

SOCIAL-EMOTIONAL Competence, Attitude, and Academic Achievement in Mathematics of Grade 7 STUDENTS

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ABSTRACT

The study aimed to determine whether social-emotional competence and attitudes of students toward mathematics predict the academic achievement of Grade 7 students. A quantitative research design using the descriptive-correlational method was employed. The respondents of the study were secondary public school students in Davao City. Sets of adapted questionnaires were used to obtain information from the respondents. Mean, Standard Deviation, Pearson product-moment correlation, and multiple regression analysis were used to analyze the data. Results of the study revealed that the level of social-emotional competence and students' attitudes were rated very high, which indicates that it was always evident. In contrast, the student's academic achievement level in mathematics was rated high, which suggests that the students demonstrated a high level of achievement. The relationship between the three variables further shows that students' social-emotional competence and attitudes are significantly related to their academic achievement in mathematics. Furthermore, students' social-emotional competence and attitudes were found to significantly influence academic achievement in mathematics.

KEYWORDS: *Education, social-emotional competence, attitude, academic achievement, mathematics, Grade 7 learners, descriptive-correlation, Philippines*

INTRODUCTION

Academic achievement in mathematics education has raised substantial public and private education concerns (Appiah et al., 2022). In fact, the issue of subpar academic achievement in mathematics is a significant global challenge encountered by numerous nations (Chand et al., 2021). Notably, during the

administration of the PISA (2018) assessment, 50 out of 79 countries scored below the average of 489 points achieved by OECD nations (OECD, 2019). Furthermore, researchers have emphasized that several factors, such as self-efficacy, teacher-student interactions, student perspectives on mathematics, and many more, exert a considerable influence on academic success in mathematics (Appiah et al., 2022).

Students in various ASEAN nations face significant challenges in mathematics education. The 2018 PISA study indicated low mathematics proficiency among Indonesian students, ranking 72 out of 79 countries with an average score of 379, down from the 2015 ranking of 63 (Setiawan et al., 2022). Indonesian students often perceive mathematics as difficult, resulting in low confidence and performance (Slamet et al., 2021). In Malaysia, only 75.6 percent of students have basic mathematics literacy, much lower than Malay Language (95.20%) and English (90.3%) literacy. This issue particularly affects Malay students due to cultural factors, attitudes, and socioeconomic status (Chew, 2013). In Brunei, primary and secondary students struggle with mathematics, facing challenges like arithmetic anxiety and exam stress, hindering their performance (Sheikh Hamid et al., 2013).

Challenges to achieving academic success in mathematics are prominent for students in the Philippines. The Philippines ranked second to last among 79 nations in Mathematics and Scientific Literacy, as demonstrated by the PISA (2018) findings. Remarkably, just around one in five Filipino students (19.7%) reached the minimum proficiency level in mathematical literacy (Philippines-OECD, 2019). The Philippines-OECD 2019 report pinpointed reasons for the country's PISA 2018 performance. Notably, most Philippine students feared failure, with 72 percent strongly agreeing that failure leads to concern about other's opinions (Philippines-OECD, 2019). According to the study by Gonzales (2018), many students grapple with fundamental mathematical concepts, particularly arithmetic and algebra, resulting in subpar achievement. Conversely, in 2022, 26 percent of eighth-grade students attained or exceeded the NAEP Proficient level in mathematics, marking a seven-percentage point drop from the prior assessment year (2019) (NAEP Report Card, 2022). Furthermore, the students' mean percentage score from NAEP stood at a mere 48.9 percent, considerably below the 75 percent goal set by DepEd (National Education Testing and Research Center, 2016).

Davao City educators face the challenge of poor mathematics

proficiency among high school students. A 2009 DepEd news release highlighted the city's low mathematics performance and categorized it as a low-performing division in Region XI (Galabo et al., 2018). Moreover, Sanchez's research (2020) pinpointed conceptual understanding gaps as a primary cause of mathematics struggles, leading to disinterest and subsequent poor performance, a notion supported by Labrador (2021), who noted students' lack of engagement during mathematics classes. This issue is exacerbated by a 12.2 percent dropout rate in the Davao Region and lower mathematics mastery than other subjects (FLIMMS; Perez, 2021). Limited technology access, educational resources, and qualified mathematics teachers further contribute (Monserate & Penascosa, 2021). Addressing these concerns through technology provision, fostering positive mathematics attitudes, enhancing teacher training, and reducing class size could empower Davao City students to excel in mathematics and all subjects (Perez, 2021).

Conversely, various factors influence students' low mathematics achievement in school, including social-emotional competence and student attitudes. Social-emotional competence describes how children and adults apply knowledge, attitudes, and skills to understand and manage emotions, set and achieve positive goals, empathize with others, establish and maintain positive relationships, and make responsible decisions (CASEL, 2023). Studies have shown that social-emotional skills impact students' academic achievement and future employment (Ng & Bull, 2018, cited by Pitlik, 2021). In addition, to ensure substantial academic achievement and high test scores, more social and emotional support for students is needed (Nix et al., 2013).

Moreover, an attitude is a combination of emotions, beliefs, and behaviors towards a specific object, person, thing, or event (Wigfield & Eccles, 2018). Additionally, Sert Agir (2019) emphasizes that an attitude can be understood as a mental or neural state of readiness, both influencing and influenced by behavior, stemming from emotional, cognitive, and behavioral tendencies shaped by past experiences. Moreover, a study by Hwang and Son (2021) found a significant connection between a student's attitude towards mathematics and their academic achievement. Students should be given instructional initiatives to help them acquire a good attitude toward mathematics.

Despite the literature referenced above, limited research has examined the significance of social-emotional competence and students' attitudes toward mathematics as predictors of academic achievement. Further, many studies have

concentrated solely on a pair of variables. For example, the study by Pitlik (2021) explored the connection between Social-emotional learning and academic achievement. In the same year, Hwang and Son's research delved into attitudes toward academic achievement in mathematics. Moreover, researchers have adopted alternative research methodologies. The studies by Dunn (2016) and Mazana and Casimir (2018) employed a mixed-methods research design. In contrast, the research by Juste et al. (2021) utilized a cross-sectional approach, and the study by Baso et al. (2021) adopted a qualitative methodology. Furthermore, some researchers exclusively engaged primary-level students as participants in their studies, including the research by Liu (2019) and Capella (2015) study.

Theoretical Lens

This study was anchored to these two theories: Self-Determination Theory (SDT) by Ryan and Deci (2020) and Expectancy-Value Theory (EVT) by Wigfield and Eccles (2000). According to Ryan and Deci (2020), the self-determination theory can explain the influence of social-emotional competence. The SDT suggested that students with strong social-emotional skills such as autonomy, sense of belongingness, competence, and self-confidence are more likely to be motivated and invested in learning. As a result, they tend to believe in their ability to face math-related challenges.

Further, the self-determination theory is applied in the study since students' academic achievement in mathematics is dynamic, which means that the high or low level of a student's academic achievement in mathematics depends on the build of the student's social-emotional aspect. Furthermore, if the students have psychological needs for autonomy, competence, and relatedness, and when these needs are satisfied, they are more likely to engage in tasks with greater enthusiasm and persistence, leading to enhanced learning outcomes. Moreover, suppose students perceive autonomy in their mathematical pursuits, such as choosing problem-solving strategies or having control over their learning pace. In that case, they are more likely to experience positive emotions and increased engagement. Moreover, when educators foster a supportive and inclusive learning environment for students, they may feel a sense of relatedness that can mitigate anxiety and enhance overall social-emotional well-being.

The expectancy-value theory by Wigfield and Eccles (2000) is another anchored theory that explains the influence of attitudes toward mathematics on academic achievement. Expectancy Value Theory suggests that students' beliefs

and values can impact their ability to succeed in a particular subject, such as mathematics. Students who have positive attitudes and believe in their ability to succeed are more likely to perform well academically. Further, the expectancy-value theory is also applied in this study since the attitudes in learning determined students' academic achievement. Furthermore, positive attitudes can develop expectancy beliefs and vice versa. When students wanted to establish a sense of mathematical competence, they were often influenced by feedback and past experiences and much inclined to believe in their ability to face math-related challenges. However, if the students recognize mathematics's real-world relevance and intrinsic value, they may become motivated to invest in their studies.

Both Self-Determination Theory and Expectancy Value Theory present theoretical frameworks for comprehending the relationship between social-emotional competence and attitudes toward mathematics and academic achievement in the subject. Educators can assist students in improving their mathematics performance by creating strategies for these factors.

METHODS

Research Design. The study utilized a quantitative research method, specifically a descriptive-correlational research design. Quantitative research involves collecting and analyzing numerical data to understand phenomena or relationships (Creswell, 2013). Hence, quantitative research involves deductive investigation wherein conclusions regarding the characteristics of the studied population are derived from the experiments and surveys conducted by the researcher. Besides, this study employed this method since the researcher utilized a survey questionnaire to gather and analyze numerical data. Furthermore, this study used a descriptive-correlational approach, and its primary objective was to evaluate and explain the connection between two variables by determining their strength and direction. A descriptive correlational approach is a scientific research method that collects data without altering the subjects involved (Price et al., 2020). This implies that the researcher cannot directly interact with the environment under investigation, which could otherwise result in environmental modifications relevant to the experiment. This research category is also called observational studies. Accordingly, the descriptive survey method is appropriate for the present study, as it examines the relationship between social-emotional competence and attitude to students' academic achievement in mathematics.

Place of the Study. The study was conducted in the Davao City Division, particularly in Marilog District. Situated in the northern Davao City, Philippines, Marilog District is a hilly terrain characterized by its mountainous landscape. For this research, the study was conducted explicitly in cluster 10 of Marilog District, composed of 14 schools. The 14 schools in cluster 10 are public secondary high schools in Marilog District, Davao City, Philippines. Six schools offer junior and senior high school curricula, while eight offer only junior high.

Respondents. The study included Grade 7 students attending cluster 10 of Marilog District, Davao City. The selection of respondents adopted stratified random sampling in which the population is divided into distinct subgroups or strata based on specific characteristics (Cochran, 1977). Moreover, in choosing the sample per school, the researcher randomly draws the names of the respondents given by the subject teacher. Moreover, 150 respondents were selected from fourteen schools in cluster 10. This study has selected the respondents based on the following inclusion criteria. First, all the respondents are Grade 7 junior high school students for the school year 2023-2024. The choice to focus on Grade 7 students is rooted in the fact that they are new to the secondary level of education and may require additional attention and guidance to foster a sense of responsibility in their studies. Second, only students who the researcher randomly drew were included in the study. Third, since participation is voluntary, students who submitted their signed Assent Parent's Consent Form and Informed Consent (ICF) were chosen to participate in this study. The identified respondents can withdraw from the study at any time if they change their decision.

Statistical tools. The following statistical tools were utilized to treat and analyze the information obtained from the questionnaires: Mean, this measure was used to describe the levels of social-emotional competence, attitudes of students towards mathematics, and academic achievement in mathematics. Standard deviation, this statistical tool was used to measure how spread out the values in a data set are around the mean per variable and indicator. It was calculated as the square root of the variance. Pearson Product-Moment Correlation was utilized to assess the correlation between social-emotional competence and academic achievement in mathematics and between students' attitudes toward mathematics and their academic achievement. Multiple Regression Analysis This tool helped determine how students' social-emotional competence, attitudes, and academic achievement relate to one another.

RESULTS

Level of Social-emotional Competence of Students

Table 1

Level of Social-emotional Competence of Students

Indicators	Mean	SD	Description
Self-awareness	4.79	0.350	Very High
Social-awareness	4.68	0.423	Very High
Self-management	4.58	0.428	Very High
Relationship Management	4.43	0.560	Very High
Responsible Decision-Making	4.46	0.575	Very High
Overall Mean	4.59	0.357	Very High

The data in Table 1 presents students' social-emotional competence level regarding self-awareness, social awareness, self-management, relationship management, and responsible decision-making. The results revealed a level of social-emotional competence, as evidenced by the overall mean of 4.59, which was described as very high. Moreover, the overall standard deviation of 0.357 suggests a high level of consistency in the respondents' ratings. This implies a notable uniformity in how respondents assessed or rated their social-emotional competence, reflecting a high degree of agreement or conformity in their opinions or evaluations.

The indicator with the highest mean is self-awareness. The means of this indicator of self-awareness ranged from 4.76 to 4.85. The category mean is 4.79, which is described as very high, meaning the students' self-awareness is always manifested. This implies that the ability of the respondents to identify and understand their emotions, thoughts, and values has been demonstrated consistently. Furthermore, this result is parallel with the findings of McCombs (2019) that students with very high levels of self-awareness actively monitor their own progress in the learning process and are more likely to seek help when necessary. Meanwhile, the indicator with lowest mean is relationship management. The means of this indicator ranged from 4.26 to 4.59. The relationship management indicator garnered a mean score of 4.43 described as very high, which indicates that the social-emotional competence of the respondents in terms of relationship management is always manifested. In addition, the results are parallel to the research conducted by Jones and Bouffard (2019), indicating that students possess notable skills in relationship

management, demonstrates the ability to build rapport, approachability, initiate friendships, engage in discussions, join social groups, express appropriate emotions, and discern interpersonal behavior. This shows that the respondents always demonstrate the capacity to form and sustain positive connections with others. This implies that students have cultivated the essential interpersonal abilities to establish and sustain favorable connections with peers, teachers, and other individuals in their social circles.

Level of Attitude of Students towards Mathematics

Table 2

Level of the Attitude of Students

Indicators	Mean	SD	Description
Anxiety	4.79	0.350	Very High
Confidence	4.68	0.423	Very High
Enjoyment	4.58	0.428	Very High
Benefits/Value	4.43	0.560	Very High
Overall Mean	4.59	0.357	Very High

Table 2 presents the level of attitudes of students in terms of anxiety, confidence, enjoyment, and benefits/value. The results revealed a very high level of attitudes of students toward mathematics as evident in the overall mean of 4.47 described as very high. This result indicates that the attitude of students toward mathematics is always evident. Further, the low standard deviation of 0.439 suggests a high level of consistency in the respondents' ratings. This implies that there is a notable uniformity in how respondents assessed or rated their attitudes toward mathematics, reflecting a high degree of agreement or conformity in their opinions or evaluations.

The indicator with the highest mean is anxiety. The means of this indicator ranged from 4.76 to 4.85. Moreover, the researcher used reverse scoring and the reversed description for this domain. The researcher aims to ensure that the overall mean of attitude toward mathematics remains unaffected and giving a more accurate representation of students' responses. By employing reverse scoring for items related to anxiety, the researcher aims to address the negative aspects associated with anxiety without undermining the comprehensive assessment of their overall attitudes toward mathematics. The mean score for the anxiety domain, with items being reversed, is reported as

4.46. This indicates that the respondents’ anxiety is never evident as they are involved in mathematics activities. Moreover, the study by Lyons and Beilock (2021) suggested that students with lower levels of math anxiety tend to have more positive attitudes towards mathematics, which in turn leads to improved academic achievement. This implies that there was a minimal experience and notable absence of anxiety in relation to the subject and the students’ approach in the challenges of mathematical tasks were in ease and calmness. Hence, the study signifies that the respondents have a lack of significance of anxiety, emotional distress and fear commonly associated with math-related tasks among students.

Level of Attitude of Students towards Mathematics

Table 3

Level of the Academic Achievement of Students in Mathematics

	Mean	SD	Minimum	Maximum	Description
Exam Score	27.0	5.25	13	37	High

Table 3 presents the level of academic achievement of students in mathematics. Computations yield a computed mean score of 27.00 with a score range of 13 to 37, described as high level, which means that students display a strong command of fundamental concepts and skills, and they consistently perform well in various mathematical tasks, showing a solid understanding of both basic and more advanced topics. Additionally, a broad distribution of individual performance level proposed a large standard deviation of 5.25 indicates variability in scores. Moreover, the students highlighted the diverse range of achievements as its dispersion with some surpassing high-level mean and others falling below, contributing to the overall variability in the data set.

The high level of mathematical achievement among students implied that those who have demonstrated confidence and competence which do not only contribute to a positive mindset but also create a groundwork for future success in professional and academic pursuits. The findings of the study supported seamlessly with the perspective presented by Cabuquin and Abocejo (2023), that two-fifths of the learners in public high school institution in Leyte exhibited a very satisfactory or very high level of performance in mathematics. In the same way, with the result of the study of Abalde and Oco (2023), which reported that

students mastered mathematics at a high level. Consequently, both academic and social development carried positive implications if students have confidence and competence (Cross & Hoover, 2011). This underscores the notion that learners who have high level of mathematical achievement with academic prowess contributed to the overall developmental trajectory.

Significance of the Influence Social-emotional Competence and Attitude of Students on Academic Achievement in Mathematics of Grade 7 Learners

Table 4

Influence of Social-Emotional Competence and Attitudes of Students on Their Academic Achievement

Variables	Academic Achievement in Mathematics			
	β	t	p-value	Remarks
Social Emotional Competence	8.30	6.63	0.000	Significant
Attitude of Students	2.90	2.85	0.000	Significant
<i>Holistic Model</i>				
R ²	.593			
F-value	109			
P-value	0.000			
Remarks	Significant			

*Significant at $p < 0.05$

Table 4 presents the significant influence of both social-emotional competence and students' attitudes toward mathematics on academic achievement. The computed F-ratio of 109, with a probability value less than 0.001, indicates a substantial significance. Furthermore, the computed R²-value of 0.593 reveals that social-emotional competence and attitudes toward mathematics collectively account for 59.3% of the variance in academic achievement in mathematics. Therefore, the difference of 40.7 percent can be attributed to other variables or factors not covered in this study. Further, the Beta coefficient analysis further elucidates the impact of these factors. Social-emotional competence, with a Beta coefficient of 8.30, a t-value of 6.63, and a p-value less than 0.001, demonstrates a noteworthy positive influence. This implies that for every unit increase in social-emotional competence, there is a corresponding increase in students' academic achievement in mathematics by

8.30. Similarly, attitudes toward mathematics, with a Beta coefficient of 2.90, a t-value of 2.85, and a p-value less than 0.001, also wield a significant positive influence. This signifies that for every unit increase in attitudes toward mathematics, there is a corresponding increase in students' academic achievement by 2.85. These results collectively emphasize the substantial impact of both social-emotional competence and positive attitudes toward mathematics on academic achievement.

The results highlighted above emphasize the robust predictive capabilities of both social-emotional competence and attitudes toward mathematics in shaping students' academic achievement in the subject. This implies that the multifaceted dimensions of social-emotional competences, encompassing self-awareness, social awareness, self-management, relationship management, and responsible decision making, collectively exerted an influence positively on the academic success of students. Moreover, Clark and O'Brien (2019) had an assertion that social-emotional competence is a pivotal aspect of the students' holistic development which has significantly impacted their performance in academic.

Moreover, the results lend support to the study conducted by Rimm-Kaufman and Sandilos (2018), indicating that students who were equipped with social-emotional competence possess the ability to regulate their emotions, collaborate effectively with peers, communicate proficiently, and persevere through challenges, ultimately influencing their academic achievement. Additionally, the findings run parallel to the insights of Candeias (2017), affirming that students with robust social-emotional competence are better positioned to engage in the learning process and demonstrate better academic performance. Furthermore, these results conform to the study of Durlak et al. (2018), stating that social-emotional learning interventions had a positive impact on academic achievement in mathematics. These interventions may include developing the students' executive functioning skills, such as working memory and inhibitory control. Collectively, these results underscore the integral role of social-emotional competence in academic success, emphasizing its broad-reaching impact on students' overall development and achievement in mathematics.

CONCLUSION

Based on the findings of the study, the following conclusions are drawn: The findings underscore a noteworthy level of social-emotional competence

among students, with consistently very high scores across various dimensions such as self-awareness, social-awareness, self-management, relationship management, and responsible decision-making. The students possess a robust foundation in emotional intelligence and interpersonal skills, contributing to a positive and well-rounded social-emotional profile. Second, the students exhibit a very high level of attitudes toward mathematics suggesting that they harbor significant interest and enjoyment in various math-related activities, fostering a conducive environment for meaningful engagement and learning in the subject. Moreover, their positive attitude extends to a belief in their own capabilities, as they express confidence in their ability to succeed in mastering mathematical skills. Thirdly, the level of academic achievement among students in mathematics is high; however, the standard deviation, reflecting large dispersion, suggests a notable variability in individual achievement levels implying that while a general high level of achievement is observed, there is a range of performance among students, with some demonstrating exceptional proficiency and others displaying comparatively lower levels of achievement. Moreover, the high level of academic achievement of students in mathematics implies that the students demonstrate confidence and competence in mathematics which do not only contribute to a positive mindset but also lay the groundwork for future success. Fourth, the study highlights a significant relationship between social-emotional competence and academic achievement in mathematics, suggesting that students with higher levels of social-emotional competence tend to perform better academically in mathematics. Additionally, a substantial correlation is observed between attitudes toward mathematics and academic achievement in the subject, indicating that students with positive attitudes toward mathematics are more likely to excel academically. Lastly, the research underscores that both social-emotional competence and students' attitudes serve as significant predictors for their academic achievement in mathematics. This highlights the importance of considering not only cognitive factors but also socio-emotional and attitudinal aspects in understanding and enhancing academic performance in mathematics. The combined impact of social-emotional competence and attitudes toward mathematics accounts for a substantial portion of the variance, emphasizing their influential role in shaping students' overall success in the subject.

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