



A Survey of Digital ICT Tools in Teacher Education: Trends and Insights

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Abstract

The use of ICT tools in teaching-learning process became significant area of research for many educators. The primary objective was to study the use of digital ICT tools by teachers of secondary level education. This study presented a comprehensive survey of the utilization of digital ICT tools in teacher education and offered valuable insights into the evolving landscape of pedagogical technology. In an era marked by rapid technological advancements, the integration of digital ICT tools had become increasingly integral to teacher training programs. This research endeavored to shed light on the current trends and emerging patterns in the adoption of these tools. The descriptive survey involved secondary education teachers of Uttar Dinajpur as the population, with 90 teachers selected as samples from 10 secondary education level institutions, including schools and madrasahs, through random sampling. The findings revealed a dynamic landscape where digital ICT tools were being harnessed to enhance teaching methodologies, streamline administrative tasks, and promote interactive learning experiences. Furthermore, the survey delved into the challenges faced by teachers in incorporating digital ICT tools effectively into their pedagogical strategies. By examining these trends and challenges, the research provided educators, institutions, and decision-makers with insightful knowledge of the changing role of digital ICT tools in teacher education. Ultimately, the study contributed to the ongoing dialogue on how best to harness technology for preparing educators to meet the needs of the classroom.

Keywords: Digital ICT Tools, Teacher Education, School Education, Digital Literacy.

Introduction

Online education in the 21st century has evolved significantly due to technological advancements, evolving educational requirements, and global events such as the COVID-19 pandemic. It provides educational opportunities to a wide array of learners, regardless of where they are located geographically, thereby fostering inclusivity and catering to students with diverse needs and situations.

The advent of digital ICT tools in teacher education represents a paradigm shift, replacing conventional teacher training models with innovative, interactive, and personalized learning

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experiences. These tools encompass a wide array of technologies, including but not limited to online learning platforms, virtual reality simulations, augmented reality applications, gamified learning environments, and data analytics systems. Collectively, these tools offer transformative opportunities for teacher candidates, novice educators, and even seasoned professionals to engage in continuous learning and reflective practice.

One of the key benefits of incorporating digital ICT tools into teacher education is the flexibility they offer. Asynchronous online courses, webinars, and virtual classrooms allow prospective teachers to access content and collaborate with peers and mentors regardless of geographical constraints. This adaptability ensures that teacher education programs can reach a broader and more diverse audience, fostering inclusivity and expanding the pool of qualified educators.

Furthermore, these tools facilitate the development of pedagogical skills tailored to the digital age. Teacher candidates can explore innovative instructional approaches, such as project-based learning, flipped classrooms, and personalized instruction by engaging with simulations and virtual classroom environments. This hands-on experience enables them to gain confidence in using technology as a pedagogical tool and prepares them to successfully incorporate it into their future classrooms.

Additionally, the data-driven nature of these ICT tools provides valuable insights into individual and group learning outcomes. Teacher educators can monitor progress, pinpoint areas for improvement, and adapt their teaching strategies as needed. This data-driven approach improves the quality of teacher preparation and supports the continuous professional growth of educators throughout their careers.

A survey of digital ICT tools in teacher education reveals a rapidly evolving landscape, characterized by various trends and insights. These tools are reshaping the way educators prepare future teachers and enhance their professional development. Robust online learning platforms and Learning Management Systems (LMS) have become central to teacher education. These platforms facilitate communication, content delivery, assessment, and collaboration among educators and students. Examples include MOODLE, Canvas, and Blackboard. Teacher education has seen a revolutionary shift with the advent of virtual classroom platforms such as Microsoft Teams, Zoom, and Google Meet. These tools enable synchronous online classes, facilitating real-time interaction between instructors and students, even at a distance. Video analysis tools like Edpuzzle and Flipgrid allow teacher candidates to record and analyze their teaching sessions. This provides an opportunity for self-reflection and peer feedback, enhancing pedagogical skills. The integration of digital ICT tools in teacher education is transforming how educators are trained and supported in their professional



development. Utilizing digital resources and open educational resources (OER) helps lower the cost of educational materials for both institutions and teacher candidates.

Review of Related Literatures

Khajuria et al. (2023) emphasize that successful incorporation of ICT in higher education relies on a diverse range of tools and applications within the teaching-learning process. They highlight the importance of effectively utilizing various ICT tools to enhance the educational experience at the higher education level. Stare et al. (2023) refers to developing university teachers' digital skills to innovate higher education. Garcia-Martin and Garcia-Martin (2022) have expressed the need to research ICT in education from multivariate approaches. Valverde-Berrocoso et al. (2021) while participating in didactic innovation projects in ICT and implementing ICT coordination is associated with more experienced training. Ricardo-Barreto et al. (2020) propose the increased use of ICT in education through training based on usage trends and skill levels of teachers. Corporan et al. (2020) was suggested that teachers need better training in ICT-mediated collaboration methods and tools. Yusuf and Balogun (2020) suggest that teachers generally exhibit a favourable disposition toward incorporating ICT into their teaching practices. Additionally, the researchers note that teachers demonstrate competence in utilizing fundamental ICT tools. Konig et al. (2020) demonstrate that ICT tools, especially teachers' digital skills, and teacher training opportunities to acquire digital skills. Nieveen and Kuiper (2019) conducted a study investigating the application of TPACK framework in the analysis of how educators for student teachers design teaching experiences infused with technology within teacher education programs. Li et al. (2018) found that teachers perceive the benefits of using ICT tools in student-centred education. Koehler et al. (2014) provided a comprehensive review of the “Technological Pedagogical Content Knowledge” (TPACK) framework and its implications for professional development in integrating ICT tools into teacher education. Ghavifekr et al. (2014) demonstrate that teachers should consistently possess both ICT skills and a positive mindset. This preparedness allows them to offer students learning opportunities that are enriched with ICT, ultimately elevating the overall quality of education. Mouza (2012) discussed the impact of integrating digital tools into teacher education programs using the TPACK framework and explores how it prepares pre-service teachers for effective technology integration. Thompson and Schmidt (2010) studied how teachers use digital portfolios to demonstrate their technological pedagogical content knowledge (TPACK) and how these tools can be integrated into teacher education programs. Hew and Cheung (2010) examined the use of Web 2.0 technologies, including online learning communities, in K-12 and higher education settings, providing insights into their potential for teacher education. Hughes (2005) delved into the impact of teacher knowledge and learning experiences on the development of technology-integrated pedagogy. The study provided valuable insights into effective e-learning strategies within teacher education.

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These reviews and studies offer valuable insights into the integration of digital ICT tools in teacher education programs, highlighting their impact, associated challenges, and effective implementation strategies.

Objectives of the Study

- To study the use of digital ICT tools by teachers of secondary level education.
- To identify the perceptions towards the use of digital ICT tools by teachers of secondary level education based on gender.
- To study the use of digital ICT tools by teachers of secondary level education under the WBBE and WBBME board.
- To analyze the mean scores of digital ICT tools among teachers of secondary level education with respect to their social category.

Hypotheses of the Study

H₀1. There is no significant difference between male and female teachers of secondary level education towards the use of digital ICT tools.

H₀2. There is no significant difference between teachers of secondary level education under the WBBSE and WBBME board towards the use of digital ICT tools.

H₀3. There is no significant difference of digital ICT tools among teachers of secondary level education with respect to their social category.

Methods of the Study

The study employed a descriptive survey research design, collecting primary data from secondary-level teachers in the Uttar Dinajpur district. A sample of 90 teachers was selected using a random sampling technique, including participants from both WBBSE and WBBME schools in Uttar Dinajpur, West Bengal. A self-developed instrument titled 'Digital ICT Tools' was used, demonstrating a Cronbach's Alpha reliability score of 0.847. The collected data were organized in MS Excel, and further analyzed using SPSS 22.0 for item analysis and percentage calculations, with results presented through tables and graphs.

Results

Finding for Objective-1:

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Table 1

Analysis of the Sample in terms of Digital ICT Tools

Digital ICT Tools	Unknown		Heard & Seen Only		Used Once		Use Sometimes		Use Regularly	
	F	%	F	%	F	%	F	%	F	%
WhatsApp	0	0	3	3.3	5	5.6	57	63.3	25	27.8
Google Translate	0	0	6	6.7	12	13.3	48	53.3	24	26.7
Google form	0	0	5	5.6	15	16.7	43	47.8	27	30
SWAYAM	1	1.1	6	6.7	15	16.7	49	54.4	19	21.1
Canva	1	1.1	5	5.6	22	24.4	46	51.1	16	17.8
Wikis	0	0	3	3.3	21	23.3	50	55.6	16	17.8
Zoom Meeting	0	0	8	8.9	21	23.3	36	40	25	27.8
Gmail	0	0	5	5.6	11	12.2	50	55.6	24	26.7
OHP	0	0	7	7.8	18	20	35	38.9	30	33.3
Instagram	3	3.3	2	2.2	8	8.9	55	61.1	22	24.4
Meta Facebook	0	0	5	5.6	12	13.3	48	53.3	25	27.8
Quizizz	1	1.1	6	6.7	18	20	47	52.2	18	20
Skype	0	0	8	8.9	18	20	47	52.2	17	18.9
YouTube	0	0	4	4.4	15	16.7	38	42.2	33	36.7
OBS	0	0	4	4.4	26	28.9	43	47.8	17	18.9
MOODLE	6	6.7	23	25.6	24	26.7	27	30	10	11.1
MS-Word	0	0	6	6.7	15	16.7	45	50	24	26.7
MS-Excel	2	2.2	3	3.3	16	17.8	47	52.2	22	24.4



Google Slides	2	2.2	8	8.9	10	11.1	45	50	25	27.8
Podcast	0	0	7	7.8	18	20	47	52.2	18	20
Blogger	0	0	5	5.6	19	21.1	41	45.6	25	27.8
AR & VR	1	1.1	5	5.6	18	20	47	52.2	19	21.1
Edmodo	1	1.1	5	5.6	20	22.2	50	55.6	14	15.6
Google Docs	0	0	6	6.7	14	15.6	44	48.9	26	28.9
Google Meet	1	1.1	5	5.6	13	14.4	48	53.3	23	25.6
Flipgrid	2	2.2	14	15.6	15	16.7	37	41.1	22	24.4
Edpuzzle	3	3.3	9	10	14	15.6	42	46.7	22	24.4
PDF Reader	3	3.3	9	10	11	12.2	41	45.6	26	28.9
OER	4	4.4	14	15.6	15	16.7	39	43.3	18	20
Kahoot	4	4.4	10	11.1	16	17.8	42	46.7	18	20

The first objective was to study the use of digital ICT tools by teachers of secondary level education reflects that:

- 1.29% of teachers are Unknown of Digital ICT Tools;
- 7.1% of teachers have Heard and Seen of Digital ICT Tools;
- 17.5% of teachers Used Once of Digital ICT Tools;
- 49.74% of teachers Use Sometimes of Digital ICT Tools;
- 24.77% of teachers Use Regularly of Digital ICT Tools.

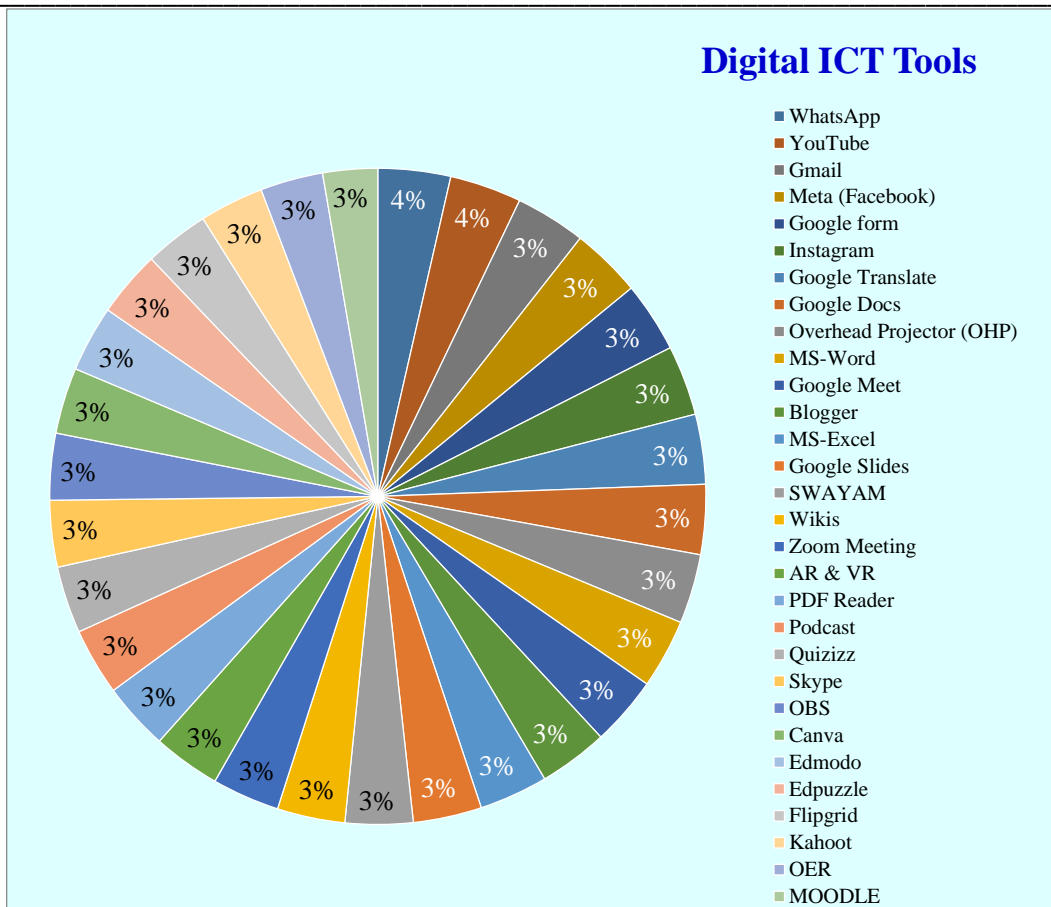


Figure 1. Use of Digital ICT Tools by Teachers of Secondary Level Education

Graphical presentation (vide Figure 1) reflects that use of Digital ICT Tools by teachers of secondary level education minimum up to 3%, such as use of MOODLE, OER, Kahoot, Flipgrid, Edpuzzle, Edmodo, Canva, OBS, Skype, Quizizz, Podcast, PDF Reader, AR & VR, Zoom Meeting, Wikis, SWAYAM, Google Slides, MS-Excel, Blogger, Google Meet, MS-Word, Overhead Projector (OHP), Google Docs, Google Translate, Instagram, Google form, Meta (Facebook), and Gmail; and maximum up to 4%, such as, use of WhatsApp and YouTube.

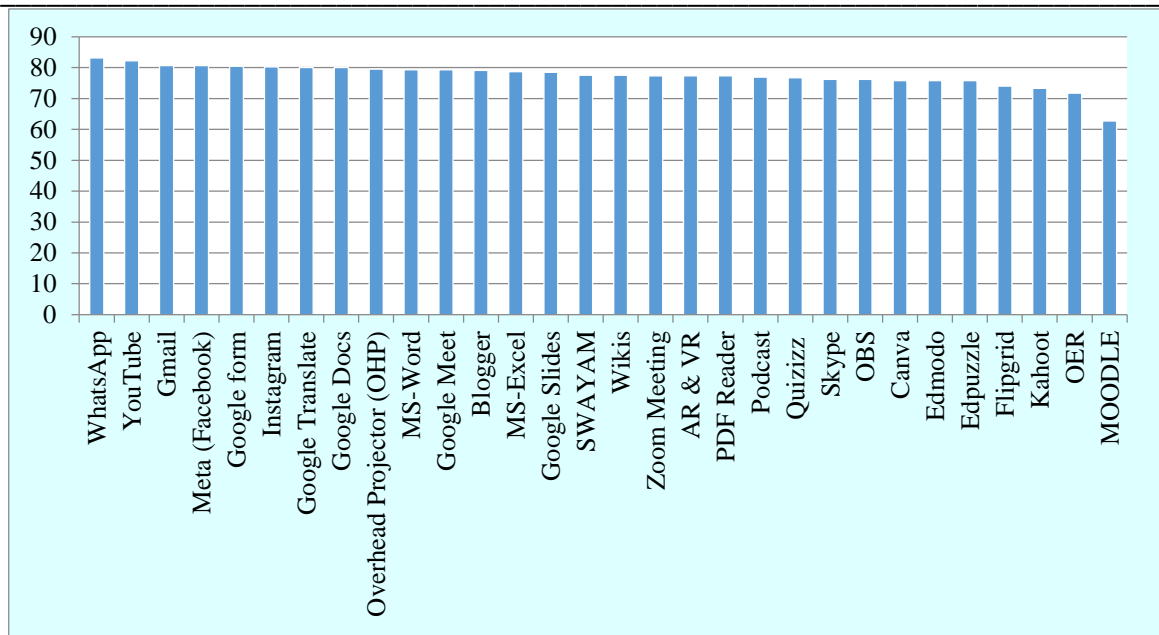


Figure 2. Use of Digital ICT Tools by Teachers of Secondary Level Education

Descriptive statistics (vide Figure 2), reflects that most of the teachers, 83.11% (n=90) has use of WhatsApp at the highest level, 82.22 % teachers has use of YouTube at the second highest level, while the use of MOODLE is for 62.67% teachers, which shows the lowest level of Uses. MOODLE, OER, Kahoot, Flipgrid, Edpuzzle, Edmodo, Canva, OBS, Skype, Quizizz, Podcast, PDF Reader, AR & VR, Zoom Meeting, Wikis, SWAYAM, Google Slides, MS-Excel, Blogger, Google Meet, MS-Word, Overhead Projector (OHP), Google Docs, Google Translate, Instagram, Google form, Meta (Facebook), Gmail were used of Digital ICT Tools for more than average, more than 62.67% of teachers under secondary education in Uttar Dinajur district.

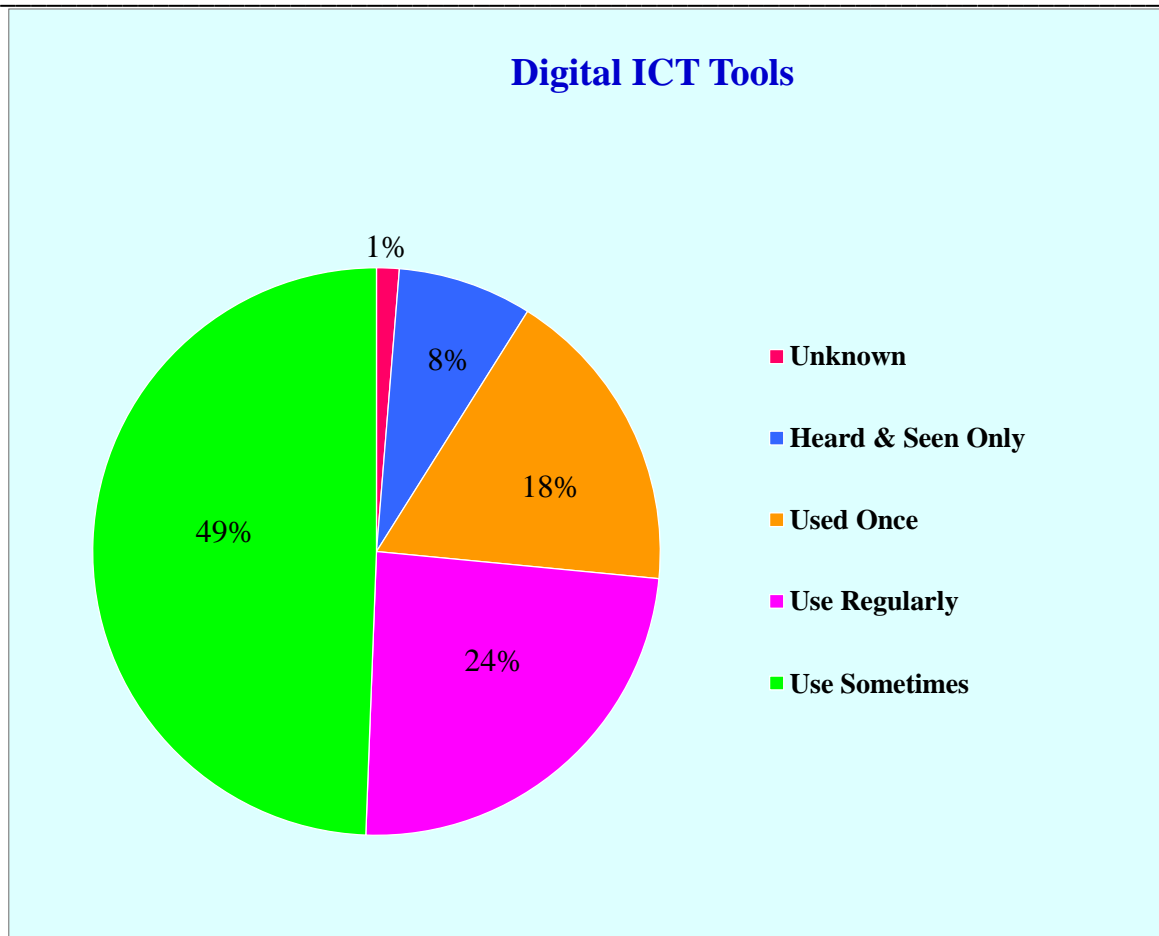


Figure 3. Use of Digital ICT Tools by Teachers of Secondary Level Education

Graphical presentation (vide Figure 3) showed that it was found that 49% of teachers were Use Sometimes of Digital ICT Tools and 24% of teachers were belonging on Use Regularly position and 18% of teachers were Used Once and 8% of teachers were Heard & Seen and 1% of teachers were Unknown of Digital ICT Tools.

It was concluded that secondary-level teachers made use of digital ICT tools. To enhance understanding, a graph was generated from the collected data, illustrating the distribution of these teachers.

Finding for the objective-2:

Table 2

Use of Digital ICT Tools among teachers based on gender

Gender	N	Mean	SD	df	't' value	'p' value	Remarks at 0.05 level
Male	62	115.85	11.96	88	-.422	.674	Not Significant

Based on Table 2, data analysis was conducted for the second objective shows at the 0.05 level of significance, the calculated t-value of -.422 is not significant ($p = .674$). Therefore, the null hypothesis (H_0), 'There is no significant difference between Male and Female teachers of secondary level education towards the use of digital ICT tools' was accepted. As a result, it became clear that there is no significant difference in how male and female secondary school teachers use modern digital ICT tools.

Finding for the objective-3:

Table 3

Use of Digital ICT Tools among teachers under the Board

Board	N	Mean	SD	df	't' value	'p' value	Remarks at 0.05 level
WBBSE	45	116.00	10.81	88	-.164	.870	Not Significant

On the basis of the Table 3, analysis of data for the second objective shows the computed t-value was -.164 which is not significant at 0.05 significance level ($p = .870$). Therefore, the null hypothesis (H_0), 'There is no significant difference between teachers of WBBSE and WBBME board towards the use of digital ICT tools' was accepted. Thus, it was revealed that there is no significant difference between WBBSE and WBBME board towards the use of digital ICT tools.

Finding for the objective 4:

Table 4

Difference on the mean scores of Digital ICT Tools among the teachers with respect to their category

Category	N	Mean	SD	Source of Variation	Sum of squares	df	Mean square	'F' Value	'p' value
General	38	114.63	12.31	Between Groups	314.10	3	104.70	.788	.504
OBC	25	116.40	12.17	Within Groups	11420.30	86	132.79		
SC	17	119.76	8.64	Total	11734.40	Not Significant at 0.05 level			

It is clear from Table 4 the mean scores of Digital ICT Tools among teachers, who belong to the social category of General is 114.63 and standard deviation is 12.31. Moreover, the mean scores of Digital ICT Tools among teachers, who belong to the social category of OBC, SC and ST is respectively 116.40, 119.76 and 115.60 and standard deviation is respectively 12.17, 8.64 and 10.91.

However, the calculated value of F is significant at every level ($F = .788; p > 0.05$). Therefore, the null hypothesis is accepted. Therefore, there is no significant difference among teachers mean scores on Digital ICT Tools and their social category. Thus, the teachers mean scores of Digital ICT Tools level do not differ with respect to their social category.

Conclusions

On the basis of the findings, a survey of digital ICT tools in teacher education provides valuable insights into how technology is shaping the landscape of teacher training and professional development. The integration of digital ICT tools is revolutionizing how educators are trained and equipped for the classroom. These tools enhance pedagogy, facilitate collaboration, and provide new avenues for professional growth. However, it's essential for teacher educators to stay updated on emerging trends and continuously adapt their programs to best prepare future teachers for the evolving educational landscape.



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