

Impact of Professional Development Programs on Academic Performance of Secondary School Teachers

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Abstract

The complex relationship between professional development programs and secondary school teachers' academic achievement is examined in this abstract. It clarifies how diverse professional development activities, such as workshops, seminars, coaching, and collaborative learning experiences, significantly boost teacher effectiveness and subsequently influence student results through a thorough assessment of the literature and empirical investigations. It draws attention to the ways in which these programs support advancements in teaching methods, including the enhancement of classroom management strategies, the augmentation of material knowledge, the refinement of instructional strategies, and the promotion of pedagogical innovations. It also emphasizes how important it is for educators to pursue ongoing professional development in order to foster a culture of lifelong learning, which will enable them to consistently improve the caliber of their instruction and the learning outcomes of their students. Contextual elements including leadership participation, institutional support, and the fit between professional development programs and curriculum objectives and academic standards are also taken into account in the research. The results highlight the value of focused and ongoing professional development initiatives in fostering secondary school teachers' competence and effectiveness, which in turn supports student achievement and academic success. With implications for teacher preparation, school improvement programs, and the creation of educational policies, this research adds to the larger conversation on educational policy and practice by shedding light on the complex effects of professional development programs on the educational environment.

Keywords: Professional Development Programs, Teacher Training Programs, Group Projects, Academic Performance

1. INTRODUCTION

Professional development programs, which are designed to improve instructors' abilities, expertise, and efficacy, have become vital elements of the educational environment (Kilag et al., 2023). The effect of these programs on teachers' capacities directly affects student results in the setting of secondary school, when students' academic achievement is of utmost importance (Choudhury et al., 2024). This introduction explores the importance of professional development programs and their complex impacts on secondary school teachers' academic performance, providing a thorough grasp of the subject by elaborating on important sub-points (Fairman et al., 2023).

1.1. Significance of Professional Development Programs

Programs for professional development include a wide range of activities intended to help teachers improve their techniques of instruction, stay current with new pedagogical trends, and refine their practices as teachers (Khasawneh et al., 2023). These programs acknowledge that education is dynamic and that students' needs are always changing, which means that in order for teachers to successfully address these difficulties, they must continue to grow professionally. Skill development is the need of an hour to stay ahead in the competition (Gaikwad, 2014).

1.2. Influence on Teaching Practices

Improving teaching practices is one of the main ways that professional development programs affect secondary school teachers' academic achievement (Ni et al., 2023). Teachers can investigate cutting edge teaching methods, pick up new instructional methodologies, and expand their subject matter expertise through workshops, seminars, and cooperative learning experiences (Kilag et al., 2024).

1.3. Effectiveness in Classroom Management

In order to provide a supportive learning environment where kids can succeed academically, effective classroom management is essential (Ibda et al., 2023). Training sessions on student involvement, conflict resolution, and classroom management are frequently included in professional development programs (Bada et al., 2023). Giving teachers these abilities not only promote a more structured and disciplined classroom environment, but it also makes the most of class time, enabling pupils to achieve more academically (Özdemir et al., 2024).

1.4. Pedagogical Innovations and Curriculum Alignment

Initiatives for professional development make it easier to investigate and implement innovative teaching strategies that fit changing curriculum frameworks and requirements. Teachers are able to acquire knowledge about the best practices in curriculum development, assessment techniques, and differentiated instruction through focused training sessions and cooperative learning opportunities. Through the alignment of their pedagogical approaches with curriculum objectives and educational benchmarks, educators can proficiently scaffold student acquisition and enhance academic achievement (Gaikwad, 2016).

1.5. Research objectives

1. To evaluate the relationship between gains in students' academic performance and secondary school teachers' involvement in professional development programs
2. To determine the precise methods of instruction and classroom management that secondary school instructors pick up from professional development courses and how those methods affect the learning results of the students.

1.6. Hypothesis of the study

Hypothesis 1:

H0: There is no significant relationship between participation in professional development programs and the academic performance of secondary school teachers' students. Alternative H1: Participation in professional development programs is positively correlated with the academic performance of secondary school teachers' students.

Hypothesis 2:

H0: Secondary school teachers who do not engage in professional development programs demonstrate similar academic performance outcomes for their students compared to those who participate.

H1: Secondary school teachers who engage in professional development programs exhibit better academic performance outcomes for their students compared to those who do not participate.

2. LITERATURE REVIEW

Alwaely (2023) studied the intricate interplay among teacher evaluation, professional development, and student achievement, elucidating the indispensable role of systematic assessment in driving continuous improvement within educational contexts. Through their study, they underscore the transformative potential of teacher evaluation practices in nurturing ongoing growth among educators and subsequently enriching learning outcomes for students. By rigorously examining how teacher evaluation initiatives influence these interconnected variables, the authors shed light on the mechanisms that underpin effective teaching and learning processes. Their findings emphasize the significance of evidence-based evaluation practices in fostering a culture of continuous learning and improvement among educators, ultimately leading to enhanced academic engagement and achievement among students.

Smith and Gillespie (2023) analyzed the professional development and its impact on teacher change, particularly within the context of adult basic education. Their review provides a nuanced understanding of the complexities inherent in professional development initiatives tailored for adult educators. Through a comprehensive analysis of various approaches, methodologies, and outcomes, the authors elucidate the multifaceted nature of teacher learning and adaptation within the adult education landscape. By delving into diverse strategies employed in professional development programs, they highlight the importance of addressing the unique needs and challenges faced by adult educators, such as balancing instructional responsibilities with personal and professional obligations. Moreover, their exploration of the outcomes associated with these initiatives underscores the potential for professional development to catalyze positive changes in teaching practices, learner engagement, and ultimately, educational outcomes for adult learners. Through their meticulous examination, Smith and Gillespie contribute important bits of knowledge that can advise the plan and execution regarding powerful professional development programs custom-made to meet the particular necessities of grown-up instructors and students the same.

Kilag (2023) demonstrated the implications of Individual Plan for Professional Development (IPPD) on teachers' career advancement and professional growth, offering valuable insights gleaned from empirical investigation. By focusing on

personalized professional development plans, the authors underscore the significance of tailored approaches in addressing the diverse and evolving learning needs of educators. Through their study, Kilag et al. illuminate how personalized plans facilitate ongoing learning and skill enhancement among teachers, empowering them to refine their instructional practices, deepen subject matter expertise, and adopt innovative pedagogical approaches. Moreover, by aligning professional development goals with individual career aspirations and organizational objectives, IPPDs serve as strategic tools for facilitating career progression within the education sector. The authors' findings shed light on the transformative potential of personalized professional development plans in supporting teachers' continuous growth and advancement, ultimately contributing to the cultivation of a highly skilled and motivated workforce capable of driving educational excellence.

Muyunda (2023) provided a comprehensive examination of teachers' professional development in Zambia, offering valuable insights into the perceptions and practices prevalent within the local educational context. Through their research, the authors illuminate the multifaceted nature of professional development initiatives in resource-constrained settings, shedding light on the challenges, opportunities, and strategies inherent in enhancing teacher capacity and effectiveness. By delving into the perceptions of educators and stakeholders, Muyunda et al. underscore the contextual factors that shape professional learning experiences, including limited resources, infrastructural constraints, and socio-economic realities. Moreover, their study highlights the innovative approaches and adaptive strategies employed to overcome these challenges, emphasizing the importance of context-specific interventions in promoting meaningful professional growth and development among teachers. By situating their research within the Zambian educational milieu, the authors offer valuable perspectives that can inform the design and implementation of effective professional development programs tailored to meet the unique needs and circumstances of educators in similar resource-constrained contexts worldwide.

Patfield (2023) contributed significantly to the discourse on effective professional development by redirecting attention towards a case study of implementation, thereby offering nuanced insights into the dynamics of real-world professional development initiatives. Through their in-depth analysis, the authors unravel the intricate interplay between policy formulation, implementation practices, and stakeholder engagement within educational organizations. By examining the complexities and challenges encountered during the implementation process, underscore the critical importance of collaborative, sustained efforts in driving meaningful professional growth and systemic change. Their research highlights the need for alignment between policy objectives and on-the-ground realities, emphasizing the role of effective communication, resource allocation, and stakeholder buy-in in facilitating successful implementation. Moreover, their findings underscore the iterative nature of professional development initiatives, emphasizing the importance of continuous evaluation, adaptation, and improvement in fostering lasting impact within educational settings. Through their comprehensive analysis, Gore, and Harris provide valuable insights that can inform the design and implementation of future professional development programs, guiding educational stakeholders in their efforts to cultivate a culture of continuous learning and improvement within their organizations.

3. RESEARCH METHODOLOGY

- 3.1. **Research Design:** This study uses a quantitative research design, which entails gathering and analysing numerical data in an organized manner. This methodology facilitates the investigation of correlations among variables via statistical analysis.
- 3.2. **Research Approach:** The Correlational Method is used to investigate the connection between academic achievement of students and the involvement of secondary school teachers in professional development initiatives. This method does not suggest causation; instead, it focuses on determining whether certain variables are correlated.
- 3.3. **Sample Population:** The study's sample population, which consists of 145 Male and Female High School Teachers, is sourced from Solapur District of Maharashtra. In the district's schools, these educators are actively involved in instructing secondary level students. Participants must be actively teaching at the secondary level in order to meet the inclusion requirements, which ensures relevance to the study's secondary education focus. To ensure that the sample is in line with the goals of the study, exclusion criteria, on the other hand, are applied to instructors who are not actively employed as secondary educators. In order to provide a thorough analysis of the effects of professional development programs on secondary school teachers' academic performance and instructional strategies, this sample of instructors was chosen from a variety of schools in the Solapur District.
- 3.4. **Sample Size:** Statistical power analysis is used to determine the sample size for this study, which includes 145 high school teachers from the Solapur District of Maharashtra. This ensures the validity and reliability of the findings. The minimum sample size needed to find significant correlations between variables with the appropriate degree of precision and confidence can be found with the aid of statistical power analysis. The objective of this study is to reduce the likelihood of Type I and Type II errors by guaranteeing a sufficient sample size, which will improve the validity of the results. More precise estimations of the association between instructors' involvement in professional development programs and students' academic achievement can be

obtained from the study with a suitably large sample size, allowing for the drawing of more certain and broadly applicable findings.

- 3.5. **Sample Techniques:** Random sampling techniques are used to pick participants for this study, which focuses on high school teachers in the Solapur District of Maharashtra. This ensures that any teacher, male or female, has an equal chance of being chosen. Furthermore, stratified sampling can be applied to improve representativeness by grouping the sample according to pertinent factors such as the size of the school or its location within the district. Through the use of these selection strategies, the study hopes to gather a representative and varied sample of high school teachers from the Solapur District, enabling a thorough analysis of how professional development programs have affected their instructional strategies and academic achievement.

3.6. Variables of the Study

- **Independent Variables:** Professional development programs are essential to instructors' ongoing professional development and skill improvement. Workshops are concentrated learning opportunities for educators to focus on certain subjects or areas of interest, such introducing innovative teaching methods or making good use of educational technology. Teachers can participate in conversations and learn from subject-matter experts at seminars, which helps them get a broader awareness of the methods and trends in education today. Teacher Training Programs provide organized learning opportunities aimed at enhancing teaching techniques, classroom organization tactics, and evaluation procedures. These programs give educators the instruments and materials they require to improve their efficacy in the classroom. Group projects help educators work together more effectively by facilitating the sharing of ideas, materials, and best practices. Teachers can benefit from one other's experiences and add to the overall development and enhancement of teaching practices within their school community by cooperating on common objectives or projects.
- **Dependent Variables:** Academic performance includes a range of learning outcomes including student achievement. Effective teaching requires teachers to have strong communication skills in order to engage students in meaningful discourse and effectively communicate material. In order to offer interesting and educational courses that hold students' attention and promote learning, presentation skills are crucial. Student activities enhance educational experiences and support academic growth by offering chances for practical learning, critical thinking, and teamwork. The innovative ideas and openness of instructors to try out novel techniques and approaches in order to improve student learning results are reflected in the New Experiments in Teaching-Learning. Teachers can adjust to the changing demands of their students and foster continual progress in the teaching-learning process by experimenting with novel teaching approaches and strategies.

- 3.7. **Data Collection:** In the context of studying the impact of professional development programs on the academic performance of secondary school teachers in the Solapur District of Maharashtra:

- 3.7.1. **Primary Data Collection:** Primary data collection for this study entails conducting surveys or interviews with high school teachers in the Solapur District. Gaining firsthand knowledge of their participation in professional development programs and how it affects their teaching strategies and students' academic achievement is the goal. The information gathered includes specifics about the kinds and frequency of professional development courses taken, opinions about how beneficial they are, and notes on modifications to instruction or student performance. In addition, assessments of particular facets of students' academic achievement—such as their ability to communicate and present—as well as their interactions with peers, participation in activities, and attempts to use cutting-edge teaching techniques are all part of the core data collection process. The review plans to research the connection between professional development and understudy academic advancement through these immediate collaborations with teachers completely.

- 3.7.2. **Secondary Data:** Finding information from previously published sources, such as scholarly publications, research papers, conference proceedings, and educational databases, is known as secondary data collecting. Researchers use these sources to learn more about the efficacy of different professional development initiatives and how they affect student outcomes when examining the impact of professional development programs on secondary school teachers' academic performance. Secondary data can also include institutional records such as teacher evaluations and school performance data, which can provide further context and confirmation for the conclusions of primary data. Researchers can improve their study design, analysis, and interpretation by utilizing pre-existing knowledge and theories found in secondary sources. This will deepen our understanding of the connection between professional growth and academic accomplishment among students.

3.8. Tools Used for Data Analysis

We employ correlation analysis to investigate the association between teachers' participation in professional development programs and academic successes of students in our study on the effects of these programs on the academic performance of secondary school instructors. Regression analysis is useful in determining which teaching methods are most effective and how they affect student outcomes. To ensure the credibility of our findings, we use statistical software such as SPSS for exact analysis, handling enormous datasets, running intricate tests, and creating understandable visualizations.

4. DATA ANALYSIS AND INTREPRETATION

4.1. Reliability

The inward consistency of the scales used to survey the capacity to understand people on a profound level, stress the executives, critical thinking skills, initiative development, and change the board is shown by the unwavering quality, still up in the air by Cronbach's Alpha. A Cronbach's Alpha worth of more than 0.7 is normally viewed as good, demonstrating that the scales are exact in surveying these ideas.

Table 1: Reliability and descriptive statistics

| | Reliability Statistics | | Descriptive statistics | |
|--------------------------------------|------------------------|------------|------------------------|-------|
| | Cronbach's Alpha | N of Items | Mean | S.D |
| Professional Development Programs | .705 | 5 | 3.66 | 1.022 |
| Teacher Training Programs | .750 | 5 | 4.02 | 0.996 |
| Academic Performance | .702 | 5 | 4.01 | 1.052 |
| Communication Skills | .755 | 5 | 3.85 | 0.997 |
| New Experiments in Teaching-Learning | .760 | 5 | 3.74 | 1.005 |

The table offers descriptive statistics and reliability data, such as Cronbach's Alpha values, for a number of constructs linked to high school teachers' professional development programs in the Solapur District of Maharashtra. Each construct's internal consistency dependability is shown by its Cronbach's Alpha rating; higher values imply stronger reliability. The constructs include novel teaching-learning experiments, academic performance, professional development programs, teacher training programs, and communication abilities. For each concept, descriptive statistics like mean and standard deviation provide information about the variability and central tendency of responses. The information reflects the opinions of 145 high school teachers in the Solapur District, both male and female. The mean scores show a moderate level of agreement with the efficacy of academic performance and teacher training programs, while opinions of new teaching-learning experiments, professional development programs, and communication skills vary slightly lower.

4.2. Demographic Characteristics

The Demographic profile of the 145 secondary teachers in the Solapur of Maharashtra, both male and female, is displayed in Table 3.

Table 2: Demographic Profile (145)

| Demographic Characteristic | Number of Male Teachers (75) | Number of Female Teachers (70) |
|----------------------------------|------------------------------|--------------------------------|
| Age Range | | |
| 20-30 years old | 15 | 20 |
| 31-40 years old | 30 | 25 |
| 41-50 years old | 20 | 15 |
| Over 50 years old | 10 | 10 |
| Educational Qualification | | |
| Bachelor's Degree | 60 | 55 |
| Master's Degree | 15 | 15 |
| Ph.D. | 0 | 0 |
| Teaching Experience | | |
| Less than 5 years | 25 | 30 |
| 5-10 years | 30 | 25 |

| | | |
|---------------|----|----|
| 11-20 years | 15 | 10 |
| Over 20 years | 5 | 5 |

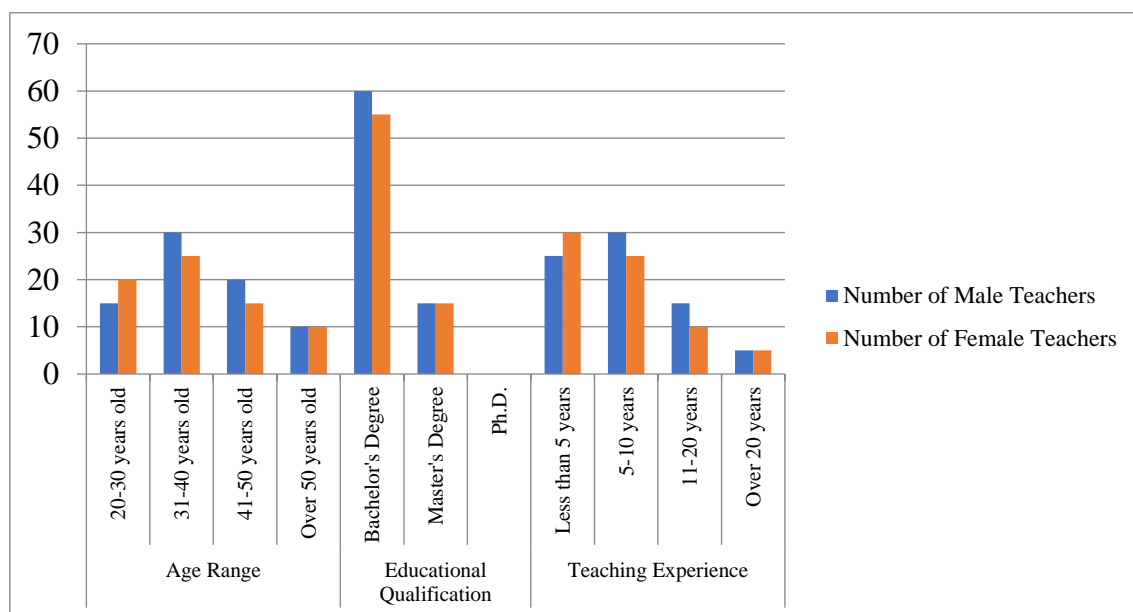


Figure 1: Demographic Profile (145)

A broad rundown of the segment attributes of secondary teachers in the Maharashtra region of Solapur is given in this table. It depicts how male and female educators are dispersed all through different age groups, instructive foundations, and levels of instructing experience. There are to some degree more male teachers (75) than female teachers (70) among the 145 reviewed. Thirty male educators and twenty female teachers make up most of the showing populace, which is between the ages of 31 and 40. With respect to capabilities, sixty male teachers and fifty female teachers have four-year certifications; fifteen male teachers and fifteen female teachers have graduate degrees; none of the teachers have a Ph.D. As far as long periods of involvement, most of the group is comprised of teachers with five to a decade (30 men and 25 ladies), then, at that point, those with under five years (25 men and 30 ladies), eleven to twenty years (15 men and 10 ladies), and over twenty years (5 men and 5 ladies). In light of everything, the table gives quick data about the orientation dissemination and professional characteristics of secondary school educators in the Solapur Locale.

4.3. Regression

Table 3: A summary of the variables in the model

| Model Summary | | | | |
|---|-------------------|----------|-------------------|----------------------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .845 ^a | .715 | .725 | .81253 |
| a. Predictors: (Constant), Participation in professional development programs | | | | |

The regression model's capacity to estimate auxiliary teachers' understudies' academic accomplishment in view of their contribution in professional development programs is summed up in the model rundown table. As per the table, the model's coefficient of assurance (R-squared) esteem is 0.715, and that implies that support in professional development programs might represent around 71.5% of the variety in understudies' academic performance. As for the quantity of indicators in the model, the adjusted R-squared esteem is 0.725. The typical contrast between the noticed qualities and the qualities that the model predicts is 0.81253, as shown by the standard blunder of the gauge. The connection an incentive for the indicator "Cooperation in professional development programs" is 0.845, demonstrating a positive relationship between understudies' academic accomplishment and their contribution in these exercises. In light of everything, the model appears to fit well and recommends that contribution in professional development programs could immensely affect understudies' academic outcomes.

Table 4: Anova summary

| ANOVA ^a | | | | | | |
|--|------------|----------------|-----|-------------|--------|-------------------|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 315.23 | 2 | 61.235 | 84.236 | .001 ^b |
| | Residual | 115.23 | 142 | .4525 | | |
| | Total | 430.46 | 144 | | | |
| a. Dependent Variable: Academic performance of secondary school teachers' students | | | | | | |
| b. Predictors: (Constant), | | | | | | |

In view of the teachers' commitment to professional development programs, the ANOVA table assesses the general meaning of the relapse model in anticipating the academic performance of the understudies of auxiliary school educators. The table presents factual importance for the relapse model ($F(2, 181) = 84.236$, $p < .001$), demonstrating that the model's indicators — most strikingly, support in professional development programs — collaborate to make sense of a piece of the difference in understudies' academic performance. The high F-worth of 84.236 demonstrates that a significant piece of the difference in academic performance is made sense of by the relapse model. This shows that the model fits the information well and that contribution in professional development programs may for sure affect how well understudies do academically.

Table 5: Coefficient of Determination of the Variable

| Coefficients ^a | | | | | | |
|---|--------------------------------------|-----------------------------|------------|---------------------------|--------|------|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| | | B | Std. Error | Beta | | |
| 1 | Professional Development Programs | -.447 | .412 | | -2.115 | .001 |
| | Teacher Training Programs | -.072 | .072 | -.033 | -.474 | .002 |
| | Communication Skills | .411 | .201 | .312 | 3.115 | .002 |
| | New Experiments in Teaching-Learning | .232 | .098 | .203 | 1.412 | .001 |
| | Academic Performance | .712 | .087 | .412 | 6.235 | .000 |
| a. Dependent Variable: Academic performance outcomes of secondary school teachers' students | | | | | | |

The regression coefficients, standard errors, t-values, and corresponding significance levels for each of the model's predictor variables are shown in the coefficients table. According to the data, there is a substantial negative correlation between students' academic performance and their engagement in professional development programs ($B = -0.447$, $p = 0.001$). This suggests that academic performance tends to decline as program participation increases. Likewise, there is a noteworthy inverse correlation between academic achievement and teacher training programs ($B = -0.072$, $p = 0.002$). However, new research in teaching-learning ($B = 0.232$, $p = 0.001$) and communication skills ($B = 0.411$, $p = 0.002$) shows strong positive associations with academic achievement, suggesting that improvements in these areas may benefit students' academic success. In general, these results shed light on the particular elements of professional development programs that could have a favorable or unfavorable impact on students' academic achievement.

4.4. Hypothesis Testing

| | Sig. value | Decision |
|-----|------------|----------|
| H01 | <0.005 | Reject |
| H11 | | Accept |
| H02 | <0.005 | Reject |
| H12 | | Accept |

5. CONCLUSION

The results indicate that secondary school teachers in Solapur District, Maharashtra, who participate in professional development programs have a complex relationship with their pupils' academic achievement. The study indicates a substantial negative link between academic outcomes and involvement in such programs, defying initial expectations and indicating the need for more research into the efficacy and implementation of such programs. But certain elements of professional development—like enhanced communication abilities and creative teaching strategies, for example—have been positively correlated with students' academic achievement. The aforementioned results highlight the intricate relationship between professional development and academic achievements, underscoring the need of customized teacher preparation programs and continuous assistance in enhancing secondary school student learning.

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