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EVALUATING THE EFFECTIVENESS OF PROFESSIONAL DEVELOPMENT PROGRAMS FOR MATHEMATICS TEACHERS IN THE PHILIPPINES

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Abstract

Professional development (PD) programs play a critical role in enhancing the instructional quality of mathematics education. This study evaluates the effectiveness of PD programs for mathematics teachers in the Philippines, focusing on teacher competence, instructional practices, and student achievement. A survey and pretest-posttest quasi-experimental design were employed to assess program impact. Findings reveal significant improvements in teacher efficacy and student learning outcomes, suggesting that well-designed PD programs can address gaps in mathematics education.

Keywords: professional development, mathematics education, teacher training, Philippines

Introduction

Mathematics education in the Philippines faces persistent challenges, including low student performance, lack of teacher preparation, and limited access to resources (Symaco, 2013; World Bank, 2021). The Philippines has implemented professional development programs as part of efforts to enhance teacher competence and align practices with global standards (DepEd, 2016). However, the effectiveness of these programs remains underexplored. This study aims to evaluate the impact of PD programs on mathematics teachers in terms of their teaching efficacy, instructional practices, and student outcomes.

Objectives:
To measure changes in teacher knowledge and confidence after participating in PD programs.
To assess how PD programs influence teaching strategies and classroom practices.
To evaluate the correlation between PD program participation and student achievement in mathematics.

Literature Review

Professional development has been recognized as a cornerstone of educational reform, particularly in mathematics education (Darling-Hammond et al., 2017; Slavin et al., 2009). Effective PD programs are characterized by sustained engagement, collaboration, and alignment with curriculum goals (Limjap et al., 2017). Studies suggest that PD programs improve teacher competence and contribute to better student learning outcomes (Llurag et al., 2024). In the Philippines, recent initiatives have included workshops, mentoring, and technology integration to address gaps in teacher preparation (Descartin et al., 2023).

Globally, programs that emphasize content knowledge and pedagogical strategies show a positive impact on student performance (Hanushek & Woessmann, 2023). However, challenges persist, such as limited

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resources and implementation inconsistencies, especially in low-income contexts (Kitchenham & Charters, 2007).

Methodology

Research Design

This study used a mixed-methods approach, combining quantitative surveys and a pretest-posttest quasi-experimental design.

Participants

Participants included 150 mathematics teachers from public and private schools in the Philippines who attended PD programs over six months. Stratified random sampling ensured representation across regions and school types.

Instruments

Teacher Competence Survey: Adapted from Henderson and Mapp (2002), assessing content knowledge, pedagogical skills, and confidence.
Student Mathematics Achievement Test: Based on DepEd (2016) curriculum standards, used for pretest and posttest evaluation.

Data Collection

Phase 1: Teachers completed the survey before and after the PD program.
Phase 2: Classroom observations assessed changes in teaching practices.
Phase 3: Students' test scores were collected for analysis.

Data Analysis

Paired t-tests measured pretest-posttest changes in teacher competence and student achievement.
Pearson correlation examined relationships between teacher competence and student outcomes.

Results

Teacher Competence

Paired t-test results indicated significant improvements in teacher content knowledge ($t(149) = 6.89$, $p < 0.01$) and confidence ($t(149) = 7.45$, $p < 0.01$) after attending the PD program.

Teaching Practices

Classroom observations revealed a shift from traditional lecture-based methods to more interactive strategies, including problem-solving and collaborative learning.

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Student Achievement

Students' posttest scores showed a significant increase ($t(299) = 5.62$, $p < 0.01$), with higher gains observed in classrooms where teachers reported higher engagement in the PD activities.

Discussion

The findings align with international literature on the effectiveness of PD programs in improving teacher competence and student outcomes (Darling-Hammond et al., 2017; Llurag et al., 2024). The study underscores the importance of sustained, targeted training in bridging gaps in mathematics education (Breakspear, 2012). Furthermore, it highlights the role of interactive and technology-integrated approaches in enhancing teaching practices (Cheung & Slavin, 2013).

While the results are promising, challenges such as limited follow-up support and resource constraints remain. Future programs should consider ongoing mentorship and the inclusion of context-specific materials to address these gaps.

Conclusion

Professional development programs significantly enhance mathematics teachers' competence and positively impact student achievement in the Philippines. By addressing implementation challenges and fostering collaboration, PD programs can serve as a catalyst for improving mathematics education nationwide.

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