



# Impact Of Virtual Teaching On Psychomotor Development Of IX Standard Students

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## ABSTRACT

The present study investigates the impact of virtual teaching on the psychomotor development of IX standard students studying Social Studies (Geography) at Government High School, Chikkabidarakallu, in Bengaluru Urban District. A total of 60 students from Grade IX were selected and equally divided into two groups: an experimental group (N=30), which received instruction through virtual teaching methods and a control group (N=30), which was taught using traditional classroom methods. The virtual teaching intervention incorporated tools such as Zoom and Google Meet for live sessions, multimedia presentations with visual aids and maps, interactive platforms like Kahoot, Quizizz, Canva and Flipgrid, as well as hands-on tasks like map drawing, labeling activities, group discussions and role plays. The study adopted a Randomized Matching Control Group Pre-test Post-test Design. To assess psychomotor development, the researcher developed and standardized a tool consisting of five practical tasks and its reliability was confirmed using the test-retest method. Data analysis using paired sample t-tests and independent sample t-tests showed that students in the virtual teaching group demonstrated significantly greater improvement in psychomotor skills compared to those in the traditional group. The findings suggest that virtual teaching methods effectively enhance not only content learning but also psychomotor abilities in Social Studies education. The study concludes that integrating virtual platforms and interactive digital tools into classroom instruction can foster improved engagement, understanding and skill development. Hence, educators are encouraged to adopt virtual teaching approaches to strengthen psychomotor outcomes in secondary school education.

**Keywords:** Impact, Virtual Teaching, Psychomotor Development, Social Studies, IX standard students.

## 1. INTRODUCTION

In recent years, the integration of technology in education has transformed traditional teaching and learning processes worldwide, including India. The shift towards digital and virtual teaching methods has accelerated, especially following the COVID-19 pandemic, which forced schools to adopt online learning platforms to ensure uninterrupted education (Kumar & Singh, 2021). Virtual teaching leverages various digital tools and multimedia resources that can engage students in interactive and participatory learning, enhancing their cognitive as well as psychomotor skills (Joshi, 2020).

Social Studies, particularly Geography, requires not only theoretical understanding but also the development of practical skills such as map reading, drawing, labeling and spatial visualization, all of which are components of psychomotor development (Rao, 2019). Traditionally, these skills are developed through hands-on classroom activities, but virtual teaching platforms now offer innovative ways to simulate and enhance such psychomotor learning remotely. Interactive tools like digital maps, quizzes and collaborative group activities allow students to practice and refine these skills effectively in virtual environments (Sharma & Gupta, 2022). Despite the growing popularity of virtual teaching in India, research focusing specifically on its impact on the psychomotor development of secondary school students, especially in Social Studies, remains limited. Understanding how virtual teaching influences these practical skills is essential for designing effective teaching strategies that accommodate evolving educational technologies.

## 2. SIGNIFICANCE OF RESEARCH

The significance of this study lies in addressing the educational challenges faced by secondary school students in India regarding the acquisition of psychomotor skills in Social Studies. With the increasing use of virtual teaching methods in Indian schools, it is important to empirically evaluate their effectiveness in promoting psychomotor development alongside cognitive learning (Mehta & Verma, 2023). By focusing on IX standard students learning Geography through virtual platforms, this study provides valuable knowledge into how digital tools can be harnessed to improve practical skills like map drawing and spatial analysis, which are critical for comprehensive understanding in Social Studies. The findings can help educators and policymakers design and implement hybrid teaching models that blend traditional and virtual methods to optimize student learning outcomes (Khatri, 2021). Moreover, this study contributes to the growing body of Indian educational research on technology-enabled learning by emphasizing psychomotor development, an area often overshadowed by cognitive and affective domains in virtual education research. Ultimately, this research supports the Indian government's initiatives towards digital education and skill development under programs like Digital India and National Education Policy 2020 (Ministry of Education, 2020).

## 3. REVIEW OF RELATED LITERATURE

In recent years, the shift toward virtual and blended learning methods has sparked considerable interest among researchers, especially in the field of secondary education. The present study, titled "Impact of Virtual Teaching on Psychomotor Development of IX Standard Students of Social Studies (Geography)," aims to explore how virtual instruction influences the psychomotor abilities of students—a dimension often overlooked in online learning environments. A review of existing literature offers valuable knowledge into how different forms of digital learning affect student outcomes, including engagement, academic performance and skill development.

### 3.2 Studies related to Effect of Virtual Teaching on Psychomotor Development

Akpen et al. (2024) conducted a systematic review using PRISMA guidelines to examine the influence of online learning on student engagement and academic performance. Their analysis of 18 studies highlighted both benefits, such as flexibility and improved learning outcomes and drawbacks like reduced interaction and student isolation. The study emphasized the importance of interactive tools and strong teacher-student communication to sustain engagement.

Sam and Jaleel (2023) explored the effectiveness of online tutoring in enhancing mathematics achievement among secondary school students. Their experimental study found that online tutoring had a significant advantage over activity-based methods, suggesting that virtual instruction can be effective when structured well. Munawar et al. (2023) focused on the impact of blended learning on students' academic performance in Chemistry at the secondary level. Their findings showed that the blended approach significantly improved student outcomes across different cognitive levels of

Bloom's taxonomy, underlining the potential of integrated face-to-face and digital strategies to enhance learning.

Kumar, Gangwar and Mehrotra (2023) conducted a meta-analysis on the impact of blended learning from 2015 to 2021. Their findings revealed a large average effect size (1.46), suggesting that blended learning substantially enhances student academic performance across disciplines. These studies collectively point toward the positive potential of virtual and blended teaching strategies in improving academic outcomes. However, there remains a significant research gap in understanding how virtual methods affect psychomotor development, particularly in subjects like Social Studies where activities such as map reading, spatial orientation and model making are essential. The present study addresses this gap by investigating how virtual teaching influences the hands-on, movement-based skills of Class IX students in Geography.

Kaur and Sharma (2023) explored the effect of blended learning strategies on achievement and self-esteem of elementary school students. Their study used a pre-test post-test control group design on a sample of 100 class VII students from schools affiliated with the Punjab School Education Board. The experimental group, taught using blended learning methods, showed significantly higher mean gain scores in both achievement and self-esteem than the control group taught using traditional methods. This study emphasized the psychological and academic benefits of integrating digital tools with traditional pedagogy. Hassan et al. (2023) examined the impact of blended learning on psychomotor skills among students studying digital photography at King Faisal University. Using an experimental approach with 11 students, the study found statistically significant improvements in all ten psychomotor skills assessed. This highlights how carefully designed blended learning environments can enhance practical, hands-on skill development, especially in technical subjects.

Sengul (2024) conducted a review on the use of virtual reality (VR) in teaching psychomotor and cognitive skills in nursing education. The study found VR to be highly effective in creating immersive, hands-on learning environments. Students could repeat tasks and receive real-time feedback, resulting in improved accuracy and reduced errors in clinical simulations. This integration of psychomotor and cognitive domains aligns well with Bloom's taxonomy and supports the case for VR-based instruction in fields requiring skill precision and competence. In another recent study, Hassan et al. (2024) evaluated the effectiveness of blended learning on psychomotor skills among physical education students in Saudi Arabia. Using a purposive sample of 20 students, the research demonstrated significant post-intervention gains in all ten psychomotor skills assessed. These findings confirm that even physically active domains like physical education benefit from well-structured blended learning environments.

Morosanu et al. (2024) investigated the use of virtual reality in enhancing psychomotor skills of high school students. The VR training program involved motor-cognitive dual-task exercises and resulted in significant improvements in choice reaction time and eye-hand coordination. The experimental group using VR tools outperformed the control group trained through traditional methods. The study concluded that VR-based training can outperform traditional methods in promoting psychomotor development. Earlier, Kaur (2018) emphasized the need for web-based instruction in the psychomotor domain. Her study argued that traditional teaching methods overly focus on the cognitive domain, leaving limited scope for developing practical skills. Web-based instructional packages, however, support learning across all domains of Bloom's taxonomy, enabling learners to apply knowledge in skill-based contexts. This shift is crucial for preparing students for a more skill-oriented future.

### 3.3 Research Gap

While numerous studies have highlighted the effectiveness of virtual, blended and web-based learning in improving students' academic performance, cognitive development and even psychomotor skills in technical and professional courses such as nursing, physical education and digital photography, very few have focused on psychomotor development in school-level Social Studies (Geography). Activities such as map reading, model making and spatial analysis require hands-on interaction, yet there is limited empirical evidence on how these skills are impacted when taught through virtual methods at the secondary school level. Most existing research also emphasizes higher education or STEM subjects, leaving a noticeable gap in understanding how virtual teaching strategies affect movement-based and skill-oriented learning outcomes in non-technical subjects. This study seeks to fill that gap by examining the influence of virtual teaching on the psychomotor abilities of

Class IX students in Social Studies (Geography), providing knowledge into an area that has received minimal attention in educational research.

#### **4. STATEMENT OF THE PROBLEM**

The present study investigates the impact of virtual teaching on the psychomotor development of IX standard students studying Social Studies (Geography) at Government High School, Chikkabidarakallu, in Bengaluru Urban District.

#### **5. OBJECTIVES**

1. To find out the impact of traditional teaching method of teaching on the Psychomotor Abilities of IX standard students learning Geography as a part of social studies.
2. To investigate the impact of virtual method of teaching on the Psychomotor Abilities of IX standard students learning Geography as a part of social studies.
3. To assess the post-test Psychomotor Abilities of IX standard students taught through virtual teaching and traditional teaching methods in Social Studies (Geography).

#### **6. HYPOTHESES**

1. There is no significant difference in the Psychomotor Abilities mean scores of IX standard students in the Traditional Method (TM) Group between the pre-test and post-test examinations that learned through the traditional method.
2. There is no significant difference in the Psychomotor Abilities mean scores of IX standard students in the Virtual Teaching (VT) Group between the pre-test and post-test examinations that learned through the virtual teaching method.
3. There is no significant difference in the post-test Psychomotor Abilities mean scores between the Virtual Teaching (VT) Group and the Traditional Method (TM) Group.

#### **7. METHODOLOGY**

The present study investigates the impact of virtual teaching on the psychomotor development of IX standard students studying Social Studies (Geography) at Government High School, Chikkabidarakallu, in Bengaluru Urban District. A total of 60 students from Grade IX were selected and equally divided into two groups: an experimental group (N=30), which received instruction through virtual teaching methods and a control group (N=30), which was taught using traditional classroom methods. The virtual teaching intervention incorporated tools such as Zoom and Google Meet for live sessions, multimedia presentations with visual aids and maps, interactive platforms like Kahoot, Quizizz, Canva and Flipgrid, as well as hands-on tasks like map drawing, labeling activities, group discussions and role plays. The study adopted a Randomized Matching Control Group Pre-test Post-test Design. To assess psychomotor development, the researcher developed and standardized a tool consisting of five practical tasks and its reliability was confirmed using the test-retest method. Statistical techniques like paired samples 't' test as well as independent samples t-test were employed to analyze the significance of improvement resulting from the intervention (virtual teaching instruction). The data collected were analyzed using SPSS and MS Excel. The level of significance was set at 0.05 and 0.01 levels of confidence.

#### **8. ANALYSIS OF DATA**

The collected data are examined based on the objectives as well as hypotheses using paired 't' test and an independent samples 't' test on the Psychomotor Abilities in Social science (geography) scores of IX standard students.

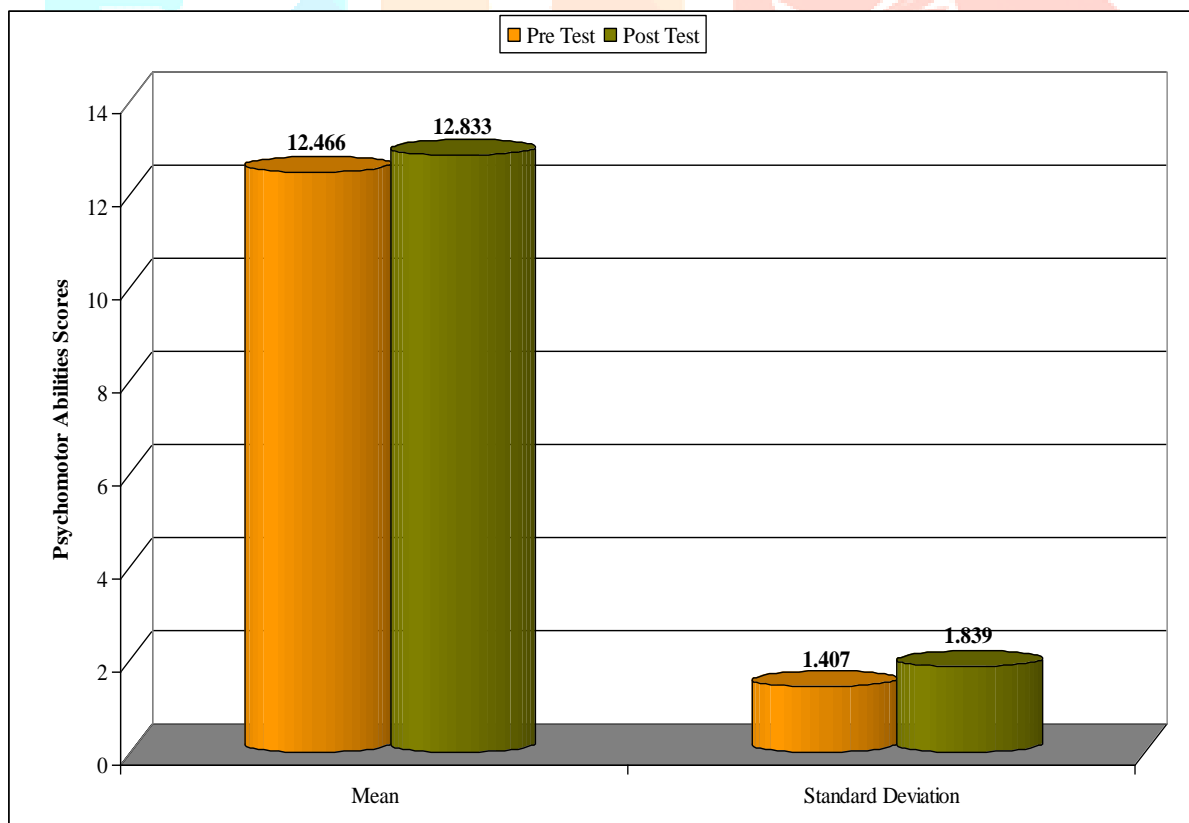
**Table-1:** Table shows of comparison of Psychomotor Abilities mean scores of IX standard students in the Traditional Method (TM) Group between the pre-test and post-test examinations that learned through the traditional method.

Test	No.	Traditional Method (TM) Group					
		Mean	Standard Deviation	Obtained 't' Value	df	Table Value	Results
Pre Test	30	12.466	1.407	1.65	29	2.04 at 0.05 level	Not Significant
Post Test	30	12.833	1.839				

Table 1 presents the comparison of Psychomotor Abilities mean scores of IX standard students in the Traditional Method (TM) Group between the pre-test and post-test. The sample consists of 30 students who were taught using traditional classroom methods. The mean score in the pre-test was 12.466 with a standard deviation of 1.407, while the post-test mean was slightly higher at 12.833, with a standard deviation of 1.839.

To determine whether this difference is statistically significant, a paired samples 't' test was conducted. The obtained 't' value was 1.65, which is less than the table value of 2.04 at the 0.05 level of significance with 29 degrees of freedom. As the calculated 't' value does not exceed the critical value, the result is considered not significant.

Hence, the null hypothesis-1 stating that there is no significant difference in the Psychomotor Abilities mean scores of students in the Traditional Method Group between the pre-test and post-test is accepted. This implies that the traditional method of teaching Geography did not lead to a statistically significant improvement in the psychomotor abilities of the students in this group.



**Fig.1:** Graph shows comparison of Psychomotor Abilities mean scores of pre and post tests of IX standard students of CG Group those who learnt through the traditional method.

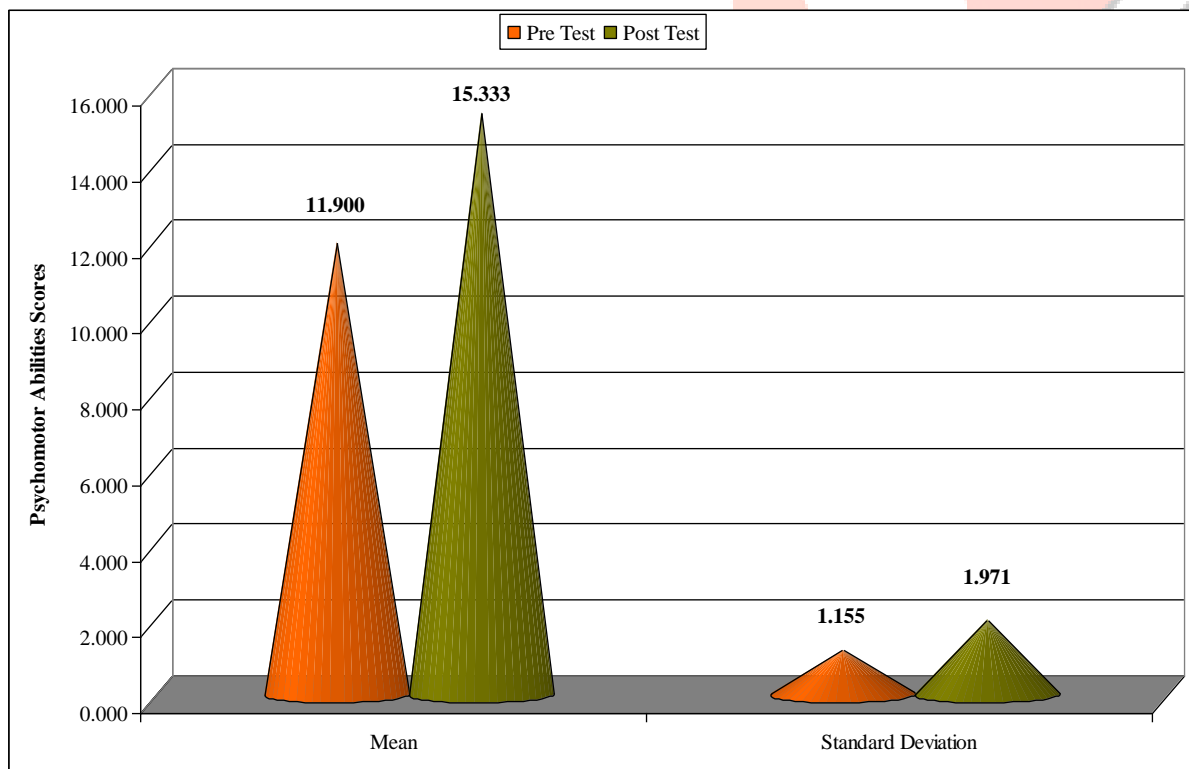
**Table-2:** Table shows of comparison of Psychomotor Abilities mean scores of IX standard students in the in the Virtual Teaching (VT) Group between the pre-test and post-test examinations that learned through the virtual teaching method.

Test	No.	Virtual Teaching (VT) Group					
		Mean	Standard Deviation	Obtained 't' Value	df	Table Value	Results
Pre Test	30	11.900	1.155	10.59	29	2.76 at 0.01 level	Significant at 0.01 level
Post Test	30	15.333	1.971				

Table 2 displays the comparison of Psychomotor Abilities mean scores of IX standard students in the Virtual Teaching (VT) Group between the pre-test and post-test. The group comprises 30 students who were taught Geography through a structured virtual teaching method. The mean score in the pre-test was 11.900 with a standard deviation of 1.155, while the post-test mean score increased substantially to 15.333, with a standard deviation of 1.971.

To analyze the statistical significance of this improvement, a paired samples 't' test was conducted. The obtained 't' value was 10.59, which is much greater than the table value of 2.76 at the 0.01 level of significance with 29 degrees of freedom. Since the calculated 't' value exceeds the critical value at the 0.01 level, the result is considered highly significant.

Therefore, the null hypothesis-2 stating that there is no significant difference in the Psychomotor Abilities mean scores of students in the Virtual Teaching Group between the pre-test and post-test is rejected. This means that virtual teaching had a statistically significant positive impact on the psychomotor abilities of IX standard students in Geography. The substantial increase in post-test scores suggests that virtual instruction effectively enhanced hands-on and skill-based learning in this subject.



**Fig.2:** Graph shows comparison of Psychomotor Abilities mean scores of pre and post tests of IX standard students of Virtual Teaching (VT) Group who learned through the virtual teaching method.

**Table-3:** Pre and Post Test Scores of Psychomotor Abilities scores of IX standard students between TM and VM Groups through independent samples 't' test

Test	Groups	Mean	Standard Deviation	Std. Error Mean	't' and 'P' value	Level of Significance
Pre	TM Group (N=30)	12.466	1.407	0.257	1.70 (P=0.094)	NS
	VT Group (N=30)	11.900	1.155	0.210		
Post	TM Group (N=30)	12.833	1.839	0.335	5.07 (P=0.000)	**
	VT Group (N=30)	15.333	1.971	0.359		

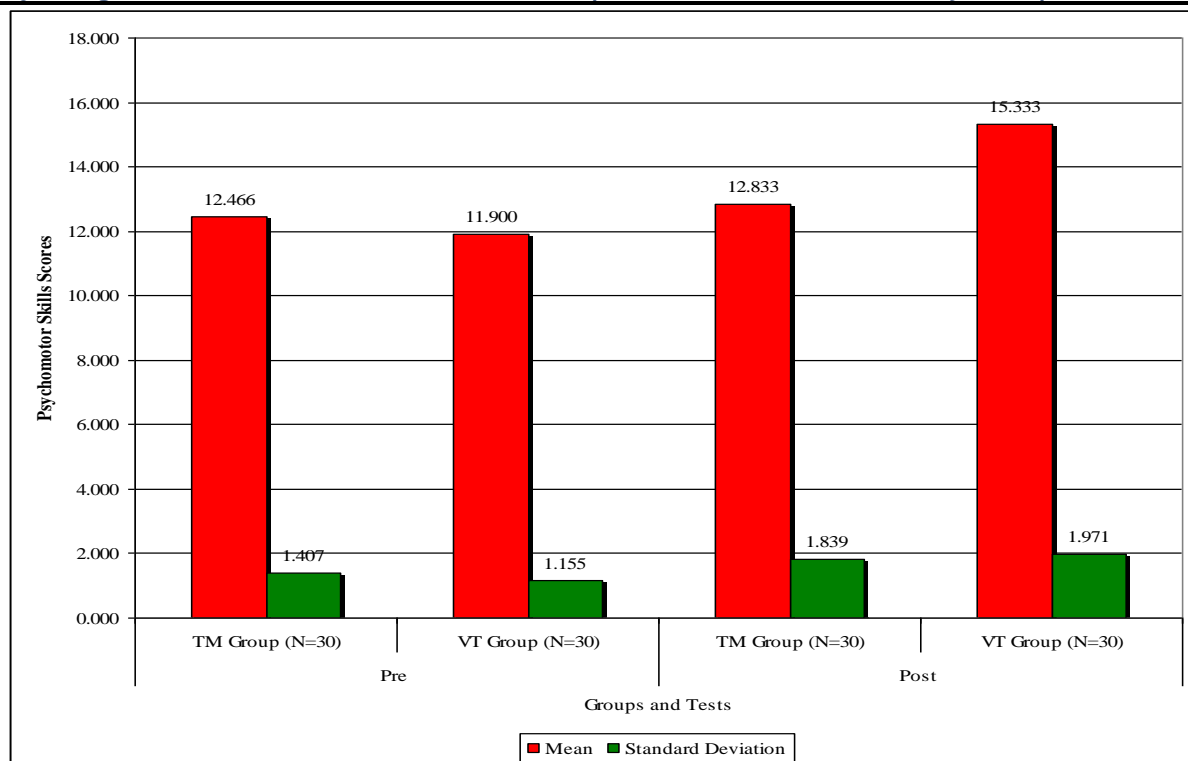
<sup>NS</sup> indicates Not Significant at 0.05 level; \*\* indicates significant at 0.01 level (df = 58, 2.66).

Table 3 presents the results of an independent samples 't' test comparing the Psychomotor Abilities mean scores of IX standard students taught through Traditional Method (TM) and Virtual Teaching (VT) in Social Studies (Geography). The table includes both pre-test and post-test scores for the two groups, each consisting of 30 students.

In the pre-test, the TM Group recorded a mean score of 12.466 with a standard deviation of 1.407, while the VT Group had a mean score of 11.900 with a standard deviation of 1.155. The obtained 't' value was 1.70 with a p-value of 0.094, which is not significant at the 0.05 level. This indicates that there was no statistically significant difference in psychomotor abilities between the two groups before the intervention, implying that both groups started at a relatively similar baseline.

In the post-test, however, there is a remarkable change. The TM Group's mean score rose modestly to 12.833 (SD = 1.839), while the VT Group's mean score increased more substantially to 15.333 (SD = 1.971). The 't' value for the post-test is 5.07 with a p-value of 0.000, which is highly significant at the 0.01 level (critical value = 2.66, df = 58).

This result leads to the rejection of Null Hypothesis-3, indicating that there is a statistically significant difference in post-test psychomotor ability scores between students taught through virtual teaching and those taught through traditional methods. Specifically, the Virtual Teaching Group performed significantly better, demonstrating that virtual instruction is more effective in enhancing psychomotor skills related to Geography in Class IX students. These findings support the growing body of literature that emphasizes the benefits of interactive and technology-supported instruction in improving not only cognitive but also psychomotor learning outcomes.



**Fig.3:** Graph shows comparison of Pre and Post Test Scores of Psychomotor Abilities scores of IX standard students between TM and VM Groups

## 9. MAJOR FINDINGS

The analysis of data yielded the following key findings:

1. There was no significant difference between the pre-test and post-test scores of the Traditional Method (TM) Group, indicating that traditional teaching had a minimal effect on the psychomotor development of IX standard students learning Geography.
2. The Virtual Teaching (VT) Group showed a statistically significant improvement in psychomotor abilities from pre-test to post-test, with a notable increase in the mean score, demonstrating the positive impact of virtual instruction on psychomotor skill development.
3. A comparison of post-test scores between the TM and VT groups revealed that the VT Group significantly outperformed the TM Group. This confirms that virtual teaching was more effective than traditional methods in enhancing psychomotor abilities in Geography.

## 10. DISCUSSION OF FINDINGS

The findings of the present study align with several recent studies that highlight the effectiveness of digital and virtual teaching strategies in improving various learning outcomes, particularly in the psychomotor domain. The results support the work of Hassan et al. (2023, 2024), who found that blended and virtual learning methods significantly improved psychomotor skills among university students studying digital photography and physical education. The virtual format enabled repeated practice, visual guidance and real-time feedback, all of which are crucial for psychomotor skill acquisition. Morosanu et al. (2024) similarly found that VR-based interventions significantly enhanced students' eye-hand coordination and reaction times, outperforming traditional training methods. These improvements are attributed to the immersive and interactive nature of virtual environments. Kaur and Sharma (2023) demonstrated that blended learning improved not only achievement but also self-esteem, showing the broader psychological and academic benefits of integrating digital tools with traditional instruction. These findings collectively affirm that virtual learning strategies, when well-designed and appropriately implemented, have the potential to effectively develop both cognitive and psychomotor skills, particularly in skill-based areas like Geography, which involves map reading, spatial orientation and model-based learning.

## 11. CONCLUSION

The study concludes that virtual teaching has a significant positive impact on the psychomotor development of IX standard students learning Geography, whereas traditional methods do not produce such improvements. Virtual instruction, with its capacity for simulation, interactivity and student-centered engagement, proves to be more effective in developing movement-based and practical skills required in Social Studies (Geography). The results call for a shift in pedagogy to embrace technologically enriched learning environments that support experiential and hands-on learning.

## 12. EDUCATIONAL IMPLICATIONS

The findings of the present study have significant educational implications for students, teachers and schools, particularly in the context of integrating virtual teaching into subjects that involve psychomotor skill development like Geography. Virtual teaching methods have proven to be effective in enhancing student engagement and fostering practical skill development. Through digital platforms, students can practice tasks multiple times, which helps in building confidence, improving hand-eye coordination and strengthening learning retention. Unlike traditional methods that primarily focus on theoretical understanding, virtual learning environments allow students to apply their knowledge through activities like map reading, model construction and spatial interpretation. This not only deepens comprehension but also encourages active learning and critical thinking.

Teachers play a crucial role in successfully implementing virtual instruction. To maximize the benefits of such methods, educators must be trained in using digital tools, simulations and interactive resources that support the development of psychomotor skills. Moving away from traditional lecture-based strategies to more activity-driven, student-centered approaches significantly improves learning outcomes. By embracing technological innovations, teachers create immersive and engaging learning experiences that encourage students to participate actively and develop real-world skills.

At the institutional level, schools must prioritize investments in ICT infrastructure, ensuring access to reliable internet connectivity, digital devices and educational software. This is essential for the seamless delivery of virtual content. Curriculum developers should also work towards embedding virtual and blended learning modules into subjects that require experiential learning. Furthermore, schools establish collaborations with EdTech companies to provide high-quality digital content and teacher training, ultimately creating a more dynamic and skill-oriented learning environment for students.

## 13. SUGGESTIONS FOR FURTHER RESEARCH

1. Future studies can explore the long-term effects of virtual instruction on psychomotor development.
2. Comparative studies may be conducted across different subjects and grade levels to generalize the findings.
3. Further Research can also focus on gender-wise, rural-urban or socio-economic variations in response to virtual teaching.
4. Further exploration into the use of VR (Virtual Reality), AR (Augmented Reality) and gamified learning environments for psychomotor training in schools is recommended.
5. Qualitative studies involving student and teacher feedback on virtual experiences can offer richer knowledge for pedagogical innovation.

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