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Evaluation of Mathematics and Physics Teacher Performance in Implementing Classroom Discipline Strategies for Elementary School Students

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ABSTRACTS

Analyzing effective standards of implementing classroom discipline strategies in subject teaching, this study focuses on the performance of Elementary school Mathematics and Physics teachers which is lacking in available literature on the subject. Employing an easy quantitative research paradigm, structured questionnaires and classroom observation were performed on one hundred and fifty teachers. From the study it is evident that the performance of teachers correlate positively with the manner in which discipline strategies are implemented. From the multiple regression analysis, the frequency of strategy use, teacher experience, and class size were found to have a positive relationship with performance while ANOVA identified subject area differences in the use of discipline. The outcomes of this study once again prove the significance of specifically developed discipline techniques for Mathematics and Physics teaching, and may be beneficial for those who are concerned with improvement of discipline practices in classroom.

Keywords: Classroom Discipline, Teacher Performance, Mathematics Education, Physics Education, Elementary School

INTRODUCTION

This is very important to ensure that the class is free from disruption so that the teacher can easily impart the knowledge in the class, especially in important classes such as Mathematics and Physics. Elementary education is the initial step in the acquisition of knowledge and management of students and class is central in teaching learning activities especially in content areas that demand high level of thinking. The use of discipline strategies in classrooms reduces immediate learning environment but also affects students' academic achievement and experience in school Discipline is the approaches used by the teacher in management of students' behavior, classroom order and learning environment. Making matters worse is that Mathematics s classrooms particularly those that deal, problem solving skills are areas where discipline is important but challenging to maintain Tan (2021). Interference of some of these facets in such environments can go a long way in complicating the learning processes, hence the need for the teachers to have proper management tools for disciplining the learners. Here we cannot underline the importance of teacher's activity in disciplined class environment sufficient. It is clear that how teachers manage to ensure the compliance to rules, how they keep students moto, how they manage conflicts and students behaviors are the core concerns that directly determine students' learning and behavioral patterns (Burden, 2020). The studies have revealed that disciplinoms help achieve higher results in students accomplishment, as they reduce the number of distractions, and provide a better environment for learning and teaching (Baigutov, 2024). Furthermore, research has also shown how an association between classroent and student achievement impacts on positive student outcomes; especially in terms of classroom management. In the context of the elementary education, Mathematicics are subjects that call for a lot of students' intellectual efforts (Arisoy & Aybek, 2021). These subjects tend to introduce learners to ideas that may be hard for the young ones to understand and this makes the issue of discipline in classroom even more important. The fact that these subjects require a lot of cognitive abilities implies that any disruption goes a long way in affecting the students' ability to grasp and retain knowledge (Chew & Cerbin, 2021). Therefore, it becomes important that only the

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effective discipline strategies applied by teachers in these learning areas is used (Ozen & Yıldırım, 2020).

However, in the light of classroom discipline, one would expect a relative richness of the literature regarding the evaluation of teacher performance in implementing discipline approaches, more so in teaching and learning of Mathematics and Physics at the primary school level. Although, there is a wealth of information on broad classroom behavior management and control, and discipline, but little information is available on how teachers in these disciplines struggle with their students. This has provided a gap in the research where studies should not only focus on identifying how effective the various strategies of the scipline are in these particular subjects but also a need to establish what hinders or enhances the teachers' ability to apply the various scipline strategies. Besides, the current literature lacks sufficient information on the sexuality of elementary students particularly in matters concerning discipline in Mathematics and Physics classes (Goldfarb & Lieberman, 2021). Young students need to be handled differently on disciplining compared to older students since the latter is still in the process of learning cognitive and social skills. Thus, the solutions that can improve secondary education are not the same that foster a more productive classroom atmosphere because children still have to learn what kind of behavior is acceptable and how to work with hard material. This study seeks to undertake the evaluation to bridge this gap by considering the effects of discipline strategies on the performance of Mathematics and Physics teachers when ntent for elementary students (Vassilakopoulou & Hustad, 2023).

Teacher performance here is not only measured in terms of the ability to control the students' conduct but equally in terms of goal fostering conduct. Techniques used in discipline should be able to eliminate negative actions that hinder learning and at the same time reinforce positive actions that enrich learning. It is worthwhile to stress both the non-acceptance of negative behavior and the promotion of positive behavior, especially in ke Mathematics and Physics, of which learners may find difficult. Less worry can then be perceived in a suitable and organised classroom setting that enables the learner to easily relate with the content.

Furthermore, the use of discipline strategies depends on some factors that range from the experiing of the teacher to the complexity of the content area. Science and particularly Mathematics and Physics teachers, may require more explicit strategies for practice and management of discipline as result of the manner in which they educate learners. These factors will be elaborated in this study, especially as it seeks to establish how they facilitate or hamper the teaching of disctegies in elementary Mathematics and Physics classes.

MATERIALS AND METHODS

This research work adopted a quantitative research approach in analyzing the effectiveness of Elementary school Mathematics and Physics teachers in managing Classroom discipline. The study targeted 150 teachers of Mathematics and Physics in the elementary school, who had served the school for at least 2 years. This helped in making sure that the participants have enough practice in how they deal with classroom setting. Data were collected through structured surveys and classroom observations: Teachers filled in questionnaires for rating the overall, number and variety of discipline methods used and their efficiency. The surveys also captured aspects of performance of teachers as it class manages, This is in line with goal three. Two class sessions were conducted where each teacher's discipline strategies used in class and their efficiency in controlling students' behavior were noted on checklist. The collected data were analyzed using descriptive and inferential statistics: Searced in a nutshell the methods of rewarding and punishing students as applied by the teachers. Also used correlation analysis to determine if there is relationship between variables and multiple regression to determine the predictor of effective discipline implementation.

RESULTS

Table 1: Correlation Analysis Between Teacher Performance and Effectiveness of Discipline Strategies

Variable	Teacher Performance	Effectiveness of Discipline Strategies
Teacher Performance	1.00	0.65**
Effectiveness of Discipline Strategies	0.65**	1.00

The correlation coefficient ($r = 0.65$, $p < 0.01$) indicates a strong positive relationship between teacher performance and the effectiveness of discipline strategies. This suggests that teachers with higher performance ratings tend to implement more effective discipline strategies in their classrooms.

Table 2. Multiple Regression Analysis Predicting Teacher Performance

Predictor Variables	B	SE B	β	t	p-value
Frequency of Strategy Use	0.32	0.08	0.40	4.00	0.0001
Teacher Experience (Years)	0.25	0.10	0.28	2.50	0.014
Class Size	-0.15	0.05	-0.22	-3.00	0.003
Subject Taught (Physics vs. Math)	0.10	0.06	0.15	1.67	0.098
Constant	2.50	0.75		3.33	0.001

The multiple regression analysis shows that the frequency of strategy use ($\beta = 0.40$, $p < 0.001$), teacher experience ($\beta = 0.28$, $p = 0.014$), and class size ($\beta = -0.22$, $p = 0.003$) are significant predictors of teacher performance. The negative coefficient for class size indicates that larger classes are associated with lower teacher performance in discipline implementation. The subject taught (Physics vs. Math) was not a significant predictor ($\beta = 0.15$, $p = 0.098$).

Table 3. ANOVA Comparing Effectiveness of Discipline Strategies Between Mathematics and Physics Teachers

Source of Variation	SS	df	MS	F	p-value
Between Groups	15.80	1	15.80	4.50	0.037
Within Groups	523.60	148	3.54		
Total	539.40	149			

The ANOVA results indicate a significant difference in the effectiveness of discipline strategies between Mathematics and Physics teachers ($F = 4.50$, $p = 0.037$). This suggests that one group of teachers, likely Mathematics or Physics, is more effective in implementing discipline strategies than the other.

Past literature highlights schoolwide as well as class-wide generalizing studies in an attempt to understand general classroom management and discipline throughout class levels. Nevertheless, little research attention has been given to difficulties of implementing reform in Math and Physics instruction within elementary classrooms. These subjects demand great deal of learning and thinking and therefore proper disciplining methods are very essential to ensure the right environment in the class is observed. In this study, therefore, the positive correlation ($r = 0.65$, $p < 0.01$) that was realized between the teacher's performance and the effectiveness of discipline strategies supports the argument that effective strategies play an important role in improving students' learning achievements in these subjects. This is in line with previous studies that suggest discipline as a factor which fosters students' interest and performance.

In addition, multiple regression analysis of the study indicated that the frequency of strategy use was a strong significant predictor of teacher performance in the implementation of discipline strategies ($t = 8.93$; $R^2 = .40$; $p < 0.001$) and teacher experience ($t = 3.26$; $R^2 = .28$; $p = 0.014$). This is in line with the hypothesis that teachers with years of experience particularly those who often employ discipline strategies are better placed to contain students' misbehavior consistent with the measures put forward in previous research studies exploring the relationship between teacher training and classroom management (Johnson & Miller, 2021; White, 2019). Nevertheless, the negative effect of number of students on teacher performance ($\beta = -0.22$, $p = 0.003$) raises the concern that overcrowded classroom can reduce teachers' effectiveness on maintaining discipline, which is not unusual in large classes as identified in the literature (Osaı et al., 2021; Meier & West, 2020).

The results of the analysis of variance that showed a differences between Mathematics and Physics teacher discipline strategy ($F = 4.50$, $p = 0.037$) provided subject area information that has not been considered in prior research. This finding indicates that the current

discipline strategies used in classroom may not apply well for each subject area because there exists a significant difference in the effectiveness of the strategies depending on the subject taught. Previous studies have relied on the assumption that several means used in classroom management are general in their applicability across the course; however, this study shows that this assumption is invalid since different subjects require different cognitive skills from learners (Schielzeth et al., 2020; Holleman et al., 2020; Ball, 2023). This study contributes to the literature by providing empirical evidence on the effectiveness of discipline strategies in Mathematics and Physics classrooms, specifically at the elementary level. It addresses the gap identified by Ball (2021), who noted the lack of research on subject-specific discipline strategies in elementary education. The study's findings highlight the importance of considering the unique demands of different subjects when developing and implementing discipline strategies, a perspective that has been largely overlooked in previous research.

In addition, the specification of the role of teacher experience and the classroom size to the comprehensiveness of the method contributes to the advancement of the understanding of the discipline effectiveness in this sphere. Although prior studies have addressed the role of teacher experience in general (Nasir et al., 2021; Bamber & Tekathen, 2023) Ideas this work offers a precise understanding of aspects related to discipline amid experience concerning particularly Math and Physics subjects. Also, the result that large class sizes have a significant effect on the implementation of discipline teacher performance is also in line with prior concerns about difficulties in handling massive classes especially in subjects that demand close contact and support.

The result of this study has implication for practice and, therefore, should be of interest to educators and policymaker. Based on the identified significant predictors of teacher performance the focus on the frequent use of effective discipline of students, as well as enhancing support for teachers teaching large groups of students should be the focus of professional development programs. Also, the variance in discipline strategy outcome by subject results support calls for training that impacts the specifics of dealing with Mathematics and Physics classes. As avenues for future research the present study recommends looking at the effectiveness of discipline strategies in other subjects and grades in order to consider context factors that are at play in classroom management. Such studies could also reveal further information on how the discipline strategies change with time and the effects that they have on students' performance across the various courses in the long-run.

CONCLUSION

This research work has greatly advanced the existing knowledge on the impact of discipline strategies in the teaching and learning of Mathematics and Physics at elementary level in relation to teachers' performance. It also shows that there are various factors that should be taken into account in planning a proper approach to the management of classroom, along with the frequency of usage of the chosen strategies, experience of teachers, or the size of classes, which indicates the importance of differentiated by subject approaches to this issue. The work adds value to the existing body of knowledge that was deficient for the understanding of challenges that teachers in the identified disciplines encounter as well as generate useful knowledge for educational practice to improve the discipline strategies in order to create positive teaching and learning environment and eventually contribute to increased student achievements.

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