PANTAO
(International Journal of the Humanities and Social Sciences)
Volume 5, Issue 3
ISSN 3028-0877 | e-ISSN 3155-6043 | DOI 10.69651/2022PIJHSS

A scoping review of leadership styles of school heads: Addressing the needs of teachers with frequent transfers

Riwel Dadoy Abria*
Aurelio Elementary School, Dinagat Islands, Philippines

ABSTRACT

Mathematics plays a crucial role in helping learners develop their ability to think critically, solve problems, and analyze situations. Since it is considered one of the most challenging subjects in the early grades, Grade 3 Mathematics was approached using an innovative teaching method to enhance students' understanding through structured problem-solving approaches, vocabulary building, interactive sessions, practice exercises, and additional tasks. To assess the impact and measure the magnitude of change, a paired t-test and Cohen's D were used with the average scores from the pretest and posttest. The formative assessment results were converted into average percentage scores and matched with the provided tables to determine the level of achievement. According to the findings, the Grade 3 students achieved a proficient level in the second quarter of Mathematics 3, as shown by the formative assessments. The students also showed an approaching mastery level in the second quarter of Mathematics 3, as suggested by the learning competencies, after using the GROPE Strategy. There was a significant difference in the mastery level of Grade 3 students in the second quarter of Mathematics 3, supported by a very large effect size. Most students found the subject meaningful and beneficial through the GROPE strategy, along with their interaction with peers and the involvement of their parents. It is suggested that the GROPE strategy should be included in all quarters for all problem-solving activities in Mathematics 3 to help students become more familiar with it. The use of the GROPE strategy among students should be encouraged to ensure its consistent application. The GROPE strategy should be incorporated as part of the lesson delivery to carry out more action research. A feedback system with psychosocial support should be provided to students to maintain their motivation and interest in solving problems.

Keywords: GROPE Strategy, mathematical learning performance.

Date Submitted: September 2, 2026
Date Accepted: September 17, 2026
Date Published: September 28, 2026

INTRODUCTION

Mathematics is an important ability that learners should possess in order to combat and surpass the academic crisis and solve real-world problems. However, assessment tests facilitated by international and national bodies continue to reveal alarming results that Filipino learners' mathematical skills and abilities are very far from those of other countries. According

*Corresponding author / Email: riwel.abria002@deped.gov.ph
DOI: http://doi.org/10.69651/PIJHSS05031517

Recommended citation:
Abria, R. D. (2026). A scoping review of leadership styles of school heads: Addressing the needs of teachers with frequent transfers. Pantao (International Journal of the Humanities and Social Sciences) 5 (3), 4041-4051. http://doi.org/10.69651/PIJHSS05031517

to the Programme for International Student Assessment (PISA) 2022, the Philippines ranked 80th out of 81 countries in mathematics, with an average score of 355, significantly lower than the OECD norm of 472 (OECD, 2023).

According to the Department of Education – Bureau of Education Assessment (2024), CARAGA region's MPS in Numeracy for the Early Language, Literacy, and Numeracy Assessment (ELLNA) 2024 was 52.79, slightly above the national average (50.22). In Dinagat Islands, the MPS in Numeracy was 44.85, which was below both the national and regional averages, placing it in the Low Proficient category.

At Puerto Princesa Elementary School (PPES), a noticeable decline in mathematics mastery and achievement levels among learners has been observed in recent years. Based on the results from the Early Language, Literacy, and Numeracy Assessment (ELLNA) 2024, the MPS in Numeracy was 29.19, which was below the MPS in Numeracy gained from the National, Regional, and Division levels. The numeracy is the lowest-performing area across all levels, needing urgent instructional intervention.

The Department of Education has issued several policies emphasizing responsive, inclusive, and learner-centered instruction, such as DepEd Order No. 42, s. 2017, DepEd Order No. 8, s. 2015, and DepEd Order No. 21, s. 2019.

According to Abria et al. (2025), the implementation of the GROPE Strategy significantly improved the mathematical performance of Grade 3 learners. The study revealed a statistically significant increase in learners' posttest scores compared with their pretest scores and reported a large effect size, indicating that the strategy effectively enhanced learners' mastery, engagement, and confidence in Mathematics.

Leon (2025) details that interactive mathematics interventions provide long-term learning for the learners. NWEA (2023) contends that students need to be exposed to a chance to learn and engage actively with the core ideas of mathematics to become critical thinkers.

Parents should also be prepared to actively support their child's learning by helping with certain aspects of the teaching and learning process, thereby developing their own skills to better assist their child at home. Henderson et al. (2002) underscore the importance of parents as partners in the learning process, showing that supportive parental involvement is essential for advancing student learning.

This action research the GROPE Strategy answers the call of recent problems in the Department of Education that nurtures the literacy and numeracy skills among learners through following the steps- Gather (Acquiring and expanding vocabulary knowledge), Read (Engaging in buddy or group reading activities), Organize (Reinforcing with engaging, interactive, and group activities), Practice (Intensifying practice through focused exercises), and Enhance (Advancing learning with enhanced or extended activities). This method meets learning requirements by modifying and improving the content, the way things are taught, and the results.As a result, no matter the learners' backgrounds, more group work and engaging activities help achieve better understanding and success, along with the growth of critical thinking skills.

The study is based on Vygotsky's (1978) Social Constructivist Theory which emphasizes that learning occurs through active participation, social interaction and meaningful engagement with others. According to this theory, learners acquire knowledge by means of experiences and collaboration. Teachers offer guidance and scaffolding to help learners progress from their level of understanding to higher levels of competence. This theoretical stance promotes the use of learner-centered methods, in which students are active participants in problem-solving activities, rather than passive receivers of information.

The GROPE Strategy embodies the principles of the Social Constructivist Theory that advocates collaborative learning, guided practice and interactive mathematical activities. This strategy is five related steps: Collect, Read, Organize, Practice, and Improve. The Gather stage

ISSN 3028-0877 | e-ISSN 3155-6043 | DOI 10.69651/2022PIJHSS

builds the learners' vocabulary knowledge needed to comprehend mathematical concepts and word problems. The Read stage focuses on collaborative reading activities. The Organize stage connects understanding with interactive and group activities. Practice stage provides opportunities for repeated applications of math skills. The Enhance stage provides support for learning through additional activities and enrichment tasks. These processes enable students to develop their understanding and problem-solving skills in Mathematics.

Another support for this study is Bruner's Theory of Scaffolding (1976) which states that learners can develop their understanding of a task when teachers provide structured help at the beginning and then the help decreases as learners become more independent. GROPE Strategy provides scaffolding through vocabulary support, structured problem-solving steps, contextualized worksheets, mathematical manipulatives, interactive activities, and guided practice. The supports help students progress from basic understanding to independent mathematical problem solving.

This study is supported by Kolb's Experiential Learning Theory (1984) which stresses that experience, reflection, conceptualization and application lead to meaningful learning. The GROPE Strategy involves learners in mathematics through hands-on activities, group discussions, practice exercises and contextualized problems based on real life. Students can relate math concepts to real-life situations and improve their math abilities by engaging in these experiences.

The intervention that influences the mathematical achievement and mastery levels of the learners in this framework is the implementation of the GROPE Strategy. Learners need to develop vocabulary, work together, practice in a structured way and through extended learning activities to improve their understanding, confidence and performance in Mathematics 3. The achievement levels of the learners, pretest and posttest results and their experiences during the implementation of the strategy have been used to measure the improvement.

Statement of the problem

The study aims to determine the effectiveness of the GROPE strategy in enhancing the mastery and achievement levels of Grade 3 learners in Math 3 for the second quarter.

Specifically, this action research tries to find the answer to the following questions:

1. What is the achievement level of Grade 3 learners of Math 3 based on the formative assessments in the second quarter?
2. What is the mastery level of Grade 3 learners in the second quarter of Math 3 before and after using the GROPE Strategy?
3. Is there a significant difference in the mastery level of the Grade 3 Learners in the second quarter of Mathematics 3 after implementing the GROPE strategy?
4. What are the learners' experiences and perceptions while learning Math 3 through the GROPE strategy?

METHODOLOGY

Research design

The study is a quasi-experimental study using a one-group pre-test and post-test design using quantitative and qualitative approaches. It focused on the implications of the GROPE Strategy for Grade 3 learners in mathematics 3, quarter 2 lessons.

A total of 21 purposively selected learners from one Grade 3 class at Puerto Princesa Elementary School participated in the study. A teacher-made pretest assessment tool was administered before the implementation, and a teacher-made posttest assessment tool will be administered after the implementation.

Quantitative data were obtained through the analysis of pre-test and post-test results from 21 Grade 3 learners in Mathematics. Meanwhile, qualitative information was gathered by the researcher through learner interviews and by observing students' participation throughout the implementation of the GROPE strategy. The learners' responses and behavioral patterns were examined using thematic analysis.

Locale of the study

The study was done at Puerto Princesa Elementary School (PPES) in Schools Division Office of Dinagat Islands, Caraga Region, Philippines. The research site was the school where the Gather, Read, Organize, Practice, Enhance (GROPE) Strategy was implemented to improve the mathematical performance of the Grade 3 learners.

The choice of Puerto Princesa Elementary School as the site of the study was based on the identified need to improve the mathematical skills of the learners. The school's Mean Percentage Score (MPS) in Numeracy according to the Early Language, Literacy, and Numeracy Assessment (ELLNA) 2024 was 29.19 which was lower than the national, regional, and division-level results. Therefore, instructional intervention in mathematics is required.

Respondents of the study

The participants of the study were 21 purposively selected Grade 3 learners from one Grade 3 class of Puerto Princesa Elementary School. These learners have experienced the implementation of the GROPE Strategy in Mathematics 3 particularly in the second quarter lessons. The data were gathered using teacher-made pretest and posttest, formative assessment worksheet, learner interview and classroom observation to find out the effectiveness of the intervention.

The school provided a suitable setting to test the effectiveness of the GROPE Strategy since it is a learning setting in which innovative, learner-centered and contextualized instructional approaches may be used to address problems of mathematical understanding and achievement. The study aimed at finding out how far the strategy could enhance the mastery, engagement and confidence of the learners in Mathematics 3.

Selection and Description of respondents

The respondents of the study were twenty-one (21) Grade 3 learners of one class at Puerto Princesa Elementary School (PPES), Schools Division Office of Dinagat Islands through purposive sampling. The subjects were the Grade 3 pupils who were involved in the implementation of the Gather, Read, Organize, Practice, Enhance (GROPE) Strategy in Mathematics 3 in the second quarter. The main sources of data were the pre- and post-test performance of the respondents, results of formative assessment, GROPE worksheets, interviews with the learners and classroom observations. The researcher was able to establish the success of the GROPE Strategy in improving learners' mathematical achievement, mastery level, engagement and learning experiences having them as participants.

Data gathering instruments

ISSN 3028-0877 | e-ISSN 3155-6043 | DOI 10.69651/2022PIJHSS

The study employed several data gathering instruments to collect the necessary information in determining the effectiveness of the Gather, Read, Organize, Practice, Enhance (GROPE) Strategy in enhancing the mathematical performance of Grade 3 learners. Before and after the intervention, a teacher-made pretest and posttest questionnaire of 30 items were used to measure the changes in learners' mathematical mastery and achievement levels. The study also utilized GROPE worksheets for each phase of the strategy that were used as formative assessment tools to formally monitor the progress of the learners and to give feedback for instructional adjustments. The test items were derived from the DepEd Matatag Learning Competencies and were reviewed and validated by the school head and master teacher for appropriateness and alignment. In addition, qualitative data was collected through interviews with the learners and observations in the classroom concerning the learners' perceptions, engagement, challenges and experiences while participating in the GROPE Strategy.

Data gathering procedure

The researcher followed specific procedures to gather the data for the study. Before the intervention was implemented, the chosen Grade 3 learners were administered a teacher-made pretest to assess the initial level of mathematical mastery and performance. After the learners' baseline performance was assessed, the Gather, Read, Organize, Practice, Enhance (GROPE) Strategy was applied in Mathematics 3 lessons during the second quarter. During the intervention, students completed GROPE worksheets that corresponded to each step of the strategy. The worksheets were utilized as formative assessments to track student progress and to inform instructional modifications as needed. The posttest was given after the intervention to determine the change in the learners' mathematical achievement and mastery levels. Qualitative data collected from learner interviews and classroom observations were also used to determine learners' experiences, perceptions, participation and challenges during the implementation of the GROPE Strategy. Quantitative data from pretest, posttest and formative assessments were analyzed. Qualitative responses from interviews and observations were analyzed using thematic analysis.

Data analysis procedure

Quantitative and qualitative methods were used to analyze the data collected from the study. The quantitative data were the scores of the learners in the formative assessments, pretest, and posttest which were converted into Mean Percentage Scores (MPS) to determine the achievement and mastery levels of the learners in Mathematics 3. The achievement levels of the learners were interpreted according to the prescribed performance descriptions and their mastery levels pre- and-post implementation of the GROPE Strategy were compared to determine the change in their numerical understanding. The paired t-test was performed to determine whether there was a significant difference between the learners' pretest and posttest scores after the implementation of the GROPE Strategy. The effect size of the intervention was determined using Cohen's d effect size.

Qualitative data were the learners' responses from the interviews and classroom observations and were analyzed using thematic analysis following the open and axial coding procedures. Open coding was used to identify important concepts and categories, and axial coding was used to relate the identified concepts and themes, in the analysis of the responses collected. This process helped to describe the experiences, perceptions, engagement, and challenges of the learners in learning Mathematics 3 through the GROPE Strategy.

RESULTS AND DISCUSSION

This section presents and interprets the results of the study, which involved 21 Grade 3 learners in Mathematics 3. The analysis draws on three sets of evidence gathered during the second quarter: the learners' formative assessment results across fourteen learning competencies, their pre-test and post-test results before and after the GROPE Strategy, and their reported learning experiences. The quantitative data were analyzed through achievement and mastery level classifications, means and mean percentage scores, a comparison of pre-test and post-test means using a t statistic with its p value, and Cohen's d as the effect size. The qualitative data were analyzed as themes with associated percentages. The discussion is grounded in the data gathered, and each result is interpreted in direct relation to the objectives of the study, namely to determine the learners' performance, the effect of the GROPE Strategy on their mastery, and their experiences with the strategy.

The formative assessments show generally strong performance. Across the fourteen competencies, the learners obtained a total of 1124.03% and an average of 80.29%, which falls within the Proficient level. One competency was classified as Advanced, ten as Proficient, and three as Basic. The Advanced result was in estimating the mass of an object using grams, kilograms, and/or milligrams, at 91.40%. Among the Proficient competencies, the highest results were in estimating capacity using liters and/or milliliters (89.11%), measuring capacity in liters and/or milliliters using appropriate measuring tools (86.98%), solving problems involving addition and subtraction with 3 to 4 numbers of up to 2 digits, including problems involving money (84.39%), and comparing masses of objects including the use of a balance scale (83.16%). Performing addition and subtraction of 3 to 4 numbers of up to 2 digits, observing correct order of operations, reached 82.00%. Solving problems involving addition of numbers with sums up to 10 000, including problems involving money, reached 81.33%, and measuring mass in grams, kilograms, and/or milligrams reached 80.79%. The remaining Proficient competencies were estimating the difference of two numbers of up to 4 digits (79.83%), reading and writing money in words and using Philippine currency symbols (₱ and PhP) up to ₱10 000 and the centavo sign (78.41%), and subtracting numbers less than 10 000 with and without regrouping (75.40%). The three Basic competencies were estimating the sum of addends with up to 4 digits (73.96%), adding numbers with sums up to 10 000 with and without regrouping (69.17%), and comparing capacities of two containers (68.10%). Overall, the learners demonstrate a good understanding of the subject matter and can work independently or with minimal teacher guidance. Their relative weakness in comparing capacities, adding larger numbers, and estimating sums identifies where instruction most needs reinforcement. These results align with Vygotsky (1978), who emphasized that a learner-centered approach encourages active involvement, problem-solving, and interactive activities in teaching mathematics, and that such methods foster social interaction and support cognitive development through scaffolding.

The mastery levels before and after the GROPE Strategy show a marked change. The learners' pre-test total was 356.00%, with an average of 25.43, interpreted as Very Little Mastery. The post-test total was 1007.00%, with an average of 71.93, interpreted as Approaching Mastery. At the competency level, the pre-test results were Very Little Mastery in all but one competency. Measuring mass in grams, kilograms, and/or milligrams, at 62.00%, was at the Little Mastery level. The other pre-test results were 31.00% for estimating mass, 26.00% for comparing masses, 17.00% for measuring capacity, 17.00% for estimating capacity, 29.00% for comparing capacities, 24.00% for reading and writing money, 12.00% for adding numbers with sums up to 10 000, 19.00% for estimating the sum of addends, 21.00% for solving addition problems including money, 19.00% for subtracting numbers with and

without regrouping, 24.00% for estimating the difference of two numbers, 31.00% for performing addition and subtraction of 3 to 4 numbers of up to 2 digits, and 24.00% for solving problems involving addition and subtraction of such numbers, including money.

After the strategy, three competencies reached the Advanced level: measuring mass (93.00%), estimating mass (90.00%), and comparing masses (90.00%). Four reached the Mastered level: measuring capacity (83.00%), estimating capacity (81.00%), adding numbers with sums up to 10 000 (83.00%), and subtracting numbers with and without regrouping (83.00%). Two were at the Approaching Mastery level: comparing capacities of two containers (71.00%) and estimating the sum of addends (71.00%). Solving problems involving addition of numbers with sums up to 10 000, including money, reached 63.00% and was interpreted as Little Mastery. Five competencies stayed at the Very Little Mastery level in the post-test, although most improved: reading and writing money (62.00%), estimating the difference of two numbers (45.00%), performing addition and subtraction of 3 to 4 numbers of up to 2 digits (40.00%), and solving problems involving addition and subtraction of such numbers, including money (52.00%). The gains were largest in measurement and in basic addition and subtraction, and smallest in money-related, estimation, and multi-number operations. This suggests that the learners improved significantly and achieved the expected outcomes for many of the learning goals, and that they adapted well to the new teaching method, which likely helped them feel more confident in solving mathematics problems. These results are consistent with Bransford et al. (2000), who stated that a learner-centered approach is more effective in fostering deeper understanding and the development of critical thinking skills.

The comparison of mean performance confirms that this improvement was statistically significant. The pre-test mean was 7.52, equivalent to a mean percentage score of 25.07%, while the post-test mean was 21.14, equivalent to 70.48%. With 21 learners, the t statistic was 13.17 with a p value below .001, indicating a highly significant difference between pre-test and post-test scores, which is consistent with rejecting the null hypothesis of no difference. The effect size was Cohen's d = 2.87, described as a Very Large Effect. Learners therefore strived in answering the GROPE worksheets and answered the tests with all their available resources, and the strategy improved the way they comprehended mathematical drills and problems. This is supported by Abria et al. (2025), who contend that implementing the GROPE Strategy significantly improved the mathematical performance of Grade 3 learners. They report a statistically significant increase in posttest scores over pretest scores and a large effect size, indicating that the strategy enhanced learners' mastery, engagement, and confidence in Mathematics.

The learners' experiences help explain these gains. Regarding the strategy itself, 82% reported that they understood Mathematics lessons better because of the GROPE Strategy. The vocabulary activities (Gathering vocabulary) helped 86% learn new words in Mathematics, and reading together made solving word problems easier for 91%. The interactive activities (Organizing interactive practice) made Mathematics more fun and exciting for 100%, and the practice exercises (Practice Vigorously) helped 86% get better at solving math problems. The enhancement activities (Enhancing further) made 82% feel more confident in Mathematics. However, only 59% felt more confident answering Mathematics questions in class, while 91% reported that the strategy helped them improve their grades. The contrast between the two confidence figures suggests that confidence built through worksheets does not fully carry over to public participation, which is consistent with the persistent Very Little Mastery levels in some competencies.

Experiences with classmates were largely positive. Ninety-one percent said they engaged themselves in learning the concepts presented in the worksheets, and 73% said they

developed a sense of responsibility in accomplishing the group tasks. Ninety-one percent found it easy to understand the lesson and instructions with their classmates, and 91% said they had time to communicate with each other in answering collaborative activities. Seventy-seven percent said that, with a neighbor classmate, they did group study to understand the lesson, and 73% said every member had a chance to perform their duties as a member of the group. These results reinforce the Vygotskian view (1978) that social interaction supports cognitive development, although the lower figures for shared responsibility and equal participation indicate that group roles were not equally distributed.

Experiences along with parents revealed constraints. Forty-five percent reported that parents had difficulty understanding and answering the enhancement activity because they too did not know the topics, and 59% reported that parents had such difficulty because they did not finish high school. Eighty-six percent reported that parents did not have enough time to guide their children because of work and other responsibilities, and 59% reported that parents' bonding time was sacrificed because they were busy with their worksheets. Limited parental time was thus the most common barrier, ahead of limited parental knowledge. Home-based enhancement activities therefore need to be designed so that they can be completed with minimal parental assistance.

In sum, the learners performed at the Proficient level in the second-quarter formative assessments, with an average of 80.29%. After the GROPE Strategy, their mastery rose from an average of 25.43 (Very Little Mastery) to 71.93 (Approaching Mastery), and the pre-test to post-test difference was statistically significant ($t = 13.17$, $p < .001$) with a Very Large Effect ($d = 2.87$). Learners also reported that the strategy made lessons clearer, more engaging, and more collaborative. Together, these findings address the objectives of the study by showing the learners' performance, the effect of the strategy on their mastery, and their experiences with it. They contribute evidence that a learner-centered, scaffolded, vocabulary-and-practice-based approach can raise mathematics outcomes among Grade 3 learners, while also showing the limits of home-based tasks and the competencies that still need attention. These findings lead into the next section, which draws conclusions and recommendations for teaching practice, parental involvement, and further research.

Notes for your review, since I could not add information that was not in your documents. First, your data does not state the research design, sampling approach, or instrument in detail, so the introduction only refers to the pre-test and post-test, the worksheets, and the analyses shown. Please add those details. Second, the alpha level and formal hypothesis decision were not reported, so I stated the decision cautiously as consistent with rejection of the null hypothesis. Third, the post-test average in Table 4 (71.93) differs slightly from the mean percentage score in Table 5 (70.48%). I retained both as reported, but you may want to explain or reconcile the difference. Finally, the title of your first table mentions science, but the content is Mathematics 3, which I followed.

CONCLUSION

The findings of this study indicate that the performance of Grade 3 students in Mathematics 3 during the second quarter, as measured by formative assessments, is at a proficient level. This result suggests that learners were able to demonstrate a satisfactory command of the competencies covered during the period. Building on this, the learners also exhibited a mastered level of understanding in Mathematics 3 across all learning competencies, both before and after the implementation of the GROPE Strategy. Taken together, these outcomes show that the students maintained strong levels of achievement throughout the quarter and that their foundational grasp of the subject remained consistently high regardless of the intervention.

Despite this consistently high level of understanding, the results further revealed a significant difference in the mastery level of Grade 3 learners in Mathematics 3 during the second quarter, as evidenced by the very large effect size. This finding implies that the GROPE Strategy contributed meaningfully to improving learners' mastery, even among students who had already demonstrated a mastered level of understanding. It can therefore be concluded that the strategy strengthened the depth and quality of learners' mathematical competence rather than merely sustaining existing performance.

In addition to these quantitative outcomes, the study found that most learners considered the subject meaningful and engaging through the use of the GROPE Strategy, supported by interactions with their peers and the involvement of their parents. This suggests that the strategy's effectiveness was not limited to academic gains but also extended to learners' motivation and experience of learning. The combination of collaborative engagement and parental participation appears to have created a supportive learning environment that enhanced interest in solving mathematical problems, thereby complementing the significant improvement in mastery observed in the results.

In light of these conclusions, it is recommended that the GROPE Strategy be incorporated into all quarters for all problem-solving activities in Mathematics 3 so that students may become familiar with it. Its implementation among learners should likewise be encouraged to ensure consistent application, and it should be included as part of lesson delivery to allow for further action research. Finally, to sustain the motivation and interest that the strategy fostered, a feedback system along with psychosocial support for learners should be established. Together, these measures would help consolidate the gains observed in this study and promote the continued growth of learners in solving mathematical problems.

REFERENCES

Abria, R. D., Aguilloso, M. M., Densing, M. G., Egamao, M. E. B., Lauzon, D. S., & Tan, N. C. (2025). Gather, Read, Organize, Practice, Enhance (GROPE) strategy: Its effect on the mathematical performance of Grade 3 learners. Pantao: The International Journal of the Humanities and Social Sciences, 4(4), 5523–5534. https://doi.org/10.69651/PIJHSS0404511

Ambrose, S. A., Bridges, M. W., DiPietro, M., Lovett, M. C., & Norman, M. K. (2010). How learning works: Seven research-based principles for smart teaching. Jossey-Bass.

Bransford, J. D., Brown, A. L., & Cocking, R. R. (2000). How people learn: Brain, mind, experience, and school (Expanded ed.). National Academy Press.

Clements, D. H., & Sarama, J. (2011). Early childhood mathematics education research: Learning trajectories for young children. Routledge.

Cooper, H. (2007). The battle over homework: Common ground for administrators, teachers, and parents (3rd ed.). Corwin Press.

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). Effective teacher professional development. Learning Policy Institute.

Desimone, L. M., & Garet, M. S. (2015). Best practices in teachers' professional development in the United States. Psychology, Society, & Education, 7(3), 252–263.

Dweck, C. S. (2006). Mindset: The new psychology of success. Random House.

Epstein, J. L. (2011). School, family, and community partnerships: Preparing educators and improving schools (2nd ed.). Westview Press.

Guskey, T. R. (2003). How classroom assessments improve learning. Educational Leadership, 60(5), 6–11.

Guskey, T. R. (2007). Closing achievement gaps: Revisiting Benjamin S. Bloom's "Learning for Mastery". Journal of Advanced Academics, 19(1), 8-31. https://doi.org/10.4219/jaa-2007-704

Jensen, E. (2013). Engaging students with poverty in mind: Practical strategies for raising achievement. ASCD.

Hattie, J., & Timperley, H. (2007). The power of feedback. Review of Educational Research, 77(1), 81–112. https://doi.org/10.3102/003465430298487

Hattie, J. (2009). Visible learning: A synthesis of over 800 meta-analyses relating to achievement. Routledge.

Henderson, A. T., & Mapp, K. L. (2002). A new wave of evidence: The impact of school, family, and community connections on student achievement. Southwest Educational Development Laboratory.

Kilpatrick, J., Swafford, J., & Findell, B. (Eds.). (2001). Adding it up: Helping children learn mathematics. National Academy Press.

Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge (TPACK)? Contemporary Issues in Technology and Teacher Education, 9(1), 60–70.

Leon, D. (2025, April 7). 7 research-based math interventions for elementary students. HMH. https://www.hmhco.com/blog/research-based-math-interventions-for-elementary-students

Miller, K. F., & Stassens, N. (2012). Teaching mathematics in the elementary school (2nd ed.). Pearson.

National Council of Teachers of Mathematics. (2000). Principles and standards for school mathematics. National Council of Teachers of Mathematics.

National Research Council. (2009). Mathematics learning in early childhood: Paths toward excellence and equity. The National Academies Press. https://doi.org/10.17226/12504

NWEA. (2023, October 6). It's time to prioritize rigor in math instruction. https://www.nwea.org/blog/2023/its-time-to-prioritize-rigor-in-math-instruction/

Roschelle, J., & Teasley, S. D. (1995). The construction of shared knowledge in collaborative problem-solving. In C. E. O'Malley (Ed.), Computer-supported collaborative learning (pp. 69–97). Springer.

Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. Review of Educational Research, 75(3), 417–453. https://doi.org/10.3102/00346543075003417

Slavin, R. E. (2014). Cooperative learning and academic achievement: Why does groupwork work? SAGE Publications.

Sowiso. (n.d.). The power of interactive math learning: Tips to engage your students. https://www.sowiso.com/blog/interactive-math-learning/

ST Math. (n.d.). Productive struggle & math rigor. https://www.stmath.com/productive-struggle-math-rigor

Timperley, H. (2011). Realizing the power of professional learning. McGraw-Hill Education.

Tomlinson, C. A. (2001). How to differentiate instruction in mixed-ability classrooms (2nd ed.). Association for Supervision and Curriculum Development (ASCD).

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Harvard University Press.