

A Correlational Study on The Teaching Performance of DORSU-MST-Math Graduates and Their Students' Performance

ABSTRACT

Aims: To examine the correlation between the teaching performance of secondary Mathematics teachers who graduated from the Davao Oriental State University Master of Science Teaching Mathematics (DORSU-MST-Math) program and the academic performance of their students.

Study design: Descriptive-correlational quantitative research design.

Place and Duration of Study: DepEd Schools Division of Davao Oriental and DepEd Schools Division of Davao Oriental, between March and April 2025.

Methodology: There were a total of 25 DORSU-MST-Math graduates participated and 25 students for each participating teacher are randomly selected, ensuring an equal number of student participants per teacher. This sample size was determined based on half of the number of students in the mathematics class of the teacher with the smallest class size. In total, this resulted in 625 student participants across all teachers involved in the study.

Results: The results revealed that the teachers' overall performance was rated as outstanding, while students' mean performance score was classified as very good. However, statistical analysis indicated a nonsignificant positive correlation (*r-value 0.07 and p-value 0.08*) between teaching performance and students' performance. These findings suggest that while high-quality teaching contributes to a positive learning environment, student performance in Mathematics may also be influenced by other external and internal factors. The study highlights the importance of holistic educational support and recommends further research into additional variables affecting student outcomes.

Conclusion: While quality teaching supports a positive learning environment, student performance in Mathematics is also influenced by various internal and external factors. This study emphasizes the need for holistic educational support and recommends further research into additional determinants of academic outcomes.

1. INTRODUCTION

Mathematics literacy is essential for daily life and the workforce, as it enables individuals to comprehend and adapt to a rapidly changing society by making sense of the mathematical concepts embedded in everyday information (Ojose, 2023). This skill fosters critical thinking and problem-solving skills, essential for personal development and societal progress (Agbata et al., 2024). Despite the highly esteemed and acknowledged importance of mathematics and the fact that it is the prerequisite for most of the subjects, there is still cause for concern regarding students' low academic performance and disinterest in mathematics at schools, colleges, and universities in both developed and developing countries (Muhammad, 2024) as it continues to be one of the most challenging subjects in schools as perceived by students (Ali and Jameel, 2016).

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Suggested topic- "Correlation Between the Teaching Performance of DORSU MST-Math Graduates and the Academic Achievement of Their Students in Mathematics"

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Education should be able to address such challenges, so as to equip future citizens with the skills, aptitudes and dispositions needed to respond to these and similar issues (Ventista, 2023) and with this issue, teachers play a crucial role since they are the primary overs in the advancement of students at school, serving as facilitators in the process of teaching and learning (Ghunio, Niamatullah, & Shaikh, 2023). Teacher quality in schools and institutions is one of the most important factors that influence student performance (Guo et al., 2023), but this conclusion, however, does not clarify what factors specifically lead to some teachers being superior to others in terms of their impact on student achievement scores (Call, 2018).

With a lot of pressure among the educators to improve the academic performance among the learners, teachers' continuous professional development has become one of strategies of the schools that are committed to improving the academic performance of their learners (Sarah & Musa, 2024). Continuing Professional Development (CPD) plays a crucial role in enhancing the knowledge, skills, and competencies of educators, empowering them to deliver high-quality education (Smith, 2019).

Effective mathematics instruction requires teachers to possess advanced subject matter knowledge, pedagogical expertise, and passion for teaching (Burrill, 2017). Some studies show that students taught by teachers who engage in CPD programs tend to achieve higher academic results, as these programs are designed to align closely with classroom practices (Mohamed et al., 2024). Teacher qualifications such as level of education, math content expertise, teaching experience, and certification play an important role in student outcomes (Podolsky et al., 2019). In the realm of secondary education, the transformative impact of CPD on teaching approaches is particularly significant, as it directly influences students' learning outcomes and academic achievement (Chachar, 2023).

Continuous professional growth is essential, as it equips educators with innovative strategies that promote optimal learning outcomes (Nasution et al., 2024). However, existing literature has produced conflicting results regarding the relationship between student achievement and teachers' possession of advanced degrees (ADs), so determining which areas of teaching and learning are most directly affected by teachers' AD is an important question for degree providers, as well as school and district administrators. (Chang et al., 2020).

With that, this study sought to assess the relationship of teaching performance of DORSU's MST major in Mathematics graduates who are currently teaching Mathematics in secondary public schools and their students' performance in the subject.

The study on the teacher performance and students' performance in mathematics has several limitations that should be acknowledged:

The study focuses on mathematics teachers who graduated from the DORSU-MST-Math program and are currently teaching in public secondary schools within the Division of Davao Oriental and Mati City, along with their respective students. The evaluation of teaching performance is confined to four indicators namely: commitment, knowledge of subject matter, teaching for independent learning, and management of learning. Meanwhile, the assessment of students' performance is solely based on Trends in International Mathematics and Science Study (TIMSS) 2011 math assessment. The data collection focuses on a specific school year which is S.Y. 2024-2025 to ensure consistency and relevance of the findings. Specifically, this research aims to correlate the teaching performance of Master of Science Teaching (MST) Mathematics graduates of Davao Oriental State and their students' performance in Mathematics.

Of the total 65 graduates, only 25 were deemed valid participants for this study. The exclusion of the remaining 40 individuals was due to several factors: some were employed as non-

teaching personnel, others did not specialize in mathematics instruction, and a portion were no longer residing in the country at the time of data collection. The researcher randomly selected 25 students from each participating teacher's class. This approach ensured equal representation of students across all teacher groups. The sample size of 25 students per class was determined based on the class with the smallest enrollment, allowing for consistent sampling across all participating teachers. In total, the study included 625 student participants.

1.1 Objectives

This paper focuses on investigating the contribution of the Master of Science Teaching (MST) major in Mathematics program of Davao Oriental State University (DOrSU) in the efforts of its graduates currently teaching Mathematics in secondary public schools. Such teacher performance as to commitment, knowledge of subject matter, teaching for independent learning, and management of learning are under scrutiny. In this regard, it seeks to address the following objectives:

1. To determine the level of teaching performance of Master of Science Teaching (MST) major in Mathematics graduates at Davao Oriental State University;
2. To assess the level of students' performance in Mathematics;
3. To determine if there is a significant relationship between teaching performance and students' performance in Mathematics.

1.2 Conceptual Framework

The conceptual framework of this study, illustrated in Fig. 1, demonstrates the relationships among the key variables: teaching performance (independent variable), students' performance (dependent variable) which was further broken down into four sub-indicators: relevance to commitment, knowledge of subject matter, teaching for independent learning, and management of learning.

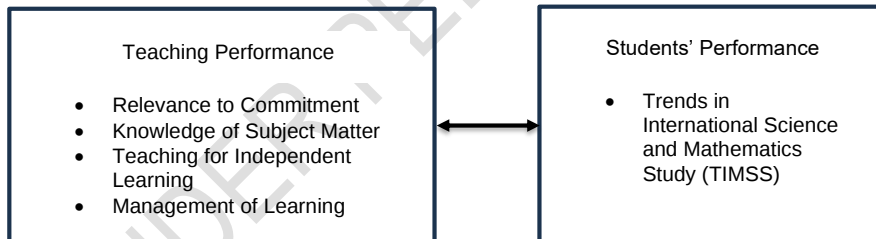


Fig. 1: The schematic diagram showing the relationship between the independent and dependent variables of the study

2. MATERIAL AND METHODS

2.1 Research Design

Descriptive-correlation research method was employed in this study. The descriptive correlation method was used to determine the relationship between dependent variables how they were manipulated by the independent variables. Researchers use descriptive research designs to answer "What is xp?" and correlational research designs to address "How are things related?" (Deckert and Wilson, 2023).

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This approach allows the researcher to identify whether differences in teachers' effectiveness which is measured through indicators such as commitment, subject matter knowledge, management of independent learning, and classroom management, are significantly associated with differences in students' academic performance. It is particularly useful in exploring how specific aspects of teaching contribute to student success, thereby providing empirical evidence to support improvement in instructional practices.

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2.2 Research Instrument

There were two sets of questionnaires to be used in this study. These questionnaires and were adapted in this study. The questionnaire for independent variable which is teaching performance is patterned under four indicators which are relevance to commitment, knowledge of subject matter, teaching for independent learning, and management of learning. On the other hand, the questionnaire for dependent variable which is student performance was measured using the Mathematics Questionnaire from Trends in International Mathematics and Science Study (TIMSS) 2019. The Trends in International Mathematics and Science Study (TIMSS) assesses the knowledge and skills of approximately 250,000 students globally, facilitating international and national comparisons of educational curricula (Demir and Gelbal, 2023).

In the first questionnaires, the student respondents are asked to evaluate their teacher's performance by putting a check mark in the box that correspond to the following anchors: five (5) Outstanding, four (4) Very Satisfactory, three (3) Satisfactory, two (2) Unsatisfactory, and one (1) Poor. In another questionnaire, they were given a multiple choice mathematical problems and is asked to choose the letter of the correct answer. The researchers modified the questionnaire to suit the study and was submitted to the panel of experts for validation.

2.2 Respondents of the Study

The respondents of this study are the students of the public high school teachers in the Schools Division of Davao Oriental and Mati City who are DORSU-MST-Math graduates. 25 graduates were identified as eligible respondents and The researcher randomly selected 25 students for each participating teacher, ensuring an equal number of student participants per teacher. This sample size was determined based on half of the number of students in the mathematics class of the teacher with the

smallest class size. In total, this resulted in 625 student participants across all teachers involved in the study.

Table 1. The distribution of respondents.

Year Graduated	Number of Graduates (N)	Number of Valid Participants	Number of Randomly Selected Students
2003 - 2004	4	0	0
2005 - 2006	7	1	25
2007 - 2008	7	1	25
2009 – 2010	6	2	50
2011 – 2012	4	1	25
2013 - 2014	3	1	25
2015 - 2016	4	2	50
2017 – 2018	2	1	25
2019 - 2020	15	9	225
2021 – 2022	9	4	100
2023 - 2024	4	3	75
TOTAL	65	25	625

2.3 Data Gathering

The study involved collecting data on various factors related to teachers' performance, including their commitment, subject matter knowledge, management of independent learning, and classroom management. It collected data related to students' performance like the scores for math assessment using the Trends in International Mathematics and Science Study (TIMSS). The Trends in International Mathematics and Science Study (TIMSS) provides reliable and timely trend data on the mathematics and science achievement of U.S. students compared to that of students in other countries.

A list of MST-Mathematics graduates provided by Davao Oriental State University Registrar Office was the basis for the number of respondents and the method which was used in gathering data a questionnaire through a google form. After which, letters of request to conduct the study were sent to the schools division superintendents of Davao Oriental and Mati City and to the school heads/principals of the included schools. Finally, the data collected underwent rigorous statistical treatment, analysis, and interpretation, ensuring the reliability of the study's findings.

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2.4 Statistical Analysis

The collected data were organized, encoded, and tabulated using spreadsheet software before being processed through statistical software.

2.4.1 Mean. In statistics for research, the mean is a fundamental measure of central tendency that summarizes the overall trend of a dataset. It is calculated by dividing the sum of all data points by the total number of observations (Smith, 2020). This tool

was used to answer the main purpose of the study, statement of the problem 1, statement of the problem 2.

2.4.1 Pearson r

It is the linear correlation between two variables. This statistical tool was used to determine if there is a significant relationship between professional development and teaching efficacy. In this study, this tool was used to measure the significant relationship between the level of teaching performance of DOrSU-MST-Math Graduates and the level of students' performance.

Computed r	Descriptive Interpretation
+/- 1.00	Perfect Correlation
Between +/- 0.75-+/-0.99	High Correlation
Between +/- 0.51-+/-0.74	Moderately High Correlation
Between +/- 0.31-+/-0.50	Moderately Low Correlation
Between +/- 0.01-+/-0.30	Low Correlation
0	No Correlation

2.4.2 Standard Deviation

It is a statistical tool used to measure the extent of variability or dispersion within a set of data. It reflects how much the individual data points deviate from the overall mean of the dataset.

3. RESULTS AND DISCUSSION

3.1 The Level of Teaching Performance in Terms of Commitment

The level of mathematical mindset of the students is presented in Table 2. The results show that the level of teaching performance in terms of commitment is *Outstanding*, with an overall mean of **4.33**. This suggests that most teachers are deeply committed to their role, although the slightly lower score in one area indicates a potential opportunity for improvement in certain practices. These results are similar to the findings of the study that discusses how graduate education serves as a mechanism for teachers to develop competencies and align with the Philippine Professional Standards for Teachers, thereby enhancing their commitment to the profession (Gepila, 2020).

3.2 The Level of Teaching Performance in Terms of Knowledge of Subject Matter

The level of mathematical mindset of the students is presented in Table 3. The teaching performance of DOrSU-MST-Mathematics graduates in terms of Knowledge of Subject Matter is rated as *Outstanding*, with an overall mean score of 4.31. This result indicates that the graduates possess a profound and comprehensive understanding of mathematics. A high level of subject matter knowledge is crucial, as it directly enhances teaching effectiveness by enabling teachers to explain concepts more clearly, respond accurately to student inquiries, and employ a wider range of instructional strategies tailored to diverse learner needs.

These findings are consistent with Su (2023), who emphasized that graduate education programs significantly strengthen teachers' professional competencies, particularly in the

areas of content expertise, pedagogical effectiveness, and instructional confidence. Moreover, strong subject matter knowledge allows teachers to design more rigorous and meaningful learning experiences, fosters higher levels of student engagement, and supports the development of students' critical thinking and problem-solving skills (Cherry, 2023). Therefore, the outstanding rating in this area suggests that the DOrSU-MST-Mathematics graduates are well-equipped to facilitate high-quality mathematics instruction, ultimately contributing to improved student learning outcomes.

3.3 The Level of Teaching Performance in Terms of Teaching for Independent Learning

The level of mathematical mindset of the students is presented in Table 4. The level of teaching performance in terms of Teaching for Independent Learning is consistently rated as Outstanding across all indicators. Individual item mean scores range from 4.34 to 4.38, with an overall mean of 4.37, firmly placing the performance in the highest descriptive category. This indicates that teachers are highly effective in promoting independent learning among students—fostering critical thinking, encouraging self-directed study, and creating learning environments that support autonomy. The consistent high ratings across all items reflect a strong commitment to developing learners who are capable of managing their own learning processes, which is a key component of quality education.

This finding aligns with the study conducted by Garcia-Cadot et al. (2024), which revealed that teacher education programs incorporating active learning approaches and metacognitive strategies significantly enhance student autonomy and promote independent learning. Their research emphasizes the vital importance of aligning instructional methods with effective learning strategies to foster meaningful and engaging educational experiences.

3.4 The Level of Teaching Performance in terms of Teaching for Management of Learning

The level of mathematical mindset of the students is presented in Table 5. The level of teaching performance in terms of Management of Learning is generally rated as Outstanding. Four out of the five indicators (4IQ1, 4IQ2, 4IQ4, and 4IQ5) received mean scores ranging from 4.27 to 4.37, all falling under the Outstanding category. One item, 4IQ3, received a slightly lower rating of 4.12, which is still classified as Very Satisfactory. Despite this, the overall mean score is 4.37, indicating an Outstanding level of performance in managing the learning process. These results suggest that the teachers demonstrate strong abilities in organizing and facilitating effective learning environments, maintaining classroom discipline, and ensuring that learning goals are met efficiently and consistently.

This result is consistent with the study of Galache (2023) which found that teachers with advanced degrees demonstrated improved classroom management strategies, leading to enhanced student engagement and academic performance. Another study concluded that graduate education programs significantly enhance teachers' management of learning by improving their classroom strategies, instructional practices, and understanding of student behavior Guskey and Yoon (2023).

3.5 The level of students' performance taught by teachers who graduated from the DOrSU-MST-Math program.

The level of mathematical mindset of the students is presented in Table 6. DOrSU-MST-Math graduates achieved a mean TIMSS score of 86.24, which is classified as "Very Good". This indicates a high level of student performance. The "Very Good" descriptive level confirms that

students are not only meeting but likely exceeding standard expectations in mathematics as defined by the TIMSS assessment.

3.6 Descriptive Table

The level of mathematical mindset of the students is presented in Table 7. Table 7 presents the descriptive data on the level of teaching performance of DOrSU-MST-Math graduates. It includes two variables: teaching performance and students' performance. Teaching performance is measured through indicators such as commitment, knowledge of subject matter, teaching for independent learning, and management of learning. Students' performance is reflected in their scores on the TIMSS questionnaire. The table also includes the number of students, the mean scores for each variable and indicator, and their corresponding descriptive levels.

The results show that all indicators under teaching performance were rated as very satisfactory. Notably, teaching for independent learning received the highest mean score (4.37), highlighting a strong focus on developing students' autonomy in learning.

3.7 The Relationship between Teaching Performance and Students' Performance

Table 8 presents the correlation table. It contained the independent variable and dependent variables. It included the r-value, p-value, decision on the hypothesis, and interpretation. The mean score for teaching performance is 4.32 (Very Satisfactory), while the mean for students' performance is 86.24 (Very Good). The correlation coefficient (r-value) is 0.07, and the p-value is 0.085. Since the p-value is greater than 0.05, the decision is to accept the null hypothesis (H_0). This indicates that there is no significant relationship between teaching performance and students' performance in this sample. Although both variables independently exhibit high levels (classified as very satisfactory and very good, respectively), the weak correlation indicates that factors beyond teaching performance may significantly influence student achievement.

This result is similar to the study conducted by Iddrisu et al. (2023) wherein they found that while certain teacher characteristics influence student performance, there is no significant direct relationship between overall teaching performance and students' mathematics achievement. Another study is conducted about teachers' learning management and its effect on Grade 8 Filipino students' performance in mathematics in a post-COVID-19 pandemic context and the research concluded that while learning management strategies are important, they are not definitive predictors of Grade 8 students' academic performance in mathematics (Inot et al., 2024). Another study on the role of the teacher-student relationship, students' self-efficacy, and students' perception of mathematics has similar result which shows that the influence of the teacher-student relationship on mathematics achievement was insignificant, highlighting those other factors like self-efficacy and students' perception had a more substantial impact (Appiah et al., 2022). These studies collectively suggest that teaching performance, as measured by various competencies and characteristics, may not have a significant direct correlation with students' performance in mathematics.

Table 2. The Level of Teaching Performance in Terms of Commitment

Item	Mean	SD	Descriptive Equivalent
1	4.30	0.92	Outstanding
2	4.47	0.86	Outstanding
3	4.45	0.85	Outstanding
4	4.03	1.17	Very Satisfactory
5	4.39	0.86	Outstanding
Overall	4.33	0.75	Outstanding

n =107

Table 3. The Level of Teaching Performance in Terms of Knowledge of Subject Matter

Items	Mean	SD	Descriptive Equivalent
1	4.37	0.94	Outstanding
2	4.41	0.89	Outstanding
3	4.29	0.89	Outstanding
4	4.14	0.98	Very Satisfactory
5	4.34	0.90	Outstanding
Overall	4.31	0.78	Outstanding

n =107

Table 4. The Level of Teaching Performance in Terms of Teaching for Independent Learning

Items	Mean	SD	Descriptive Equivalent
1	4.38	0.93	Outstanding
2	4.36	0.90	Outstanding
3	4.34	0.88	Outstanding
4	4.34	0.91	Very Satisfactory
5	4.34	0.89	Outstanding
Overall	4.37	0.78	Outstanding

n =107

Table 5. The Level of Teaching Performance in Terms of Management of Learning

Items	Mean	SD	Descriptive Equivalent
1	4.37	0.93	Outstanding
2	4.28	0.95	Outstanding
3	4.12	1.09	Outstanding
4	4.27	0.92	Very Satisfactory
5	4.29	0.91	Outstanding
Overall	4.27	0.81	Outstanding

n =107

Table 6. The level of students' performance taught by teachers who graduated from the DOrSU-MST-Math program.

Variable	AWM	SD	Descriptive Equivalent
Students' Performance	86.24	14.76	

n =107

Table 7. Descriptive Table

Variables	N	Mean	Descriptive Level
1. Teaching Performance			
1.1 Commitment	625	4.33	Outstanding
1.2 Knowledge of Subject Matter		4.31	Outstanding
1.3 Teaching for Independent Learning		4.37	Outstanding
1.4 Management of Learning	625	4.27	Outstanding
<i>Overall</i>		4.32	Outstanding
2. Students' Performance			
2.1 TIMSS		86.24	Very Good

Table 8. The Relationship between Teaching Performance and Students' Performance

Variables	Mean	n	r-value	p-value
Teaching Performance	4.32	625	.07	.09
Students' Performance	86.24			

4. CONCLUSION AND RECOMMENDATION

4.1 Conclusion

In conclusion, while the study affirms the presence of high teaching performance among DOrSU-MST Mathematics graduates, the lack of a significant correlation with student achievement highlights the complexity of educational outcomes, emphasizing the necessity for holistic strategies that integrate classroom excellence with broader support systems to foster sustained student success. These may include learner motivation, socio-economic status, home support, and access to educational resources. As recent studies emphasize, student achievement is a multifaceted outcome shaped by both classroom and non-classroom variables (García-Cabot et al., 2020). Therefore, improving student outcomes requires a comprehensive strategy that includes teacher development, curriculum support, and broader contextual considerations (Kraft & Hill, 2021).

4.2 Recommendation

Based on this study's findings, several recommendations can be made to support policymakers, school principals, teachers, and future researchers in enhancing the teaching performance of DOrSU-MST-Math graduates to have a significant impact to their students' performance. Given that student achievement is influenced by various factors beyond teaching performance, the Department of Education (DepEd) may prioritize the implementation of targeted professional development programs for teachers, with a particular focus on differentiated instruction. These programs may include regular workshops and hands-on training to equip teachers with strategies to address diverse student needs and foster independent learning. DepEd may also establish a monitoring system to track the effectiveness of these programs, using feedback from both teachers and students to make continuous improvements.

To ensure the continued quality and relevance of the MST-Math program, DOrSU may implement a regular curriculum review process, conducted every two years, involving faculty, industry experts, and alumni to align course content with current trends and best practices in Mathematics education. This review may include updates on emerging mathematical techniques and the integration of new teaching methodologies. Teachers may participate in ongoing professional development focused on student-centered teaching methods and educational technology. They can engage in reflective teaching practices, using student performance data to adjust their methods to meet the diverse needs of learners.

Students need to take responsibility for their learning by developing strong study habits, managing their time effectively, and seeking academic support when necessary. They can also use available resources like online tools, review modules, and interactive practice tests

to strengthen their understanding of Mathematics. Lastly, Finally, future researchers may compare MST-Math graduates with those from other teacher education programs to identify strengths and areas for improvement. They can also examine the impact of differentiated instruction and educational technology on teaching effectiveness and student outcomes in Mathematics.

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CONSENT

Parental consent forms were secured since the respondents were minors, and informed consent forms were obtained to ensure respondents' understanding and voluntary participation.

ETHICAL APPROVAL

An endorsement letter from the Graduate School Dean and ethical clearance from the University Research Ethics Board were secured, followed by a request for approval from the two Schools Division Superintendents to conduct the study in the research locale.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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