ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 11| Issue: 7| July 2025|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2025: 8.691 || ISI Value: 1.188

LEARNING ON STUDENTS' CONFIDENCE AND MATHEMATICAL PROBLEM-SOLVING SKILLS

Maria Theresa A. Celebre Lpt, Romulo G. Doronio, Phd
Master of Arts in Mathematics, Assumption College of Nabunturan
Graduate School Department, Nabunturan, Davao de Oro

ABSTRACT

This quasi-experimental study investigates the impact of Peer-Assisted Learning (PAL) on students' confidence and mathematical problem-solving skills among Grade 9 students at Elizalde National High School, Maco, Davao de Oro. With 80 participants, the study utilized a pre-test and post-test design to measure students' levels of confidence in mathematics and their ability to solve mathematical problems before and after engaging in structured peer-assisted learning activities. Through statistical analysis, the results indicated a significant improvement in both confidence and problem-solving skills, demonstrating that peer-assisted learning is an effective instructional strategy in mathematics education. The study suggests that collaborative learning through peer interactions fosters a supportive learning environment where students feel more comfortable expressing their ideas, clarifying misconceptions, and developing critical thinking skills. Furthermore, findings highlight the role of peer-assisted learning in addressing learning gaps, improving engagement, and making mathematics more accessible and less intimidating for students. Based on these results, the study recommends that educators incorporate structured peer-assisted learning strategies into mathematics instruction to maximize student learning outcomes, enhance motivation, and develop a positive attitude toward mathematical problem-solving.

KEYWORDS - *Peer-Assisted Learning, Mathematics Confidence, Problem-Solving Skills, Quasi-Experimental Research, Collaborative Learning*

INTRODUCTION

Mathematical problem solving has remained a core skill necessary for academic performance of students. But a big number of students found this lacking skill a barrier to learning success in mathematics and spent a long time and effort to learn it. One of the most inspiring interventions to overcome this challenge was Peer-Assisted Learning mechanism which created opportunities for students to work together to develop their ability to solve problems and raised their self-confidence in math. Research indicated that peer tutoring enhanced learners' mathematics scores and the confidence with which they approached new problems when working together (Topping et al., 2012).

International studies, especially in the UK, have established that peer-assisted learning strategies are an effective strategy, because they develop students' confidence and problem-solving skills. (McGavock et al., 2012) performed a study in Scottish schools, revealing that Peer-Assisted Learning significantly improved students' academic performance and self-confidence in mathematics. By working in teams, students were encouraged to tackle mathematical challenges collectively, reducing the stress often associated with the subject and creating a positive learning environment (Topping et al., 2012).

Students struggles in mathematics persistently remain pressing concern in Philippine education system prompting educators and policymakers seeking more effective novel teaching strategies. Peer-assisted learning yields promising outcomes in academic settings by substantially enhancing performance and positively influencing various affective factors related to it. Celedonio and Elicay (2023) implemented Reciprocal Peer Tutoring in senior high school Mathematics classes recently and found students' anxiety decreased significantly. Intervention didn't yield much change in students' self-efficacy but overall results underscore potential of peer-assisted learning in fostering supportive classroom environments. Exploring peer-assisted learning approaches reinforces their relevance especially at junior high school level and helps address persistent gaps in mathematical problem-solving.

Students struggled particularly badly with mathematics rather obviously at Elizalde National High School in Maco Davao de Oro province lately. Only 2 students out of 49 passed quarterly Mathematics examination in first quarter of school year 2024–2025 and fewer still demonstrated problem-solving proficiency. Urgent need for instructional interventions surfaced quickly which could bolster mathematical skills and confidence of students significantly. Peer mentoring was implemented at school aiming squarely to bolster students' confidence and problem-solving prowess via intensive collaborative learning sessions. Peer-assisted learning effects in this setting remained woefully underexplored necessitating further in-depth investigation badly in many respects. Understanding how peer-assisted strategies influence learners in real classroom contexts crucially informs future teaching practices and supports targeted Math's intervention programs.

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 11| Issue: 7| July 2025|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2025: 8.691 || ISI Value: 1.188

REVIEW OF RELATED LITERATURE

Peer-Assisted Learning (PAL) is grounded in Vygotsky's Social Constructivism, where students engage in collaborative learning within their Zone of Proximal Development (ZPD). Topping (2005) described PAL as structured, intentional cooperation among learners of similar status, enabling students to act as both tutor and tutee. Studies have confirmed that PAL enhances students' mathematics performance and fosters confidence through mutual peer interactions (Topping et al., 2017; Rohrbeck et al., 2003).

In the Philippine context, Celedonio and Elicay (2023) found that Reciprocal Peer Tutoring in senior high school mathematics classes significantly reduced students' anxiety and improved performance. Although changes in self-efficacy were limited, the results supported the use of peer collaboration to address affective barriers to learning. Similarly, Bernardo and Gonzales (2019) observed that peer-based strategies in rural Mindanao schools enhanced engagement and problem-solving skills despite resource limitations.

Collaborative learning, often integrated with PAL, also improves students' attitudes and academic performance in mathematics (Johnson & Johnson, 2009; Lawrence, 2004). Fasli and Kopoules (2005) showed that group-based learning environments motivate students to engage actively, increasing both achievement and interest in math. Such learning conditions foster resilience and self-efficacy (Zimmerman, 2000), particularly when students reflect on and monitor their own progress (Hadwin et al., 2011).

Mathematical problem-solving involves applying reasoning and learned concepts to unfamiliar tasks. The National Council of Teachers of Mathematics (NCTM, 2000) emphasized that students who develop problem-solving abilities exhibit persistence, confidence, and curiosity. Han and Kim (2020) noted that collaborative learning strategies help build these skills, especially in STEM-related education.

Self-confidence plays a crucial role in math achievement. Hendriana et al. (2017) linked students' self-confidence to improved participation and performance in mathematics classes. Inkeeree et al. (2017) echoed this, noting that confident learners communicated better, overcame anxiety, and performed more efficiently in solving math problems.

The integration of PAL with game-based or interactive learning also contributes positively to performance. Siegler and Ramani (2009) and Gee (2003) concluded that peer interactions—when combined with engaging formats—lead to improved retention and higher-order thinking.

Finally, PAL aligns with the Department of Education's (DepEd, 2019) emphasis on learner-centered pedagogies, particularly through the Most Essential Learning Competencies (MELCs). Teachers are encouraged to apply strategies that foster collaboration and active learning—principles central to peer-assisted learning.

In summary, literature confirms that PAL enhances students' mathematical achievement and confidence through structured, supportive, and interactive peer engagements. However, further research is needed to assess its effectiveness in resource-limited Philippine public school

OBJECTIVE

This study aimed to evaluate the effects of Peer-Assisted Learning (PAL) on the confidence and mathematical problem-solving skills of Grade 9 students at Elizalde National High School, Maco, Davao de Oro. Specifically, it sought to determine the level of students' confidence in mathematics and their performance in mathematical problem-solving before and after the implementation of PAL. It further aimed to assess whether there were significant differences in student confidence and problem-solving abilities after the intervention. Moreover, the study intended to examine the relationship between students' confidence and their mathematical problem-solving performance following the implementation of PAL.

Research Questions

1. What is the level of student confidence in mathematics before and after the implementation of peer-assisted learning?
2, What is the level of students' mathematical problem-solving performance before and after the implementation of peer-assisted learning?
3. Is there a significant difference in student confidence in mathematics before and after the implementation of peer-assisted learning?
4. Is there a significant difference in mathematical problem-solving performance before and after the implementation of peer-assisted learning?
5. Is there a significant relationship between students' confidence in mathematics and their mathematical problem-solving performance after the intervention?

METHODS

Research Design

A quasi-experimental one-group pretest-posttest design assessed impact of peer-assisted learning on confidence and math problem-solving abilities of Grade 9 students. A pretest measured students' baseline confidence very thoroughly in mathematics and assessed problem-solving skills quite effectively at outset. Peer-assisted learning intervention was subsequently implemented with considerable fanfare afterwards. A posttest was administered subsequently evaluating effects of intervention on dependent variables pretty thoroughly afterwards. Dalisay 2024 investigated effects of peer learning strategies on students' math performance using an approach mirrored in this research design. Dalisay's study employed a similar one-group pretest-posttest design measuring impact of peer-assisted learning interventions pretty effectively beforehand.

Research Locale

This study was conducted at Elizalde National High School, located in Barangay Elizalde, Maco, Davao de Oro. The school, established in the 1990s through a local initiative, serves both junior and senior

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 11| Issue: 7| July 2025|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2025: 8.691 || ISI Value: 1.188

high school students and is now the second-largest public high school in Maco North District, with 50 teaching staff and an enrollment of 1,367 learners. Barangay Elizalde, formerly known as Somil, is a mountainous area about 48 kilometers from Maco town proper, characterized by a mixed population, primarily Cebuano-speaking, and reliant on agriculture and small businesses. Maco, a first-class municipality, is known for its agriculture, mining, and accessibility to major cities like Tagum and Davao, making it conducive to both economic and educational development.

Research Subjects

Grade 9 Junior High School students from two sections under direct supervision of researcher in Mathematics 9 at Elizalde National High School participated. Each section typically comprised roughly 40 students making a total of 80 participants overall in the study. Participants were placed in an experimental group and taught with peer-assisted learning strategy rather vigorously by somewhat experienced instructors. Students collaboratively enhanced problem-solving skills and confidence in mathematics through active engagement with peer tutors pretty effectively somehow. Purposive sampling was utilized by researcher in selecting participants because she sought examine learning experiences of students under her guidance keenly. Research took place over academic year 2024-2025 quite thoroughly.

Research Instrument

Two primary research instruments were utilized in this study assessing impact of peer-assisted learning on students confidence and math problem-solving abilities heavily. Researchers crafted a 40-item questionnaire with specifications table measuring student engagement levels in peer-assisted learning strategy pretty effectively somehow. Contents of instrument were presented rather formally for validation by group of assorted experts.

The test results of students will be interpreted using the following parameterlimits based on the DepEd proficiency level standards:

Range of Mean	Parameter Limit (Proficiency Level)	Interpretation
35.00 - 40.00	Outstanding	This implies that the students' mathematical problem-solving skills is very high.
30.00 – 34.99	Very Satisfactory	This implies that the students' mathematical problem-solving skills is high.
20.00 – 29.99	Satisfactory	This implies that the students' mathematical problem-solving skills is average.
10.00 – 19.99	Poor	This implies that the students' mathematical problem-solving skills is low.
9.99 and below	Did not meet expectation	This implies that the students' mathematical problem-solving skills is very low.

Students completed a quirky Students' Confidence Survey Questionnaire before and after intervention assessing changes in their math confidence particularly in gnarly problem-solving scenarios. Survey included Likert scale items with responses ranging from 1 Not Confident at All up to 4 labelled Very Confident. Questions probed students' convictions regarding their capacity for solving math problems effectively with support from peers being quite influential normally. Specialists in educational psychology reviewed Rubrics for Students' Confidence: survey thoroughly assessing reliability of it in measuring confidence levels among students fairly accurately. Cronbach's alpha determined instrument reliability with a threshold of 0.70 or higher deemed acceptable pretty much universally in research circles nowadays. Instruments were employed collecting data assessing effectiveness of peer-assisted learning on students' confidence and maths problem-solving skills quite effectively

Range of Mean	Parameter Limit (Confidence Level)	Interpretation
4.50 - 5.00	Very Confident	This implies that the students' confidence is excellent.
3.50 – 4.49	Confident	This implies that the students' confidence is very good.
2.50 – 3.49	Slightly Confident	This implies that the students' confidence is good.
1.50 – 2.49	Not Confident	This implies that the students' confidence is poor.
1.00-1.49	Very Low	This implies that the students' confidence is very poor.

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 11| Issue: 7| July 2025|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2025: 8.691 || ISI Value: 1.188

Data Collection Procedure

The researcher secured ethical clearance and obtained official permissions from the Division Superintendent of Davao de Oro and the school principal. Informed consent was sought from all participants before the study began. A 40-item multiple-choice test, developed and validated through expert review and pilot testing, was used alongside a confidence survey to measure student achievement and self-efficacy in problem-solving.

Two Grade 9 sections under the researcher, totaling around 80 students, participated in the study. Ten high-performing students in each section served as peer tutors after receiving training in mathematical problem-solving and motivational strategies. Each tutor was assigned three tutees, forming small peer-assisted learning groups. Sessions were conducted three times a week during or after class over six to eight weeks.

During the intervention, the researcher implemented expert-reviewed lessons, observed sessions to ensure fidelity, and monitored tutor effectiveness. Post-tests and surveys were administered to assess changes in achievement and confidence. Feedback was collected regularly to guide adjustments, and outstanding progress was recognized to motivate further improvement. All data, including test scores, survey results, and session observations, were documented for analysis.

Statistical Treatment of the Study

Mean. Quite remarkably she appeared rather mean spirited and ornery most days. Mean values were computed afterwards for comparing number of problems solved versus confidence level exhibited by various experimental groups during tests. Performances of students were scrutinized fairly thoroughly yielding a broad comprehension of data distribution and settling several key research queries simultaneously.

Paired t-Test. A statistical method known colloquially as paired t-Test involves comparing two related samples usually with a considerable time gap. A paired t-test was employed quite effectively for comparing frequencies of responses from pre-test and post-test scores of learners in an experimental group. Statistical analysis revealed a fairly significant difference in students' confidence and problem-solving skills from pre-intervention phase quite starkly post-intervention.

RESULTS

Data presentation analysis and interpretation unfold in tandem with problem statement sequence rather meticulously across various crucial stages obviously. Students' mathematical problem-solving skills were gauged pretty roughly based on pretest results overall. Results of initial problem statement are presented here examining students' mathematical problem-solving skills level based on pretest administered beforehand somehow.

Table 1
Pretest Scores in Mathematical Problem-Solving

	No. of Students	Mean	Proficiency Level
PRETEST	80	11. 1500	Poor

Pretest mean score averaged 11.15 putting it squarely in DepEd's "poor" category under proficiency level standards. Students at this level demonstrate meager grasp of mathematical problem-solving processes and can barely tackle familiar questions with simplistic reasoning.

Level of students' Mathematical problem-solving skills based on the posttest. Table 2 presents the posttest performance in **mathematical problem-solving** after the peer-assisted learning intervention.

Table 2
Posttest Scores in Mathematical Problem-Solving

	No. of Students	Mean	Proficiency Level
POSTTEST	80	25.5875	Satisfactory

Data presented in Table 2 indicate students obtained a mean posttest score of 25.59 quite remarkably. DepEd proficiency level descriptors categorize this score as satisfactory. Students have developed mastery of mathematical problem-solving skills sufficiently and apply appropriate strategies quite effectively solving routine problems accurately. Posttest results reveal a marked uptick in problem-solving prowess among students fairly significantly after intervention. Such a positive outcome intimates peer-assisted learning strategy proved rather efficacious at enhancing students' analytical prowess and faculties for lucidly justifying their proposed solutions.

Level of students' confidence in Mathematics before the intervention. Table 3 shows the result of the survey in students' confidence in mathematics prior to the intervention.

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 11| Issue: 7| July 2025|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2025: 8.691 || ISI Value: 1.188

Table 3
Students' Confidence in Mathematics Score before the Intervention

	No. of Students	Mean	Confidence Level
Before the intervention	80	2.2463	Not Confident

Students obtained a mean confidence score of 2.25 before intervention as vividly illustrated right in Tale 3. A mean score between 1.50 and 2.49 on study's scale gets interpreted rather dubiously as Not Confident pretty frequently nowadays. Students generally seem pretty diffident about grasping mathematical concepts and concocting solutions pretty much on their own. Low confidence apparently hinders students from actively tackling math tasks and underscores necessity for interventions fostering skill development alongside emotional preparedness.

Level of students' confidence in Mathematics after the intervention. Table 4 presents the results of students' confidence survey in mathematics after the peer-assisted learning intervention.

Table 4
Students' Confidence in Mathematics Score after the Intervention

	No. of Students	Mean	Confidence Level
After the intervention	80	3.1900	Slightly Confident

Students obtained a mean confidence score of 3.19 after intervention as indicated in Table 4. This score lands squarely within Slightly Confident level according to interpretation scale with moderate confidence overall apparently. Students felt fairly confident engaging mathematical concepts independently or with peers and solving problems pretty effectively mostly on their own. Peer-assisted learning strategy seemed effective in fostering a positive learning environment and bolstering learners' mathematical abilities remarkably well overall.

Difference in students' Mathematical problem-solving skills between the pretest and posttest. To evaluate the improvement in problem-solving skills, a paired samples t-test was performed.

Table 5
Test Difference of Means in Pretest and Posttest Performance of Students' Problem-Solving Skills

	Mean	p-value	t-value	Remarks
PRETEST	11.15	0.000	-21.104	Significant
POSTTEST	25.59			

Table 5 yields results with t-value -21.10 and p-value 0.000 somehow indicating quite significant statistical differences pretty clearly already. P-value comes in under 0.05 threshold so result turns out statistically significant indicating score boost wasn't just some fluke occurrence. Significant improvement confirms peer-assisted learning strategy effectively enhanced students' mathematical problem-solving abilities remarkably well during assessment.

Difference in students' confidence in Mathematics before and after the intervention. To determine the significance of the improvement in confidence, another paired samples t-test was conducted.

Table 6
Test Difference of Means of Students' Confidence in Mathematics Before and After the Intervention

	Mean	p-value	t-value	Remarks
Before the intervention	2.25	0.000	-16.40	Significant
After the intervention	3.19			

Results in Table 6 yielded a t-value of -16.40 and p-value was 0.000 indicating statistical significance pretty much very strongly. Observed increase in students' confidence appears statistically significant with p-value less than 0.05 indicating it did not occur randomly by chance. Findings suggest peer-assisted learning has a profoundly positive impact on students' math's confidence quite substantially and effectively overall.

DISCUSSIONS AND CONCLUSION

Discussion

Level of students' mathematical problem-solving skills based on the pretest. Pretest results showed students struggled mightily with mathematical problem-solving skills before intervention was administered very quietly. Many folks wrestled with grasping problem nuances and devising pertinent tactics then implementing fixes with varying degrees of effectiveness

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 11| Issue: 7| July 2025|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2025: 8.691 || ISI Value: 1.188

ultimately. Challenges arise from glaring gaps in foundational knowledge indicating need for instruction tailored heavily to wildly varying learner abilities. Students benefit from structured assistance and interaction with more capable peers which can help them progress from current understanding levels to advanced problem-solving skills under Vygotsky's 1978 sociocultural theory framework rather quickly. Findings align with notion that learning gets enhanced quite significantly when students engage cognitively in meaningful social tasks with others.

Level of students' Mathematical problem-solving skills based on the posttest. A significant improvement in students' problem-solving performance was observed after peer-assisted learning intervention was implemented fairly recently. Posttest scores indicated students had gotten markedly better at comprehending tricky mathematical problems and solving them with relative ease afterwards. Findings ostensibly support Vygotsky's sociocultural theory from 1978 which puts great stock in social interaction and scaffolded learning for developing higher cognition. Structured peer collaboration during peer-assisted learning probably enabled students to clarify concepts and internalize strategies rather effectively consistent with evidence from recent cooperative learning research.

Level of students' confidence in Mathematics before the intervention. Pre-intervention data revealed many students lacked confidence in succeeding at mathematics. Math anxiety and low self-efficacy emerge in literature as performance barriers consistent with this manifest lack of confidence in students somehow. Kids lacking confidence tend to shy away from tough tasks and often give up quickly amidst pretty big obstacles. Supportive learning environments profoundly impact students' perceptions of math abilities quite positively and foster a deeper understanding somehow.

Level of students' confidence in Mathematics after the intervention. Students' confidence in math improved significantly after implementation of peer-assisted learning as reflected in post-intervention scores remarkably well overall. Paired t-test results indicate statistically significant improvement suggesting peer-assisted strategies effectively supported emotional growth and academic development remarkably well overall. Topping 2010 and O'Donnell 2017 substantiate this outcome by noting structured peer learning environments facilitate students overcoming anxiety and building self-efficacy thereby engaging more confidently. Students gained confidence rapidly working alongside peers who encouraged expression of quirky ideas and facilitated candid questioning yielding swift reactions.

Difference in pretest and posttest scores in Mathematical problem-solving skills. Pretest scores were dwarfed by posttest scores indicating a statistically significant bump in mathematical problem-solving prowess among students afterwards. Peer-assisted learning proves remarkably effective in enhancing students' abilities to tackle mathematical problems with considerable skill and solve them quickly. Peer explanations and cooperative engagement blossomed through collaborative intervention which spurred meaningful learning as Roseth Johnson and Johnson emphasized in 2008 study. Social interaction fosters academic gains remarkably by spurring quite active cognitive processing alongside shared understanding amongst participants effectively everyday.

Difference in students' confidence in Mathematics before and after the intervention. A significant difference was found in students' confidence levels before and after intervention somewhat remarkably. Peer-assisted learning cultivated rather inclusive classroom environments wherein students felt somewhat more capable and decidedly less daunted by complex mathematical concepts. Peer tutoring evidently boosts confidence and motivation while reinforcing findings of Topping and Ehly 2001 who reported improved academic performance. Peer dynamics fostered an environment where learners felt remarkably validated and surprisingly competent key factors sustaining interest in mathematics persevered.

CONCLUSION

Peer-assisted learning proves remarkably effective in boosting mathematical problem-solving prowess and confidence among Grade 9 students before and after intervention. Students demonstrated pretty low confidence and fairly limited ability in solving mathematical problems before intervention commenced rather abruptly. Significant improvements were observed afterwards with implementation of peer-assisted learning indicating a profoundly positive impact on both cognition and affective facets.

Peer-assisted learning emerges as a remarkably effective instructional strategy fostering student engagement deeply and shared responsibility fairly among learners. Fostering collaborative vibes amongst learners ramped up problem-solving prowess remarkably and bolstered their self-belief somewhat alongside motivation quietly within them. Consistent gains across measured areas affirm peer-assisted learning addresses diverse needs and contributes significantly to a rather effective mathematics classroom.

Recommendations

Mathematics teachers should regularly integrate peer-assisted learning into their instructional strategy enhancing students' confidence remarkably and problem-solving skills greatly. Peer-assisted learning cultivates collaborative environs wherein students elucidate math concepts using idiosyncratic language and buoy each other's self-efficacy remarkably.

Teachers should be given proper training and resources for facilitating structured peer learning activities effectively in their respective classrooms. School administrators are urged vigorously through innovative classroom practices and school-based professional development initiatives to foster peer-assisted learning that boosts student involvement hugely.

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 11| Issue: 7| July 2025|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2025: 8.691 || ISI Value: 1.188

Curriculum planners should weave pretty seamlessly rather complex peer-based tasks and collaborative activities into mathematics curriculum pretty effectively nowadays. Cultivating essential 21st-century skills like critical thinking and communication happens alongside development of academic competencies pretty effectively this way.

Future researchers might replicate this study with a control group or examine peer-assisted learning's long-term impact across various grade levels. Students are encouraged eventually to take quite an active role in peer-learning activities which offer valuable opportunities for enhancing performance markedly.

REFERENCES

1. *Bernardo, A. & Gonzales, J. (2019). Collaborative learning in rural schools: Enhancing problem-solving through peer support. Philippine Journal of Education, 94(2), 45–59.*
2. *Celedonio, M. & Elicay, J. (2023). The effect of Reciprocal Peer Tutoring in senior high school mathematics. Asia Pacific Journal of Multidisciplinary Research, 11(1), 60–68.*
3. *Department of Education (DepEd). (2019). Most Essential Learning Competencies (MELCs). Philippines: DepEd.*
4. *Fasli, M. & Kopoules, A. (2005). Motivational impact of cooperative learning. Journal of Mathematics Education, 8(3), 91–103.*
5. *Gee, J. P. (2003). What video games have to teach us about learning and literacy. Palgrave Macmillan.*
6. *Hadwin, A. F., Järvelä, S., & Miller, M. (2011). Self-regulated, co-regulated, and socially shared regulation of learning. In B. Zimmerman & D. Schunk (Eds.), Handbook of self-regulation of learning and performance. Routledge.*
7. *Han, S. & Kim, D. (2020). STEM education and problem-solving: A meta-analysis. Journal of Educational Psychology, 112(5), 909–929.*
8. *Hendriana, H., Slamet, I., & Sumarmo, U. (2017). Students' self-confidence and mathematical problem-solving ability. Journal on Mathematics Education, 8(1), 1–10.*
9. *Inkeeree, R., et al. (2017). Impact of self-confidence in mathematics learning. International Journal of Learning and Teaching, 3(4), 256–261.*
10. *Johnson, D. W., & Johnson, R. T. (2009). An educational psychology success story: Social interdependence theory and cooperative learning. Educational Researcher, 38(5), 365–379.*
11. *Lawrence, A. (2004). Collaborative methods in math instruction. Journal of Education Research, 97(4), 220–227.*
12. *National Council of Teachers of Mathematics (NCTM). (2000). Principles and Standards for School Mathematics. Reston, VA: NCTM.*
13. *O'Donnell, A. M. (2017). Peer learning: Beyond the basics. In B. B. Frey (Ed.), The SAGE encyclopedia of educational research, measurement, and evaluation (pp. 1223–1226). SAGE Publications. https://doi.org/10.4135/9781506326139.n494*
14. *Rohrbeck, C. A., Ginsburg-Block, M. D., Fantuzzo, J. W., & Miller, T. R. (2003). Peer-assisted learning interventions with elementary school students: A meta-analytic review. Journal of Educational Psychology, 95(2), 240–257.*
15. *Roseth, C. J., Johnson, D. W., & Johnson, R. T. (2008). Promoting early adolescents' achievement and peer relationships: The effects of cooperative, competitive, and individualistic goal structures. Psychological Bulletin, 134(2), 223–246. https://doi.org/10.1037/0033-2909.134.2.223*
16. *Siegler, R. S., & Ramani, G. B. (2009). Playing linear numerical board games improves low-income children's numerical understanding. Developmental Science, 12(5), 1045–1062.*
17. *Topping, K. J. (2005). Trends in peer learning. Educational Psychology, 25(6), 631–645.*
18. *Topping, K. J. (2010). Peering into peer tutoring: A glimpse of the past, present and future. In K. J. Topping & S. Ehly (Eds.), Peer-assisted learning (pp. 1–39). Routledge.*
19. *Topping, K. J., & Ehly, S. (2001). Peer assisted learning: A framework for consultation. Journal of Educational and Psychological Consultation, 12(2), 113–132. https://doi.org/10.1207/S1532768XJEPC1202_03*
20. *Topping, K., Buchs, C., Duran, D., & Van Keer, H. (2017). Effective peer learning: From principles to practical implementation. Routledge.*
21. *Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Harvard University Press.*
22. *Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. Contemporary Educational Psychology, 25(1), 82–91.*