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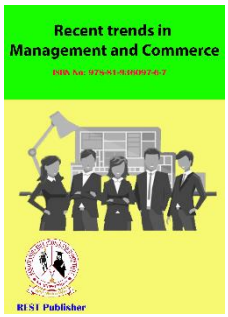

From Classroom to Cloud: Perceptions of IMT and AI Skills Among Mumbai's Teachers in A Digital Age

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Abstract: *This study explores Mumbai's teachers' perceptions of Information, Media, and Technology (IMT) and Artificial Intelligence (AI) skills in teaching, particularly in the post-pandemic era. The transition to digital education during COVID-19 prompted rapid adoption of these skills, yet their long-term relevance in traditional classrooms remains uncertain. Through a qualitative exploratory approach, 300 teachers were surveyed on how IMT/AI skills have impacted their teaching methods, student engagement, and professional growth.*

Findings show mixed responses: while many teachers recognize the potential of IMT/AI in fostering interactive and collaborative learning, others feel uncertain about their ongoing value. Some teachers have successfully integrated these tools, enhancing lesson delivery and student interaction. However, confidence levels vary, and there is notable dissatisfaction with current professional development programs, suggesting a need for more practical, relevant training.

The study concludes that IMT and AI skills can significantly enhance educational practices if supported by targeted training and resources. These findings provide insights for policymakers and educational institutions seeking to promote effective digital integration. By addressing the gaps in digital training, schools can empower teachers to leverage IMT and AI for improved teaching outcomes in both digital and traditional learning environments.

Keywords: *IMT skills, AI in education, post-pandemic education, digital literacy, professional development, interactive learning, collaborative learning, educational technology.*

1. INTRODUCTION

The integration of Information, Media, and Technology (IMT) skills, coupled with Artificial Intelligence (AI), has significantly transformed educational practices in recent years. The COVID-19 pandemic further accelerated the adoption of these digital tools, reshaping how educators deliver lessons and interact with students. As classrooms shifted online, teachers were required to rapidly adapt to these new technologies, which have continued to play a vital role even in post-pandemic educational settings. This shift has prompted an examination of how effectively these skills enhance teaching and learning, especially in urban areas such as Mumbai, where digital adoption is more feasible due to better access to technology. Mumbai's teachers, operating in a dynamic educational landscape, are now at the forefront of using IMT and AI skills to facilitate learning. Their perceptions and experiences are crucial to understanding the practical benefits and challenges associated with these technologies. This study seeks to capture the insights of teachers regarding the effectiveness and relevance of IMT and AI skills in improving student engagement, lesson delivery, and learning outcomes, while also considering their views on the necessity of continuous professional development in digital skills. By focusing on teachers' experiences, this study aims to provide a comprehensive understanding of the perceived value of IMT and AI skills in modern education. It delves into whether these technologies are considered beneficial tools for enhancing teaching effectiveness and learning engagement or if they present obstacles due to insufficient training or support. The findings from this study can offer valuable insights for educational policymakers, administrators, and institutions seeking to optimize digital integration in educational settings.

2. RESEARCH OBJECTIVES

1. To explore the perceptions of Mumbai's teachers regarding the effectiveness of IMT and AI skills in teaching.
2. To analyze the relevance of IMT and AI skills in improving teaching and learning experiences post-pandemic.

3. REVIEW OF LITERATURE

Akcaoglu and Lee (2020) conducted a mixed-methods study to examine the impact of microteaching experiences with technology on the confidence of preservice teachers. The researchers implemented a microteaching intervention focused on technology use and collected both quantitative and qualitative data to assess its effects on future educators' confidence. The findings demonstrated that participating in microteaching experiences significantly enhanced preservice teachers' readiness to integrate technology into their lessons. The study emphasized the importance of providing practical experience with educational technology to build confidence and expertise among future teachers.

Baturay, Kuzu, and Ogan-Bekiroglu (2021) analyzed the online experiences of primary school teachers during the COVID-19 pandemic. Through questionnaires, the researchers investigated the challenges faced by instructors during the transition to online instruction and explored potential solutions. The difficulties identified included technology issues, low student engagement, and increased workload. The study emphasized the value of providing teachers with tools and resources to enhance their proficiency in online education.

Bolliger, Reisetter, and Martin (2020) conducted a case study examining interactions between online teachers and students. The researchers conducted interviews with both teachers and students to gather firsthand accounts of their experiences in virtual classrooms. The results provided insights into effective classroom practices, student engagement strategies, and ways to overcome common obstacles. The research underscored the importance of establishing clear norms and expectations for online learning environments among instructors and students.

Crompton, Burke, and Gregory (2020) conducted a comprehensive review on mobile learning in K-12 settings. By analyzing multiple studies, the researchers investigated the advantages, disadvantages, and effective approaches to mobile learning. The research revealed promising outcomes, including increased student interest, motivation, and performance in the classroom. The study highlighted the importance of pedagogical practices and adequate infrastructure while emphasizing the potential of mobile learning to enable personalized and authentic learning experiences in K-12 education.

Eren and Ozdamli (2021) explored the impact of the flipped learning strategy on students' information literacy during the 2009 COVID-19 pandemic. Using a flipped instructional model and quantitative data collection, the study evaluated students' information literacy skills. The findings indicated significant improvement in students' information literacy as a result of engaging with the flipped learning approach. The research emphasized the potential of the flipped learning approach, particularly in distance education, to enhance students' independent learning, critical thinking, and effective information use.

Huang, Tlili, Chang, Zhang, Nascimbeni, and Burgos (2020) investigated the use of open educational practices and resources in China to compensate for lost class time during the COVID-19 pandemic. The study examined the challenges faced by schools and the strategies employed to maintain effective teaching and learning. The research underscored the importance of having the necessary infrastructure in place and providing adequate training and support to educators and students to facilitate successful remote learning.

Janssen and Stoyanov (2020) conducted a systematic literature review on teacher professional development using collaboration tools. By examining previous research, the study aimed to identify the most beneficial collaboration tools for fostering teachers' professional growth. The findings highlighted the potential of collaborative tools to improve teacher communication, self-reflection, and teamwork. The research emphasized the inclusion of collaboration technologies in teacher training programs to promote professional growth and cultivate a collaborative learning environment among educators.

Khan and Almutairi (2021) surveyed early childhood education instructors in Saudi Arabia to explore their perspectives on integrating ICT into the classroom. Through questionnaires and interviews, the researchers gathered insights into the benefits and challenges of adopting ICT in early childhood education. The results

emphasized the usefulness of ICT in facilitating distance education, particularly in terms of communication, student engagement, and resource sharing. The study highlighted the importance of professional development programs and support to enhance teachers' ICT skills and confidence in technology integration.

Koc and Bakr (2020) surveyed professors in Turkey to examine their perspectives on e-learning during the H1N1 pandemic. The surveys aimed to gather information about instructors' views on the advantages and challenges of online teaching. The study revealed that faculty perspectives were influenced by factors such as technological difficulties, workload concerns, pedagogical considerations, and the need for professional development. The research underscored the significance of faculty support and resource provision for the effective implementation of online education.

Tomczyk and Tomczykowa (2021) investigated the impact of the COVID-19 pandemic on educators' technology use for instruction and communication. Through surveys, the researchers explored educators' experiences and perspectives regarding the pandemic's effects on their technology integration in the classroom. The findings indicated a substantial impact on educators' ICT competence, with many reporting improvements in this area. The study emphasized the need for ongoing training and support to enhance educators' ICT proficiency in the modern classroom.

The study conducted by Carpenter and Krutka (2014) aimed to explore the utilization of Twitter by educators as a professional learning tool. The sample consisted of 755 educators from diverse educational backgrounds, including K-12 teachers, higher education faculty, and administrators. The research was conducted in the United States, covering various regions across the country. To gather data, a survey questionnaire comprising both closed-ended and open-ended questions was utilized. The results indicated that educators utilized Twitter for a multitude of purposes, such as professional development, resource sharing, networking, and engaging in educational discussions. The study highlighted the significance of Twitter as a platform for fostering connections among educators, enhancing professional growth, and facilitating the exchange of knowledge and resources.

4. RESEARCH SIGNIFICANCE

This study is significant as it addresses the growing need for digital proficiency in education by investigating the real-world implications of IMT and AI skills among teachers in Mumbai. By highlighting the perspectives of educators, this research provides valuable insights into the successes and challenges associated with integrating these technologies into teaching practices. Understanding these perspectives is crucial for educational policymakers and institutions to make informed decisions on training, resource allocation, and support mechanisms, ultimately aiming to enhance teaching quality and student outcomes in an increasingly digital educational landscape.

5. RESEARCH METHODOLOGY

This study uses a qualitative exploratory approach combined with quantitative analysis. A structured questionnaire was given to 300 Mumbai teachers to assess their perceptions of IMT and AI skills. Descriptive statistics summarized key trends, while thematic analysis explored qualitative insights. One-sample statistical tests supported findings, with frequency tables and graphs visually highlighting teachers' responses on skill relevance, confidence, and satisfaction with training. This mixed-methods approach provides a well-rounded understanding of the role and impact of IMT and AI skills in education post-pandemic.

Data Analysis

TABLE 1. Frequency table enhanced IMT/ AI skills acquired in the wake of the pandemic

Do you think the enhanced IMT/ AI skills you acquired in the wake of the pandemic will continue to be beneficial for your teaching even after the pandemic is over?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, they will be highly beneficial	13	4.3	4.3	4.3
	Yes, they will be somewhat beneficial	50	16.7	16.7	21.0
	Neutral, they may or may not be beneficial	21	7.0	7.0	28.0
	No, they will not be very beneficial	86	28.7	28.7	56.7
	No, they will not be beneficial at all	130	43.3	43.3	100.0
	Total	300	100.0	100.0	

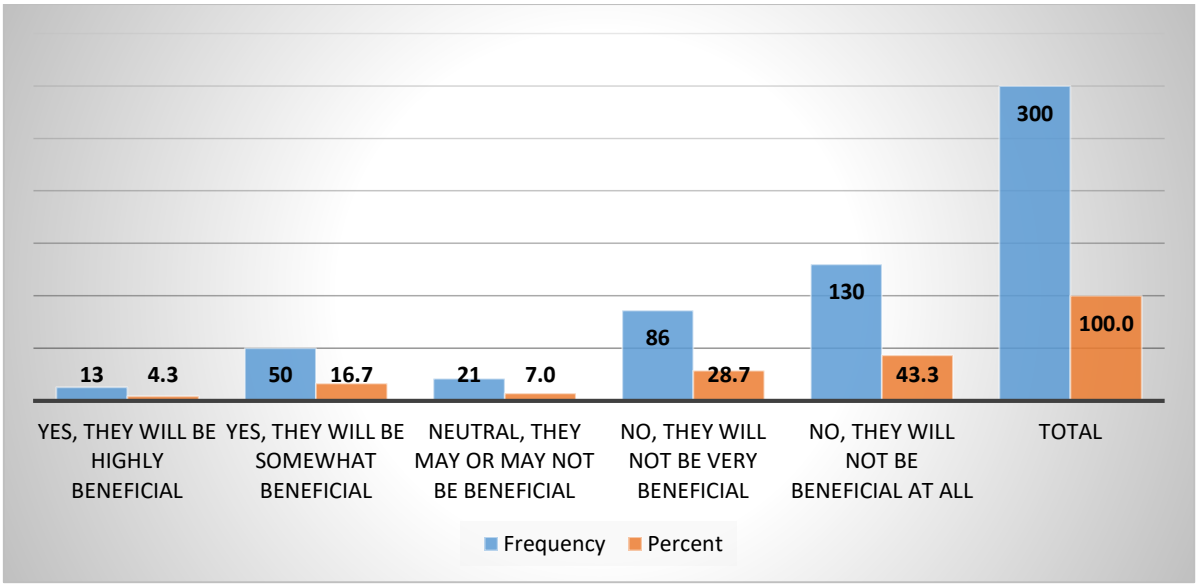

FIGURE 1. Frequency graph of enhanced IMT/ AI skills acquired in the wake of the pandemic

Table 1 presents the frequency distribution of teachers' perceptions regarding whether the enhanced IMT/AI skills they acquired during the pandemic will continue to be beneficial for their teaching after the pandemic. The data shows that only 13 teachers (4.3%) believe these skills will be highly beneficial, and 50 teachers (16.7%) think they will be somewhat beneficial. A smaller group of 21 teachers (7.0%) are neutral, unsure if the skills will be beneficial. However, a significant portion of teachers, 86 (28.7%), feel that the skills will not be very beneficial, and 130 teachers (43.3%) believe they will not be beneficial at all.

These results suggest that a large majority of teachers (72.0%) are skeptical about the long-term benefits of the IMT/AI skills they acquired during the pandemic, indicating concerns about the relevance or applicability of these skills in the post-pandemic teaching environment. This highlights the need to better align technological training with ongoing teaching needs to ensure that the skills acquired remain valuable beyond the immediate crisis.

TABLE 2. Frequency table improved IMT/ AI skills influenced teaching methods

Have the improved IMT/ AI skills influenced your teaching methods and approaches positively in the wake of the pandemic?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, they have positively influenced my teaching	87	29.0	29.0	29.0
	No, they have not had a significant impact on my teaching	108	36.0	36.0	65.0
	I am unsure	105	35.0	35.0	100.0
	Total	300	100.0	100.0	

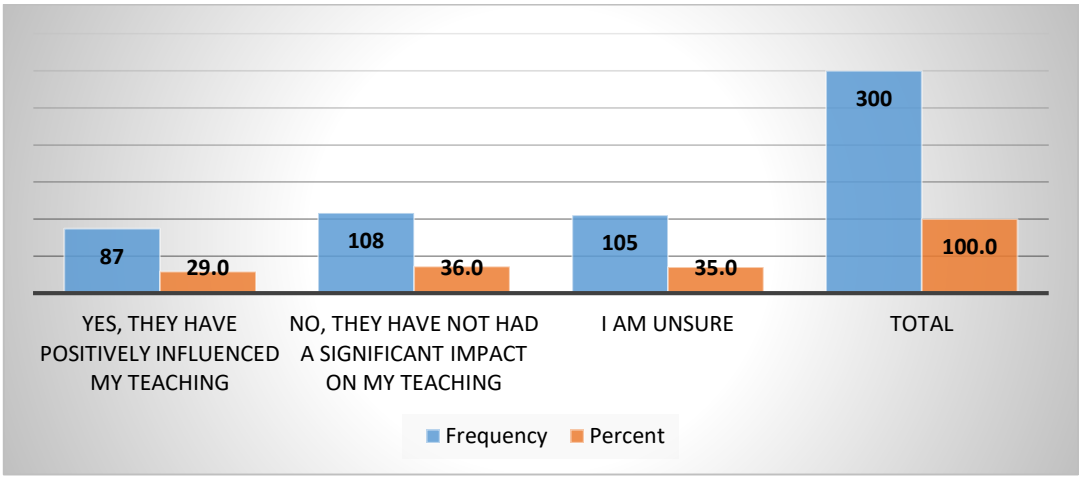

FIGURE 2. Frequency graph of improved IMT/ AI skills influenced teaching methods

Table 2 presents the frequency distribution of teachers' responses regarding whether the improved IMT/AI skills they acquired during the pandemic have positively influenced their teaching methods and approaches. The data shows that 87 teachers (29.0%) believe the skills have positively influenced their teaching, while 108 teachers (36.0%) feel the skills have not had a significant impact. Additionally, 105 teachers (35.0%) are unsure about the impact of these skills on their teaching. These results indicate a mixed response, with a relatively even distribution between those who felt a positive impact and those who either did not perceive a significant influence or were unsure. This suggests that while some teachers have successfully integrated IMT/AI skills into their teaching methods, a larger portion remains uncertain or has not experienced substantial changes, highlighting the need for further exploration into how these skills can be effectively applied in various teaching contexts.

TABLE 3. Frequency table for utilize the newly acquired IMT/ AI skills in teaching

How frequently did you utilize the newly acquired IMT/ AI skills in your teaching in the wake of the pandemic?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very frequently	46	15.3	15.3	15.3
	Frequently	84	28.0	28.0	43.3
	Occasionally	97	32.3	32.3	75.7
	Never	73	24.3	24.3	100.0
	Total	300	100.0	100.0	

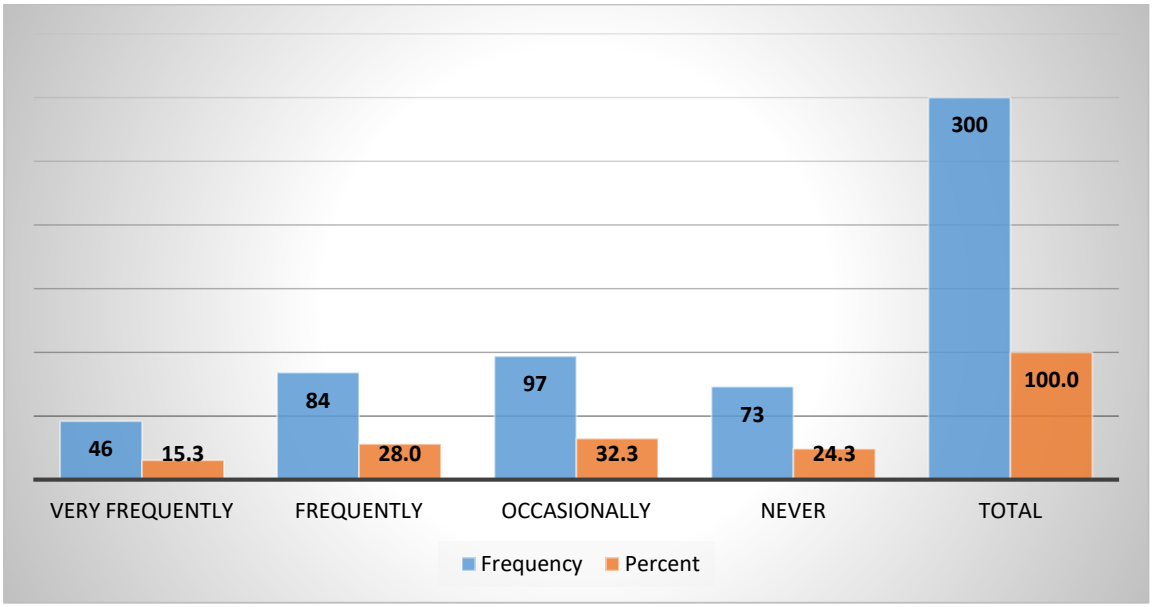

FIGURE 3. Frequency graph for utilize the newly acquired IMT/ AI skills in teaching

Table 3 presents the frequency distribution of how often teachers utilized their newly acquired IMT/AI skills in their teaching during the pandemic. The data shows that 46 teachers (15.3%) used these skills very frequently, while 84 teachers (28.0%) used them frequently. The majority, 97 teachers (32.3%), reported using the skills occasionally, and 73 teachers (24.3%) never utilized the newly acquired skills.

These results indicate that while a portion of teachers incorporated IMT/AI skills regularly into their teaching, a significant number either used them only occasionally or not at all. This suggests variability in the adoption of these skills, with some teachers integrating them more fully into their teaching practices, while others may have faced barriers or challenges in consistently applying the skills they acquired.

TABLE 4. Frequency table for recommend the professional development programs and available resources for enhancing IMT/ AI skills

Would you recommend the professional development programs and available resources for enhancing IMT/ AI skills to your fellow teachers?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, highly recommend	13	4.3	4.3	4.3
	Yes, recommend	50	16.7	16.7	21.0
	Neutral	21	7.0	7.0	28.0
	No, do not recommend	86	28.7	28.7	56.7
	No, strongly do not recommend	130	43.3	43.3	100.0
	Total	300	100.0	100.0	

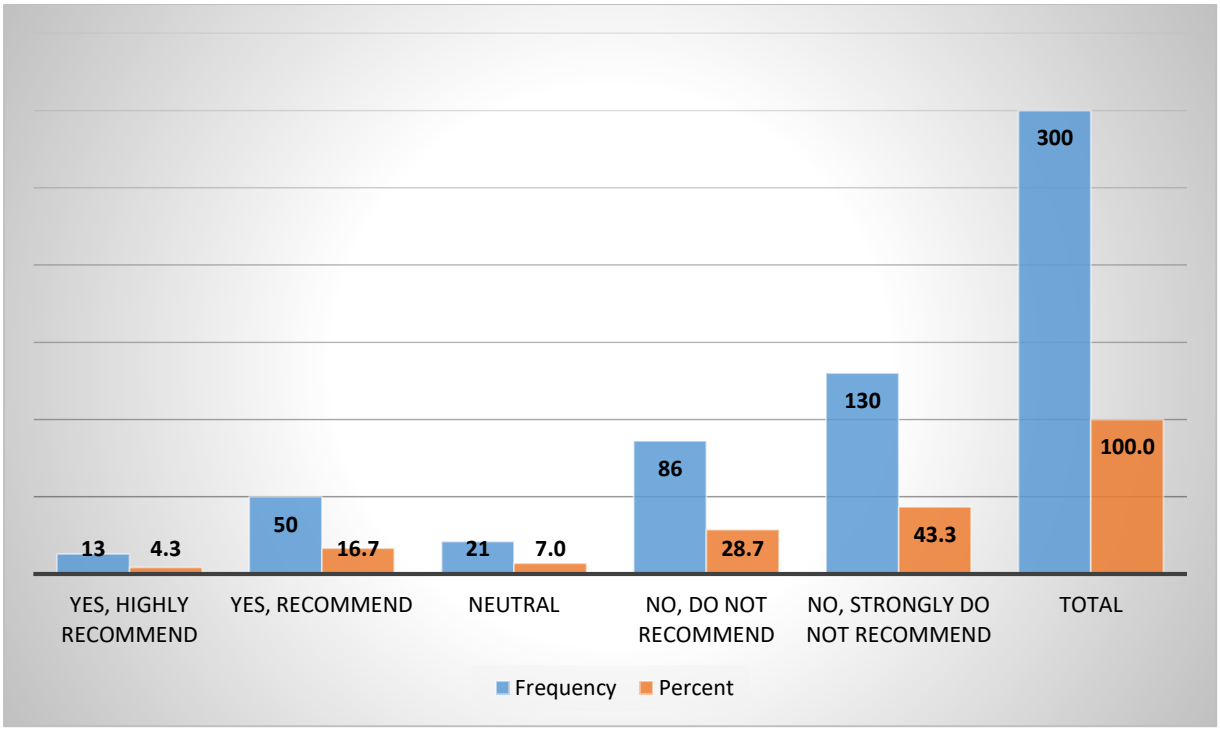

FIGURE 4. Frequency graph for recommend the professional development programs and available resources for enhancing IMT/ AI skills

Table 4 presents the frequency distribution of teachers' willingness to recommend the professional development programs and available resources for enhancing IMT/AI skills to their fellow teachers. The data shows that only 13 teachers (4.3%) would highly recommend the programs, while 50 teachers (16.7%) would recommend them. A smaller group of 21 teachers (7.0%) remain neutral. However, a significant portion, 86 teachers (28.7%), would not recommend the programs, and 130 teachers (43.3%) strongly do not recommend them.

These findings indicate a general dissatisfaction with the professional development programs and resources aimed at enhancing IMT/AI skills, with the majority of teachers (72.0%) unwilling to recommend them. This suggests that many teachers found the programs to be ineffective or lacking, underscoring the need for improvements in the quality and relevance of these training initiatives.

H_{01}: "Teachers are likely to perceive IMT skills, including proficiency in AI and other emerging technologies, as crucial and relevant for effective teaching and learning in the post-pandemic era, recognizing the importance of digital literacy, online pedagogy, and the integration of AI."

H_{A1}: "Teachers are do not likely to perceive IMT skills, including proficiency in AI and other emerging technologies, as crucial and relevant for effective teaching and learning in the post-pandemic era, recognizing the importance of digital literacy, online pedagogy, and the integration of AI."

TABLE 5. One-Sample Statistics table for perceptions and experiences of Mumbai's teachers regarding the effectiveness and relevance of IMT/ AI skills

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
I believe that IMT/ AI skills are essential for effective teaching and learning in today's digital age.	300	2.68	1.138	.066
IMT/ AI skills have improved my ability to deliver content and interact with students in the online setting.	300	2.15	1.422	.082
I find that incorporating IMT/ AI skills in my teaching makes the learning experience more engaging for students.	300	1.82	.604	.035
IMT/ AI skills have helped me adapt to the challenges of remote teaching in the wake of the pandemic.	300	2.92	.848	.049
I feel confident in my ability to use various technology tools and platforms for teaching purposes.	300	2.61	.821	.047
Give your feedback on my use of IMT/ AI skills in teaching has been positive.	300	2.58	.844	.049
I have received adequate training and support to develop my IMT/ AI skills for remote teaching.	300	3.90	1.247	.072
IMT/ AI skills have allowed me to create a more interactive and collaborative learning environment online.	300	3.94	1.261	.073
I believe that continuously improving my IMT/ AI skills is important for my professional development.	300	3.87	1.274	.074
The use of IMT/ AI skills has positively impacted students' learning outcomes in remote education.	300	3.61	1.353	.078

The one-sample statistics in Table 5 provide an overview of Mumbai teachers' perceptions and experiences regarding the importance and effectiveness of IMT/AI skills in the post-pandemic teaching landscape. The highest mean value of 3.94 indicates that teachers strongly agree that IMT/AI skills have enabled them to create more interactive and collaborative online learning environments. Additionally, a mean of 3.87 shows that teachers recognize the importance of continuously improving their IMT/AI skills for professional development. However, the mean of 2.68 for the statement "IMT/AI skills are essential for effective teaching and learning" suggests moderate agreement, indicating that while many teachers see value in these skills, there is still some variation in perception. Teachers also expressed a moderate level of confidence in using technology tools (mean of 2.61), and they feel that these skills have positively impacted student learning outcomes, with a mean of 3.61. The results support the null hypothesis (H01) that teachers generally perceive IMT/AI skills as crucial for effective teaching and learning in today's digital age.

TABLE 6. One-Sample Test table for perceptions and experiences of Mumbai's teachers regarding the effectiveness and relevance of IMT/ AI skills (One-Sample Test)

	Test Value = 0.5					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
I believe that IMT/ AI skills are essential for effective teaching and learning in today's digital age.	33.244	299	.000	2.183	2.05	2.31
IMT/ AI skills have improved my ability to deliver content and interact with students in the online setting.	20.104	299	.000	1.650	1.49	1.81
I find that incorporating IMT/ AI skills in my teaching makes the learning experience more engaging for students.	37.785	299	.000	1.317	1.25	1.39
IMT/ AI skills have helped me adapt to the challenges of remote teaching in the wake of the pandemic.	49.471	299	.000	2.423	2.33	2.52
I feel confident in my ability to use various technology tools and platforms for teaching purposes.	44.533	299	.000	2.110	2.02	2.20
Give your feedback on my use of IMT/ AI skills in teaching has been positive.	42.676	299	.000	2.080	1.98	2.18
I have received adequate training and support to develop my IMT/ AI skills for remote teaching.	47.222	299	.000	3.400	3.26	3.54
IMT/ AI skills have allowed me to create a more interactive and collaborative learning environment online.	47.187	299	.000	3.437	3.29	3.58
I believe that continuously improving my IMT/ AI skills is important for my professional development.	45.867	299	.000	3.373	3.23	3.52
The use of IMT/ AI skills has positively impacted students' learning outcomes in remote education.	39.812	299	.000	3.110	2.96	3.26

The one-sample test in Table 6 evaluates the perceptions and experiences of Mumbai's teachers regarding the effectiveness and relevance of IMT/AI skills for teaching and learning. The test value used for comparison is 0.5, and all t-values are highly significant, with p-values (Sig. 2-tailed) of 0.000, indicating that the mean differences for all items are statistically significant and far above the test value. For the statement "IMT/AI skills are essential for effective teaching and learning in today's digital age," the t-value is 33.244, with a mean difference of 2.183. This shows that teachers strongly agree with this statement. The statement "IMT/AI skills have allowed me to create a more interactive and collaborative learning environment online" has one of the highest t-values (47.187) and a mean difference of 3.437, further emphasizing teachers' strong agreement with the positive role of IMT/AI in enhancing interaction and collaboration. Similarly, statements related to confidence in using technology tools (t-value of 44.533) and the belief that continuously improving IMT/AI skills is important for professional development (t-value of 45.867) show significant agreement among teachers. All the confidence intervals for the mean differences are positive, suggesting strong agreement across the board regarding the relevance and effectiveness of IMT/AI skills in remote teaching. These results confirm that teachers perceive IMT/AI skills as highly valuable, aligning with the null hypothesis (H01) that these skills are crucial for effective teaching and learning in the post-pandemic era.

6. CONCLUSION

The study concludes that Mumbai's teachers largely recognize the transformative potential of IMT and AI skills in enhancing educational practices, particularly in the evolving post-pandemic landscape. These skills are valued for fostering interactive and collaborative learning, as well as for supporting teachers' professional development. However, there exists notable variability in teachers' confidence and perceived necessity of these skills, highlighting the need for continuous training and support. Ensuring that IMT and AI skills are effectively integrated into teaching practices will require structured, relevant training programs and sufficient resources. By addressing these areas, educational institutions can help teachers fully leverage digital tools to enrich student engagement and learning outcomes.

Suggestions:

1. Educational institutions should implement regular training programs to improve teachers' confidence in using IMT and AI skills.
2. Policymakers should focus on creating standardized frameworks to support digital literacy among teachers.

Limitations:

1. The study is limited to teachers in Mumbai, which may not fully represent perceptions in other regions. Self-reported data may introduce bias, as responses are based on personal experiences and perceptions.

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