

# EXAMINING THE ROLE OF TEACHERS' IMT AND AI SKILLS ON EDUCATIONAL OUTCOMES IN DISTANCE LEARNING: AN ANALYSIS OF DIGITAL COMPETENCIES, CHALLENGES, AND SUPPORT NEEDS IN REMOTE TEACHING

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## Abstract

This study examines the impact of teachers' Information, Media, and Technology (IMT) skills, including the use of Artificial Intelligence (AI), on teaching and learning outcomes in distance education. The transition to online teaching during the COVID-19 pandemic has underscored the importance of digital competencies, yet many educators face challenges in adapting to new technologies. Using a mixed-methods approach, this research surveyed 300 teachers in Mumbai to assess their confidence, preparedness, and the challenges encountered in using IMT and AI tools. Quantitative data was analyzed through descriptive statistics, while qualitative insights were obtained through thematic analysis, providing a comprehensive view of teachers' experiences. Findings reveal a divide in confidence and readiness, with some educators feeling well-equipped while others report significant obstacles, such as technical issues and lack of support. This study highlights the need for targeted training and support programs to enhance teachers' digital skills, ensuring effective integration of IMT and AI in virtual classrooms. By identifying areas of improvement, this research offers valuable insights for educational institutions seeking to strengthen teacher competencies in a rapidly evolving digital landscape.

**Keywords:** IMT skills, AI in education, distance learning, teacher digital competencies, online education, remote teaching challenges, educational technology, teacher preparedness.

## Introduction

The rapid shift to online education during the COVID-19 pandemic has highlighted the importance of teachers' digital competencies, particularly in Information, Media, and Technology (IMT) and Artificial Intelligence (AI) skills. These competencies are now essential for effectively engaging students, delivering lessons, and evaluating learning outcomes in virtual classrooms. As schools and universities transitioned to remote teaching, educators faced the challenge of adopting new tools and technologies to maintain the quality of education. This study explores how teachers' proficiency in IMT and AI impacts teaching and learning outcomes in distance education, providing insights into the benefits, challenges, and support needs of educators in this digital landscape.

In addition to enhancing lesson delivery, IMT and AI skills play a crucial role in fostering interactive and engaging learning experiences. Teachers proficient in these skills can better adapt their methods to maintain student engagement, manage virtual classrooms, and use data to personalize instruction. However, not all educators feel adequately prepared to incorporate these technologies, and many report facing obstacles, including technical

issues and lack of training. Identifying these barriers is essential to support teachers' digital readiness and help them leverage IMT and AI effectively for both synchronous and asynchronous learning.

This study addresses these challenges by examining the levels of confidence, preparedness, and support needed for teachers to use IMT and AI in distance education. By analyzing teachers' experiences, this research aims to inform educational policymakers and institutions about the critical areas requiring attention to enhance teachers' digital competencies. In doing so, it underscores the need for ongoing professional development programs, targeted training, and technical support to enable teachers to overcome challenges and utilize technology in ways that optimize student outcomes in remote learning environments.

### **Research Objectives**

1. To examine the impact of teachers' IMT and AI skills on teaching and learning outcomes in distance education.
2. To identify the challenges and support needs of teachers in using IMT and AI tools effectively in remote education.

### **Research Significance**

This research is significant in highlighting the critical role of digital competencies in today's education system. As technology continues to shape learning environments, understanding the effectiveness of IMT and AI tools can inform targeted support and training programs. By identifying areas where teachers struggle or excel, this study offers insights that can help educational institutions enhance teacher readiness, bridge skill gaps, and ultimately improve student engagement and learning outcomes in remote contexts.

### **Review of Literature**

Arnold and Ducate (2020) conducted a study on the use of digital media in language teacher education, published in *Language Learning & Technology*. The research focused on foreign language educators and assessed the advantages and limitations of incorporating digital media into teacher development programs. By examining existing literature, the authors highlighted digital media's potential to enhance language teachers' professional growth. Their findings underscored the value of digital media in supporting teacher learning, resulting in recommendations for more effective integration of digital resources into training programs.

Bista (2020) released a study in the *International Journal of Technology in Education and Science* that surveyed professors' perspectives on online teaching during the COVID-19 pandemic. The study aimed to capture academics' experiences with online education, including the benefits and challenges they observed. Based on an online survey, the findings provided insights into the concerns and technological difficulties professors faced, as well as their suggestions for improvement, highlighting the varied experiences of educators with online teaching in pandemic conditions.

Bower (2020) published research in *Technology, Pedagogy, and Education* that reflects on the rapid implementation of a capacity-building initiative for teachers to deliver blended learning during the COVID-19 pandemic. Using a case study method, Bower examined the program's rollout, the challenges teachers encountered, and the outcomes of the initiative, which aimed to support diverse classroom settings. The study highlighted the pandemic's potential as a transformative period for educational practices, emphasizing the importance of quickly accessible professional development to support teachers' capacity for blended learning.

Bullock and Gallagher (2020) explored media literacy education and its potential to develop critical thinking skills through news analysis, with their research published in the *Journal of Media Literacy Education*. The study sought to integrate media literacy into the curriculum to help students critically evaluate content, especially during the pandemic. By using student questionnaires and reflective exercises, the study emphasized the need for students to learn skills for assessing the credibility of information, navigating the media landscape, and making informed judgments.

Chen, Huang, and Sun (2020) examined media and information literacy training in higher education during the COVID-19 pandemic, publishing their findings in *Sustainability*. This case study aimed to enhance students'

critical approach to media consumption by implementing a literacy education program. Through pre- and post-surveys, the study demonstrated improvements in students' critical thinking, media understanding, and ability to evaluate sources, highlighting the importance of equipping students with media literacy skills in today's information-saturated world.

Chen, Huang, and Wei (2021) published a case study in Sustainability that examined the impact of a media literacy program implemented at a university during the COVID-19 pandemic. Using pre- and post-surveys, the researchers assessed the program's effects on students' media literacy, attitudes, and behaviors. The data indicated an enhancement in students' media literacy skills and promoted responsible media consumption, underscoring the value of such programs during times of increased media exposure.

Edem and Ntuen (2020) analyzed the impact of the COVID-19 pandemic on media literacy education in a study published in the Journal of Media Literacy Education. Their study explored both positive and negative implications of the pandemic for media education. The findings emphasized the need for media literacy skills to navigate the media landscape effectively during crises, with educators playing a key role in fostering these skills and adapting teaching methods to the evolving media environment.

Fernández-Cárdenas and De-Marcos (2021), in their study published in Education Sciences, investigated a redesigned university course aimed at building digital skills among preservice teachers during the COVID-19 pandemic. Using a case study approach, they assessed the effectiveness of the course, which included adjustments to content, pedagogy, and assessment tools. Their findings highlighted the importance of adaptability and innovation in online education, demonstrating the course's potential for enhancing preservice teachers' digital competencies during the pandemic.

**Methodology**

A mixed-methods approach was used, combining quantitative and qualitative data. A structured questionnaire was distributed to 300 teachers in Mumbai, covering aspects of their IMT and AI skills, confidence levels, and support needs. Descriptive statistics were employed to summarize responses, while thematic analysis identified recurring themes and insights in qualitative feedback. Frequency tables and graphs provided visual representation of teachers' preparedness, challenges, and confidence in using IMT/AI tools, offering a comprehensive view of digital competency across the sample.

**Data Analysis:**

**Table 1: Frequency table of trained and prepared to use information, media, and technology (IMT)**

Do you feel adequately trained and prepared to use information, media, and technology (IMT)/ AI skills for remote teaching during and after the COVID-19 pandemic?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	42	14.0	14.0	14.0
	Agree	102	34.0	34.0	48.0
	Neutral	34	11.3	11.3	59.3
	Disagree	62	20.7	20.7	80.0
	Strongly Disagree	60	20.0	20.0	100.0
	Total	300	100.0	100.0	

**Graph 1: Frequency graph of trained and prepared to use information, media, and technology (IMT)**

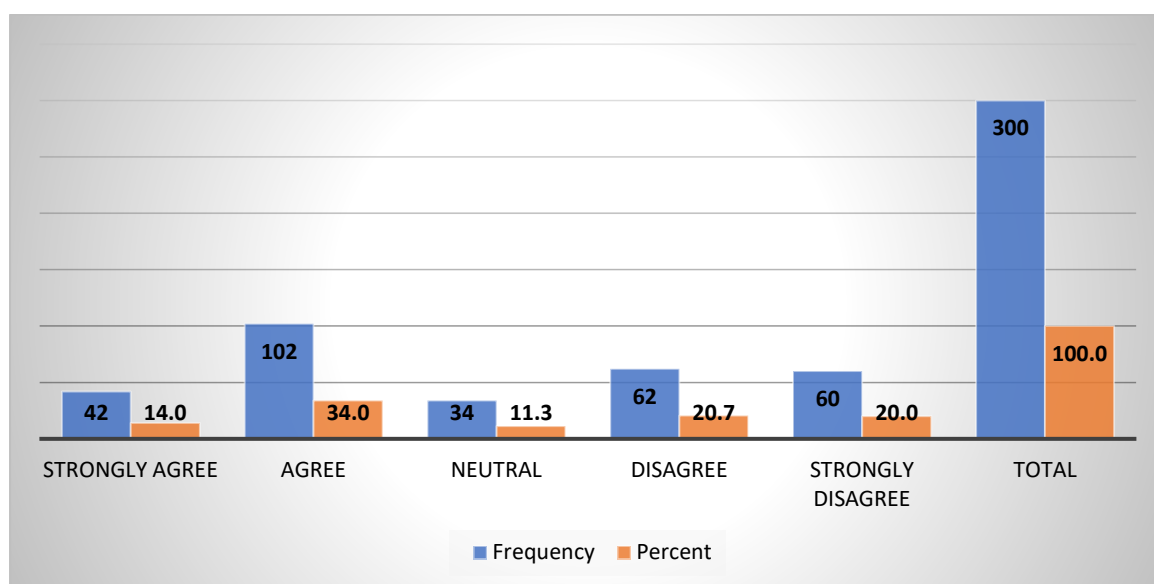


Table 1 presents the frequency distribution of teachers' perceptions of whether they feel adequately trained and prepared to use Information, Media, and Technology (IMT) and AI skills for remote teaching during and after the COVID-19 pandemic. The data shows that 42 teachers (14.0%) strongly agree and 102 teachers (34.0%) agree that they are adequately trained. Meanwhile, 34 teachers (11.3%) are neutral on the matter. However, 62 teachers (20.7%) disagree, and 60 teachers (20.0%) strongly disagree that they are adequately prepared. These findings suggest a significant divide, with nearly half of the respondents feeling prepared, while a considerable portion of teachers either lack confidence in their training or feel unprepared to use IMT and AI effectively in remote teaching.

**Table 2: Frequency table of faced challenges in accessing and utilizing online educational resources**

Have you faced challenges in accessing and utilizing online educational resources supported by AI to support your teaching in the wake of the pandemic?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, frequently	80	26.7	26.7	26.7
	Yes, occasionally	104	34.7	34.7	61.3
	No, not at all	116	38.7	38.7	100.0
	Total	300	100.0	100.0	

**Graph 2: Frequency graph of faced challenges in accessing and utilizing online educational resources**

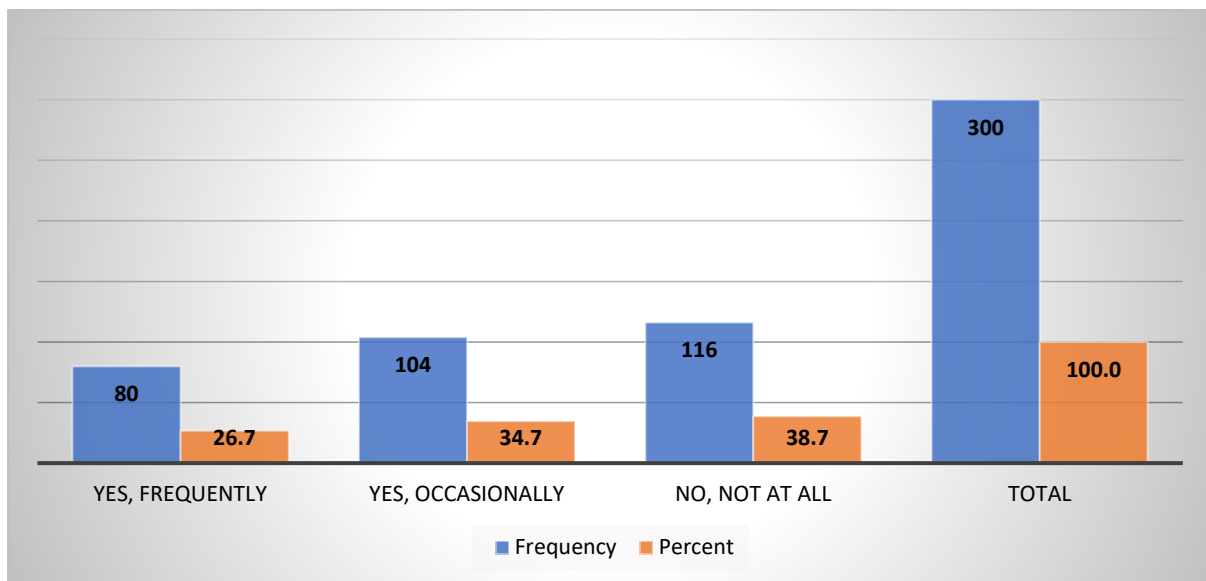


Table 2 and Graph 2 presents the frequency distribution of teachers' experiences with challenges in accessing and utilizing online educational resources supported by AI during the pandemic. The data reveals that 80 teachers (26.7%) faced challenges frequently, while 104 teachers (34.7%) experienced such challenges occasionally. In contrast, 116 teachers (38.7%) reported that they did not face any challenges in accessing and using AI-supported online educational resources. These findings indicate that while a significant portion of teachers encountered obstacles in using AI-based educational tools, a notable group of teachers did not experience such difficulties, reflecting diverse experiences with the availability and usability of digital resources during the pandemic.

**Table 3: Frequency table of confident while using digital collaboration tools**

How confident do you feel in using digital collaboration tools/AI enabled tools to interact with students and colleagues (e.g., Google Classroom, Microsoft Teams)?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Confident	49	16.3	16.3	16.3
	Confident	84	28.0	28.0	44.3
	Neutral	18	6.0	6.0	50.3
	Not Confident	88	29.3	29.3	79.7
	Not at all Confident	61	20.3	20.3	100.0
	Total	300	100.0	100.0	

**Graph 3: Frequency graph of confident while using digital collaboration tools**

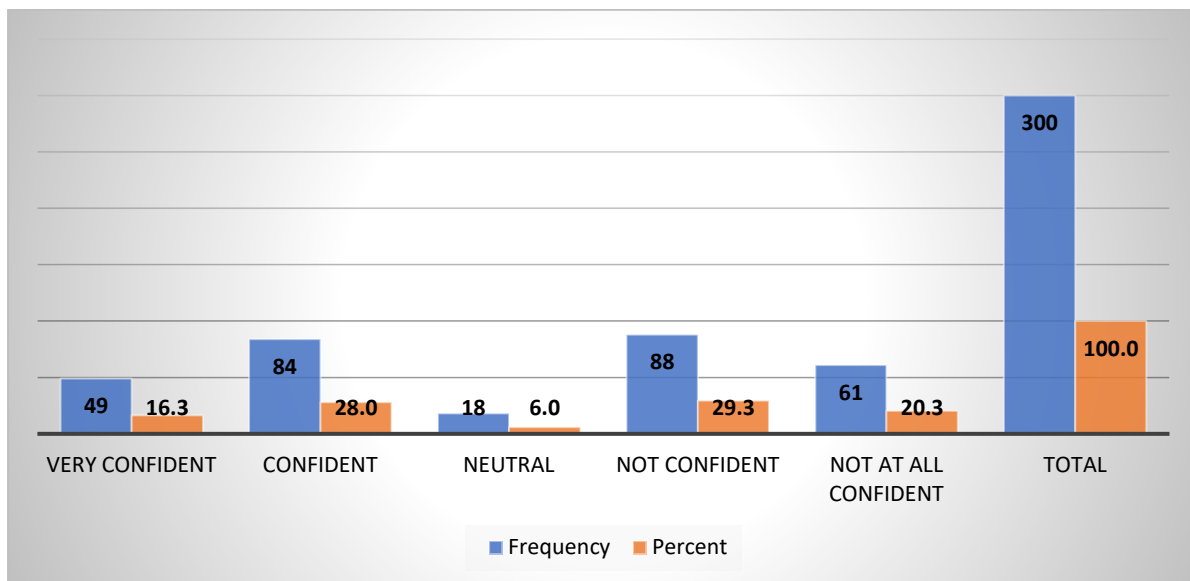


Table 3 and Graph 3 shows the frequency distribution of teachers' confidence in using digital collaboration tools and AI-enabled platforms, such as Google Classroom and Microsoft Teams, to interact with students and colleagues. The data shows that 49 teachers (16.3%) feel very confident, and 84 teachers (28.0%) feel confident in using these tools. A smaller group of 18 teachers (6.0%) report a neutral stance. On the less confident side, 88 teachers (29.3%) feel not confident, and 61 teachers (20.3%) are not at all confident. These results indicate that while a significant portion of teachers feel confident or very confident in using digital collaboration tools, there remains a substantial number who lack confidence, highlighting a potential area for further training and development in the use of these technologies.

**Table 4: Frequency table of well-equipped home or workspace**

How well-equipped do you consider your home or workspace for remote teaching using IMT/ AI tools?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very well-equipped	49	16.3	16.3	16.3
	Well-equipped	84	28.0	28.0	44.3
	Neutral	18	6.0	6.0	50.3
	Not well-equipped	88	29.3	29.3	79.7
	Not at all equipped	61	20.3	20.3	100.0
	Total	300	100.0	100.0	

**Graph 4: Frequency graph of well-equipped home or workspace**

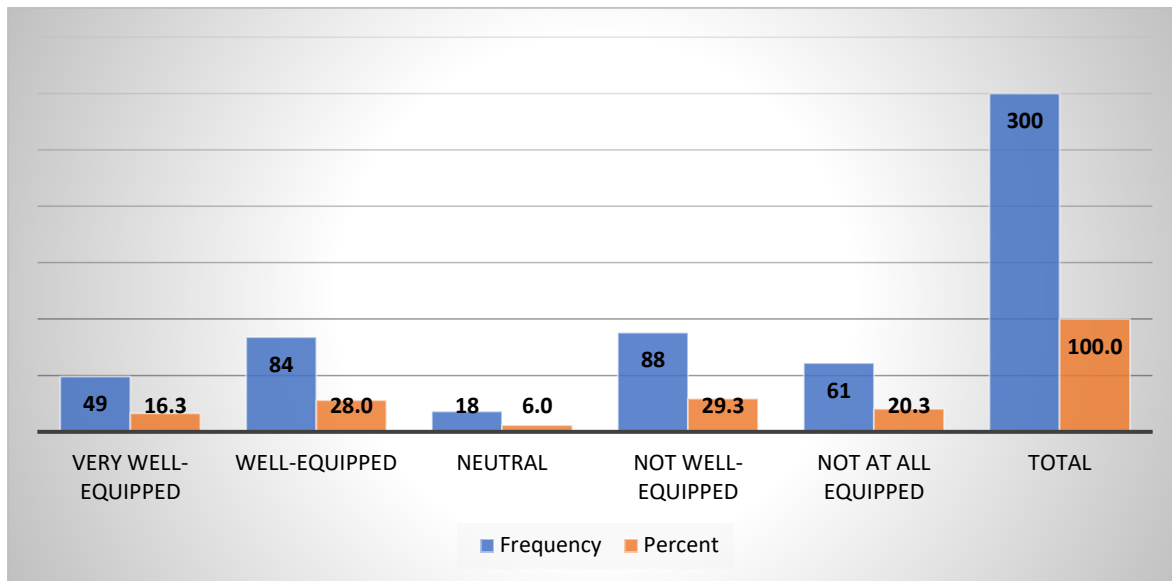


Table 4 and Graph 4 provides the frequency distribution of teachers' assessment of how well-equipped their home or workspace is for remote teaching using Information, Media, and Technology (IMT) or AI tools. The data shows that 49 teachers (16.3%) consider their workspace very well-equipped, and 84 teachers (28.0%) believe it is well-equipped. A smaller group of 18 teachers (6.0%) expressed a neutral stance. However, a significant portion of teachers reported less favorable conditions, with 88 teachers (29.3%) indicating that their workspace is not well-equipped and 61 teachers (20.3%) stating that their workspace is not at all equipped. These results suggest that while some teachers have suitable environments for remote teaching, a substantial number are working in spaces that may lack the necessary resources, which could hinder their effectiveness in delivering online education.

**Table 5: Frequency table of sufficient support and training from your school or educational institution in using IMT**

Do you receive sufficient support and training from your school or educational institution in using IMT/ AI skills for remote teaching?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, sometimes	106	35.3	35.3	35.3
	Neutral	64	21.3	21.3	56.7
	No, rarely	72	24.0	24.0	80.7
	No, never	58	19.3	19.3	100.0
	Total	300	100.0	100.0	

**Graph 5: Frequency graph of sufficient support and training from your school or educational institution in using IMT**

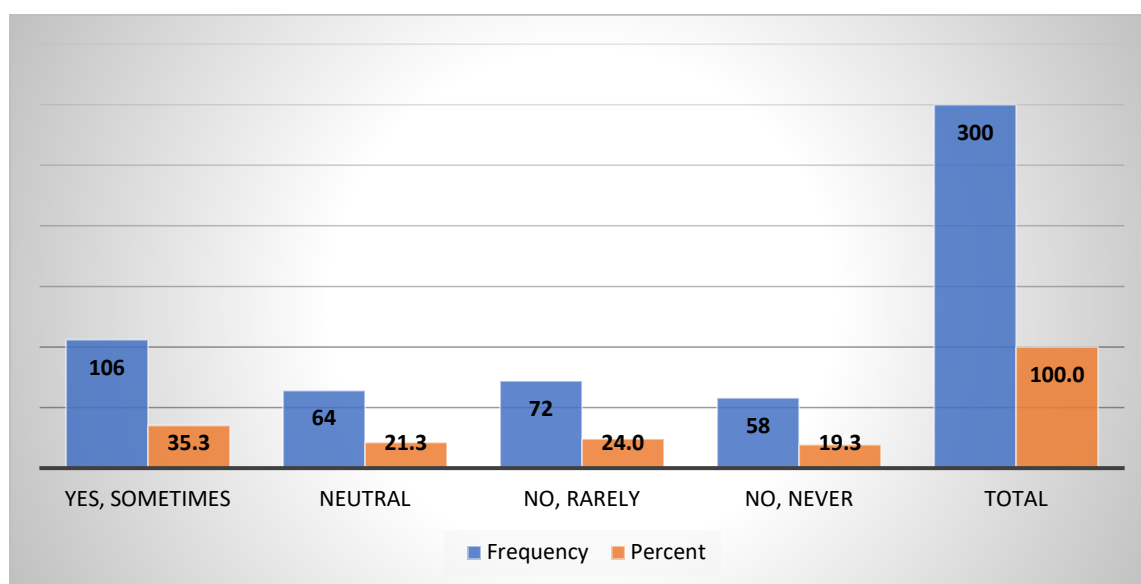


Table 5 and Graph 5 shows the frequency distribution of teachers' perceptions regarding the support and training they receive from their school or educational institution in using Information, Media, and Technology (IMT) and AI skills for remote teaching. The data shows that 106 teachers (35.3%) report receiving support and training sometimes, while 64 teachers (21.3%) hold a neutral view. On the negative side, 72 teachers (24.0%) state that they rarely receive sufficient support, and 58 teachers (19.3%) report never receiving any support or training. These findings suggest that while a portion of teachers receive occasional support, a significant number feel that their institutions provide inadequate training, which may affect their ability to effectively use IMT and AI tools for remote teaching.

**Table 6: Frequency table of effectively assess and evaluate students' performance**

Are you able to effectively assess and evaluate students' performance using online assessment tools?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, always	38	12.7	12.7	12.7
	Yes, sometimes	112	37.3	37.3	50.0
	Neutral	54	18.0	18.0	68.0
	No, rarely	47	15.7	15.7	83.7
	No, never	49	16.3	16.3	100.0
	Total	300	100.0	100.0	

**Graph 6: Frequency graph of effectively assess and evaluate students' performance**



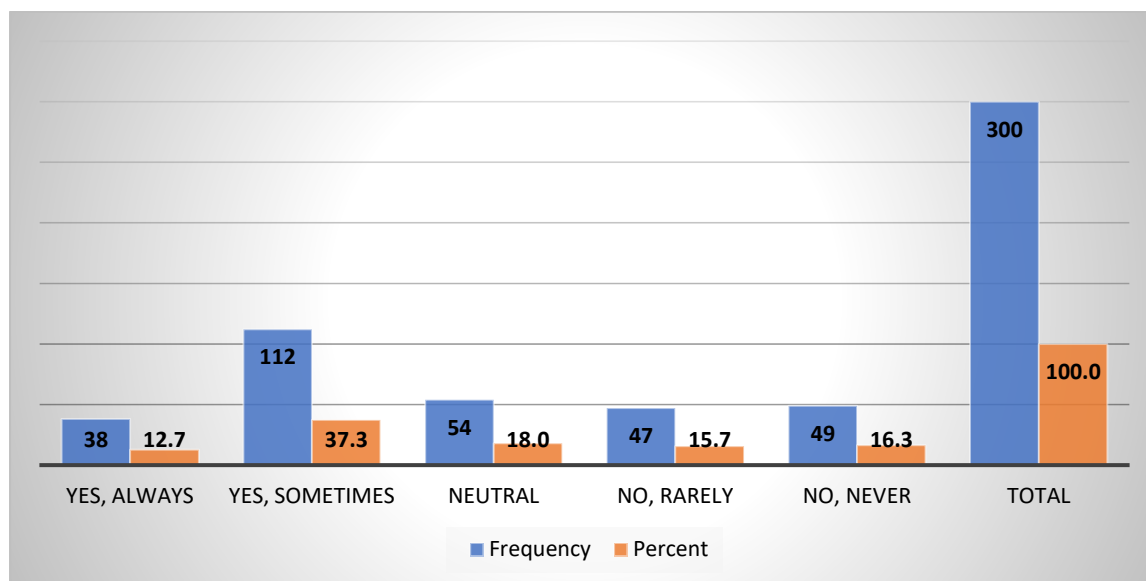


Table 6 and Graph 6 demonstrates the frequency distribution of teachers' ability to effectively assess and evaluate students' performance using online assessment tools. The data shows that 38 teachers (12.7%) report being able to assess students' performance effectively at all times, while 112 teachers (37.3%) can do so sometimes. Fifty-four teachers (18.0%) hold a neutral view on their ability to assess students, while 47 teachers (15.7%) rarely feel able to do so, and 49 teachers (16.3%) report that they are never able to effectively assess students using online tools. These results suggest that while a portion of teachers feel capable of assessing students' performance online, a significant number face challenges or uncertainty in this area, indicating the need for improved tools, training, or support in utilizing online assessment platforms effectively.

**Table 7: Frequency table of confident while providing technical assistance**

How confident are you in providing technical assistance and support to students and parents who may face difficulties with online learning tools?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Confident	83	27.7	27.7	27.7
	Confident	94	31.3	31.3	59.0
	Neutral	21	7.0	7.0	66.0
	Not Confident	55	18.3	18.3	84.3
	Not at all Confident	47	15.7	15.7	100.0
	Total	300	100.0	100.0	

**Graph 7: Frequency graph of confident while providing technical assistance**

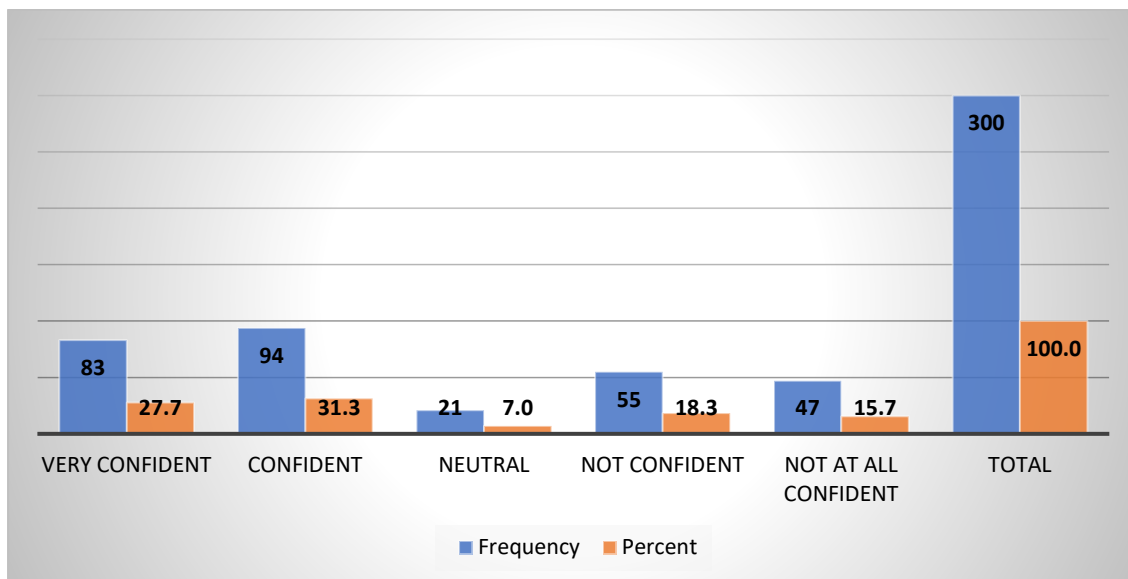


Table 7 and Graph 7 shows the frequency distribution of teachers' confidence in providing technical assistance and support to students and parents who may face difficulties with online learning tools. The data shows that 83 teachers (27.7%) feel very confident, and 94 teachers (31.3%) feel confident in providing such support. A smaller group of 21 teachers (7.0%) are neutral on the matter. On the less confident side, 55 teachers (18.3%) are not confident, and 47 teachers (15.7%) are not at all confident in providing technical assistance. These results suggest that while a significant portion of teachers are comfortable assisting students and parents with technical challenges, a notable number still lack confidence in this area, highlighting a potential need for additional training or resources to enhance teachers' technical support skills.

### Conclusion

The study concludes that although teachers recognize the potential of Information, Media, and Technology (IMT) and Artificial Intelligence (AI) skills in enhancing distance education, many feel inadequately prepared to implement these tools effectively. Confidence and readiness to use digital tools vary significantly among teachers, with numerous educators facing technical challenges such as connectivity issues, device incompatibility, and a lack of well-equipped workspaces. These obstacles, compounded by limited training, hinder many teachers from fully engaging students and utilizing IMT and AI to its full potential, impacting the overall quality of online learning.

### Suggestions

1. Provide regular, hands-on training to boost teachers' confidence in using IMT and AI tools.
2. Enhance technical support and resources to help teachers overcome digital challenges.
3. Develop tailored programs that address specific needs in remote teaching environments.

### Limitations

1. The study is limited to teachers in Mumbai, which may affect the generalizability of findings to other regions.
2. Self-reported data may introduce bias, as responses are based on personal perceptions and experiences.

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