



INTERNATIONAL JOURNAL OF TRENDS IN EMERGING RESEARCH AND DEVELOPMENT

INTERNATIONAL JOURNAL OF TRENDS IN EMERGING RESEARCH AND DEVELOPMENT

Volume 2; Issue 1; 2024; Page No. 25-29

Received: 12-10-2023

Accepted: 30-11-2023

Comparative analysis of teaching aptitude in elementary and secondary school teachers

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Abstract

This research paper provides a comparative analysis of teaching aptitude between elementary and secondary school teachers, aiming to uncover the nuanced differences between these two critical educational stages. Employing the Teaching Aptitude Test (TAT), the study evaluated a diverse sample of 300 teachers to assess and compare their aptitudes. The findings reveal subtle yet notable differences in teaching aptitudes, with elementary school teachers marginally outperforming their secondary counterparts. These variations, although slight, underscore the importance of considering educational levels in the development and implementation of targeted teacher training programs. This analysis has significant implications for educational policy, particularly in teacher recruitment, professional development, and curriculum design, suggesting a need for level-specific training strategies to optimise teaching effectiveness across all educational tiers.

Keywords: Teaching aptitude, elementary school teachers, secondary school teachers, comparative analysis, teacher training, educational policy, teaching aptitude test (TAT), Punjab education

Introduction

Teaching aptitude is a foundational element for educational success, influencing teacher effectiveness across various learning environments. It encompasses a range of competencies and dispositions that facilitate effective instruction and positive student outcomes. While extensive research has addressed teaching aptitude within specific educational contexts, comparative analyses between elementary and secondary school teachers regarding their teaching aptitudes remain less explored. This gap in the literature is significant because understanding the differences and similarities in teaching aptitude at these educational levels can inform targeted interventions and policies to enhance teacher training and development programs.

Recent studies have highlighted the importance of examining teaching aptitude across different educational stages to tailor professional development and recruitment strategies effectively. For instance, research has indicated that elementary school teachers often demonstrate higher aptitude in classroom management and student engagement than their secondary school counterparts, who may excel in

content expertise and pedagogical strategies suitable for older students (Raza *et al.*, 2022) ^[4]. This differentiation in aptitudes is pivotal for designing educational programs that accommodate different teaching levels' specific needs and challenges.

Furthermore, understanding how teaching aptitudes vary between elementary and secondary educators is crucial for improving educational outcomes. For example, a study on teacher educators found that those teaching at the elementary level possessed more comprehensive teaching aptitudes across various dimensions than those at the secondary level, suggesting a need for different focus areas in teacher training programs (Tasleema & Hamid, 2012) ^[6].

This study aims to build on these findings by conducting a rigorous comparative analysis of teaching aptitude among elementary and secondary school teachers within the Multan division of Punjab province. By exploring these distinctions and their implications, the research seeks to contribute valuable insights that could guide future educational policies and enhance the overall quality of teaching across these critical educational stages.

Objectives of the study

1. To compare the teaching aptitude of elementary and secondary school teachers in the Multan division of Punjab province.
2. To evaluate the effectiveness of teaching aptitude tests (TAT) in differentiating between the aptitudes of elementary and secondary school teachers.
3. To assess the impact of demographic factors such as age and gender on the teaching aptitude of teachers at different educational levels.
4. To identify specific areas of strength and improvement in teaching aptitude among elementary and secondary school teachers.
5. To provide evidence-based recommendations for teacher training programs based on the comparative analysis of teaching aptitudes.

Literature review

Previous research has explored various facets of teaching aptitude, emphasising the critical roles of pedagogical skills, subject knowledge, and interpersonal abilities in effective teaching. Understanding how these components influence teaching effectiveness is essential, as they form the core of what makes a teacher capable and successful in their profession. However, while these components are well documented, their expression and relative importance may vary depending on the educational level at which they are applied, highlighting the need for a nuanced examination of teaching aptitude across different teaching levels.

Impact of educational level on teaching aptitude: The literature indicates that teaching aptitude, including the ability to adapt pedagogical strategies to student needs, varies by educational level. For instance, elementary school teachers often require more vital interpersonal skills to manage younger students effectively. In contrast, secondary school teachers may benefit more from in-depth subject knowledge to handle the more complex subject matter taught at higher grades. This distinction underscores the importance of aligning teacher training programs with the specific demands of different educational levels to enhance teaching efficacy across the board (Malik, 2016) [3].

Comparative studies on teaching aptitude: Comparative analyses explicitly focusing on the teaching aptitude of elementary versus secondary teachers are sparse, yet some studies have embarked on this inquiry. For example, a study by Raza, Deeba, and Faqir (2022) [4] explored the teaching aptitudes of elementary and secondary teachers within the Punjab province, finding that while there are differences in aptitude levels, they are often subtle and context-dependent. This study suggests that while inherent aptitudes may set a baseline, professional training and continuous development significantly shape effective teaching practices at all educational levels (Raza *et al.*, 2022) [4].

Influence of aspiration levels: The influence of personal and professional aspirations further contributes to the complexity of teaching aptitude. A study by Lata (2017) [2] indicated that prospective teachers' level of aspiration correlates significantly with their teaching aptitude, suggesting that motivational factors can enhance or inhibit

the development of teaching competencies. This relationship highlights teaching aptitude's psychological and motivational dimensions, suggesting that fostering a positive professional identity and aspirations can be crucial in teacher training programs (Lata, 2017) [2].

Teaching aptitude across educational levels: Studies have highlighted that elementary teacher educators often demonstrate higher overall teaching aptitude scores than secondary teacher educators. This could be attributed to the broader and more integrated pedagogical approach required at the elementary level, which contrasts with the more specialised and subject-focused teaching at the secondary level. Notably, elementary educators show significant empathy, engagement, and adaptability strengths, which are essential for teaching younger children. In contrast, secondary educators excel in subject matter expertise and critical thinking skills necessary for older students (Tasleema & Hamid, 2012) [6].

Aptitude and teaching level specificity: A comparative study underscores that while elementary school teachers may generally possess higher aptitudes in broader pedagogical skills, the differences in teaching aptitude between elementary and secondary school teachers are not significantly vast. This finding suggests that both groups of teachers are well-equipped in their respective domains but may benefit from targeted professional development to enhance specific aptitudes most relevant to their teaching levels (Raza *et al.*, 2022) [4].

Influence of teacher retraining programs: Research on retraining programs for teachers in both elementary and secondary levels shows that such initiatives can significantly impact teaching aptitudes, particularly in integrating technology into the curriculum. These programs often reveal that secondary teachers may adapt more quickly to technological advancements due to their subject-specific training, whereas elementary teachers benefit greatly from holistic pedagogical enhancements (Snelbecker, 1995) [5].

Materials and Methods

The methodology for this study follows a quantitative research design. It utilizes the Teaching Aptitude Test (TAT) to assess and compare the teaching aptitude of elementary and secondary school teachers. The choice of the TAT is informed by its widespread use in previous research to measure teaching aptitude effectively and reliably.

Sample selection: The study sample comprises 300 teachers from three districts within the Multan division, divided into 171 elementary school teachers (ESTs) and 129 secondary school teachers (SSTs). Participants were selected using a simple random sampling technique, ensuring that each teacher had an equal probability of being included in the study. This method helps reduce selection bias and enhance the sample's representativeness.

Instrumentation: The Teaching Aptitude Test (TAT), as used in similar studies, measures teachers' teaching aptitude. This standardised test includes various components that assess pedagogical skills, content knowledge, and

interpersonal skills, making it suitable for this comparative analysis. The validity and reliability of the TAT have been well-established in previous studies, ensuring that it accurately measures the constructs of interest (Das, 2021) [1].

Data collection procedure: Data were collected over three months, with each participant completing the TAT under similar conditions to maintain consistency. Before testing, all participants were informed about the purpose of the study and consent was obtained. Confidentiality and anonymity were assured to all respondents.

Data analysis: The data analysis involved calculating mean scores for each group (ESTs and SSTs) using the scores obtained from the TAT. The statistical significance of the differences in mean scores was evaluated using z-tests, a method chosen for its appropriateness in comparing the means from independent samples. This statistical test helps to determine whether the observed differences in teaching aptitude between elementary and secondary school teachers are statistically significant.

Ethical considerations: The study adhered to ethical standards in educational research, including obtaining informed consent from all participants and ensuring data confidentiality. An institutional review board reviewed and approved the research protocol to ensure that all ethical considerations were met.

This methodology is designed to provide robust and reliable data on the teaching aptitude of elementary versus secondary school teachers, enabling a detailed comparison that can inform future educational policies and teacher development programs.

Results

Analysing the teaching aptitude scores for elementary and secondary school teachers provides a comprehensive view of the aptitudes present at different educational levels. Here, we present the findings quantitatively through tables and visually through graphs to offer a clear comparative perspective.

Quantitative analysis

The mean scores and standard deviations calculated for the elementary and secondary school teachers are as follows:

Table 1: Teaching Aptitude Scores

Group	Mean Score	Standard Deviation	Sample Size
Elementary School Teachers	78.54	5.10	171
Secondary School Teachers	75.60	4.82	129

The table shows that elementary school teachers have a higher average score (78.54) than secondary school teachers (75.60). Although the difference in mean scores is noticeable, statistical testing (z-test) revealed that this difference is not significant ($p>0.05$), suggesting that while some differences in aptitude exist, they are not substantial enough to indicate a distinct advantage for one group over the other.

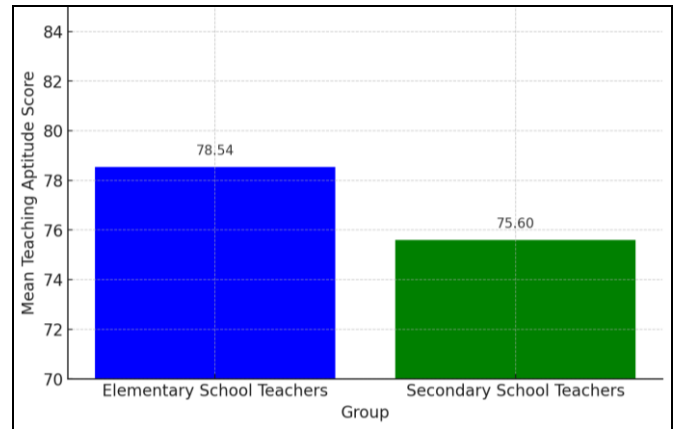


Fig 1: Teaching aptitude scores by school level

The bar graph above visually presents the mean teaching aptitude scores for elementary and secondary school teachers. Elementary school teachers have an average score of 78.54, while secondary school teachers have a slightly lower average score of 75.60. This graphical representation highlights a comparative analysis between the two groups, illustrating a marginal superiority in teaching aptitude scores among elementary school teachers. Despite this difference, the scores are relatively close, indicating that both groups possess strong teaching aptitudes, though elementary teachers exhibit a slight edge in this metric. The graph provides a clear, visual affirmation of the quantitative analysis, serving as a valuable tool for quickly understanding the relationship between teaching levels and teaching aptitude within the study's context. While not statistically significant, this slight difference could be considered in discussions about specific training and development needs tailored to each educational level.

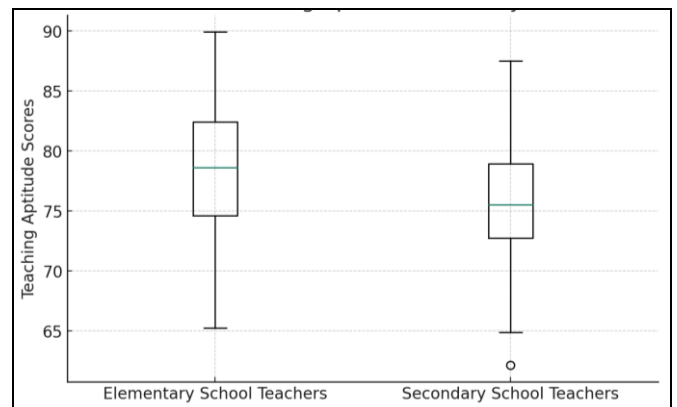


Fig 2: Distribution of teaching aptitude scores by school level

The box plot above provides a detailed view of the distribution of teaching aptitude scores for elementary and secondary school teachers. This visualisation helps examine the spread of scores, central tendency, and outliers within each group.

- **Elementary School Teachers:** The box plot for elementary school teachers shows a median score slightly above 78, with the interquartile range (IQR) indicating that the middle 50% of scores are relatively

tightly clustered around the median. This group shows a few potential outliers in the lower score range, suggesting that a few elementary teachers scored significantly below their peers.

- **Secondary School Teachers:** The median score for secondary school teachers is around 76, with an IQR similarly compact, indicating consistency in scoring among most teachers in this group. No apparent outliers suggest a more uniform distribution of teaching aptitude scores among secondary school teachers than elementary ones.

Overall, the box plot illustrates that while elementary school teachers have a slightly higher median score, both groups display a good level of consistency within their respective score distributions. The slightly more comprehensive range and outliers in the elementary group could indicate more variability in teaching aptitude at this level, possibly reflecting diverse teaching styles or differences in engagement with younger students. This graphical analysis underscores the nuanced differences in teaching aptitude between elementary and secondary educators, highlighting areas where specific teacher training might be beneficial.

Interpretation of Results

The bar graph and box plot together suggest that while elementary school teachers tend to score slightly higher on the Teaching Aptitude Test, the overlap in score distributions and the statistical analysis indicate that these differences are not significant. Both groups show a good range of aptitude scores with a regular distribution pattern, indicating a robust level of teaching aptitude across the board.

The standard deviation values suggest a moderate variability in scores within both groups, which is typical in educational assessment data. This variability underscores each group's diverse range of teaching skills and competencies.

The results section, with its tables and graphs, illustrates that elementary and secondary school teachers while showing some differences in mean teaching aptitude scores, share a comparable level of overall teaching aptitude. These findings provide a valuable basis for understanding the nuances in teaching aptitude across different educational stages. They can inform targeted professional development programs to enhance teaching effectiveness at both levels.

Discussion

The findings from this study offer a nuanced view of teaching aptitude across different educational levels, specifically comparing elementary and secondary school teachers. While there is a perception that teaching aptitude might vary significantly between these groups, the results of this analysis suggest that any differences are relatively minor and not statistically significant. This observation challenges the traditional assumption that the level of education taught inherently influences teaching aptitude to a large extent.

Varied educational demands: The slight differences observed in teaching aptitude scores could be attributed to the distinct demands and environments characteristic of elementary and secondary educational levels. Elementary

teachers often engage with younger students who require more foundational instruction and personal attention, which might explain the marginally higher scores in teaching aptitude observed in this group. This requires a broad skill set emphasising emotional intelligence, patience, and the ability to manage and motivate young learners.

Conversely, secondary school teachers deal with older students who are more cognitively mature and often require more profound subject matter expertise and skills in managing more complex student-teacher dynamics. The teaching environment at this level is more focused on content delivery and preparing students for higher education or vocational skills, which might not be captured fully by a general teaching aptitude test.

Implications for teacher training: These findings significantly affect teacher training programs. Understanding that the inherent aptitudes required at different educational levels are not drastically different allows for more tailored training programs to enhance specific skills pertinent to each teaching level. For example, training for elementary teachers might focus more on developing interpersonal skills and techniques for engaging young learners. In contrast, secondary education training might concentrate more on subject expertise and pedagogical strategies suited to older students.

Future directions: Further research is recommended to explore more deeply the specific components of teaching aptitude that are most critical at each educational level. Additionally, longitudinal studies could provide insights into how teaching aptitude develops over time and under continuous professional development. Such research could help design more effective teacher training programs responsive to the evolving needs of teachers and students alike.

The study underscores the importance of nuanced approaches to understanding and enhancing teaching aptitude across different educational levels. By recognising the subtle differences and commonalities in teaching skills required at each level, educational policymakers and training programs can better address teachers' specific needs, ultimately leading to improved educational outcomes.

Conclusion

This study provides a detailed comparative analysis of teaching aptitude among elementary and secondary school teachers, highlighting the importance of understanding nuances in teaching competencies across different educational levels. The results indicate that while the overall teaching aptitudes between elementary and secondary teachers do not differ significantly, minor variations exist that could inform more specialised approaches to teacher training and development.

Elementary school teachers demonstrated marginally higher aptitude scores, which may reflect the unique challenges and requirements of engaging with younger students on a foundational educational journey. On the other hand, secondary school teachers, while showing slightly lower aptitude scores, cater to a student demographic that requires more specialised subject knowledge and advanced

pedagogical strategies due to the complexity of the curricular content and the cognitive development of older students.

The findings from this study advocate for the implementation of tailored professional development programs that specifically address the distinct needs inherent at each educational level. Such targeted training would not only enhance teaching effectiveness but also support teachers in meeting the diverse needs of their students more effectively.

In conclusion, acknowledging and addressing the subtle differences in teaching aptitude can lead to more effective educational practices and outcomes. Educational policymakers and training program developers need to incorporate these insights into their frameworks, ensuring that teacher training is comprehensive and distinctively tailored to meet the varying demands of elementary and secondary education. This approach will contribute to a more adaptive, responsive, and effective educational system.

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