A case study of teaching practices that promote mathematical wellbeing for elementary students in the United States

Tye G. Campbell[1]; Erin Rich[2]; Sehrish Jabeen[1], Melissa Barker[1], Mindy Green[3]

1 Utah State University, United States of America
2 Indiana University, United States of America
3 Revere School, United States of America

Abstract: Student wellbeing has become increasingly important over the last several decades, as students face growing challenges to their mental and emotional health. Mathematical wellbeing (MWB), the focus of this study, is particularly significant because negative experiences in mathematics can influence students' overall wellbeing and academic achievement. The present study explores teaching practices that promote wellbeing in mathematics classrooms in the United States. Using a case study design, we collaborated with an exceptional elementary teacher (Ms. G) and tracked 24 students in her classroom over four months to understand their perspectives on teaching practices that enhance MWB. Survey results showed that students' MWB grew over time in Ms. G's classrooms. Through interviewing students at two time points, we identified six teaching practices that students reported as supporting various aspects of their MWB. These teaching practices include standing up at vertical whiteboards, working in random groups, interesting tasks, between-group movement, math games, and incentives. The findings provide empirical support for teaching practices that may foster MWB in the United States. Future research should examine teaching practices that promote MWB across diverse contexts and cultures.

Keywords: mathematical wellbeing, teaching practices, elementary school.

Contact: tye.campbell@usu.edu

1 Introduction

Student wellbeing has become increasingly important over the last several decades (Hossain et al., 2023; Løhre et al., 2010), as it has been associated with higher academic performance and better emotional and mental health (e.g., Arslan, 2018; Fong Lam et al., 2015). Although student wellbeing is a global priority, there has been less emphasis placed on learners' wellbeing experiences in specific disciplines (Hill et al., 2021). It is important to examine students' subjective experiences in academic subjects known to elicit negative wellbeing, such as mathematics, because discipline specific wellbeing may have broader impacts on students' general wellbeing and academic performance (e.g., Campbell & Bean, 2025; Rodríguez et al., 2020).

The present study uses the construct of Mathematical Wellbeing (MWB) to explore the teaching practices that promote elementary students' wellbeing in mathematics in the United States (U.S.). We use a case study design, to be explained shortly, as a basis for further theoretical and empirical development.

1.1 Mathematical wellbeing

Although there has been much research devoted to students' affective relationship with mathematics over the last three decades (e.g., McLeod, 1992, 1994), student wellbeing in mathematics has remained largely unchanged, with students globally reporting negative attitudes and dispositions toward mathematics. For example, the Trends in International Mathematics and Science Study 2023 showed that over 50% of 8th graders in most countries reported having low confidence in mathematics (von Davier et al., 2024). Although less pronounced, a substantial amount of 8th graders similarly reported not liking mathematics. Thus, there is an opportunity for new frameworks that help clearly elucidate how learners can develop positive wellbeing in mathematics to help reverse these negative trends.

Mathematical Wellbeing (MWB) is a multidimensional, yet unifying construct that considers students' affective, social, and cognitive experiences in mathematics. Drawing from a value fulfillment model of wellbeing (Tiberius, 2018), Hill et al. (2024) defined MWB as the fulfillment of ultimate values in mathematics, accompanied by feeling good and functioning well. As the theory goes, students experience wellbeing in mathematics when certain ultimate values across cognitive, affective, and social dimensions are fulfilled. Hill et al. (2022) defined the ultimate values that are critical to wellbeing in mathematics by conducting a scoping review of student values. The resulting ultimate values are shown in Table 1. As illustrated, these seven ultimate values, which comprise the MWB framework, contain multiple dimensions, each of which are critical to the development of wellbeing in mathematics. The ultimate vales are thought to be universal, meaning they apply across cultural contexts (i.e., all students need to experience each ultimate value to optimize their wellbeing in mathematics).

Although MWB is multidimensional, it is unifying in the sense that each of the dimensions are important indicators of learners' overall wellbeing experiences. Thus, MWB can be thought of as an amalgamation of the seven ultimate values, as has been explicitly acknowledged in prior studies (e.g., Campbell & Bean, 2025). To illustrate the MWB framework, consider Anthony, a 4th grade student who enjoys mathematics (positive emotions; engagement) and finds meaning in doing mathematical work (meaning). Yet, Anthony has few peers he can rely on for help in mathematics (relationships) and often lacks confidence in his abilities (accomplishment; cognition). The MWB framework offers an opportunity to examine Anthony's overall wellbeing experience by amalgamating the ultimate values, while also examining the particular dimensions which may be lacking. We might ascertain that Anthony's mathematical wellbeing is moderate with notable room to grow in the ultimate values of relationships, accomplishment, and cognition. As shown, the MWB framework offers a flexible framework for considering learners' holistic experiences, while also pinpointing ultimate values that remain unfulfilled.

Table 1. MWB Framework

Ultimate Value	**Description**
Accomplishment	Reaching and achieving mastery in mathematics; feeling as though one can achieve at high levels in mathematics
Cognition	Feeling confident in mathematics and believing that one has the skills necessary to achieve.
Engagement	Having a sense of intrinsic interest in mathematics and being deeply absorbed in mathematical activity
Meaning	Sensing purpose in mathematics; believing that mathematics is useful for daily life
Perseverance	Having a sense of grit in mathematics; continuing to try even when problems are challenging
Positive emotions	Having a sense of joy in mathematics or other positive reactions to mathematics
Relationships	Having friends in the mathematics classroom; feeling as though one can help other and be helped by others; feeling a sense of belonging in the mathematics classroom

1.1.1 Gaps in MWB research

Current research on MWB has mostly relied on survey design. These studies have shown that students' MWB differs across cultural contexts (Campbell & Bean, 2025; Hill & Hunter, 2024; Hill et al., 2024; Hill & Seah, 2023). For example, Hill et al. (2024) found that Australian students experience very high levels of cognition and relationships. Yet, Hill and Hunter (2024) found that New Zealand students ranked cognition very low concerning their mathematical experiences. Similarly, Hill and Hunter (2024) found that older students have lower MWB than younger students in New Zealand, but Campbell and Bean (2025) found that students' MWB was relatively stable across ages in the U.S.

Although survey research has demonstrated several interesting findings, several gaps are important to consider. First, the field lacks qualitative research that examines students' perspectives on MWB. Exploring students' perspectives could help the field in understanding the determinants of positive MWB. Second, the field currently lacks investigations of teaching practices that promote MWB in school settings. It is imperative to explore teaching practices that promote MWB to meet the overarching goal of improving students' MWB at scale.

1.2 Teaching practices

As the present study explores teaching practices, it is prudent to describe our conceptualization of teaching practices for the current analysis. For the purpose of this study, teaching practices refer to observable actions teachers use to engage learners (MacSuga-Gage et al., 2012). We are particularly concerned with those practices that occur in-the-moment of teaching. Thus, we do not examine planning practices or other practices that would not be observable to students.

1.3 Purpose and research questions

The present study addresses current gaps in literature by examining the teaching practices that elementary students report as promoting MWB in one teacher's classroom in the U.S. We collaborate with an exceptional teacher (Ms. G), who has a reputation for enhancing students' experiences in mathematics. The goal is to explore students' perceptions of teaching practices that promote MWB in a localized context toward further testing in future research. Two research questions guide this study:

1. How do elementary students' MWB change over four months in Ms. G's classroom?

1. What teaching practices do students' report as promoting MWB in Ms. G's classroom?

2 Method

The present study uses an embedded mixed methods design, where the primary data analysis method is qualitative, with a quantitative strand added to complement the qualitative analysis (Creswell & Clark, 2017). In our case, we use quantitative data to show that Ms. G's class promoted students' MWB and primarily rely on qualitative data to explore the efficacy of Ms. G's teaching practices on MWB growth.

The study took place at a rural school in the U.S. that serves approximately 120 students from Kindergarten to Grade 12. We collaborated with Ms. G, a 4th-6th grade mathematics teacher. By all accounts, Ms. G is an exceptional teacher whose classroom provides a positive learning experience. We have collaborated with Ms. G on research projects in the past (Campbell et al., 2023a, 2023b) and her students consistently praise her teaching. In the present study, we show evidence of students' MWB growth in Ms. G's classroom and we examine the elements of Ms. G's practice that students perceive as supporting their growth. Thus, Ms. G's classroom offers a productive starting point for examining promotive teaching practices.

Ms. G draws on a unique style of instruction called Thinking Classrooms (Liljedahl, 2021), while also integrating several other teaching practices. In Ms. G's classroom, students stand at whiteboards to solve mathematics problems rather than sitting at desks. Students are placed in random groups of two to three each day, and they follow the Illustrative Mathematics curriculum, which uses novel tasks designed to support student understanding through engagement with ill-structured, complex problems. Ms. G also uses mathematics games and incentives to promote student engagement and enthusiasm. In the findings section, we elaborate on the specific practices students identified as promoting their MWB.

Each of Ms. G's mathematics classes (Grades 4-6) contain approximately 8-12 students. All students in Ms. G's classes were invited to participate (30 students total), and 24 students agreed with consent and assent. In the U.S. grade 4 students are 9-10 years old, grade 5 students are 10-11 years old, and grade 6 students are 11-12 years old. Demographics by grade level and gender are shown in Table 2. The present analysis is part of a larger study that analyzed students' MWB over one school year (beginning in August and ending in May). In this study, we examine students' MWB over four months (August 2024-December 2024) in Ms. G's classroom.

Table 2. Student demographics

Grade	Number of Students	Male Students	Female Students
4th	7	4	3
5th	10	5	5
6th	7	3	4

Two data sources were collected for analysis: MWB survey and student interviews. We administered the MWB scale (see Figure 1) to all students in August 2024 and December 2024 to track growth in their MWB over time. The MWB scale is a seven-item Likert scale survey designed to measure students' composite MWB. Students rate their agreement with each item on a 5-point scale from 1=Strongly Disagree to 5=Strongly Agree. The scale was validated in the U.S. for students aged 9-14 in a separate study (Campbell & Bean, 2025).

Figure 1. MWB Scale

1. I believe math is important to my life
2. I like to figure out math problems
3. If others have a question in math, I feel like I can help them
4. I am good at math
5. I feel happy when I do math
6. I will continue to get better at math in the future
7. Other people listen to me when I share ideas about math

Students were also interviewed at two time points (August 2024 and December 2024). Interviews centered around students' wellbeing in mathematics and the teaching practices in Ms. G's classroom that contribute to their wellbeing. Rather than explicitly asking students about teaching practices, we allowed them to tell us about Ms. G's practices and how those practices make them feel. Sample interview questions include: (1) How do you feel about math?; (2) Tell me about what you do in math class. (3) Do you enjoy learning math like this? How does it make you feel? All interviews were semi-structured (Roulston, 2010), and we used a serial interview format, meaning that we followed up on students' responses to the first interview during the second interview (Tuthill et al., 2020).

To answer Research Question 1, we measured changes in students' MWB composite score at the beginning of the school year (August 2024) to the middle of the school year (December 2024). A composite score was created for each student by summing students' scores across each of the seven MWB scale items. Because of the small sample size, we simply conducted descriptive statistics (mean; standard deviation) on aggregated data to explore differences across the sample of students rather than using inferential statistics.

To answer Research Question 2, we employed a thematic approach (Nowell et al., 2017). We coded all interviews in MAXQDA using a hybrid inductive/deductive method. The unit of analysis was students' responses to each interview question. First, we coded responses according the MWB ultimate values (accomplishment, cognition, engagement, meaning, perseverance, positive emotions, relationships). We merged accomplishment/cognition and positive emotions/engagement into single codes due to their overlapping nature. For example, statements revealing engagement (e.g., "I really like standing at whiteboards) also signal positive emotions. Thus, it was analytically challenging to separate positive emotions and engagement, as well as accomplishment and cognition. Additionally, we used a code named "negative" for responses indicating negative wellbeing.

Next, we coded references to teaching practices mentioned by students. We started with a deductive list of codes relevant to the Thinking Classroom framework (e.g., standing up at vertical surfaces, random groups) and expanded this list through inductive coding of student responses. We continuously updated our codebook until a final list of codes was reached. Table 3 provides definitions for the final list of teaching practice codes.

Table 3. Teaching Practices Codes

Teaching Practice	Definition
Standing up at vertical whiteboards	This teaching practice refers to students standing up to work on mathematics problems at vertical whiteboard spaces rather than sitting in desks.
Random groups	This teaching practice refers to students being assigned to random groups of three each day they entered their mathematics class.
Interesting tasks	This teaching practice refers to the nature of tasks in Ms. G's classroom. Rather than working on typical problems, Ms. G used thinking tasks (i.e., highly engaging tasks that are not necessarily related to the curriculum) and scripted curricular tasks (i.e., scaffolded tasks that build from prior knowledge to novel concepts). Under this approach, all students receive increasingly challenging tasks to keep them engaged.
Between-group movement	This teaching practice refers to students having the opportunity to move freely within the classroom to check their work with other groups. Rather than

	being confined to a specific location in the classroom, groups are free to move around and discuss mathematics with other groups in the classroom.
Math games	This teaching practice refers to students having opportunities to play games to build mathematics fluency, such as Blooket or Gimkit. Students also have opportunities to play "capture the flag" or other fun games to learn mathematics concepts.
Incentives	This teaching practice refers to incentivizing student learning through external rewards. For example, Ms. G has reward charts where students can earn big prizes, such as a trip to a baseball game.

After coding student responses for MWB values and teaching practices, we aggregated the data across all students and examined links between teaching practices and MWB values using the code relations browser in MAXQDA. This tool allowed us to identify instances where MWB values and teaching practices were coded in proximity. The code relations browser counts the frequency of times that one set of codes (MWB values) is coded within 2-3 lines of another set of codes (teaching practices). Thus, the code relations browser allowed us to draw links between specific teaching practices and each of the MWB ultimate values. However, it is important to note that proximity does not always imply meaningful relationships among codes. Despite this limitation, the code relations browser offers a broader picture of the connections between teaching practices and MWB in Ms. G's classroom.

3 Findings

3.1 Research question 1: How do elementary students' MWB change over four months in Ms. G's classroom?

The MWB scale showed appropriate reliability for the both the pre- ($\alpha = 0.74$) and post-survey ($\alpha = 0.80$). Table 4 shows the average MWB growth for students in each grade band, as well as average MWB scores at August 2024 (start of school) and December 2024 (middle of school year). As illustrated, the mean MWB growth was positive when considering all grade levels together. Grades 4 and 6 showed a positive mean MWB growth while Grade 5 showed a moderately negative MWB growth. However, 5th graders already reported very high levels of MWB at the beginning of the year, which may have introduced a ceiling effect (i.e., there was little room for growth). It is important to note that students in Ms. G's classroom reported higher levels of MWB than the national sample of 408 students aged 9-14 in the U.S. in a prior study (M=26.38) (Campbell & Bean, 2025).

Table 4. Mean MWB Scores

Grade	Mean Growth (SD) from Aug 2024 to December 2025	Mean (SD) MWB Score August 2024	Mean (SD) MWB Score December 2024
4th	1.43 (3.36)	28.14 (5.58)	29.57 (6.02)
5th	-0.50 (3.81)	30.10 (2.23)	29.60 (2.95)
6th	1.57 (2.23)	26.86 (4.10)	28.43 (2.99)
Altogether (4th-6th)	0.67 (3.31)	28.58 (4.05)	(3.94)

3.2 Research question 2: What teaching practices do students report as promoting MWB in Ms. G's classroom?

Table 5 shows a contingency table and heat map revealing how often each teaching practice was coded in proximity to each MWB value. The teaching practices are listed across the rows and the MWB values are listed across the columns, with numbers in each cell representing the frequency that the pairs of codes were coded in proximity. Colours closer to red indicate a higher frequency of codes in proximity, while colours closer to blue indicate a lower frequency of codes in proximity. As illustrated, random groups/relationships represented the highest frequency of codes in proximity, followed by standing at vertical whiteboards/positive emotions.
There were several findings that were somewhat expected. For example, we were not surprised that random groups supported relationship building. However, some findings were unexpected. We did not expect so many students to describe between-group movement as a perserverance-building practice. Due to length limitations, we used this section to describe a few of the connected codes that had the highest proximity counts using illustrative quotes from the data.

Table 5. Contingency table of MWB Values and Teaching Practices

	Positive emotions and Engagement	Relationships	Meaning	Accomplishment and Cognition	Perseverance	Negative
Standing at vertical whiteboards	57	27	2	21	7	14
Random groups	49	84	3	22	25	14
Interesting tasks	47	13	6	17	10	3
Between-group movement	19	45	3	13	36	4
Math games	37	7	6	13	3	1
Incentives	5	2	0	1	1	0

3.2.1 Random groups/relationships

Random groups/relationships were coded in proximity 84 times in the dataset. Students often referenced groups as being supportive of their mathematics experience because it offered them opportunities to help others and/or receive help from others. Some students suggested that random groups supported them in increasing their social skills and getting to know their classmates better in mathematics. The following quotes are representative of students' feelings about groups and their influence on relationships:

Paisley: Well, it kind of makes [math] easier because you aren't the only one like deciding it. And like I said, if anything's wrong, then somebody else can help you.

Tyler: [Groups] can help you learn because there's problems that you haven't like done in such a different way before. And you have classmates that can help you out if you're stuck on one.

Walter: [Groups] helps like with your social stuff like you can get better about social activity.

As illustrated, Ms. G’s use of random grouping had a positive influence on students’ experiences of relationships.

3.2.2 Standing at whiteboards/positive emotions and engagement

Students expressed positive emotions about standing at whiteboards, rather than sitting in desks, while doing mathematics problems (57 proximity codes). For instance, consider the following representative student quotes:

Lori: Yeah, Miss G's class, I like it because, like the other classes, we have to sit down. But like it's like the other classes, we sit down and stand up. Ms. G’s class, it's just stand up and we do a lot of creative stuff.

Arden: [I] like it, because whenever I stand up, my mind's kind of like working, instead of sitting down.

As shown, students believed standing at whiteboards was fun and exciting.

3.2.3 Interesting tasks/positive emotions and engagement

Students reported that Ms. Green’s tasks and activities elicited positive emotions in mathematics (coded in proximity 47 times). Students often used words such as “fun” to describe the activities. For example, consider Paisly and Camille’s characterisation of tasks in Ms. G’s class.

Paisley: My favorite thing, I'd say is probably doing the math problems in like a fun way. Like, cause we she uses different ways by saying like she wants to plant flowers, you know, and like that kind of stuff. So she uses it in a fun way.

Camille: My favorite thing about math class is like. when we like, do fun stuff like we have to do patterns like math patterns.

3.2.4 Between-group movement/perseverance

Between-group movement and perseverance were coded in proximity 36 times. Students believed that having the opportunity to check their answers with other groups helped them to persevere when they were stuck during problem-solving. The following quotes are representative of students’ perspectives:

Tristan: [If we] can't find it out, we go to different groups to figure it out with them and see if we both agree on something.

Camille: So basically, our whole class is working together to get the answer. Because, say, my group didn't have the right answer, like we did something wrong.

Well, the other group might have did it right, and then like had the right answer. So we go over [to the other group]. Compare [our answers]. They tell us what we did wrong, and then we do their math on our board.

4. Discussion

The present study offers insight into the teaching practices that were associated with increased MWB in one classroom in the U.S. Although the study was constrained to a local context, it provides theoretical insight that can be built upon and tested in future analyses, which we describe here.

Overall, students in Ms. G's classroom reported higher levels of MWB at the middle of the school year compared to the beginning of the school year, providing evidence that Ms. G's classroom was a productive case example for examining teaching practices that may be associated with MWB growth. It was notable that students in Ms. G's classroom reported higher levels of MWB than the national average found in a prior study (Campbell & Bean, 2025).

The student-reported perspectives in this study provide groundwork for future research examining teaching practices that promote MWB at scale. Although teaching practices and their efficacy are contextually constrained, there are important elements from Ms. G's practice that may benefit future research and practice. Rather than prescribing specific teaching practices that promote specific elements of MWB, we believe that practitioners and researchers can learn from the *characteristics* of teaching practices described in this study and their connection to MWB. For example, in Ms. G's classroom, random groups promoted a positive sense of relationships. If we examine *why* random groups had this effect on students, then we can define characteristics that may promote the ultimate value of relationships in other classroom settings. Random groups provide students with frequent opportunities to discuss ideas with their classmates. Further, random groups provide opportunities for learners to talk with *everyone* in their classroom over time. Thus, we can make the theoretical leap that providing ample opportunities for students to talk with *everyone* in the classroom may influence students' relationships—a critical component of MWB. As shown in this thought experiment, it is possible to extrapolate the specific findings of the current study to build a theoretical model of characteristic teaching practices that may promote MWB at scale. Of course, such a model would need to be empirically tested. We leave this endeavor for future research.

Concerning future directions, it will be important to examine teaching practices that promote MWB in contexts different from the U.S. As suggested by Hill and colleagues (Hill & Hunter, 2024; Hill et al., 2021), students' MWB differs across cultural contexts. For example, Hill and Hunter (2024), Hill et al. (2024), and Hill and Seah (2023) showed that students' experiences of MWB differ across New Zealand, Australia, and China. Therefore, it will be important to examine the influence of various teaching practices across cultural contexts.

In addition, there is a critical need to explore MWB from a qualitative lens. Current research on MWB is correlational by nature, relying on survey methodology. There is a need to interview students and teachers to understand their perspectives "on the ground". Qualitative research would complement the current research on MWB, which tends to be primarily quantitative in nature.

Notwithstanding the findings, there are several limitations of note. The study was conducted in a single classroom and therefore only offers exploratory insight that can be built upon in future practice and research. We view this study as an opportunity for teachers to "try out" practices identified in this study and an opportunity for researchers to further develop a catalogue of teaching practices that might help support learners' MWB. An additional limitation was that Ms. G's class consisted of just 12 students due to the rural nature of her school. Class size could have affected the success of the identified teaching practices. Finally, an additional limitation is that 5th and 6th graders in Ms. G's class had taken Ms. G's class the year before, which could have affected their MWB growth patterns.

In conclusion, the present study offers fresh insight into a set of teaching practices that may support students' MWB in U.S. contexts. Future research should test these teaching practices more broadly in other settings. We hope this research motivates future studies on MWB from the perspectives of teachers and students.

Acknowledgements

Thank you to all collaborators.

References

Arslan, G. (2018). Understanding the association between school belonging and emotional health in adolescents. *International Journal of Educational Psychology, 7*(1), 21–41. https://doi.org/10.17583/ijep.2018.3117

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

Campbell, T. G., Yeo, S., Green, M., Rich, E. (2023a). Intervening in mathematics group work in the middle grades. *Journal of KSME Series D: Research in Mathematical Education, 26*(1), 1–17. https://doi.org/10.7468/jksmed.2023.26.1.1

Campbell, T. G., Yeo, S., Rich, E., Green, M. (2023b). Exploring affordances and limitations of between-group movement in elementary mathematics classrooms. *Journal of Mathematical Behavior, 71*, 101083. https://doi.org/10.1016/j.jmathb.2023.101083

Creswell, J. W., & Clark, V. L. P. (2017). *Designing and conducting mixed methods research*. Sage.

Fong Lam, U., Chen, W. W., Zhang, J., & Liang, T. (2015). It feels good to learn where I belong: School belonging, academic emotions, and academic achievement in adolescents. *School Psychology International, 36*(4), 393–409. https://doi.org/10.1177/0143034315589649

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

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 wellbeing and values. *ECNU Review of Education, 4*(2), 349–375. https://doi.org/10.1177/2096531120928084

Hill, J. L., Kern, M. L., Seah, W. T., & van Driel, J. (2022). Developing a model of "mathematical wellbeing" through a thematic analysis of the literature. In M. Vollstedt, I. Kontorovich, K. Jones, & D. Sommerhoff (Eds.), *Proceedings of the 45th Conference of the International Group PME*. PME.

Hill, J. L., Kern, M. L., Seah, W. T., & van Driel, J. (2024). To what extent are students fulfilling their values and thriving in mathematics education?—The case for Victoria, Australia. In *Values and Valuing in Mathematics Education: Moving Forward into Practice* (pp. 259–283). Singapore: Springer Nature Singapore.

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

Hossain, S., O'neill, S., & Strnadová, I. (2023). What constitutes student well-being: A scoping review of students' perspectives. *Child Indicators Research, 16*(2), 447–483.

Løhre, A., Lydersen, S., & Vatten, L. J. (2010). School wellbeing among children in grades 1-10. *BMC public health, 10*, 1-7.

MacSuga-Gage, A. S., Simonsen, B., & Briere, D. E. (2012). Effective teaching practices: Effective teaching practices that promote a positive classroom environment. *Beyond Behavior*, *22*(1), 14–22.

McLeod, D. B. (1992). Research on affect in mathematics education: A reconceptualization. In D. A. Gruows (Ed.), *Handbook of research on mathematics teaching and learning* (pp. 575–596). Macmillan.

McLeod, D. B. (1994). Research on affect and mathematics learning in the JRME: 1970 to the present. *Journal for Research in Mathematics Education*, *25*(6), 637–647.

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, *16*(1), 1609406917733847.

Rodríguez, S., Regueiro, B., Piñeiro, I., Valle, A., Sánchez, B., Vieites, T., & Rodríguez-Llorente, C. (2020). Success in mathematics and academic wellbeing in primary-school students. *Sustainability*, *12*(9), 3796. https://doi.org/10.3390/su12093796

Roulston, K. (2010). *Reflective interviewing: A guide to theory & practice*. Sage.

Tiberius, V. (2018). *Wellbeing as value fulfilment: How we can help each other to live well*. Oxford University Press.

Tuthill, E. L., Maltby, A. E., DiClemente, K., & Pellowski, J. A. (2020). Longitudinal qualitative methods in health behavior and nursing research: assumptions, design, analysis and lessons learned. *International Journal of Qualitative Methods, 19*, 1609406920965799.

von Davier, M., Kennedy, A., Reynolds, K., Fishbein, B., Khorramdel, L., Aldrich, C., Bookbinder, A., Bezirhan, U., & Yin, L. (2024). *TIMSS 2023 International Results in Mathematics and Science*. Boston College, TIMSS & PIRLS International Study Center. https://doi.org/10.6017/lse.tpisc.timss.rs6460