscript.

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Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/feduc.2025.1636887/full#supplementary-material>

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