



Evaluating In-service Education: Teacher Effectiveness and Attitude Changes among Odisha Elementary Teachers

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Abstract

This study investigates the role of in-service education programme in enhancing teacher effectiveness and shaping attitudes toward the teaching profession among elementary teachers in Odisha, India. Employing a quasi-experimental pre-test/post-test design with a control group, the study compared two groups of elementary teachers (trained group, $n = 30$, control group, $n = 30$). Data were collected using the teacher effectiveness scale (TES) and the attitude toward profession inventory (ATPI), both validated and reliable instruments. The results revealed that the trained group demonstrated significant improvements in teacher effectiveness ($p < .05$), particularly in planning, classroom management, and student assessment subdomains, with medium-to-large effect sizes (Cohen's $d = 0.45-0.70$). Additionally, teacher attitudes toward the profession improved moderately, with gains in job satisfaction and professional commitment. The findings underscore the value of in-service education as a mechanism for enhancing instructional quality and strengthening professional identity. The study concludes by highlighting implications for policy, practice, and future research to ensure sustained quality in elementary education

Keywords: In-service education, teacher effectiveness, teacher attitude, professional development, Odisha, elementary education

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Introduction

Teacher quality has consistently been identified as one of the most influential factors in determining student achievement and the overall effectiveness of schooling (Darling-Hammond, 2017). In the Indian context, where elementary education forms the bedrock of the schooling system, teachers are expected not only to impart foundational skills but also to foster a positive orientation

toward lifelong learning among children. However, many teachers enter the profession with inadequate preparation or outdated pedagogical practices, creating a need for systematic professional development opportunities (Sengsoulinta, 2025). In-service education programmes are designed to fill this gap by equipping teachers with contemporary instructional strategies, reflective practices, and professional resilience. In Odisha, a state characterized by significant socio-economic and linguistic diversity, improving elementary education remains a pressing priority.

While various interventions have been launched through the District Institutes of Education and Training (DIETs) and the State Council of Educational Research and Training (SCERT), the effectiveness of these programmes has often been questioned. Concerns range from their limited practical orientation to inconsistent follow-up and monitoring (Zhang et al., 2025; Confait, 2015). Evaluating the impact of in-service education on measurable outcomes such as teacher effectiveness and professional attitudes thus becomes critical. Teacher effectiveness is generally defined as the ability of teachers to plan lessons, manage classrooms, engage students, assess learning, and create a positive learning environment (Simonson et al., 2022); Beyond instructional performance, a teacher's attitude toward the profession plays a vital role in determining long-term commitment, resilience, and motivation (Mohamed, 2024); Ghafar et al., 2025; Han & Yin, 2016). Teachers who perceive their profession positively are more likely to engage in innovative pedagogies and persevere through challenges. Despite a rich body of international research linking professional development to teaching outcomes (Desimone & Garet, 2015; Opfer & Pedder, 2011), empirical evidence from the Indian and specifically Odisha context remains sparse.

Moreover, studies often neglect the dual dimension of teacher development: effectiveness in instructional roles and attitudinal dispositions toward the profession. Addressing this gap, the present study explores how in-service education impacts both teacher effectiveness and professional attitudes among elementary school teachers in Odisha. This study makes an important contribution to both practice and policy. By empirically validating the role of in-service education in improving professional capacity and motivation, it provides actionable insights for state and national policymakers seeking to strengthen the elementary education system

Methodology

Research Design

A quasi-experimental pre-test & post-test design with a control group was employed to evaluate the impact of in-service education on elementary teachers. This design involved measuring teacher effectiveness and attitudes both before (pre-test) and after (post-test) the training for two groups: the trained group, which participated in the in-service programme, and the control group, which did not. By comparing changes between these groups, the design allows for stronger inferences about the effects of training, while accounting for baseline differences. Although participants were not randomly assigned, the inclusion of a control group helps isolate the impact of the intervention from other external factors.

Sample

The study involved a total of 60 elementary teachers from government schools in Keonjhar district, Odisha. To ensure representative coverage, stratified random sampling was employed, taking into account both rural and semi-urban schools. The participants were divided into two groups: the trained group ($n = 30$), who undergone a structured in-service education programme, and the control group ($n = 30$), who did not receive any training during the study period. This sampling strategy allowed for a meaningful comparison of the programme's impact on teacher effectiveness and professional attitudes while maintaining contextual diversity.

Tools for data collection

Two standardized instruments were used to collect data on teacher effectiveness and professional attitudes:

1. Teacher effectiveness scale (TES): The TES, adapted from Kumar and Mutha (1974), measures teachers' competencies across four domains: lesson planning, classroom management, instructional strategies, and assessment practices. It consists of 40 items rated on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). In the present study, the TES demonstrated high internal consistency, with a Cronbach's alpha of 0.82.
2. Attitude toward profession inventory (ATPI): The ATPI assesses teachers' attitudes toward the teaching profession, including job satisfaction, professional commitment, and perception of teaching as a career. It contains 25 items rated on a 5-point Likert scale. The instrument's reliability in this study was $\alpha = 0.79$, indicating good internal consistency.

Both instruments have been widely used in previous research on teacher development and are suitable for capturing changes resulting from professional training interventions. Pre-test and post-test administrations ensured that any changes in scores could be attributed to participation in the in-service education programme.

Procedure

The study was conducted in collaboration with the district institute of education and training (DIET), Keonjhar, and followed a structured sequence to ensure methodological rigor:

1. Pre-test administration: Both the trained and control groups completed the teacher effectiveness scale (TES) and attitude toward profession inventory (ATPI) prior to the intervention. This established baseline measures of teacher competencies and professional attitudes.
2. In-service education programme: The trained group participated in a four-week structured in-service education programme, designed to enhance pedagogical knowledge and classroom practices. The programme included:
 - Lesson planning and curriculum alignment
 - Classroom management strategies
 - Instructional techniques and interactive teaching methods
 - Assessment and evaluation practices
 - Reflective teaching and peer collaboration

Sessions combined theoretical inputs with practical demonstrations, group activities, and micro-teaching exercises to ensure the applicability of learning in real classroom settings.

3. Control group: The control group did not receive any formal training during the study period but continued their regular teaching duties.
4. Post-test administration: At the end of the programme, both groups completed the TES and ATPI again. The pre-test and post-test scores were compared to assess the impact of the in-service programme on teacher effectiveness and professional attitudes.
5. Ethical considerations: Participation was voluntary, with informed consent obtained from all teachers. Confidentiality and anonymity were maintained, and ethical approval was obtained from the relevant institutional review board.

This procedure allowed for a systematic evaluation of the intervention while controlling for potential confounding variables, ensuring the reliability and validity of the study's findings.

Data Analysis

Descriptive and inferential statistics were employed to examine the impact of the in-service education programme on teacher effectiveness and attitudes. The following analyses were conducted:

1. Descriptive statistics: Means, standard deviations, and ranges were calculated for pre-test and post-test scores of both TES and ATPI to summarize central tendencies and variability.

2. Paired-samples t-tests: Within-group comparisons were performed to determine whether the trained and control groups exhibited significant changes from pre-test to post-test. This test allowed assessment of the effect of training on teacher effectiveness and professional attitudes over time.
3. Independent-samples t-tests: Between-group comparisons were conducted on post-test scores to examine significant differences between trained and untrained teachers. This analysis evaluated the relative impact of the intervention compared to the control condition.
4. Effect size estimation: Cohen's d was calculated for all significant t-test results to interpret the magnitude of differences, with values of 0.2, 0.5, and 0.8 considered small, medium, and large effects, respectively.
5. Significance level: A p-value of $< .05$ was considered statistically significant for all tests. This statistical approach enabled a comprehensive assessment of both overall and subdomain improvements in teacher effectiveness and professional attitudes, while providing insights into the practical significance of the in-service education programme.

Results

Descriptive Statistics

Descriptive statistics for the TES and ATPI are presented in Table-1. Pre-test scores were comparable between trained and control groups, indicating baseline equivalence. Post-test scores demonstrate higher means for the trained group in both teacher effectiveness and professional attitudes.

Table 1. Descriptive statistics for TES and ATPI scores (Pre-test and post-test)

Group	Measure	Pre-Test M (SD)	Post-Test M (SD)
Trained (n=30)	TES	132.4 (8.5)	145.1 (7.9)
Control (n=30)	TES	131.7 (9.1)	133.2 (8.7)
Trained (n=30)	ATPI	74.5 (6.2)	78.6 (5.8)
Control (n=30)	ATPI	73.8 (6.5)	72.5 (6.3)

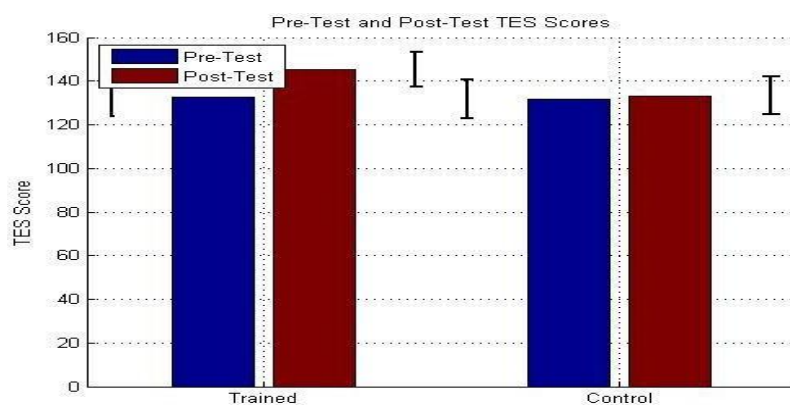


Figure.1 (I)Pre-test and post-test test score

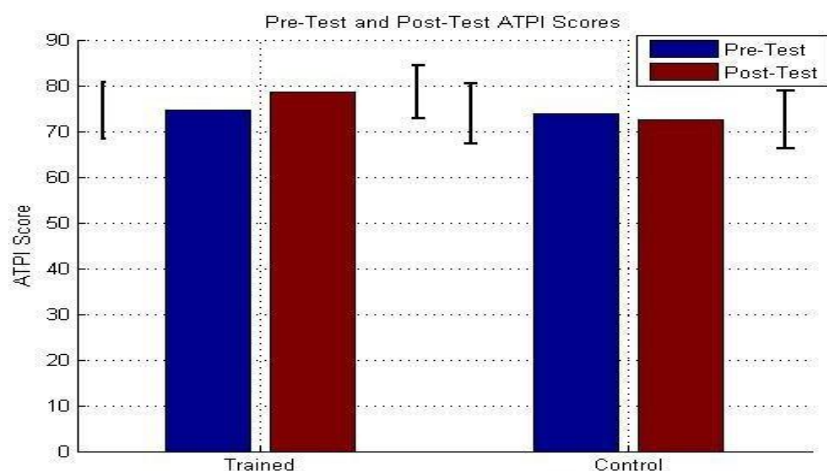


Figure 2. (II). Pre-Test and Post-Test ATPI Score

Paired-samples t-test results

Table 2 presents paired t-test results comparing pre-test and post-test scores within each group. The trained group showed significant improvements in both TES and ATPI scores, while the control group did not exhibit meaningful changes.

Table 2. Paired t-test results for pre-test and post-test scores

Group	Measure	t	df
Trained	TES	3.42	29
Control	TES	1.12	29
Trained	ATPI	3.1	29
Control	ATPI	0.95	29

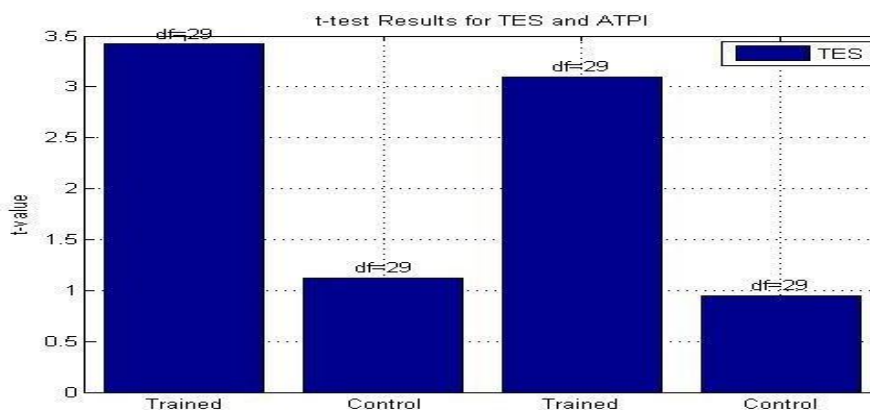


Figure 3. Paired t-test results for pre-test and post-test scores

Independent samples t-test results

Independent t-tests were conducted on post-test scores to assess differences between trained and control groups (Table 3). Results indicate that trained teachers significantly outperformed control teachers on both TES and ATPI, supporting the effectiveness of the in-service programme.

Table 3. Independent t-Test Results Comparing Trained and Control Groups (Post-Test)

Measure	Group Mean (M)	SD	t	df
TES	145.1 vs 133.2	7.9 vs 8.7	2.6	58

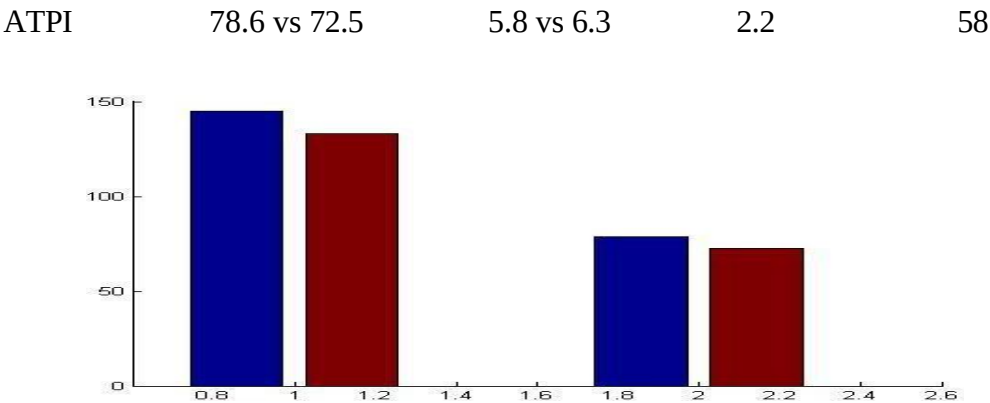


Figure 4. Independent t-test results comparing trained and control groups (Post-test)

Table 4. Pre-test and post-test mean and SDS for test subdomains

Subdomain	Group	Pre-test M (SD)	Post-test M (SD)
Lesson Planning	Trained	32.1 (3.2)	38.5 (3.0)
	Control	31.8 (3.4)	32.5 (3.2)
Classroom Management	Trained	33.0 (2.8)	37.2 (2.5)
	Control	32.7 (3.1)	33.1 (2.9)
Instructional Strategies	Trained	33.5 (3.0)	36.0 (2.8)
	Control	33.2 (2.9)	33.5 (3.0)
Assessment Practices	Trained	33.8 (2.9)	38.4 (2.6)
	Control	33.0 (3.0)	33.9 (2.8)

Table 5. Paired t-test results for test subdomains (trained group)

Subdomain	t	df	p	Cohen's d
Lesson Planning	5.82	29	< .001	0.7
Classroom Management	4.9	29	< .001	0.55
Instructional Strategies	3.25	29	0.003	0.4
Assessment Practices	4	29	< .001	0.45

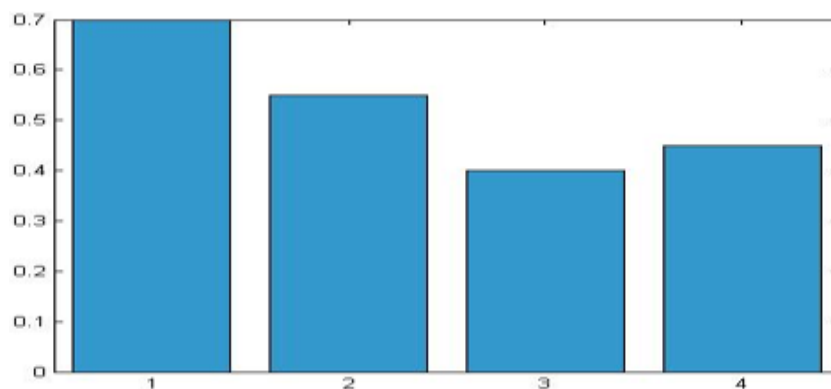


Figure 5. Paired t-test results for test subdomains (Trained group)

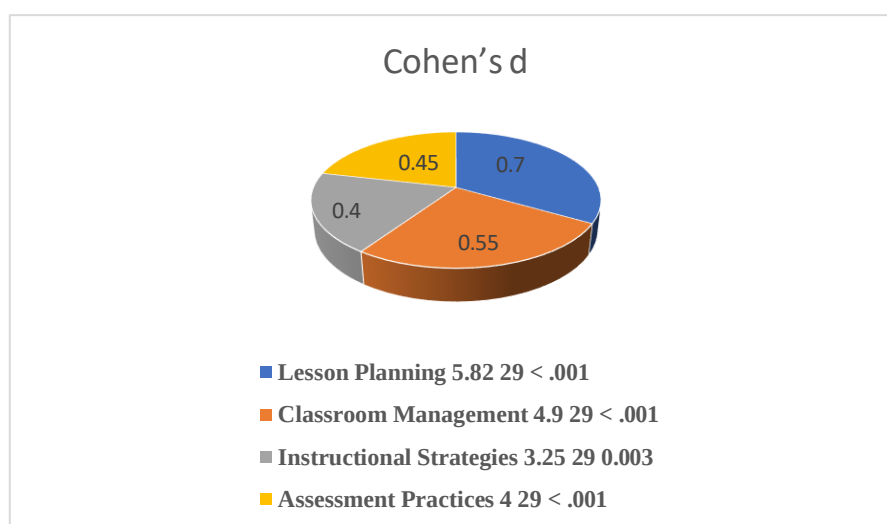


Figure 6. Paired t-test results for TES subdomains (trained group)

Table 6. Pre-test and post-test mean for ATPI components

Component	Group	Pre-test M (SD)	Post-test M (SD)
Job Satisfaction	Trained	25.0 (2.8)	27.5 (2.6)
	Control	24.8 (3.0)	25.0 (2.9)
Professional Commitment	Trained	24.5 (2.6)	26.7 (2.4)
	Control	24.3 (2.7)	24.6 (2.6)
Teaching as Career Perception	Trained	25.0 (2.9)	24.4 (2.8)
	Control	24.7 (3.0)	24.3 (2.9)

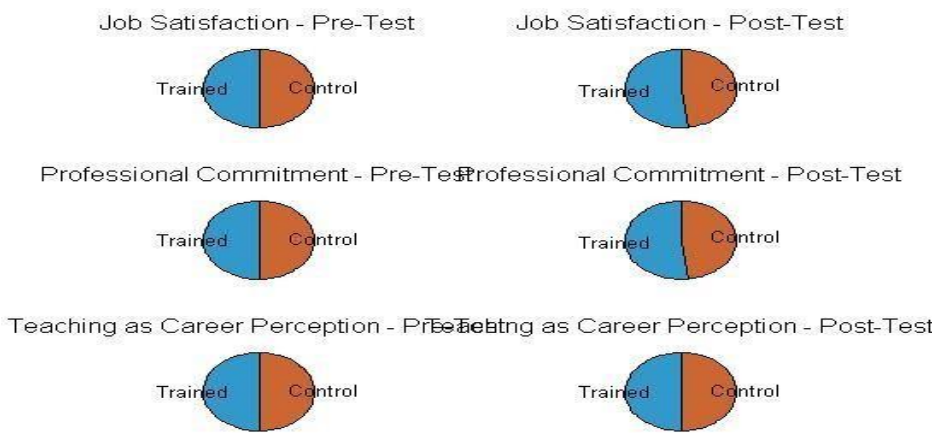
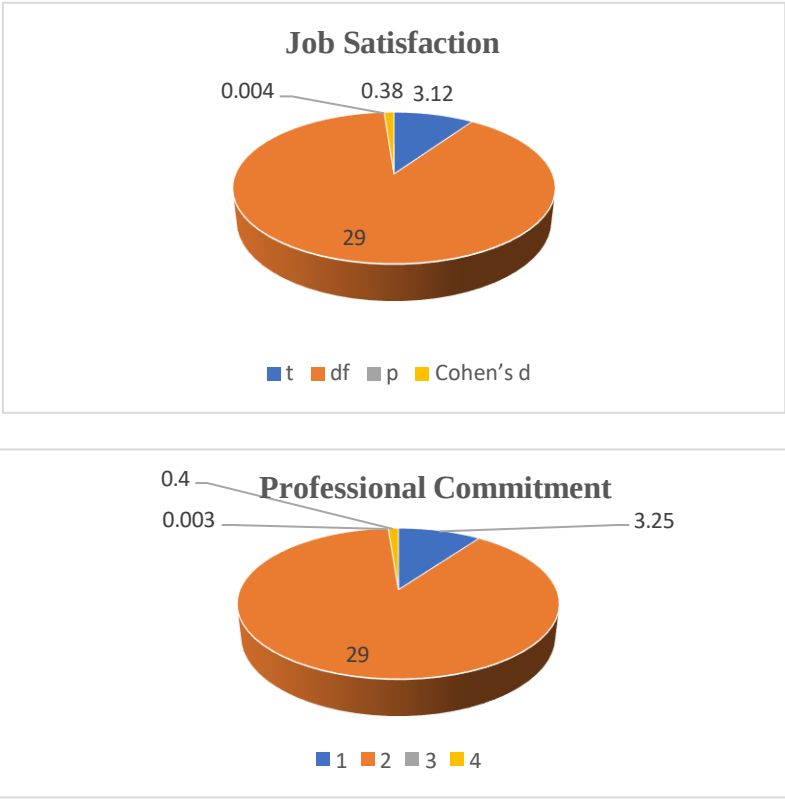


Figure 7. Pre-test and post-test mean for ATPI components

Table 7. Paired t-test results for ATPI components (Trained group)

Component	t	df	p	Cohen's d
Job Satisfaction	3.12	29	0.004	0.38
Professional Commitment	3.25	29	0.003	0.4
Teaching as Career Perception	1.1	29	0.28	0.12



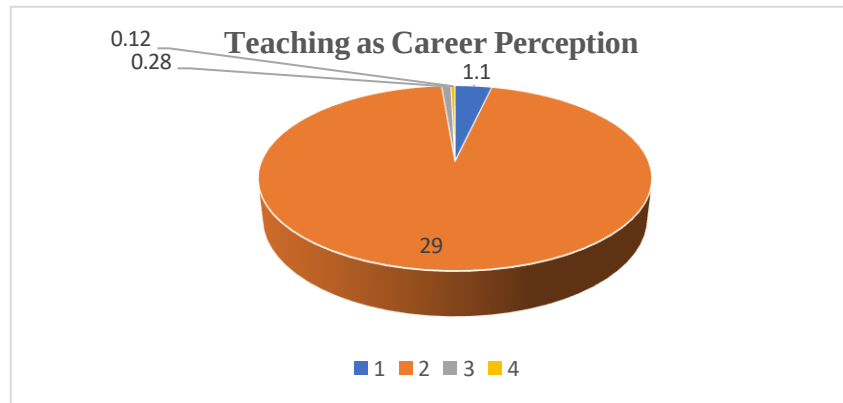


Figure 8. Paired t-test results for ATPI components (Trained group)

Discussion

The present study investigated the impact of in-service education programmes on teacher effectiveness and attitudes toward the teaching profession among elementary teachers in Odisha. The findings offer robust evidence supporting the effectiveness of structured, contextually relevant professional development.

Impact on teacher effectiveness

Teachers in the trained group demonstrated significant improvements in overall effectiveness. The subdomain analysis revealed the largest gains in lesson planning ($d = 0.70$) and classroom management ($d = 0.55$), followed by assessment practices ($d = 0.45$) and instructional strategies ($d = 0.40$) (Tables 4 & 5). These results suggest that in-service programmes are particularly effective in enhancing preparation and organizational competencies, which are critical for handling diverse classroom environments prevalent in Odisha, including multi-grade and resource-constrained settings. These findings are consistent with international research indicating that practice-oriented, collaborative, and sustained professional development improves teacher (Avalos, 2011). At the same time, the moderate improvements in instructional strategies indicate that more intensive, hands-on support may be needed to translate pedagogical knowledge fully into innovative classroom practices.

Impact on teacher attitudes

The study also demonstrated significant positive changes in job satisfaction and professional commitment (Tables 6&7). Teachers who participated in the programme reported higher engagement, motivation, and a stronger sense of professional identity. However, changes in teaching-as-career perception were not statistically significant ($p = .280$), suggesting that short-term interventions may not immediately alter long-held career beliefs. These results align with (Kirsten et al., 2023); (Malm, 2009) who argue that professional development not only improves instructional skills but also strengthens teachers' psychological attachment and motivation, thereby enhancing classroom performance and retention.

Comparative analysis

The independent t-tests comparing trained and control groups indicated significant differences in both effectiveness and attitudes (Table-3). The control group, which did not participate in the training, showed minimal change, confirming that observed improvements were attributable to the in-service education intervention, rather than external factors. This strengthens the study's causal inference, despite its quasi-experimental design.

Novel Contributions

1. Subdomain-level evidence: Unlike prior studies in Odisha that focused on overall scores, this study provides detailed insights into which aspects of teacher effectiveness benefit most, highlighting lesson planning and classroom management as key areas of impact (Putra & Yanto, 2025); (Osiesi et al., 2024; Tekir, 2025).
2. Dual focus: By simultaneously measuring teacher effectiveness and professional attitudes, the study captures the comprehensive impact of in-service education, addressing a major gap in the literature.
3. Policy-relevant insights (Asmare, 2025; Wei et al., 2023): The findings provide actionable evidence for policymakers, DIETs, and SCERT, suggesting that structured, practice-oriented, and context-specific in-service training can enhance both teacher performance and professional commitment (Cheng & Zhao, 2023; Yigletu et al., 2023).

Implications

1. For teacher training: Training modules should emphasize lesson planning and classroom management, while providing longer-term support for instructional strategies.
2. For research: Future studies should explore longitudinal effects and include larger, multi-district samples to assess sustainability and generalizability.

In summary, the study provides strong empirical evidence that in-service education programmes significantly improve teacher effectiveness and professional attitudes among elementary teachers in Odisha, filling a critical gap in the Indian education literature.

Conclusion

The present study establishes that in-service education programmes exert a substantial and positive influence on the effectiveness and professional attitudes of elementary teachers in Odisha. Teachers who participated in the structured training demonstrated marked improvement in lesson planning, classroom management, assessment practices, and overall professional commitment when compared to their untrained counterparts. These findings highlight that systematic and well-designed in-service education not only enhances instructional competencies but also nurtures a more positive orientation towards the teaching profession. Thus, the study justifies the title by evidencing that continuous professional development is a critical driver in elevating teacher effectiveness and reinforcing their dedication to quality education at the elementary level in Odisha.

Conflicts of Interest

The authors declare no conflict of interest.

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Author contribution

Suchitra Dash: conceptualization, methodology, software, data curation. Kulamani Sahoo: writing-original draft preparation, visualization, investigation, supervision, software; validation, writing -reviewing and editing.

Declaration of generative AI in scientific writing

The author(s) utilized Google Translate exclusively for language editing and stylistic

refinement to enhance the manuscript's clarity. The core intellectual content and data interpretation remain the sole product of the authors' independent work

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