Classroom Management of Teachers, Social-Emotional Competence, and Mathematics Learning Strategies of Students

Gae Marie N. Daitic[1] and Lolly Jean C. Simbulas[2], PhD

[1] Teacher II / Communal National High School,
Prk 3, Brgy. Communal, Davao City
gaemarie.daitic@deped.gov.ph
[2] University of the Immaculate Conception, Davao City

ABSTRACT

Most secondary school students struggle to understand basic mathematical ideas and one potential reason for this problem is the failure to use appropriate strategies in learning mathematics. This study aimed to determine the influence of the classroom management of mathematics teachers and social-emotional competence on mathematics learning strategies of Grade 10 students. The study used adapted questionnaires. The descriptive correlation method was utilized in the research. Data were gathered from Grade 10 students at three selected public schools in Buhangin District, Davao City. These data were analyzed using the mean, standard deviation, and linear regression analysis. Both the two independent variables, classroom management of mathematics teachers and social-emotional competence, yielded a significant relationship to the mathematics learning strategies of students. Moreover, the mathematics learning strategies of Grade 10 students were influenced by the classroom management of mathematics teachers and the social-emotional competence of students.

Keywords: Education, mathematics, descriptive-correlation, Philippines

INTRODUCTION

Mathematics learning strategies are a person's approach to a task that outlines how a person organizes and employs a collection of skills to learn the material or to do a specific activity more quickly and effectively, either in or out of the classroom (Saraswathy & Nagavalli, 2016). However, most secondary school students struggle to understand basic mathematical ideas (Ayotola & Adedeji, 2019), and one potential reason for this problem is the failure to use appropriate strategies in learning mathematics (Anthony, 2018). In fact, in Lithuania, the study of Kliziene et al. (2022) shows that 12 percent of the students at the fundamental level found that implementing the strategy in problem-solving was the most challenging phase based on their conduct of diagnostic tests of cognitive abilities (DTCA). Further, the failure of the students to utilize cognitive, metacognitive, multimedia, and effort management strategies in learning mathematics have contributed to their struggles in grasping mathematical information (Mousoulides & Philippou, 2018), and they have problems coming up with new ideas for the same math problem (Liu & Koirala, 2018).

The use of learning strategies is encouraged and supported by research findings and curriculum materials as a key component of successful mathematics learning. Nevertheless, despite such promotion, some students from the United States, Italy, and the United Kingdom currently exhibit passive, dependent learning behaviors rather than active, self-regulated ones (Anthony, 2018) Further, in Taiwan, the report of TIMSS revealed that seventy-four percent of 8th graders have no confidence in learning mathematics due to poor learning strategies (Liu & Lin, 2012). Furthermore, Sa'ad et al. (2014) made their study in Nigeria and came out with findings that students' poor learning strategies were some of the causes of negative attitudes toward mathematics. Unfortunately, because students lack the necessary strategic learning strategies, they become ill-equipped to handle the high cognitive expectations of a constructivist learning environment (Cardelle-Elawar, 2018).

In the Philippines, most Filipino students find difficulty in learning math and this problem may include inappropriate strategies for learning mathematics. As Perez (2020) pointed out, involvement in the practical work approach to learning mathematics, self-practice, and the use of computers and videos available on YouTube are a few other learning strategies teachers should have looked into. Unfortunately, many students never tried using the said strategies; instead, they spent the majority of their free time playing video games. On the other hand, Tacadena (2021) highlighted that other students may also desire to use different mathematics learning strategies, but they need the resources such as a computer and an internet connection. Still, other students exert little effort in learning mathematics since they lack knowledge of using mathematics learning strategies.

In Davao City, many students have unfavorable impressions of mathematics since they lack conceptual understanding. Most students fear this subject due to this perception, and 21st-century math students enter math classrooms with a major lack of proficiency and dependability in manipulating, simplifying, and applying for numbers in algebra and a negative attitude (Bongcac, 2021). One apparent reason for this problem is the lack of students' knowledge and utilization of the different strategies in learning mathematics (Gurat, 2018) and students who failed to apply suitable strategies in learning mathematics resulted to undesirable attitudes toward mathematics subject (Sullano, 2020).

On the one hand, a classroom is where the learners gain knowledge of their contributions, which they can utilize to shape their social identities (Chalak & Fallah, 2019). Accordingly, effective classroom management has become one of the most critical elements in creating a positive learning environment (Tacadena, 2021). It is almost only possible to learn in a structured and orderly classroom. A teacher should always begin every class with a well-planned lesson (Schroer, 2002). To develop various learning strategies, it is significant to focus on the value of grouping and collaborative learning (Özreçberoğlu & Çağanağa, 2017).

On the other hand, educators' and researchers' attention was drawn to social-emotional learning (SEL), which has developed a significant component of primary education (Zhou & Ee, 2012). According to the report of Collaborative for Academic, Social, and Emotional Learning or CASEL (2017), It is connected to five fundamental competencies: the capacity to comprehend and regulate emotions, nurturing empathy, and compassion for others, making sound decisions, creating meaningful connections, and handling challenging circumstances with grace. When students acquire social-emotional competence (SEC) because of SEL, they will be able to self-regulate their learning and self-monitor their behavior which could develop good learning strategies in mathematics (Wilson et al., 2001; Zins et al., 2004).

Despite the extensive literature cited above, there are only few studies conducted in Davao City about classroom management of teachers, social-emotional competence, and their relationship to students' learning strategies in mathematics. Further, most of the studies highlighted in the literature focus on elementary teachers' classroom management skills as a predictor of students' social-emotional competence, such as the study of Poulou et al. (2021); there is not so much on the secondary level. Furthermore, some authors utilized mixed-methods research design, such as the study of Belbase et al. (2021), and qualitative research design, such as the study of Özreçberoğlu and Çağanağa (2017), which is different from the study presently conducted by the researcher. Following the **Social Learning Theory** by Vygotsky (1962) and **Classroom Management Theory** by Froyen and Iverson (1999), this study aims to determine the influence of classroom management of teachers and social-emotional competence on the mathematics learning strategies of students in Public High Schools in Davao City.

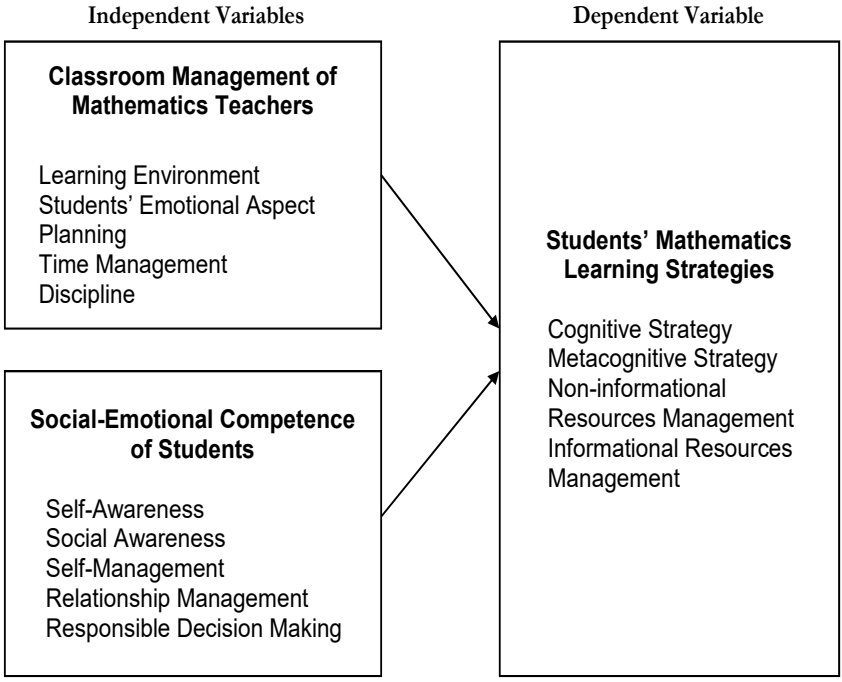


Figure 1. Conceptual Framework of the Study

METHODS

Research Design. This study utilized a descriptive correlational design to determine whether teachers' classroom management and students' social-emotional competence had a substantial impact on students' learning strategies for mathematics.

Research Locale. This study was conducted among the public junior high schools in Davao City, particularly in Buhangin District: Schools A, B, and C. The choice of these schools is prompted by the fact that they have a large number of Junior High School student population. These public institutions offer educational programs, including Senior High School, from grades 7 to 12. In like manner, they employ a face-to-face learning modality completely.

Research Respondents. The respondents of this study were the 204 grade 10 students at the selected schools in Davao City. Cluster sampling was used in selecting the respondents. The respondents covered from the following schools namely: School A with 63 students; School B (79) students; and School C (62) students. On the other hand, students from other grade levels will be excluded from this study.

In this study, only students enrolled in the school year 2022-2023 from the three selected public schools in Buhangin District, Davao City that attends their face-to-face class are included in the study since these schools have a more significant number of grade 10 students than the number of students from other secondary schools. Since the participation is voluntary, only those who have submitted their signed Assent Parent's Consent Form and Informed Consent (ICF) were chosen to participate.

Research Instruments. This study utilized questionnaires that were divided into three parts which were all adapted from published research available online. The first part of the questionnaire deals with the classroom management of mathematics teachers followed by the students' social-emotional competence. Further, the last part included students' mathematics learning strategies in Davao City public high schools. The questionnaire contains (5) indicators for classroom management of teachers as perceived by the students, (5) indicators for social-emotional competence, and (4) indicators for mathematics learning strategies of students.

The questionnaires underwent for pilot test for reliability. The computation of classroom management reliability test using Cronbach alpha is 0.718, for social-emotional competence is 0.793, and for mathematics learning strategies is 0.936, which means that questionnaires are in a high internal consistency. Thus, the whole test is reliable. The 5-point Likert Type was used.

The statistical techniques used to total and analyze the information obtained from the questionnaires are the mean, standard deviation, person product-moment correlation, and multiple regression analysis.

Data Collection. During the data gathering, the researcher underwent steps as follows: A letter from the dean of the Graduate School was requested to seek authorization to undertake the study titled classroom management of Teachers, social-emotional competence, and Mathematics learning strategies of students. Upon approval of the permission letter, the researcher formally requested ethical clearance from the REC before administering the instruments to the study's target respondents. Once REC had released the ethical clearance, the researcher forwarded the letters and other documents to the School's Division Superintendent of Davao City to formally request approval to perform the study. In a separate request letter addressed to the principal of the three participating schools, the researcher personally sent it to them, attaching the approved request letter from the SDS and an endorsement letter from the Graduate School Dean. On the one hand, the intended respondents have received official notification that they are participating in the study. An informed Consent Form (ICF) and Assent Form have been disseminated to the respondents for them to accomplish with their parents or guardians. They were informed of the study's goals and their significant contribution to the research. It was also highlighted to the respondents that participation is not compulsory, and data gathering will be done face-to-face. The data were encoded, tabulated, and analyzed according to the study's objectives.

RESULTS AND DISCUSSION

Correlation of Classroom Management of Mathematics Teachers and Social-Emotional Competence to Mathematics Learning Strategies of Students

Illustrated in Table 1 were the results of the test on the significance of the relationship between classroom management of mathematics teachers and mathematics learning strategies of students. It shows that classroom management of mathematics teachers has a significant moderate positive relationship with the mathematics learning strategies of students as evident by the p-value of .00 which is less than 0.05, and r-value of 0.46. Hence, as the level of classroom management of teachers increases, the level of the mathematics learning strategies of students also increases.

Table 1
Correlation of Classroom Management of Mathematics Teachers and Social-Emotional Competence to Mathematics Learning Strategies of Students

	Mathematics Learning Strategies		
Independent Variables	**r**	**p-value**	**Remarks**
Classroom Management	.46	.00	Significant
Social-Emotional Competence	.61	.00	Significant

The findings of the study corroborate the result of the study of Jain and Sharma (2017) reported how the classroom management of teachers affects the mathematics learning strategies of students in different cultural contexts. Further, based on the result of the study of Berger and Karabenick (2018), teachers' classroom management is linked to using different mathematics learning strategies, such as problem-solving in mathematics and involvement in self-regulated mathematics learning. Furthermore, the findings of this study are parallel with the result of the study of Sunbul and Geban (2018), which reported that classroom management practices significantly correlated with mathematics learning strategies. The study emphasized the importance of positive teacher-student relationships, clear expectations and guidelines, and active student participation in the learning process in promoting successful mathematics learning strategies. Likewise, this finding confirms what Rimm-Kaufman and Sawyer (2018) and Stein et al. (2019) stated that effective classroom management practices of teachers are essential for promoting students' involvement in mathematics learning strategies, engagement, perseverance, and deep understanding of mathematical concepts.

Moreover, the table 1 also shows that social-emotional competence has significant moderate positive relationship with the mathematics learning strategies of students as evident on the p-value of .00 which is less than 0.05, r-value of 0.61. Hence, as the level of social-emotional competence of students increases, the level of the mathematics learning strategies also increases.

The findings validate the study by Durlak et al. (2019) found that school-based social-emotional learning programs positively impacted students' mathematics learning strategies. The results further reveal that establishing a better relationship and maintaining favorable social relationships with the students encourage the students to involve in cognitive and metacognitive strategies in learning mathematics. In the same vein, the result of the study of Götz et al. (2017) reported that students with high levels of social-emotional competence employ learning strategies for mathematics more effectively and engage with peers, parents, and other adults, and are frequently related with self-regulation techniques. Further, existing evidence suggests that students' social-emotional competence can positively impact their social interactions, attitudes to learning, and use of strategies in learning mathematics (Götz et al., 2017).

Influencers of Mathematics Learning Strategies of Students

Table 2 presents the linear regression analysis to determine the significance of the combined influence of classroom management of mathematics teachers and social-emotional competence on the mathematics learning strategies of Grade 10 students. As gleaned in the table, the overall computed r^2 value of 0.39 indicates that the combined influence of the classroom management of teachers and the social-emotional competence of students have contributed significantly to the variability of students' mathematics learning strategies by 39.0 percent of the total variability. Therefore, the difference of 61.0 percent can be attributed to other variables or factors not covered in this study.

Table 2
Significance of the Influence of Classroom Management of Teachers and Social-Emotional Competence on Mathematics Learning Strategies

Variables	Mathematics Learning Strategies			
	β	**t**	**p-value**	**Remarks**
Classroom Management	.14	2.10	.04	Significant
Social-Emotional Competence	.53	7.71	.00	Significant
Holistic Model				
R^2	.39			
F-value	64.06			
P-value	. 00			
Remarks	Significant			

**Significant at p<0.05*

Moreover, results in Table 2 indicate that classroom management of mathematics teachers significantly influenced the mathematics learning strategies of students, as evident by the regression coefficient value of 0.14 with p<0.05. This means that for every unit increase in classroom management of mathematics teachers, there would be a 0.14 increase in the mathematics learning strategies of students. This denotes that classroom management of mathematics teachers has a positive contribution to the mathematics learning strategies of Grade 10 students.

This supports the Social Learning Theory of Vygotsky (1962) who pointed out that people learn through observation and imitation of others' behaviors and the interpretation of social cues in their environment. In the context of mathematics education, classroom management strategies and practices employed by teachers can influence the learning strategies of students. For instance, modeling effective classroom management strategies can encourage students to imitate these behaviors and integrate them into their own learning strategies. Teachers who provide a positive and supportive classroom environment can help students feel more comfortable asking questions.

Also, the results in Table 5 indicate that social-emotional competence significantly influenced the mathematics learning strategies of students, as evident by the regression coefficient value of 0.53 with p<0.05. This means that for every unit increase in classroom management of mathematics teachers, there would be a 0.53 increase in the mathematics learning strategies of students. This denotes that social-emotional competence has a positive contribution to the mathematics learning strategies of Grade 10 students.

The findings confirm the Classroom Management Theory by Froyen and Iverson (1999). According to the theory, positive behaviors of students in using strategies for learning mathematics may be developed by reinforcing students to do well in math class as a form of positive classroom management. In the context of mathematics education, in teaching students to acquire mathematical strategies, teachers need to focus on the student as a whole, including their social-emotional well-being, and the teacher needs to be socially and emotionally competent to figure out the negative influences the student might have as they learn mathematics.

Lastly, the statement of Meece et al. (2018) and Pekrun et al. (2019) that both classroom management and social-emotional competence are important factors in promoting high levels of mathematics learning strategies for students. They suggest that effective classroom management can create a positive learning environment that promotes engagement, persistence, and a deep understanding of mathematical concepts, while social-emotional competence can help students regulate their emotions, form positive relationships, and engage in effective learning strategies.

Together, these factors can create a powerful learning environment that supports students' academic success in mathematics.

The empirical results helped shape the conclusions. The study concludes that there was a significant relationship between the classroom management of teachers and the mathematics learning strategies of students, and there was also a significant relationship between social-emotional competence and the mathematics learning strategies of students. This indicated that the increase in the levels of classroom management of mathematics teachers and social-emotional competence led to an increase in mathematics learning strategies of Grade 10 students. The study also found that both classroom management of teachers and social-emotional competence of students predicted the mathematics learning strategies. This implies that both classroom management of teachers and social-emotional competence of students influenced the mathematics learning strategies of Grade 10 students.

REFERENCES

Anthony, G. (2018). Learning strategies in the mathematics classroom: What can we learn from stimulated recall interviews?New Zealand Journal of Educational Studies, 29(2), 127–140.

Ayotola, A. & Adedeji, T. (2019). The relationship between mathematics self-efficacy and achievement in mathematics. Procedia Social and Behavioral Sciences 953–957.

Belbase, S., Khanal, B. P., Panthi, R. R., Kshetree, M. P., & Acharya, B. R. (2021). Mathematics learning strategies of high school students in Nepal. SN Social Sciences, 1(7). https://doi.org/10.1007/s43545-021-00165-y

Berger, J. (2023). Motivational Beliefs, Metacognition, and Self-Regulated Learning: Investigating the Learning Triumvirate with Stuart Karabenick 1. In Advances in motivation and achievement (pp. 195–213). Emerald Publishing Limited. https://doi.org/10.1108/s0749-742320230000022014

Bongcac, B. G. (2021). Self-Efficacy and Anxiety As Determinants Of Mathematical Achievement Of Grade 7 Students: A Quan + Qual Approach. Global Specific Journals, 9(10), ISSN 2320-9186.

Cardelle-Elawar, M. (2018). Effects of teaching metacognitive skills to students with low mathematics ability.Teaching and Teacher Education, 8(2), 109–121.

CASEL (2017). Schoolwide SEL essentials. Collaborative for Academic, Social, and Emotional Learning.

Chalak, A., & Fallah, R. (2019a). Effect of Classroom Management and Strategies on Students' Achievement at Undergraduate Level. ERIC, 11, EJ1325977.

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2019). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. Child Development, 82(1), 405-432.

Froyen, L.A., and Iverson, A.M. (1999). School wide and classroom management: the reflective educator-leader. Upper Saddle River, N.J.: Prentice-Hall.

Götz, T., Zirngibl, A., Pekrun, R., & Hall, N. C. (2017). Emotions, learning and achievement from an educational-psychological perspective. In P. Mayring & C. V. Rhoeneck (Eds.), Learning emotions: The influence of affective factors on classroom learning (pp. 9−28). Peter Lang.

Gurat, M. G. (2018). Mathematical Problem-Solving Strategies among Student Teachers. Journal on Efficiency and Responsibility in Education and Science, 11(3), 53–64. https://files.eric.ed.gov/fulltext/EJ1208772.pdf

Kliziene, I., Paskovske, A., Cizauskas, G., Augustiniene, A., Simonaitiene, B., & Kubiliunas, R. (2022). The Impact of Achievements in Mathematics on Cognitive Ability in Primary School. Brain Sciences, 12(6), 736.

Lin, M., Chen, H., & Liu, K. S. (2017). A Study of the Effects of Digital Learning on Learning Motivation and Learning Outcome. Eurasia Journal of Mathematics, Science and Technology Education, 13(7). https://doi.org/10.12973/eurasia.2017.00744a

Liu, X. and Koirala, H. (2018).The effect of mathematics self-efficacy on mathematics achievement of high school students. NERA Conference Proceedings 2009. 30.

Meece, J. L., Wigfield, A., & Eccles, J. S. (Eds.). (2018). Predictors of math anxiety and its influence on young adolescents' course enrollment intentions and performance in mathematics. Washington, DC: National Science Foundation

Mousoulides, N., & Philippou, G. (2018). Student regulation strategies and mathematics achievement. In: H. L. Chick & J. L. Vincent, eds, Proceedings of the 29th Conference of the International Group for the Psychology of Mathematics Education (PME),pp. 321-328.

Özreçberoğlu, N., & Caganaga, C. K. (2018). Making It Count: Strategies for Improving Problem-Solving Skills in Mathematics for Students and Teachers' Classroom Management. Eurasia Journal of Mathematics, Science and Technology Education, 14(4). https://doi.org/10.29333/ejmste/82536

Poulou, P. (2018). Students' emotional and behavioral difficulties: The role of teachers' social and emotional learning and teacher student relationships," Int. J. Emot. Educ., vol. 10, no. 2, pp. 146–153

Rimm-Kaufman, S. E., & Sawyer, B. E. (2020). Primary-grade teachers' self-efficacy beliefs, attitudes toward teaching, and discipline and teaching practice priorities in relation to the "responsive classroom" approach. The Elementary School Journal, 104(4), 321-341.

Sa'ad, T. U., Adamu, A., & Sadiq, A. (2014). The Causes of Poor Performance in Mathematics among Public Senior Secondary School Students in Azare Metropolis of Bauchi State, Nigeria. IOSR Journal of Research & Method in Education, 4(6), e-ISSN: 2320–7388.

Saraswathy, R., & Nagavalli, T. (2016). MATHEMATICS LEARNING STRATEGIES OF COLLEGE STUDENTS. Research and Reflections on Education, 14(1), ISSN 0974-648X.

Stein, M. K., Smith, M. S., Henningsen, M. A., & Silver, E. A. (2019). Implementing standards-based mathematics instruction: A casebook for professional development. Teachers College Press.

Sunbul, A. M., & Geban, O. (2018). Classroom management in mathematics education. International Journal of Education in Mathematics, Science and Technology, 1(4), 225-233.

Tacadena, J. E. (2021). Classroom Management and Students' Learning in Mathematics. International Journal of Research and Innovation in Social Science, 05(03), 418–423. https://doi.org/10.47772/ijriss.2021.5328

Vygotsky, L. S. (1962). Thought and Word. In MIT Press eBooks (pp. 119–153). https://doi.org/10.1037/11193-007

Zhou, M. & Ee, J. (2012). Development and validation of social emotional competency questionnaire. https://www.researchgate.net/publication/261872642_Development_and_validation_of_social_emotional_competency_questionnaire

Zins, J. E., Weissberg, R. P., Wang, M. C., & Walberg, H. J. (2018). Building academic success on social and emotional learning: What does the research say? Teachers College Press.