A Comparative Study of Teachers' Knowledge and Strategies for Developing Graphomotor Skills in Preschool Children

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HOW TO CITE:
Rajani Karnwal , Khwairakpam Sharmila , Shalini Agarwal, Shivani Singh, Pooja, Anjali Singh, Anshika Sharma (2026). A Comparative Study of Teachers' Knowledge and Strategies for Developing Graphomotor Skills in Preschool Children. International Journal of Special Education, 41(15s), 1130-1144

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ABSTRACT:

Background:
Graphomotor abilities, including fine motor control crucial for handwriting and drawing, are essential to early childhood education and literacy advancement. Notwithstanding their importance, these abilities are often overlooked in several preschool environments.

Objectives:
This research examines and compares the knowledge and instructional methods of preschool educators in public and private institutions about the enhancement of graphomotor abilities in young children. This study aimed to evaluate teachers' comprehension of graphomotor development and to investigate the strategies they use to enhance these abilities in children aged 3 to 6 years.

Methods:
A quantitative study approach was used, using a structured questionnaire sent to a sample of 200 preschool instructors, including 100 from government schools and 100 from private schools. The research used SPSS for data analysis to ascertain major disparities in knowledge levels and strategy execution between the two types of schools. The participants' demographic profile included differences in age, educational qualifications,

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teaching experience, and the particular preschool level they instructed.

Key Results:

The results enhance the previous research by emphasizing the inequalities in teacher readiness and methodologies across various institutional contexts.

Conclusion:

The research emphasizes the need for specialized teacher training programs and curricular modifications that focus on enhancing graphomotor skills in early school. This study seeks to improve the quality of foundational education by identifying existing gaps and best practices, ensuring that children develop the motor skills essential for academic achievement and lifetime learning.

Keywords: Graphomotor Skills, Preschool Education, Teacher Knowledge, Teaching Strategies, Early Childhood Education.

1. Introduction

The term "Graphomotor skills" denotes a category of fine motor abilities specifically related to the use of a standard pencil (Suggate et al., 2019). Graphomotor activities result from the integration of many cognitive and musculoskeletal processes, such as visual-spatial perception, size discrimination, visual retrieval, and orientation discrimination (Gonzalez et al., 2019). Furthermore, Graphomotor skills may be essential for everyday functioning and for the development of other skills, including perception, cognition, and language (Sinvani et al., 2023). Graphomotor abilities involving writing instruments are significant indicators of future academic success and daily engagement. Despite being regarded as significant in motor development, graphomotor abilities remain an under-explored area of specialised developmental competencies in preschool children.

Fine motor skills are small muscle movements in the fingers, involving more proximal parts like the wrist, forearm, upper arm, shoulder, and spine for stability. They include graphomotor skills (GS), which involve the strength and control of finger muscles, and daily skills like writing and drawing, essential for academic achievement. Early childhood (2-6 years old) is a crucial period for children to develop and refine these movement skills, primarily through play, which is seen as the child's equivalent of work (Spanaki et al., 2014). Play is a facilitator of cognitive and affective growth and a means for developing fine and gross motor skills. The transition from kindergarten to elementary school is crucial for developing fine motor skills and graphomotor skills. Children learn to become competent hand writers during their first years at school.

- **Development of Graphomotor Skills**

Early childhood is crucial for the development of reading and writing skills. Conventional literacy views writing as the onset of writing when children enter elementary school, with handwriting skills also beginning at this time. However, research on handwriting abilities, particularly for younger children, is limited. Emergent literacy, on the other hand, considers a broad range of knowledge about print concepts, alphabetic knowledge, and early writing skills as precursors to conventional reading and writing. Reading does not precede writing, but both skills develop simultaneously (No & Choi, 2021). Scribbling or drawing are also considered forms of writing. Handwriting fluency is essential for beginning writers, as it contributes to text quality. When children lack adequate transcription skills,

they focus on forming letters and spelling words, taking away attention and cognitive resources from composing text.

Proficiency in handwriting, even as young children, may offer significant advantages in writing development. Therefore, an in-depth evaluation of the writing process may provide more insight into the development of handwriting in early childhood.

Handwriting skills are crucial for beginning writers, as fluency in writing letters and copying text contributes to text quality. Children who lack transcription skills, such as handwriting and spelling, focus on forming letters and spelling words, wasting attention and cognitive resources. Proficiency in handwriting, even in young children, can offer significant advantages in writing development. Graphomotor skills, which involve fine motor control, have been studied in occupational therapy to understand children struggling with handwriting. Tweens typically show interest in using a writing utensil like a crayon at around 12 months of age. The initial grip of a crayon gradually transitions to using fingers, and by the age of four, children can grip a crayon using their thumbs, index, and middle fingers. The movements involved in writing shift from shoulder and elbow to wrist and fingers. Graphomotor skills allow young children to draw geometric forms and write letters or words by the end of the fifth year. Although a significant proportion of these skills develop during early childhood, pre-schoolers can still be considered unskilled writers. Handwriting is a slow and laborious process acquired until 9-10 years of age.

The development of graphomotor skills in children with language deficits in primary school is a complex and long process that can disrupt both literation and academic learning. This process is dependent on the normal development of senses, intellect, and social environment. Disturbances in visual-motor coordination in children and school pupils can lead to immaturity or false formation of higher cortical functions responsible for graphomotor skills and habits. This disturbed formation can result in aberrations in orientation, low motivation, and insufficient self-control, causing difficulties in the formation of graphomotor skills and mastering written language (Spassova, 2020). From a psycho-physiological perspective and a neuro-psychological model, mastering written language involves three features: visual, kinetic, and auditory. The leading role in this process has historically been found in the premotor field or Brodmann area 8 in the posterior part of the second frontal gyrus.

The graphomotor development of children is often assessed by the tracing of pre-marked forms in graphomotor sheets (exercise books). The children's capacity to replicate forms from graphomotoric sheets is not contingent upon the repetitive imitation of pre-marked shapes. The outcome is contingent upon the degree of cognitive development, the advancement of motor abilities, and the maturation of the central nervous system. Systematic development of children's graphomotor skills via creative activities is the most effective method for attaining appropriate writing abilities in elementary school (Daniela Valachová, 2016). Consequently, we assert that for a teacher to effectively facilitate the graphomotor growth of preschool children, it is essential to first comprehend the fundamental concepts of graphomotorics, as well as the associated habits and abilities. Additionally, to comprehend the foundation of graphomotor development, to embrace the progression of their advancement and enhancement, and to implement appropriate educational concepts and tactics.

- **State the problem and research objectives**

- **Problem Statement**

Graphomotor skills are fundamental to children's handwriting, drawing, and early literacy development. Although these skills play a vital role in early childhood education, they are often overlooked in preschool settings. Existing research has primarily focused on children's

graphomotor performance, handwriting difficulties, and motor skill interventions, while limited attention has been given to preschool teachers' knowledge and instructional strategies for fostering graphomotor development. Moreover, there is a lack of comparative research examining the differences between government and private preschool teachers regarding their understanding and classroom practices for developing graphomotor skills. This gap highlights the need to evaluate teachers' knowledge and instructional strategies to identify disparities and provide evidence for improving teacher training and curriculum development in early childhood education.

- **Research Objectives**

1. To assess the knowledge level of preschool teachers regarding graphomotor skills in children.

2. To compare the knowledge of government and private preschool teachers regarding graphomotor skill development.

3. To examine the instructional strategies adopted by government and private preschool teachers for developing graphomotor skills among children aged 3–6 years.

4. To determine whether significant differences exist in teachers' knowledge and instructional strategies based on the type of preschool.

5. To provide evidence that supports improvements in teacher training programmes and curriculum development for enhancing graphomotor skills in early childhood education.

- **Literature review**

(Sviridkina, e.o. & Razdobarina, 2023) explored the role of ISO tools in teaching graphomotor skills, focusing on the development of writing skills through drawing. Drawing helps develop fine motor skills, which are gradually formed through artistic activities. Graphomotor skills positively affect imagination, attention, memory, speech, and coordination, making visual drawing techniques particularly popular in correctional techniques.

(Trouli, Kalliopi; Linardakis, 2023) investigated the relationship between gross and fine motor skills and graph motor skills in preschool children. It found that upper-limb coordination and agility influence bilateral coordination, which in turn influences fine motor precision and integration. Fine motor precision and integration have the largest influence on all five factors of graphomotor skills, with handwriting control having the largest influence. This highlights the importance of enhancing gross and fine motor skills in preschool children.

(R. Perrone, V. Minghelli, 2024) examined the impact of handwriting on primary school children's self-efficacy, relational dimensions, and learning. It found that writing difficulties can negatively affect self-efficacy and learning. The study involved 200 children aged 8 and 9, divided into control and experimental groups. Symbolic games and the BHK scale were used to assess writing quality and speed. Results confirmed the body's centrality in promoting effective writing skills. The study recommends integrating the body component into teaching practices, particularly in early primary school, and designing trans-disciplinary educational interventions.

(J. Havigerová, 2018) developed new screening tool for children with graphomotor difficulties at pre-school age. The first version of the scale consists of 28 items divided into five areas: relationship to motor activities, drawing circumstances, drawing line properties, spontaneous drawings, and handling graphic elements. Pilotage with 35 children and 2 kindergarten teachers revealed some items had low differentiation potential. The final version will include 22 items for further data collection and evaluation.

(Mirecka & Domagała, 2018) examined issues with graphomotor activities in first-grade primary school children and those undergoing one-year preschool preparation. It identifies undesirable behaviours such as improper writing technique,

sheet positioning, and work pace. The study uses diagnostic tools like the Scale of Assessment of Graphomotor Skills and the Profile of Graphomotor Skills, designed for each developmental stage. The study found that most irregularities in writing technique and work pace were identified at the earliest stage of education.

(Maurer et al., 2023) examined the acquisition of handwriting skills in early primary school found that girls showed superior performance in graphomotor skills, while boys tended to spell more accurately. The study also found that working memory predicted graphomotor skills but not spelling. Motivation to handwrite predicted both first-grade graphomotor skills and second- grade spelling. The findings suggested that graphomotor skills play a crucial role in spelling acquisition and contribute to spelling difficulties, highlighting the need for early support in enhancing these skills.

(Huau, A., Velay, J.-L., & Jover, 2015) analysed handwriting difficulties in children with developmental coordination disorder (DCD) and hypothesized a deficit in procedural learning could explain them. Children with DCD performed better on handwriting tasks and learning a new letter on a graphic tablet. The results showed greater intra-individual variability in the DCD group, suggesting a deficit in motor pattern stabilization. This supports both the hypothesis of procedural learning and neuromotor noise in DCD.

(Sinvani et al., 2023) The study analysed the role of personal and environmental factors in determining graphomotor skills in pre-schoolers and first-year elementary school students. Results showed that home literacy and educational approach significantly influenced graphomotor skills, accounting for 43.1% of variance after controlling for age, gender, and spoken language. This highlights the importance of environmental factors in early intervention programs.

(No & Choi, 2021) analysed the differences in children's graphomotor skills based on writing medium and gender. It found that writing on a tablet screen decreased clarity, but increased print size and speed. Boys generated larger print sizes than girls. The results suggest that providing children with larger writing mediums and encouraging larger print sizes for writing practice, especially for boys, may be beneficial in developing graphomotor skills among young learners.

(Downing & Caravolas, 2023) analysed the relationship between handwriting legibility and fluency, focusing on children in Year 3 through Year 5. It found that spelling, graphomotor, and selective attention skills explained moderate variance in handwriting legibility and fluency. Graphomotor skills contributed more to legibility than spelling, while spelling ability had stronger contributions to fluency. Selective attention predicted fluency and partially mediated its influence. The study highlights the complex relationship between handwriting legibility and fluency. (Sparaci et al., 2024) compared the performance of 39 Italian primary school children with handwriting difficulties on three standardized tests for grapho-motor skills assessment. The results showed some agreement between tests, but no agreement in second grade and limited agreement in third grade. The study also revealed significant correlations between some GMP scores and children's overall performance, and children experienced specific difficulties with some GMPs, such as letter joins and alignment. This data is crucial for clinicians, therapists, and educators to design tailored intervention strategies.

(Vasileva, 2023) analysed the neuropsychological mechanisms in the formation of motor graphic programs in preschool children aged 4-6. It found that age significantly influences the development of cerebral mechanisms and graphomotor functions during this period. The study included 365 children, divided into three age groups. The results showed a significant influence of age, demographics, and gender on the development of children's graphic skills. The study concluded that the age range of 4-6 years is sensitive for the formation of serial and spatial organization of

children's graphic skills, which predicts successful school learning.

(Huau et al., 2015) analysed handwriting difficulties in children with developmental coordination disorder (DCD) and hypothesized a deficit in procedural learning could explain them. The experimental setup compared DCD children with and without DCD on motor learning tasks. Results showed that handwriting was more impaired in DCD children when speed or length constraints were added. Greater intra-individual variability was observed in DCD children, supporting both the hypothesis of procedural learning and neuromotor noise.

(Revormis & Saridewi, 2022) examined the development of fine motor skills in a kindergarten in Pesisir Selatan, Indonesia, with an average age of 5-6 years. Using a qualitative approach, observation, interviews, and documentation, the research reveals that teachers effectively implement fine motor development strategies, including creating semester programs and daily learning plans. The varied media used in the classroom provides an engaging environment for kindergarten children to develop their fine motor skills.

- **Research gap**

Despite many studies have investigated the development of graphomotor abilities in early childhood, the majority of this research has focused on children's performance, handwriting challenges, and the effects of motor skill therapies. A substantial body of study examines the impact of fine and gross motor coordination on handwriting competence, along with the effect of variables such as gender, age, and environmental circumstances on motor skill learning. Nevertheless, little emphasis has been placed on the influence of preschool instructors' expertise and pedagogical approaches in promoting graphomotor development throughout early childhood. A significant deficiency exists in comparison study between government and private school instructors about their comprehension and pedagogical approaches to improving graphomotor abilities. Although several studies have explored the use of creative and body- integrated techniques for skill enhancement, little research has systematically assessed the preparedness of instructors to employ these methods in actual classroom environments. Moreover, there is a dearth of research using quantitative approaches to evaluate teacher knowledge levels and the efficacy of strategies in the preschool setting. This study examines and contrasts teachers' knowledge and strategies in government and private preschools, thereby enhancing the understanding of early childhood education practices and providing data-driven insights for the improvement of teacher training and curriculum design.

Methodology

- **Research design:** The study methodology included a quantitative analysis to examined the teachers Knowledge and Strategies for Developing Graphomotor Skills in Preschool Children. A structured approach is used to systematically collect the data and analyze data from representative sample of 200 the sample divide for both Government and private school respondents to ensure statistical reliability and validity.

- **Conceptual Framework**

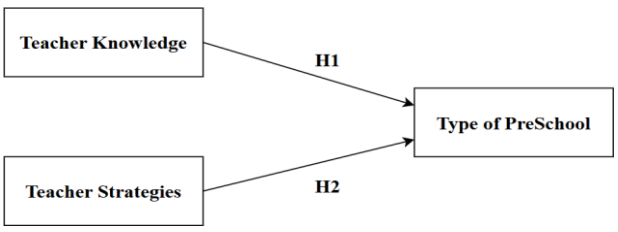

Figure 1 Conceptual Framework

Participants/Sample: The study included a total of **200 preschool teachers**, comprising **100 teachers from government preschools and 100 teachers from private preschools**. A **stratified sampling technique** was used to ensure equal representation from both types of institutions. The participants represented different age groups, educational qualifications, teaching experience, and current preschool teaching levels, providing a reliable and representative sample for comparative analysis

- **Instruments:** Data were collected using a **structured questionnaire** developed to assess teachers' knowledge and instructional strategies related to the development of graphomotor skills in preschool children. The questionnaire also gathered demographic information, including age, educational qualifications, teaching experience, and current teaching assignments

- **Procedure:** The structured questionnaire was administered to preschool teachers from government and private schools. Responses were collected from all **200 participants**, ensuring equal representation from both school types. The collected data were checked for completeness, organised systematically, and prepared for statistical analysis.

- **Data Analysis:** The collected data were analysed using the **Statistical Package for the Social Sciences (SPSS)**. Descriptive statistics were used to summarise the demographic characteristics of the participants. Independent samples **t-tests** were performed to determine significant differences in teachers' knowledge and instructional strategies regarding graphomotor skills between government and private preschool teachers. Statistical significance was determined using the corresponding p-values.

2. Results

- **Introduction**

This section defines the findings of the comparative study undertaken to evaluate the knowledge and strategies used by preschool instructors in fostering graphomotor abilities in children. The investigation examines factors like preschool type (public vs private), instructor qualifications, age, teaching experience, and current teaching assignments. Independent sample t-tests were used to assess significant variations in teachers' knowledge levels and instructional practices according to the type of preschool environment.

1.1 Demographic

Table 1 Demographic

		Frequency	Percent
Type of PreSchool	Government School	100	50.0
	Private School	100	50.0
	Total	200	100.0
Teacher Age	20-29	41	20.5
	30-39	61	30.5
	40-49	51	25.5
	50-59	47	23.5
	Total	200	100.0

Degree	NTT	40	20.0
	B.Ed.	44	22.0
	B.T.C	40	20.0
	M.Ed.	43	21.5
	Other	33	16.5
	Total	200	100.0
Teaching Experience	Less than 5 years	66	33.0
	Between 5-10 years	56	28.0
	More than 10 years	78	39.0
	Total	200	100.0
Currently Teaching	PreNursery	40	20.0
	Nursery	56	28.0
	Junior Kindergarten	52	26.0
	Senior Kindergarten	52	26.0
	Total	200	100.0

Type of Preschool

Of the 200 teachers who answered the survey, 100 worked in government schools and 100 worked in private schools. This shows that the respondents were evenly split between the two types of schools.

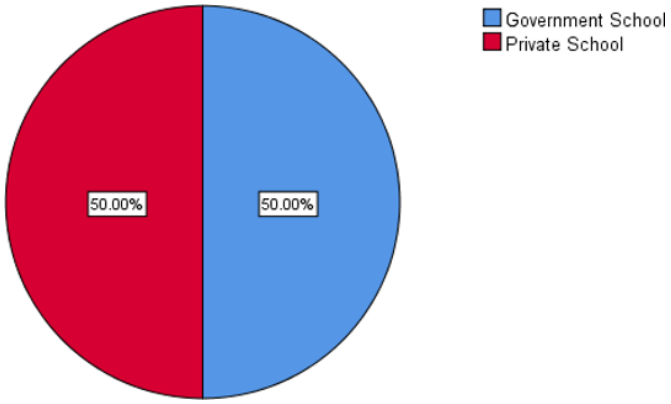

Figure 2 Type of Preschool

Teacher Age

The ages of the 200 preschool teachers were as follows: 41 were between the ages of 20 and 29, 61 were between the ages of 30 and 39, 51 were between the ages of 40 and 49, and 47 were between the ages of 50 and 59 when they were employed.

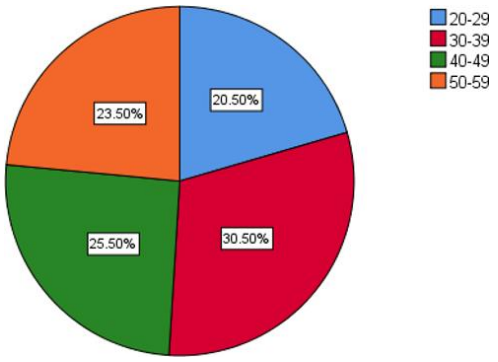

Figure 3 Teacher Age

Degree

There were forty teachers who held a Bachelor of Education degree, forty who held a Bachelor of Teaching Certificate, forty who held a Master of Education degree, and thirty-three who held other degrees. These are the educational qualifications that the teachers possessed.

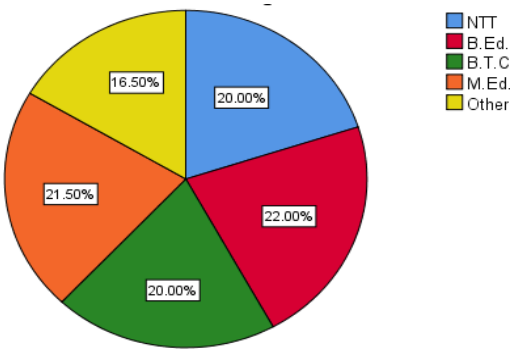

Figure 4 Degree

Teaching Experience

The total number of teachers who had more than ten years of experience in the classroom was 78. There were 56 teachers who had between five and ten years of experience, and there were 66 teachers who had less than five years of experience.

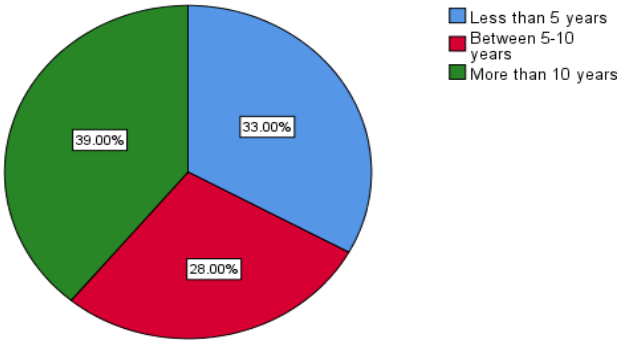

Figure 5 Teaching Experience

Currently Teaching

In terms of the current teaching assignments, forty teachers were in charge of Pre-Nursery classes, fifty-six teachers were in charge of Nursery classes, fifty-two teachers were in charge of Junior Kindergarten classes, and fifty-two more teachers were in charge of Senior Kindergarten classes.

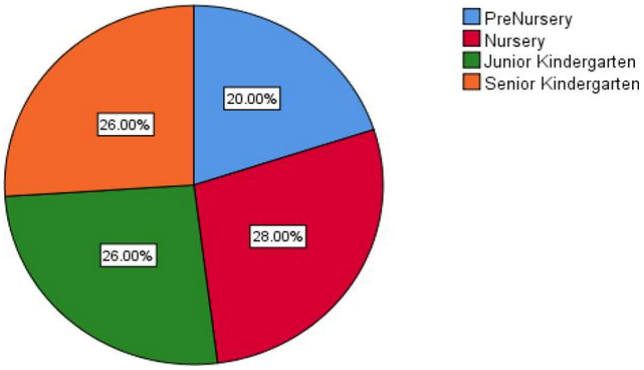

Figure 6 Currently Teaching

H1: There exist significant differences in the knowledge level of teachers from different schools regarding graphomotor skills.

Table 2 Independent Sample test

Type_of_PreSchool		N	Mean	t	Sig. (2-tailed)
Teacher Knowledge	Government School	100	2.9767	-5.764	0.000
	Private School	100	3.7300		

The independent samples t-test was carried out with the purpose of determining whether or not there is a discernible distinction in the level of knowledge that early childhood educators from various types of preschools possess with regard to graphomotor skills. The findings revealed that teachers working in public schools (N = 100) had a mean score of 2.9767 for their knowledge, whereas teachers working in private schools (N = 100) had a higher mean score of 3.7300. Given that the t-value was -5.764 and the significance level was 0.000, it can be concluded that there is a statistically significant difference in the levels of knowledge that are possessed by the two groups. Therefore, the hypothesis (H1) is supported, which suggests that different types of preschools are associated with different levels of teacher knowledge regarding graphomotor skills.

H2: There exist significant differences in the strategies adopted by teachers to improve the graphomotor skills of Preschool children.

Table 3 Independent Sample test

	Type_of_PreSchool	N	Mean	t	Sig. (2-tailed)
Teacher Strategies	Government School	100	2.7633	-8.896	0.000
	Private School	100	3.7367		

An independent samples t-test was performed to whether or not there are significant differences in the approaches that teachers from various types of preschools take in order to improve the graphomotor skills of preschool children, a t-test with independent samples was carried out. The findings showed that teachers working in public schools (N = 100) reported a mean score of 2.7633 for their strategies, while teachers working in private schools (N = 100) reported a higher mean score of 3.7367 according to the findings. Given that the t-value that was calculated was -8.896 and the significance level was 0.000, it can be concluded that there is a statistically significant

difference between the two groups. It can be concluded that the second hypothesis (H2) is supported, which confirms that the strategies that teachers use to improve children's graphomotor skills are influenced by the type of preschool that the children attend.

- **Summary of Findings**

The statistical analysis showed significant differences between government and private preschool teachers in both knowledge and instructional strategies related to graphomotor skill development.

- Teachers from private preschools demonstrated significantly higher knowledge scores than government preschool teachers ($t = -5.764$, $p < .001$).
- Teachers from private preschools also reported significantly higher instructional strategy scores than government preschool teachers ($t = -8.896$, $p < .001$).

3. Discussion

The study's findings show that government and private preschool instructors differ significantly in their understanding of and approaches to teaching graphomotor skill development. Private school teachers performed much better in both areas, indicating that they could have more access to chances for professional growth, more organised teaching materials, and perhaps more robust institutional support. These results are in line with other studies showing that the educational environment and teacher preparation have a major impact on the quality of teaching in early childhood education. Additionally, the disparity in how the strategies are implemented suggests that while both groups acknowledge the value of graphomotor skills, private school instructors are better prepared with practical, efficient methods to foster these abilities in young students. This brings up important issues about equality in early childhood education, especially in public schools where a lack of resources and training opportunities may prevent kids from developing vital fine motor skills. Targeted treatments are clearly needed since early graphomotor development is closely related to later writing fluency and academic success. In order to enable government preschool instructors to use engaging, child-centred strategies for fostering fine motor abilities, the research emphasizes the need to improve training programs and provide ongoing professional development.

- Interpret the results in relation to objectives and literature

The present study aimed to compare the knowledge and instructional strategies of government and private preschool teachers regarding the development of graphomotor skills in children. The findings revealed significant differences between the two groups, with private preschool teachers demonstrating higher levels of knowledge and reporting greater use of instructional strategies for promoting graphomotor development. These findings support the study objectives, which sought to assess teachers' knowledge and determine whether differences existed between government and private preschool settings.

The findings are consistent with previous studies that emphasise the importance of teacher competence and educational environments in supporting graphomotor development. **Sinvani et al. (2023)** reported that environmental and educational factors significantly influence children's graphomotor development, highlighting the importance of teacher practices and learning environments. Similarly, **Trouli and Linardakis (2023)** demonstrated that structured motor skill activities contribute positively to graphomotor performance in preschool children. Furthermore, **Revormis and Saridewi (2022)** found that teachers who implement well-planned classroom activities and use varied learning materials provide more effective support for children's fine motor development. These previous findings are consistent with the present study, which observed higher knowledge and greater use of instructional strategies among private preschool teachers.

- Explain implications for theory, practice, or policy

From a practical perspective, the findings suggest the need to strengthen teacher preparation programmes, particularly for government preschool teachers. Regular professional development programmes, workshops, and competency-based training focused on graphomotor skill development could improve teachers' instructional practices. Educational authorities may also consider integrating graphomotor skill development into preschool curricula and providing teachers with appropriate instructional materials and classroom resources. Strengthening teacher capacity in this area may contribute to improved handwriting readiness, fine motor development, and early learning outcomes among preschool children.

From a theoretical perspective, the study reinforces the view that teacher knowledge and instructional practices are important determinants of children's graphomotor development. The findings support existing theories of early childhood education that emphasise the interaction between teacher competence, classroom environment, and children's motor skill acquisition. The study also provides comparative evidence regarding differences between government and private preschool settings, contributing to the limited literature on teachers' preparedness for graphomotor skill instruction.

- Address limitations of the study

This study has several limitations that should be considered when interpreting the findings. First, the study included **200 preschool teachers from government and private preschools**, which may limit the generalisability of the findings to other geographical regions or educational contexts. Second, the research employed a **cross-sectional quantitative design** using a structured questionnaire; therefore, the findings reflect teachers' responses at a single point in time and do not capture changes in knowledge or instructional practices over time. Third, the study relied on **self-reported data**, which may be subject to response or social desirability bias. Finally, the study focused only on teachers' knowledge and instructional strategies and did not directly assess children's graphomotor skill outcomes or classroom observations. Future research should include larger and more diverse samples, adopt mixed-method or longitudinal designs, and incorporate observational and child outcome measures to provide a more comprehensive understanding of graphomotor skill development.

4. Conclusion

This comparative research clearly demonstrates that preschool teachers' knowledge and strategies concerning graphomotor skill development varies considerably according to the type of preschool in which they are employed. Private school educators demonstrated a superior

comprehension and more proficient use of tactics to develop these abilities in preschoolers. The statistically significant findings underscore the urgent need to address the professional disparities encountered by government school instructors. Graphomotor skills, essential for writing and academic endeavours, need early and continuous assistance from knowledgeable educators. In the absence of equitable training and resource allocation, students in public schools may face disadvantages that might impact their long-term educational outcomes. The report urges educational authorities and stakeholders to engage in specialized teacher training, resource improvement, and curriculum development, particularly within the public preschool sector. It is imperative that all educators, irrespective of the kind of institution, demonstrate robust abilities in graphomotor development techniques to attain fairness and excellence in early childhood education. Ultimately, equipping all preschool instructors with the requisite information and resources will foster more inclusive and effective learning environments for children in their early years.

- Summarize key findings

This study compared the knowledge and instructional strategies of government and private preschool teachers regarding the development of graphomotor skills in preschool children. The findings revealed statistically significant differences between the two groups, with private preschool teachers demonstrating higher levels of knowledge and greater use of instructional strategies than government preschool teachers. These findings indicate that teacher preparedness plays an important role in supporting graphomotor skill development and that differences in institutional settings may influence the quality of instructional practices. The study highlights the importance of equipping preschool teachers with the necessary knowledge and effective teaching strategies to promote children's fine motor development, handwriting readiness, and overall school preparedness.

- Suggest recommendations or future research directions

Based on the findings, it is recommended that educational authorities and preschool administrators organise regular professional development programmes, specialised training workshops, and continuous in-service education to strengthen teachers' knowledge and instructional strategies related to graphomotor skill development. Adequate teaching resources, classroom materials, and activity-based learning approaches should be provided, particularly in government preschools, to ensure equitable learning opportunities for all children. In addition, graphomotor skill development should be incorporated into preschool teacher education programmes and early childhood curricula to enhance the quality of instruction.

Future research should include larger and more diverse samples from different geographical regions to improve the generalisability of the findings. Researchers are also encouraged to employ longitudinal and mixed-method research designs, incorporating classroom observations and direct assessments of children's graphomotor performance, to provide a more comprehensive understanding of the relationship between teachers' instructional practices and children's graphomotor development. Such studies can contribute to the development of evidence-based educational policies and teaching practices that support high-quality early childhood education.

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5. Acknowledgements

Acknowledgement

I thank Professor Dr. Shalini Agarwal and Dr. Khwairakpam Sharmila for their contributions to this work. Additionally, special thanks to the teachers of government and private preschools.

Funding Statement

This research received no specific funding from any funding agency in the public, commercial, or not-for-profit sectors.

Data Availability

No new data were created or analyzed in this study. Data sharing does not apply to this article.

8. Author Declaration

- Confirm originality of work

The authors certify that this manuscript is an original work, has not been published previously, and is not under consideration for publication elsewhere.

- State no conflicts of interest

The authors declare that they have no conflicts of interest related to this study.