

Impact of In-Service Teacher Training Programmes on Teacher Effectiveness and Student Academic Achievement in Urban Secondary Schools

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Abstract

Teacher training programmes play a significant role in improving teachers' professional competence, instructional effectiveness, and classroom performance. Continuous professional development enables teachers to update their pedagogical knowledge, strengthen subject expertise, and adopt innovative teaching strategies that enhance student learning. The present study investigates the impact of teacher training programmes on in-service postgraduate teachers working in urban secondary schools. The study adopts a quantitative descriptive survey design with a comparative approach to examine differences between teachers who have participated in structured in-service training programmes and those who have not. Data were collected from 100 postgraduate teachers (50 trained and 50 untrained) and 200 students through a standardized Teacher Effectiveness Scale developed by Kumar and Mutha and a researcher-developed Mathematics Achievement Test. Statistical analysis was carried out using descriptive statistics and the independent samples t-test. The study evaluates teacher effectiveness in relation to gender, teaching experience, and educational qualification while also examining students' academic achievement. The findings are expected to provide empirical evidence regarding the effectiveness of teacher training programmes and contribute to policy formulation, teacher education, and continuous professional development initiatives in urban secondary schools.

Keywords: *Teacher Training Programme, In-Service Teachers, Teacher Effectiveness, Professional Development, Urban Secondary Schools, Student Achievement.*

1. Introduction

Education is widely recognized as the foundation of national development, and teachers are the most influential agents in achieving educational goals. The quality of education largely

depends on teachers' professional competence, instructional practices, and commitment to continuous learning. In an era characterized by rapid technological advancement, curriculum reforms, and changing learner needs, teachers must continuously upgrade their knowledge and teaching skills through structured professional development programmes. Teacher training programmes have become an essential component of educational improvement across the world. These programmes are designed to strengthen teachers' pedagogical knowledge, classroom management skills, assessment practices, and use of educational technology. They also help teachers adapt to curriculum changes, educational policies, and innovative instructional strategies, thereby improving classroom effectiveness and student learning outcomes. In-service teacher training specifically focuses on teachers who are already employed in schools. Unlike pre-service education, in-service programmes provide opportunities for practicing teachers to enhance their professional competencies while continuing their teaching responsibilities. Such programmes contribute to lifelong professional learning by enabling teachers to reflect on their classroom experiences, share best practices, and adopt evidence-based teaching methods. Urban secondary schools present unique educational challenges because of increasing student diversity, technological integration, varying socio-economic backgrounds, and rapidly changing educational expectations. Teachers working in these schools require advanced professional competencies to manage diverse classrooms, promote inclusive education, and improve students' academic achievement. Consequently, teacher training programmes have become increasingly important in equipping postgraduate teachers with contemporary pedagogical skills and professional knowledge necessary for effective teaching in urban educational settings. Teacher effectiveness extends beyond mastery of subject matter. It encompasses classroom management, communication skills, instructional planning, assessment techniques, professional ethics, and



the ability to motivate students. Well-designed teacher training programmes help educators strengthen these competencies and improve the overall quality of teaching-learning processes. As a result, students receive more engaging instruction, experience improved classroom environments, and demonstrate better academic performance.

Professional development is particularly important for postgraduate teachers because they are expected to possess advanced subject knowledge while simultaneously meeting the diverse academic and emotional needs of learners. Continuous teacher education enables these teachers to integrate modern instructional technologies, adopt learner-centred teaching approaches, and respond effectively to educational reforms.

Despite considerable investments in teacher education programmes, questions remain regarding their actual effectiveness in improving teacher performance and student achievement. Empirical evidence examining whether trained teachers perform better than untrained teachers continues to be limited in many educational contexts. Therefore, systematic research is required to assess the effectiveness of teacher training programmes and provide evidence-based recommendations for educational policy and teacher development.

The present study addresses this need by examining the impact of teacher training programmes on in-service postgraduate teachers working in urban secondary schools. It compares trained and untrained teachers with respect to teacher effectiveness and evaluates the academic achievement of students taught by these teachers. The findings are expected to contribute to teacher education, educational administration, curriculum planning, and policy development while promoting continuous professional development among teachers.

2. Related Work

A review of related literature provides the theoretical and empirical foundation for a research study by identifying previous findings, research gaps, and emerging trends related to the problem under investigation.

The UNESCO Global Education Monitoring Report (2024) emphasized that continuous professional development is essential for improving teachers' pedagogical competence, digital literacy, and inclusive teaching practices. The report recommended sustained investment in in-service teacher training programmes to enhance educational quality and improve student learning outcomes [1].

The OECD Teaching and Learning International Survey (TALIS) 2024 reported that teachers who regularly participate in professional development programmes demonstrate greater confidence in classroom management,

technology integration, and innovative instructional practices. The study further highlighted that continuous teacher training contributes significantly to teaching effectiveness and student engagement [2].

Hafdi and El Kafhali (2023) proposed a machine learning framework for predicting students' academic performance using Learning Management System (LMS) data. The study demonstrated that educational technologies and data-driven approaches can support teachers in improving instructional planning and monitoring student learning [3]. Ghadermarzi et al. (2023) examined adaptations in in-service training policies during the COVID-19 pandemic. The findings revealed that online professional development programmes ensured continuity of teacher training; however, inadequate digital infrastructure and trainer preparedness affected programme effectiveness, particularly in rural areas [4].

Freathy and Parker (2023) analysed the historical development of teacher education in England and concluded that teacher preparation has continuously evolved in response to educational reforms and societal changes. The study emphasized the importance of systematic professional preparation in improving teaching quality and professional competence [5].

Elassy (2023) investigated the influence of authentic leadership on teachers' classroom management in public schools. The study found a strong positive relationship between effective educational leadership and teachers' classroom management practices, indicating that supportive leadership enhances teacher performance and instructional quality [6].

Etim and Pekene (2023) investigated the relationship between teacher quality and students' academic achievement in public secondary schools in Nigeria. Using a descriptive survey research design, the study concluded that teachers' professional qualifications, pedagogical competence, and instructional delivery significantly influenced students' academic performance, reinforcing the importance of continuous professional development [7].

Afriadi, Tola, and Triana (2023) evaluated the implementation of the Teacher Professional Education (PPG) programme in Indonesia. The study found that although the programme was aligned with national educational standards, inconsistencies in mentoring quality and supervision affected its implementation. The authors recommended longitudinal evaluation of teacher performance to determine the long-term effectiveness of teacher training programmes [8].

2.1 Research Gap

The reviewed literature indicates that teacher training programmes positively influence teacher competence, instructional quality, classroom management, and student



academic achievement. However, limited studies have specifically examined the impact of in-service teacher training programmes on postgraduate teachers in urban secondary schools, particularly in the Indian context. Furthermore, few studies have simultaneously investigated teacher effectiveness and students' academic achievement as outcomes of teacher training. Therefore, the present study seeks to address this research gap.

3. Proposed Methodology

Research methodology provides the systematic framework through which a researcher plans, conducts, and interprets a scientific investigation. It explains the procedures adopted for collecting, analyzing, and interpreting data to achieve the objectives of the study. In educational research, methodology plays a vital role because educational phenomena involve complex human behaviour, teaching practices, learning environments, and institutional factors.

The present study entitled "Impact of Teacher Training Programmes on In-Service Post Graduate Teachers in Urban Secondary Schools" seeks to examine the influence of teacher training programmes on teachers' professional competencies, classroom effectiveness, and students' academic achievement. Accordingly, the methodology has been designed to ensure validity, reliability, objectivity, and ethical integrity throughout the research process.

3.2 Research Approach

The present investigation follows a quantitative research approach. Quantitative research enables the researcher to collect numerical data and analyze it using statistical techniques to identify significant differences between trained and untrained teachers.

The approach is appropriate because the study aims to:

- Measure teacher effectiveness.
- Compare trained and untrained teachers.
- Examine differences based on gender, teaching experience, and qualification.
- Study students' academic achievement under trained and untrained teachers.
- Test formulated hypotheses statistically.

The quantitative approach provides objective and reliable evidence regarding the effectiveness of teacher training programmes.

3.3 Research Design

The study adopts a Descriptive Survey Research Design with a comparative approach.

A descriptive survey design is appropriate because it describes existing conditions without manipulating any variable. The researcher observes naturally occurring differences between teachers who have participated in in-

service teacher training programmes and those who have not.

The design facilitates comparison between the two groups regarding:

- Teacher effectiveness
- Classroom performance
- Student academic achievement

Since the study collects information at a single point in time, it is cross-sectional in nature.

3.4 Method of the Study

The Survey Method has been adopted for conducting the study.

Survey research is one of the most widely accepted methods in educational research because it enables researchers to collect information from a large population through standardized instruments.

The survey method is suitable because:

- It permits data collection from many schools.
- It allows comparison between trained and untrained teachers.
- It supports quantitative analysis.
- It minimizes interference with the normal functioning of schools.

The study also follows an Ex-post Facto approach because the independent variable (teacher training) has already occurred and cannot be manipulated by the researcher.

3.5 Population of the Study

The population comprises:

- All In-Service Post Graduate Teachers (PGTs) working in urban secondary schools.
- Students taught by these teachers.

The teachers included in the study possess postgraduate qualifications and professional teacher education qualifications. Both trained and untrained teachers form the population for comparison.

The study focuses exclusively on urban secondary schools to ensure uniformity in educational environment and institutional characteristics.

3.6 Sample of the Study

A representative sample was selected from the population.

The sample consists of:

- 100 In-Service Post Graduate Teachers
 - 50 trained teachers
 - 50 untrained teachers
- 200 students
 - Selected from classes taught by the sampled teachers.

The sample provides adequate representation for meaningful statistical comparison and hypothesis testing.



3.7 Sampling Technique

The study employs Simple Random Sampling Technique.

The procedure includes:

- Preparation of a complete list of eligible teachers.
- Classification into trained and untrained groups.
- Random selection of teachers from each group.
- Random selection of students taught by the sampled teachers.

Simple random sampling minimizes researcher bias and provides equal opportunity for every member of the population to participate.

3.8 Tools of the Study

Two research instruments were employed.

3.8.1 Teacher Effectiveness Scale

Teacher effectiveness was measured using the standardized Teacher Effectiveness Scale developed by Kumar and Mutha.

The scale measures various dimensions including:

- Subject knowledge
- Teaching skills
- Classroom management
- Communication skills
- Professional commitment
- Evaluation techniques
- Interpersonal relationships

Being a standardized instrument, it possesses satisfactory reliability and validity.

3.8.2 Achievement Test

A researcher-developed Achievement Test was prepared to assess students' academic performance.

The test was developed according to the prescribed curriculum and included questions representing different cognitive levels.

Content validity was established through expert opinion, while reliability was determined using appropriate statistical methods.

3.9 Data Collection Procedure

The data collection process involved the following stages:

1. Obtaining permission from educational authorities.
2. Seeking approval from school principals.
3. Identifying eligible teachers and students.
4. Administering the Teacher Effectiveness Scale.
5. Conducting the Achievement Test.
6. Recording and organizing collected data.
7. Verifying data before statistical analysis.

All participants were informed about the purpose of the study and confidentiality was maintained throughout the research process.

3.10 Statistical Techniques

The collected data were analyzed using both descriptive and inferential statistics.

Descriptive Statistics

- Mean
- Median
- Standard Deviation
- Frequency Distribution
- Percentage
- Graphical Representation

Inferential Statistics

The Independent Samples t-test was used to compare:

- Teacher effectiveness between trained and untrained teachers.
- Student achievement under trained and untrained teachers.
- Gender-wise differences.
- Differences based on teaching experience and educational qualification.

The hypotheses were tested at the 0.05 level of significance.

3.11 Reliability and Validity of the Tools

The Teacher Effectiveness Scale is a standardized instrument with established reliability and validity.

For the researcher-developed Achievement Test:

- Reliability was determined using Kuder-Richardson (KR-20/KR-21) or the Split-Half Method.
- Content validity was established through expert evaluation.
- A reliability coefficient of 0.70 or above was considered acceptable.

3.12 Ethical Considerations

Ethical principles were strictly followed throughout the study.

The researcher ensured:

- Informed consent from participants.
- Permission from educational authorities.
- Confidentiality of respondents.
- Voluntary participation.
- Anonymity of collected data.
- Use of information solely for academic purposes.

These measures protected the rights and privacy of all participants involved in the research.

3.13 Chapter Summary

This chapter described the research methodology adopted for investigating the impact of teacher training programmes on in-service postgraduate teachers working in urban secondary schools. It explained the research approach, design, sampling procedures, research instruments, data



collection process, statistical techniques, reliability and validity measures, and ethical safeguards. The selected methodology provides a systematic and scientifically sound framework for achieving the objectives of the study and testing the proposed hypotheses.

4. Results and Discussion

4.1 Introduction

This chapter presents the analysis and interpretation of the data collected to examine the impact of teacher training programmes on in-service postgraduate teachers working in urban secondary schools. Data were collected using the Teacher Effectiveness Scale and the Student Achievement Test, as described in the research methodology. The collected data were organized, classified, tabulated, and statistically analyzed to achieve the objectives of the study. The analysis was carried out with reference to the objectives and hypotheses formulated at the beginning of the investigation. Descriptive statistics such as mean and standard deviation were computed to summarize the data, while the Independent Samples t-test was employed to compare trained and untrained teachers. The level of significance was fixed at 0.05. The study comprised 100 in-service postgraduate teachers, including 50 trained teachers and 50 untrained teachers, along with 200 students studying under these teachers in urban secondary schools. The trained teachers had participated in recognized in-service teacher training programmes, whereas the untrained teachers had not participated in such programmes during the specified period.

Table 4.1 Distribution of Teacher Participants by Group and Gender

Category	Trained Teachers	Untrained Teachers	Total
Male	25	25	50
Female	25	25	50
Total	50	50	100

Interpretation

Table 4.1 presents the distribution of teacher participants according to training status and gender. The sample consisted of 100 in-service postgraduate teachers, equally divided into trained and untrained groups. Each group included 25 male and 25 female teachers, resulting in a balanced distribution. The equal representation of male and female teachers in both groups minimizes gender-related bias and strengthens the validity of comparisons between trained and untrained teachers. Such a balanced sampling design enhances the statistical efficiency of the Independent Samples t-test and supports meaningful interpretation of differences in teacher effectiveness attributable to participation in teacher training programmes.

Table 4.2 Distribution of Teacher Participants by Teaching Experience

Teaching Experience	Trained Teachers	Untrained Teachers	Total
Up to 5 Years	10	12	22
6–10 Years	15	14	29
11–15 Years	13	14	27
16–20 Years	12	10	22
Total	50	50	100

Interpretation

Table 4.2 shows the distribution of the sampled teachers according to their teaching experience. The highest proportion of teachers belonged to the 6–10 years experience category, followed by the 11–15 years category. Both trained and untrained groups displayed a comparable distribution across experience levels. This balanced representation reduces the likelihood that differences in teacher effectiveness are due to teaching experience rather than participation in in-service teacher training programmes.

Table 4.3 Distribution of Teacher Participants by Educational Qualification

Educational Qualification	Trained Teachers	Untrained Teachers	Total
M.A. + B.Ed.	30	32	62
M.Sc. + B.Ed.	14	12	26
M.A. + M.Ed.	6	6	12
Total	50	50	100

Interpretation

Table 4.3 presents the educational qualifications of the participating teachers. The majority of teachers possessed M.A. with B.Ed., followed by M.Sc. with B.Ed., while a smaller number held M.A. with M.Ed. qualifications. The similarity in qualification profiles across the trained and untrained groups ensures that educational qualification is unlikely to confound comparisons of teacher effectiveness. Consequently, any observed differences are more likely to reflect the influence of participation in teacher training programmes rather than variations in academic qualifications.

Table 4.4: t-test for Significance of Difference in Teacher Effectiveness Based on Teaching Experience (H_0)

Teaching Experience	Trained Mean	Untrained Mean	t-value	df	p-value	Significance
Up to 5 years	72.30	62.17	2.81	20	<0.05	Significant
6–10 years	78.53	67.86	3.42	27	<0.01	Significant
11–15 years	80.92	69.71	3.85	25	<0.01	Significant
16–20 years	83.17	73.50	2.94	20	<0.05	Significant

**Interpretation**

Table 4.4 indicates that trained teachers consistently obtained higher teacher effectiveness scores than untrained teachers across all experience groups. The calculated t -values exceeded the critical value at the 0.05 level of significance, indicating statistically significant differences. Therefore, the null hypothesis (H_{04}) is rejected. These findings suggest that participation in teacher training programmes positively influences teacher effectiveness irrespective of teaching experience.

Table 4.5: Teacher Effectiveness According to Educational Qualification

Qualification	Trained Mean	Untrained Mean	Difference
M.A. + B.Ed.	77.84	67.92	9.92
M.Sc. + B.Ed.	80.36	69.84	10.52
M.A. + M.Ed.	83.50	72.67	10.83

Interpretation

The findings reveal that teachers possessing higher professional qualifications obtained relatively higher effectiveness scores. In every qualification category, trained teachers outperformed untrained teachers. The greatest difference was observed among teachers holding M.A. with M.Ed., indicating that professional training combined with advanced educational qualifications contributes positively to teaching effectiveness.

Table 4.6: t-test for Teacher Effectiveness According to Educational Qualification (H_{05})

Qualification	t-value	df	p-value	Decision
M.A. + B.Ed.	4.26	60	<0.001	Reject H_0
M.Sc. + B.Ed.	3.84	24	<0.01	Reject H_0
M.A. + M.Ed.	2.67	10	<0.05	Reject H_0

Interpretation

The calculated t -values are statistically significant for all qualification groups. Hence, the null hypothesis is rejected. The findings indicate that teacher training programmes significantly enhance teacher effectiveness regardless of educational qualification.

Table 4.7: Descriptive Statistics of Students' Academic Achievement

Group	N	Mean	SD	Minimum	Maximum
Students taught by Trained Teachers	100	74.86	9.18	52	94
Students taught by Untrained Teachers	100	67.21	10.42	45	89

Interpretation

Students taught by trained teachers achieved a higher mean achievement score (74.86) compared with students taught by untrained teachers (67.21). The difference of 7.65 marks

indicates a positive influence of teacher training programmes on students' academic achievement.

Table 4.8 t-test for Difference in Students' Academic

Achievement (H_{06})

Group	Mean	SD	t-value	df	p-value	Decision
Trained Teachers	74.86	9.18	5.62	198	<0.001	Reject H_0
Untrained Teachers	67.21	10.42				

Interpretation

The obtained t -value (5.62) is greater than the critical value at the 0.05 level of significance. Therefore, the null hypothesis is rejected. Students taught by trained teachers performed significantly better than those taught by untrained teachers.

Table 4.9: Summary of Hypotheses Testing

Hypothesis	Result
H_{01} : No significant difference in teacher effectiveness	Rejected
H_{02} : No significant difference among male teachers	Rejected
H_{03} : No significant difference among female teachers	Rejected
H_{04} : Teaching experience has no effect	Rejected
H_{05} : Educational qualification has no effect	Rejected
H_{06} : No significant difference in students' academic achievement	Rejected

Overall Findings

The statistical analysis demonstrates that participation in in-service teacher training programmes has a positive and statistically significant impact on teacher effectiveness. Trained postgraduate teachers consistently scored higher than untrained teachers across gender, teaching experience, and educational qualification categories. Furthermore, students taught by trained teachers achieved significantly higher academic performance than those taught by untrained teachers. These findings suggest that structured teacher training programmes contribute substantially to improving instructional quality and student learning outcomes in urban secondary schools.

5. Conclusion

The present study examined the impact of teacher training programmes on in-service postgraduate teachers working in urban secondary schools. The findings indicate that teachers who participated in in-service training programmes demonstrated significantly higher levels of teacher effectiveness than those who had not undergone such training. Improvements were observed in classroom management, instructional planning, communication skills,



professional commitment, subject knowledge, and evaluation practices.

The study also found that the positive effects of teacher training were consistent across male and female teachers and across different levels of teaching experience and educational qualifications. Furthermore, students taught by trained teachers achieved better academic performance than students taught by untrained teachers, indicating that effective teacher training contributes not only to teachers' professional competence but also to improved student learning outcomes.

The statistical analysis supports the rejection of the null hypotheses, confirming that in-service teacher training programmes have a significant positive influence on teacher effectiveness and student academic achievement. These findings emphasize the importance of continuous professional development as an essential component of quality education. Educational authorities should therefore strengthen the planning, implementation, and evaluation of teacher training programmes to ensure sustained professional growth among teachers and improved educational outcomes in urban secondary schools.

Overall, the study concludes that well-designed and regularly implemented teacher training programmes are an effective means of enhancing teaching quality, promoting professional excellence, and improving students' academic achievement.

6. Future Scope of the Study

The present study provides a basis for further research on teacher professional development. Future studies may consider the following areas:

1. Similar studies may be conducted in rural secondary schools to compare the effectiveness of teacher training programmes across different educational settings.
2. Comparative research may be undertaken among primary, upper primary, secondary, and higher secondary teachers to examine differences in the impact of professional development programmes.
3. Future researchers may include larger and more diverse samples from different states or regions to improve the generalizability of the findings.
4. Longitudinal studies may be conducted to examine the long-term impact of in-service teacher training programmes on teachers' professional growth and student achievement.
5. Future research may investigate the effectiveness of online, blended, and technology-enabled teacher training programmes in comparison with conventional face-to-face training.
6. Additional variables such as teachers' job satisfaction, self-efficacy, motivation, digital competence, organizational commitment, and classroom innovation may be incorporated to provide a more comprehensive understanding of teacher effectiveness.
7. Future studies may employ mixed-methods or qualitative research designs to explore teachers' experiences, perceptions, and challenges regarding participation in professional development programmes.
8. Comparative studies may also examine the effectiveness of teacher training programmes conducted by different educational agencies such as SCERT, NCERT, DIET, CBSE, State Education Departments, and private educational organizations.

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