INFLUENCE OF MATHEMATICS TEACHERS' PROFICIENCY ON STUDENT ENGAGEMENT AND MOTIVATION IN THE FIRST CONGRESSIONAL DISTRICT OF PANGASINAN

RIZA C. DIANGO

Institution : Institute of Graduate and Professional Studies
Lyceum Northwestern University
Dagupan City

Abstract: This study examines the influence of mathematics teachers' proficiency on student engagement and motivation in learning mathematics. Utilizing a descriptive-correlational research design, data were collected from both teachers and students to determine the relationship between teachers' mathematics proficiency and students' levels of engagement and motivation. Results revealed a positive but not very strong correlation, indicating that as teachers demonstrate higher proficiency in mathematics, students are more likely to participate actively in learning activities and show stronger motivation to succeed. The findings highlight the importance of continuous professional development and training programs to enhance teacher proficiency, which in turn can foster greater student engagement, motivation, and academic achievement in mathematics.

Keywords - Mathematics Proficiency, Teacher Proficiency, Student Engagement, Student Motivation, Teaching Effectiveness, Academic Achievement, Professional Development, Learning Outcomes, Mathematics Education, Correlation

---

INTRODUCTION

Mathematics is a foundational subject in education, yet student performance in the Philippines remains below international standards. Reforms such as the K to 12 Curriculum highlight the need for improved teaching practices (Flores, 2019). Teachers play a central role in developing mathematical proficiency, but many lack mastery in key areas (Nanda & Rani, 2025). Mathematical proficiency encompasses conceptual understanding, procedural fluency, and problem-solving (Fuchs et al., 2021; Al-Mutawah et al., 2019). International assessments such as PISA reveal significant gaps, with Filipino learners scoring far below the OECD average (Luchavez & Caloc, 2024).

National Achievement Test (NAT) results consistently show low mastery in mathematics, with mean percentage scores below proficiency levels (Rivera-lacia, 2019). Recent data from Pangasinan I indicate Grade 6 students attained an overall MPS of 53.39% (Nearly Proficient), while Grade 12 students scored 37.32% (Low Proficient). These findings underscore the urgent need to strengthen teacher proficiency.

Existing studies focus on content knowledge and pedagogy but rarely examine how teacher proficiency translates into classroom practices or impacts student engagement and motivation. This study addresses this gap by analyzing the influence of mathematics teachers' proficiency on student engagement and motivation.

NEED OF THE STUDY.

In the field of mathematics education, teacher proficiency and student engagement remain critical determinants of learning outcomes. Despite numerous reforms and curriculum innovations, many classrooms continue to face challenges such as limited teacher preparedness, low student motivation, and inconsistent achievement levels. These issues highlight the necessity of examining how teacher competencies directly influence student participation and performance.

Existing literature has emphasized the importance of pedagogical skills, yet there is limited empirical evidence that connects teacher proficiency with measurable student engagement in local contexts. This gap underscores the need for research that not only validates theoretical claims but also provides actionable insights for educators and policymakers. By investigating this relationship, the study aims to contribute to a deeper understanding of how teacher effectiveness can foster active learning environments and improve mathematics achievement.

Furthermore, the findings of this study are expected to inform professional development programs, curriculum design, and classroom practices. Addressing the need for evidence-based strategies will strengthen the capacity of teachers to engage students meaningfully, thereby enhancing overall educational outcomes. Ultimately, this research seeks to bridge the gap between theory and practice, ensuring that mathematics education evolves to meet the demands of contemporary learners.

Statement of the Problem

This study aimed to determine how Mathematics Teachers' Proficiency influenced student engagement and motivation in the secondary schools of the first congressional district of Pangasinan. Specifically, this study sought to answer the sub-problems:

1. What is the profile of the mathematics teachers in terms of:
   a. Highest educational attainment;
   b. Teaching experience; and
   c. Trainings related to Mathematics?
2. What is the level of Mathematics proficiency of the teachers?
3. Is there a significant relationship between the level of Mathematics proficiency of the teachers and the profile of the mathematics teachers?
4. What is the level of student engagement in learning mathematics of the respondents?
5. What is the level of student motivation in learning mathematics of the respondents?
6. Is there a significant relationship between the level of Mathematics proficiency of the teachers and
   A. Student engagement; and
   B. Student motivation?
7. Is there a significant relationship between student engagement and student motivation?
8. What framework can be proposed to enhance student engagement and student motivation in Mathematics?

Theoretical framework

This study is based on Self-Determination Theory (SDT) by Deci and Ryan (1985), which explains motivation through three needs: competence, autonomy, and relatedness. In education, SDT shows that teachers who give clear feedback, respect learning styles, and provide choices help students feel more motivated and engaged (Ryan & Deci, 2020).

Teacher proficiency—strong subject knowledge and effective teaching skills—directly supports these needs. Proficient teachers can explain lessons clearly, adjust to different learners, and create supportive classrooms. This reduces student anxiety and builds confidence, leading to higher engagement and motivation (Brady & Berkich, 2021; Li et al., 2022; Zhao et al., 2020).

While SDT is useful, it does not fully consider outside factors like school culture, peer influence, or parental support (O'Neill & McMahon, 2019). Future studies should explore how these factors, along with teacher training and collaboration, affect student engagement in mathematics.

In summary, SDT provides a clear framework for understanding how teacher proficiency improves student motivation and engagement in mathematics.

METHODOLOGY

This chapter discusses the research design, sources of data (locale of the study, population sampling), instrumentation and data collection, tools for data analysis, and ethical considerations.

Research Design

This study used a quantitative, descriptive-correlational design to examine the relationship between student engagement, student motivation, and teacher proficiency in mathematics. Quantitative research focuses on collecting and analyzing numerical data to identify patterns and relationships (Goertzen, 2017). A descriptive-correlational approach was chosen because it allows the researcher to measure variables and determine their associations without manipulating them (Capinding, 2023).

A survey research design was employed to gather data. Standardized questionnaires were administered to students to assess engagement and motivation, while a mathematics proficiency test was given to teachers. Survey designs are widely used in quantitative research to describe attitudes, behaviors, and characteristics of a population through structured instruments, and the data collected can be statistically analyzed to answer research questions and test hypotheses (Survey Research Design, 2018).

Sources of Data

The study gathered information from two primary sources: mathematics teachers and Grade 11 students in public secondary schools within the First Congressional District of Pangasinan.

- Teachers provided data through surveys that assessed their professional development experiences and mathematics teaching proficiency. These responses helped determine how teacher-related factors influenced student engagement and motivation.
- Students answered surveys on their engagement and motivation in mathematics, giving insights into their attitudes, participation, and interest in the subject.

Population and Sample

The study involved secondary school mathematics teachers and Grade 11 students in the First Congressional District of Pangasinan. Teachers were chosen through random sampling, where districts or schools serve as clusters and a random selection is made to represent the population (Thomas, 2023). This ensured fair representation and minimized bias.

The sample size was determined using Yamane's (1973) formula:

$$n = \frac{N}{1 + Ne^2}$$

with a 5% margin of error at 95% confidence level.

For students ($N = 3473$):

$$n = 359$$

For teachers ($N = 150$):

$$n = 109$$

Instrumentation and Data Collection

The study used three main instruments:

Student Engagement Questionnaire – adapted from Camingawan (n.d).

Student Motivation Questionnaire – adapted from Dayel et al. (2018).

Mathematics Proficiency Test (MPT) – based on the National Competency-Based Teacher Standards (NCBTS) and Dio (2015), covering arithmetic, measurement, geometry, algebra, probability, and statistics. The test was validated by five experts, with a Content Validity Index (CVI) of 1.00, indicating excellent validity.

To ensure reliability, a pilot test was conducted with 11 teachers and 36 students. Cronbach's Alpha showed **0.97** for the student questionnaires (excellent) and **0.72** for the MPT (acceptable).

Data was collected from two groups of respondents:

Mathematics teachers – provided profile information (education, teaching experience, trainings) and answered the proficiency test.

Grade 11 students – answered the engagement and motivation questionnaires using a 5-point Likert scale, interpreted from *Very Low* (1.00–1.80) to *Very High* (4.21–5.00).

Confidentiality was observed, and all data were used strictly for academic purposes.

IV. RESULTS AND DISCUSSION

Profile of the Respondents

Table 1 presents the profile of the respondents in terms of relevant highest educational attainment, teaching experience and training related to mathematics. This table provides background information that helps describe the characteristics of the participants involved in the study.

Table 1
Profile of the Respondents
N=359

Profile	Category	Frequency	Percentage
Highest Educational Attainment	High School Graduate	0	0%
	Vocational Level	0	0%
	Bachelor's Degree	41	37.62%
	Master's Degree	58	53.21%
	Doctorate Degree	10	9.17%
Teaching Experience	0- 5 years	24	22.02%
	6- 10 years	36	33.03%
	11- 15 years	26	23.85%
	16- 20 years	11	10.09%
	21 years and above	12	11.01%
Training related to Mathematics	1-2 trainings	105	96.33%
	3-5 trainings	4	3.67%
	6-8 trainings	0	0%
	9-10 trainings	0	0%
	More than 10 trainings	0	0%

Highest Educational Attainment

Most mathematics teachers hold the minimum academic qualification required to teach. However, only a few have advanced degrees, which limits opportunities for deeper mastery of mathematical concepts and innovative teaching approaches. Teachers with graduate studies are generally more proficient, able to use diverse strategies that improve student engagement and motivation. Encouraging further studies and professional development can strengthen teacher proficiency and enhance classroom interactions (Hanushek & Rivkin, 2006; Sancassani, 2023).

Teaching Experience

The majority of teacher-respondents (33.03%) have 6–10 years of teaching experience, followed by 23.85% with 11–15 years, 22.02% with 0–5 years, 11.01% with 21 years and above, and 10.09% with 16–20 years. This shows that most teachers are moderately experienced, with enough classroom exposure to refine their strategies. Longer teaching experience is linked to higher proficiency, as seasoned teachers can simplify abstract concepts, address diverse learning needs, and sustain student interest. Teachers with fewer years of experience highlight the need for continuous professional development. These findings align with Flores (2019), who noted that experienced teachers often produce students with higher academic achievement.

Training Related to Mathematics

Nearly all teachers (96.33%) attended 1–2 training sessions per year, while only 3.67% joined 3–5 trainings. This indicates that most teachers consistently engage in at least one professional development activity annually, showing commitment to growth. Continuous training enhances instructional quality and supports student motivation and engagement. Participation in seminars, workshops, and graduate programs helps teachers deepen their knowledge and improve classroom practices (Flores, 2019).

Table 2
Level of Mathematics Proficiency of the Teachers
N=359

Item No.	Number of Correct Responses	% of Correct Responses	Proficiency Level
1	107	98.17	HP
2	106	97.25	HP
3	99	90.83	HP
4	106	97.25	HP
5	108	99.08	HP
6	106	97.25	HP
7	102	93.58	HP
8	107	98.17	HP
9	107	98.17	HP
10	103	94.50	HP
11	103	94.50	HP
12	103	94.50	HP
13	105	96.33	HP
14	104	95.41	HP
15	98	89.91	P
16	100	91.74	HP
17	100	91.74	HP
18	96	88.07	P
19	97	88.99	P
20	101	92.66	HP
21	106	97.25	HP
22	95	87.16	P
23	105	96.33	HP
24	102	93.58	HP
25	108	99.08	HP
26	105	96.33	HP
27	107	98.17	HP
28	98	89.91	P
29	102	93.58	HP
30	103	94.50	HP
31	102	93.58	HP
32	107	98.17	HP
33	104	95.41	HP
34	104	95.41	HP
35	94	86.24	P
36	97	88.99	P
37	91	83.49	P
38	100	91.74	HP
39	91	83.49	P
40	96	88.07	P
41	97	88.99	P
42	91	83.49	P
43	106	97.25	HP
44	101	92.66	HP
45	105	96.33	HP
46	106	97.25	HP
47	102	93.58	HP
48	102	93.58	HP
49	106	97.25	HP
50	105	96.33	HP

Total Number of Respondents: 109 | Proficiency Average: 93.50 | Level: HP

Mathematics Teacher Proficiency

The mathematics teachers obtained an average score of 93.52, which falls under the category High Proficiency (HP). This indicates that, in general, teachers have a strong command of mathematical knowledge and skills, allowing them to deliver lessons with accuracy and confidence. Such proficiency supports effective teaching and helps make learning more engaging for students.

Highly proficient teachers can apply diverse problem-solving strategies, explain concepts clearly, and adjust instruction to meet different learner needs. This level of mastery positively influences student engagement and motivation, as learners respond better when teachers demonstrate expertise.

However, not all teachers reached the High Proficiency level. A few were classified as Proficient (P), showing that while most teachers are highly skilled, some still need further professional development to strengthen their mastery.

In summary, the results show that mathematics teachers are generally highly proficient, which ensures effective instruction and fosters student motivation and active participation in mathematics learning (Faek, 2021).

Table 3.a
Relationship between the Level of Mathematics Proficiency and Highest Educational Attainment of the Teachers

	Highest Educational Attainment				
Mathematics Proficiency	X^2	df	p-value	V	Interpretation
	14.837	16	0.537	0.184	No statistically significant relationship

The computed Chi-Square value of 14.837 with 16 degrees of freedom produced a p-value of 0.537, which is greater than 0.05. This means there is no statistically significant relationship between mathematics proficiency and the highest educational attainment of teachers. Since the observed χ^2 (14.837) is less than the critical χ^2 (26.296), the null hypothesis of no association is retained.

Cramér's V was 0.184, indicating only a weak relationship between the two variables. This suggests that while some associations exist, it is not strong or meaningful.

The findings imply that earning higher academic degrees (e.g., master's or doctoral units) does not automatically lead to higher mathematics proficiency. This is consistent with Liu (2021), who found that teachers with bachelor's or higher credentials had only a small positive effect on pupil learning gains (0.042 SD) in the China Education Panel Survey.

Table 3.b
Relationship between the Level of Mathematics Proficiency and Teaching Experience of the Teachers

	Teaching Experience				
Mathematics Proficiency	X^2	df	p-value	V	Interpretation
	1.478	16	0.999	0.058	No statistically significant relationship

The computed Chi-Square value of 1.478 with 16 degrees of freedom resulted in a p-value of 0.9999, which is much greater than the 0.05 significance level. Since the observed χ^2 (1.47) is less than the critical χ^2 (26.296), the null hypothesis stating that there is no significant relationship is accepted. The computed Cramér's V = 0.058 further suggests a very weak association between the variables, meaning that changes in one variable are not related to changes in the other.

This implies that the number of years of teachers spend in the profession does not automatically translate to stronger mathematics competency. According to the study published in International Journal of Scientific and Research Publications (2022), basic school mathematics teachers in Ghana with 5 years and below, 6–10 years, and more than 10 years of teaching experience "have relatively the same algebra teaching knowledge. This directly supports the finding: increasing years in the profession did not significantly improve teacher proficiency.

Table 3.c
Relationship between the Level of Mathematics Proficiency and Training related to Mathematics

	Training related to Mathematics				
Mathematics Proficiency	X^2	df	p-value	V	Interpretation
	0.346	16	1.000	0.028	No statistically significant relationship

The computed Chi-Square value of 0.346 with 16 degrees of freedom resulted in a p-value of 1.000, which is greater than the 0.05 level of significance.

Because the observed χ^2 (0.346) is much smaller than the critical χ^2 (26.296), the null hypothesis—that there is no significant relationship between the mathematics proficiency and training related to mathematics.

The computed Cramér's V = 0.028 indicates a very weak or negligible association, suggesting that variations in one variable are almost completely unrelated to variations in the other.

This result implies that simply attending mathematics-related training is not enough to significantly improve teachers' proficiency. The quality, depth, and applicability of the training may matter more than the frequency. Schools and education authorities should therefore focus on designing relevant, intensive, and skills-oriented training programs to truly enhance mathematics proficiency, rather than relying only on the number of trainings attended. This finding was supported by a meta-analysis study conducted by Park et al., (2025), which demonstrates that professional development (PD) for math teachers

has a positive effect on learner outcomes. However, the study also emphasized that *not all PD is equally effective* — features such as pedagogical content, sustained duration, and active learning are critical.

Table 4

Level of Student Engagement in Learning Mathematics

N=359

Key Dimensions	Level of Student Engagement	
	WM	**DE**
Behavioral Engagement		
1. I actively participate in math class discussions.	4.11	H
2. I complete my math assignments on time.	4.12	H
3. I pay attention during mathematics lessons.	4.27	VH
4. I ask questions when I don't understand math topics.	4.09	H
5. I attend mathematics classes regularly.	4.52	VH
Emotional Engagement		
6. I enjoy learning mathematics.	4.15	H
7. I feel confident in solving math problems.	3.90	H
8. I feel motivated when I succeed in solving a math problem.	4.51	VH
9. Mathematics is important for my future.	4.45	VH
10. I am conscious about the grades and other performance metrics.	4.34	VH
Cognitive Engagement		
11. I try to understand math concepts instead of just memorizing them.	4.33	VH
12. I look for different ways to solve math problems.		
13. I connect math lessons to real-life situations.	4.12	H
14. I keep trying even when I find a math problem difficult.	4.15	H
15. I am analyzing ideas, concepts and rules in depth.	4.35	VH
	4.21	H
Weighted Mean	**4.24**	**VH**

The computed weighted mean of 4.24 indicates that learners exhibit a very high level of engagement in learning mathematics. The very high level of student engagement implies that teachers should continue using interactive and motivating teaching strategies, as these effectively sustain learners' interest, participation, and positive attitude toward learning mathematics. Learners may connect their prior knowledge with the material they gained during interactive learning sessions. They could monitor and assess their development. Learners are also encouraged to think creatively and experiment with new approaches to problem-solving (Rabut & Rabut, 2025).

Table 5

Level of Student Motivation in Learning Mathematics

N=359

Key Dimensions	Level of Student Motivation	
	WM	**DE**
Extrinsic Motivation		
1. I participate in class because I want to be recognized or get a good grade.	4.17	H
2. I complete my math assignments to get a good grade or avoid getting in trouble.	4.29	VH
3. I pay attention in class, so I won't miss anything important for exams or grades.	4.38	VH
4. I ask questions so I can understand better and get a good grade.	4.18	H
5. I attend math class regularly, so I won't miss important lessons or lose marks.	4.44	VH
Intrinsic Motivation		
6. I enjoy learning mathematics because I find the process of solving problems intellectually rewarding.	4.15	H
7. I'm certain I can understand the most difficult problem presented in the lesson.	3.76	H
8. It gives me a sense of personal achievement and reinforces my love for the subject.	4.03	H
9. It helps me develop critical thinking and problem-solving skills that I find valuable.	4.24	VH
10. They reflect my progress and help me stay focused on improving my skills.	4.23	VH
Self-efficacy		

11. I am confident in my ability to understand math concepts deeply.	3.99	H
12. I believe in my ability to find multiple solutions to a math problem because I am resourceful.	4.00	H
13. I am confident in my ability to relate math lessons to real-life situations because I understand the practical value of math.	4.08	H
14. I believe in my ability to overcome challenges and persist through difficult math.	4.09	H
15. I am confident in my ability to analyze ideas, concepts, and rules in depth because I have critical thinking skills.	4.10	H
Weighted Mean	**4.14**	**H**

The computed weighted mean of 4.14, which falls under the High level, indicates that learners generally demonstrate strong motivation in learning. This implies that teachers should continue implementing strategies that challenge and support students, as motivated learners are more likely to actively engage and achieve success in mathematics. This finding was supported by the study of Eminita, et. al. (2024), who stressed out that teachers employed diverse methodologies, such as their passion, to exemplify and maintain students' engagement and motivation in activities and assignments.

Table 6.a
Relationship between the Level of Mathematics Proficiency and Student Engagement

Source of Variation	SS	df	MS	F	P-value	η Value
Between Groups	434020.5	1	434020.5	63216.61	1.61E-268	0.998296
Within Groups	1482.971	216	6.865608			
Total	435503.5	217				

Table 6.a presents the analysis of variance (ANOVA) results examining the relationship between the level of mathematics proficiency and student engagement. The findings show a significant difference between groups, as indicated by the very high F-value of 63,216.61 and an extremely small p-value of 1.61×10^{-268}, which is far below the 0.001 threshold. This indicates that the observed relationship is highly significant and not due to random chance. This provides strong evidence that mathematics proficiency and student engagement are meaningfully connected.

Furthermore, the eta coefficient ($\eta = 0.998296$) shows an extremely strong effect size. An eta value close to 1 indicates that nearly all the variance in student engagement can be explained by differences in mathematics proficiency. This means the strength of the relationship is not only statistically significant but also practically very strong. Overall, the findings imply that individuals with higher levels of mathematics proficiency demonstrate much higher levels of student engagement. This highlights the substantial role of mathematics proficiency in influencing and enhancing students' involvement, participation, and engagement in learning. These findings were supported by the study of Silvosa and Salimaco (2025), who found significant correlations between perceived teacher PCK (pedagogical content knowledge) and students' interest in mathematics. Strong PCK likely enhances student engagement and interest, which aligns with the finding of this study that higher teacher proficiency relates to greater student engagement.

Table 6.b
Relationship between the Level of Mathematics Proficiency and Student Motivation

Source of Variation	SS	df	MS	F	P-value	η Value
Between Groups	434967.8	1	434967.8	63149.84	1.8E-268	0.998294
Within Groups	1487.779	216	6.887868			
Total	436455.6	217				

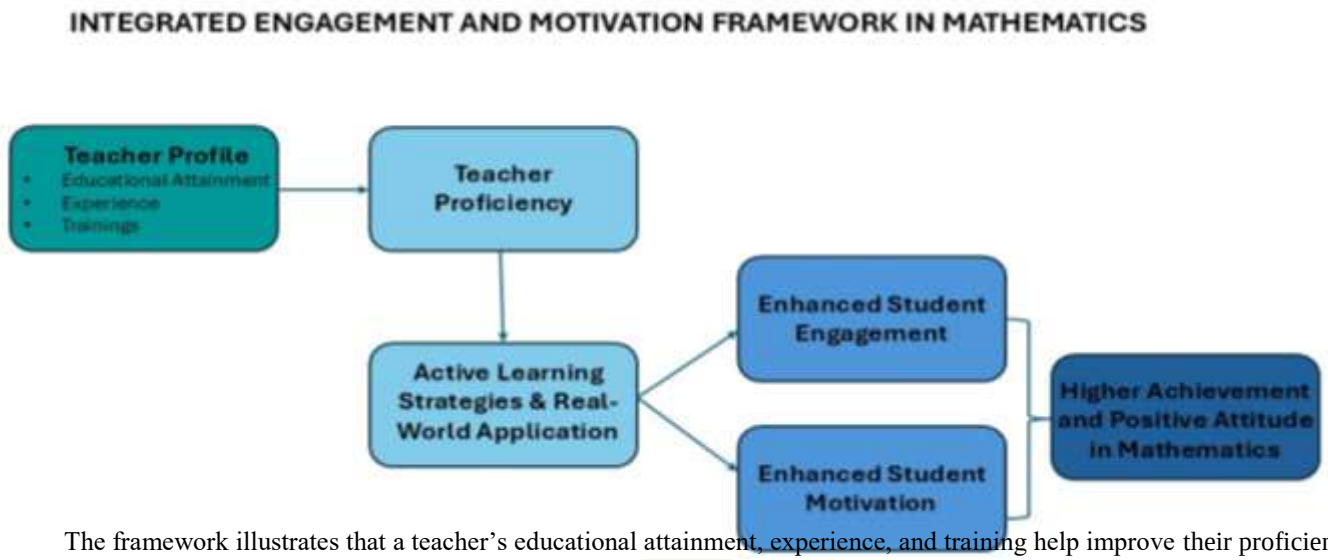
Table 6.b presents the analysis of variance (ANOVA) results examining the relationship between the level of mathematics proficiency and student motivation. The findings indicate a highly significant difference between groups, as shown by the very large F-value of 63,149.84 and the extremely small p-value of 1.8×10^{-268}, which is far below the 0.001 level of significance. This demonstrates that the relationship between mathematics proficiency and student motivation is statistically significant and not attributable to random variation. The eta coefficient ($\eta = 0.998294$) provides additional insight into the strength of this relationship. With a value extremely close to 1, the eta coefficient suggests an exceptionally strong effect size, indicating that nearly all the variance in student motivation can be explained by differences in mathematics proficiency. This means that mathematics proficiency is a very powerful predictor of student motivation.

Table 7
Relationship between the Level of Student Engagement and Student Motivation

Student Motivation			
	r	p-value	Interpretation
Student Engagement	0.544	p<0.001	There is a significant moderate positive correlation

There is a strong, statistically significant positive relationship between the level of student engagement and student motivation. This means that students who are more engaged in learning activities also tend to demonstrate higher levels of motivation. The high significance level ($p < .001$) suggests that this relationship is unlikely to be due to random variation. The positive relationship between student engagement and motivation implies that teachers should design learning activities that actively involve students, as increased engagement can directly enhance their motivation to succeed in mathematics. In a three-wave longitudinal study of Zhang, Y., Yang, X., Sun, X., & Kaiser, G. (2023), they found a reciprocal relationship between students' motivation (intrinsic and extrinsic) and their cognitive engagement in mathematics.

Proposed Framework to Enhance Student Engagement and Student Motivation



The framework illustrates that a teacher's educational attainment, experience, and training help improve their proficiency in teaching mathematics. When teachers are proficient, they can use active learning strategies and connect lessons to real-life situations, making learning more meaningful. These teaching practices increase student engagement and motivation, which then lead to higher achievement and a more positive attitude toward mathematics.

This framework is aligned in Integrated Engagement and Motivation Theory, a self-made theory which highlights the interconnected roles of teachers' proficiency, student engagement and student motivation in improving mathematics learning outcomes.

CONCLUSIONS

1. Majority of participants have attained advanced graduate education, reflecting a strong academic background but with relatively few reaching the highest level of education. Teachers who gained 6-10 years of teaching experience indicate a well-established professional background. Furthermore, nearly all respondents attended only 1-2 mathematics-related training, showing limited opportunities for continuous professional development.
2. An average proficiency score of 93.50 indicates that teachers have strong mathematical knowledge and teaching competence.
3. Teachers who earned advanced degrees, such as Master's and Doctorate, demonstrated higher levels of mathematical proficiency compared to their counterparts with only a Bachelor's degree. For teaching experience, teachers with more years of service tended to have higher proficiency scores, however, the relationship was not strong, suggesting that experience alone does not fully account for proficiency. Similarly, mathematics-related training also demonstrated a weak positive correlation, indicating that limited training attendance contributes only slightly to proficiency gains.
4. Learners are generally active, attentive, and motivated during mathematics classes, showing positive attitudes toward participation and involvement in learning tasks.
5. Learners are generally eager to participate, persistent in accomplishing tasks, and willing to exert effort to succeed in the subject.
6. The study concludes that mathematics teachers' proficiency plays a critical role in enhancing student engagement, as higher teacher proficiency is both statistically and practically associated with greater student involvement, participation, and interest in learning mathematics. Moreover, mathematics teachers' proficiency is a key determinant of student motivation, as higher teacher proficiency is both statistically and practically associated with greater student drive, interest, and willingness to engage in learning mathematics.
7. Learners who are more engaged in learning activities also tend to be more motivated to achieve in mathematics.
8. Enhancing teacher proficiency through education, experience, and training fosters greater student engagement and motivation, leading to improved achievement and a positive attitude toward mathematics.

RECOMMENDATIONS

Based on the findings and conclusions of the study, the following recommendations are hereby presented:

1. Teachers should continue higher professional studies and gain additional knowledge to maintain higher proficiency level. Teachers who gained 6-10 years of teaching are encouraged to engage in higher-level training such as graduate studies, specialization programs, or national certifications to deepen content mastery and pedagogical skills. Attending training related to mathematics is relatively beneficial and a must, especially for newly hired teachers.
2. Teachers should continuously update their mathematical knowledge and teaching strategies through refresher courses, workshops, and professional development programs.
3. Schools and educational institutions should encourage teachers to pursue advanced studies, such as Master's and Doctorate degrees, since these are strongly linked to higher levels of mathematical proficiency. While teaching experience and mathematics-related training contribute positively, their impact is relatively weak. Thus, professional development programs should go beyond mere training attendance and instead focus on sustained, intensive and high-quality learning opportunities.
4. Teachers should continue using interactive and engaging teaching strategies to sustain learners' active participation and motivation in mathematics.
5. Teachers should sustain learners' enthusiasm and persistence by offering engaging and goal-oriented mathematics activities.
6. Teachers should continuously enhance their mathematics proficiency to further strengthen students' engagement and motivation in learning the subject.
7. Teachers should design interactive learning experiences that simultaneously promote student engagement and motivation in mathematics.
8. Schools should provide continuous professional development programs to strengthen teachers' proficiency and enhance students' engagement and motivation in mathematics.

REFERENCES

Altarawneh, A. F., & Marei, S. T. (n.d.). *Mathematical proficiency and preservice classroom teachers' instructional performance*. https://eric.ed.gov/?id=EJ1295515

Camingawan, D. M. (n.d.). Survey Questionnaire 1_Student Engagement. Scribd. *https://www.scribd.com/document/591822374/Survey-Questionnaire-1-Student-Engagement*

ChatGPT. (n.d.). *https://chatgpt.com/c/67d60fb4-3bec-800f-ab5e-1eec4d6864b1*

Capinding, A. T. (2023). Student's Readiness on the Implementation of Face-to-Face Classes: The Aftermath of Face-to-Face Class Restriction. *International Journal of Educational Methodology*, *9*(2), 309–320. https://doi.org/10.12973/ijem.9.2.309

Dunn, J. C., & Zimmer, C. (2020). Self-determination theory. *Routledge Handbook of Adapted Physical Education*, *55*(1), 296–312. https://doi.org/10.4324/9780429052675-23

Eminita, V., Saefuddin, A., Sadik, K., & Syafitri, U. D. (2024). *Analyzing multilevel model of educational data: Teachers' ability effect on students' mathematical learning motivation*. *Journal on Mathematics Education*, *15*(2), 431–450.Faek, A. (2021). *MATHEMATICAL PROFICI ENCY INSTRUCTIONAL PERFORMANCE AND CLASSROOM TEACHERS ' Keyword s*. *9*(2), 354–364. https://doi.org/10.18488/journal.61.2021.92.354.364

Flores, I. M. (2019). *Competencies of Mathematics Teachers in the Province of Batangas , Philippines : Basis for Direction on Continuing Education for the K to 12 Curriculum*. *7*(4), 26–35.

Fukaya, T., Fukuda, M., & Suzuki, M. (2024). *Relationship between mathematical pedagogical content knowledge, beliefs, and motivation of elementary school teachers. Frontiers in Education, 8.*

Liu, J. (2021). Evaluating Educational Credentials of Teachers as predictor of Effective Teaching: A Pupil Fixed-Effect Modeling approach. *Frontiers in Psychology*, *12*, 729360. https://doi.org/10.3389/fpsyg.2021.729360

Luchavez, L. J. T., & Caloc, L. J. R. (2024). *M ATHEMATICAL P ROFICIENCY AS AN O UTPUT OF E NRICHMENT P ROGRAMS AND P EDAGOGICAL*. *9*(4).

Osei, W., & Kubi, M. K. (2022). *Algebra Teaching Knowledge of Professional and Non-professional Basic School Mathematics Teachers*. **International Journal of Scientific and Research Publications**, **12**(1), 41–48. https://doi.org/10.29322/IJSRP.12.01.2022.p12107

Park, S., Lee, Y. R., Nelson, G., Cook, M. A., & Doabler, C. T. (2025). *Teacher Professional Development and Student Mathematics Achievement: A Meta-Analysis of the Effects and Moderators*. *Education Sciences*, **15**(9), 1177. https://doi.org/10.3390/educsci15091177Rivera-lacia, M. (2019). *Classroom Practices in Mathematics : Effects on Elementary and Secondary School S tudents ' Achievement in Mathematics in Region XII , Philippines*. *September*.

Rabut & Rabut (2025)Teachers, P.-E., & Dio, R. V. (2019). *Validation of the NCBTS- -Based Mathematics Proficiency Test (MPT) For Validation of the NCBTS- - - Based Mathematics Proficiency Test (MPT) For Pre- - - Service Elementary Teachers*. *August*.

Silvosa, H. A., & Salimaco, R. A., Jr. (2025). *The impact of teachers' pedagogical content knowledge and students' self-concept on mathematics interest among junior high school students*. *Asian Journal of Education and Social Studies*, *51*(7), 377–386. https://doi.org/10.9734/ajess/2025/v51i72128

Xiao, F., & Sun, L. (2021). *Students ' Motivation and Affection Profiles and Their Relation to Mathematics Achievement , Persistence , and Behaviors*. *11*(January), 1–15. https://doi.org/10.3389/fpsyg.2020.533593

Zhang, Y., Yang, X., Sun, X., & Kaiser, G. (2023). *The reciprocal relationship among Chinese senior secondary students' intrinsic and extrinsic motivation and cognitive engagement in learning mathematics: A three-wave longitudinal study.* **ZDM – Mathematics Education, 55**, 399–412. https://doi.org/10.1007/s11858-022-01465-0