

The Use of ICT In Schools of Eastern Suburb of Mumbai

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Abstract

This research investigates the impact of integrating Information and Communication Technology (ICT) into school education in the eastern suburbs of Mumbai. With rapid urbanization and diverse educational needs in this region, the study aims to evaluate how ICT tools—such as multimedia devices, interactive whiteboards, and educational apps—affect teaching and learning processes. It examines the benefits and challenges associated with ICT adoption, including infrastructure limitations and teacher training gaps. By focusing on areas like Chembur, Ghatkopar, and Mulund, the study provides insights into effective ICT use in similar urban educational contexts. The findings aim to enhance understanding of ICT's role in education and offer recommendations for improving its implementation to support student learning and prepare them for a technology-driven future.

Keywords: Information and Communication Technology (ICT), eastern suburbs of Mumbai, ICT's role in education, technology-driven future.

Introduction

Education is the cornerstone of personal and societal development, and as we progress into the 21st century, the role of Information and Communication Technology (ICT) in shaping educational practices has become increasingly pivotal. In this digital era, the integration of ICT into schools offers transformative potential, providing new opportunities for enhancing teaching and learning processes. This research paper investigates the use of ICT in secondary schools within the eastern suburbs of Mumbai, focusing on its impact, challenges, and benefits.

The rapid advancements in technology have introduced a variety of tools and resources that can significantly alter traditional educational methods. Interactive multimedia devices, including computer applications, smart boards, and educational software, have the potential to create more dynamic and engaging learning environments. These tools not only facilitate interactive learning but also enhance student motivation and enable the development of essential digital literacy skills.

Despite the promising benefits, the adoption of ICT in education is not without its challenges. Schools in the eastern suburbs of Mumbai face issues related to infrastructure, access to technology, and teacher training, which can hinder the effective implementation of ICT. The integration of technology requires a shift from traditional teacher-centered methods to more learner-centered approaches, necessitating adjustments in pedagogy and teaching strategies.

The eastern suburbs of Mumbai, which include areas such as Chembur, Ghatkopar, and Mulund, present a unique study area due to their diverse population and rapid urbanization. This region is home to numerous educational institutions and has experienced significant growth in recent years, leading to an

increased demand for skilled workers. Understanding how ICT is currently used in these schools, and identifying both the benefits and obstacles encountered, can provide valuable insights into improving educational practices and preparing students for future challenges.

This research aims to explore the current state of ICT integration in schools within the eastern suburbs of Mumbai, assess its impact on teaching and learning, and offer recommendations for overcoming implementation challenges. By examining the effectiveness of ICT in enhancing educational outcomes and addressing practical issues, this study seeks to contribute to the broader discourse on technology in education and support efforts to foster a more equitable and effective learning environment.

Literature review

The literature review is a fundamental component of research. By analysing various sources, including books, journal articles, and research papers, this review aims to provide a comprehensive understanding of how ICT influences teaching and learning, the challenges associated with its implementation, and its overall significance in education.

Literature Review on Information and Communication Technology in Teaching and Learning:

Smeets et al. (1999) explored the impact of ICT on teaching practices in multiple countries, including Belgium, Germany, Ireland, the Netherlands, and Spain. Their study, "The Impact of Information and Communication Technology on the Teacher," highlights how ICT presents both opportunities and challenges for traditional classroom teaching. The authors underscore the transformative potential of ICT in altering instructional methods and improving educational outcomes. They emphasize the need for teachers to adapt to these technological changes to effectively harness the benefits of ICT.

Dhanarajan (2002), in a UNESCO report, discussed strategies for the effective use of ICT in education. His study focused on the benefits of integrating ICT, such as enhancing the quality of education, supporting lifelong learning, and facilitating non-formal education. Dhanarajan emphasized that ICT can overcome barriers of time and distance, providing more flexible and interactive learning experiences compared to traditional methods. His work highlights the advantages of using digital technologies, such as email, the web, and multimedia tools, in fostering an engaging learning environment.

Abbot (2003) provided a broad overview of how ICT is changing education in his book, "ICT Changing Education." He examined the intersection of technology with education and literacy, discussing how technological advancements, including the internet and multimedia tools, have transformed various sectors such as banking and shopping. Abbot's work points to the necessity of basic computer skills for students and the role of technology in preparing them for future careers.

Siddiqui (2004) investigated the use of ICT in higher education, noting its role in standard learning processes such as email, word processing, and web-based tools. His study also addressed blended learning approaches, where ICT complements traditional teaching methods. Siddiqui's research indicates that ICT can enhance teaching and learning quality by integrating various educational practices and resources.

UNESCO (2014) conducted a comparative analysis of ICT integration across Asia, examining policy use, infrastructure, and participation in ICT programs. The report provides insights into the varying levels of ICT access and usage in education across different Asian countries. This comprehensive analysis helps to understand the broader context of ICT implementation and its impact on teaching and learning within diverse educational settings.

Chaib and Svensson (2005) focused on the challenges and opportunities associated with integrating ICT into teacher education. Their study emphasizes the importance of continuous professional development for teachers to keep pace with technological advancements. They argue that sustainable ICT integration requires ongoing skill renewal and professional growth, highlighting the need for effective teacher training programs.

Olsson (2006) examined the implementation of ICT in teacher education, identifying issues related to time constraints and the maintenance of digital tools. Olsson's study found that consistent use of ICT can enhance the learning environment and improve teachers' willingness to adapt to new technologies. The research underscores the significance of developing communicative, analytical, and scientific skills among educators to optimize the use of ICT in their teaching practices.

The literature review highlights the substantial impact of ICT on education, revealing both its transformative potential and the challenges associated with its integration. The reviewed studies provide a diverse perspective on how ICT can enhance teaching and learning, improve educational quality, and support lifelong learning. However, they also underscore the need for effective implementation strategies, including teacher training and infrastructure development.

The insights gained from the literature review are invaluable for understanding the current state of ICT use in education, particularly within the context of secondary schools in the eastern suburbs of Mumbai. By identifying best practices, challenges, and gaps in existing research, this review sets the stage for further investigation into the specific impacts and opportunities of ICT in this region. It also provides a theoretical framework for developing research questions and hypotheses, ensuring that the study builds on existing knowledge and contributes to the ongoing discourse on technology in education.

Method

Research methodology employed in studying the impact of Information and Communication Technology (ICT) on teaching, learning, and evaluation processes in secondary schools in the eastern suburbs of Mumbai. It provides a comprehensive framework for understanding the research design, including problem statement, sample population, data collection methods, and analytical techniques.

Purpose of the Study

The study aims to address the gap in research on ICT in higher education at the national level, with a specific focus on Mumbai. It seeks to explore the significance of ICT in the educational context, particularly its impact on teaching, learning, and evaluation processes.

Importance of the Study

Given the increasing role of ICT across various sectors, including education, this study is crucial for understanding how ICT influences teaching and learning in secondary schools. The findings will contribute to improving educational practices and addressing the needs of a growing student population.

Objectives of the Study

1. To examine the concept of ICT, including its practices, processes, and applications.
2. To assess the implementation of ICT in secondary schools in the eastern suburbs of Mumbai.
3. To evaluate the enhancement of educational quality through ICT in teaching, learning, and evaluation.
4. To analyze the impact of ICT on the teaching and learning process.

5. To identify financial and administrative challenges related to ICT implementation.

Methods of Sampling and Data Collection

Population and Sampling

Population: Teachers from secondary schools in the eastern suburbs of Mumbai.

Sampling Framework:

Stage 1: Selection of the study area (Mumbai Eastern Suburb).

Stage 2: Selection of secondary schools in the area.

Stage 3: Selection of 50 teachers (26 male and 24 female) using simple random sampling.

Data Collection Methods

Primary Data: Collected through a structured inquiry form using a Likert Scale, administered via Google Forms.

Secondary Data: Gathered from research papers, dissertations, books, publications, and online resources.

Data Analysis Tools and Techniques

Statistical Tests: T-test for analysing differences between sample means and assessing hypotheses.

Data Analysis: Involves tabulation, coding, and interpretation of data. Visual tools like graphs, charts, and tables are used for presenting findings.

Findings

Tabulation and Analysis of Data

The collected data was analysed to provide insights into various aspects of ICT in education. Key findings include:

Demographic Information:

Gender Distribution: 52% male and 48% female.

Age Distribution: Balanced across age groups with a higher percentage in the 31-40 years range.

Educational Qualification: 50% graduates, 38% postgraduates, and 12% MPhil/Ph.D.

Teaching Experience: Majority with 11-20 years of experience.

ICT Infrastructure:

62% of schools have ICT infrastructure.

Availability of resources: Computers (86%), Wi-Fi (72%), LCD projectors (46%), and Smart boards (52%).

Teacher Perceptions of ICT:

Sr.No.	ITEMS	STRONGLY DISAGREE	DISAGREE	AGREE	STRONGLY AGREE	MEAN	S.D
		Frequency and Percentage (%)					
1	I feel confident learning new computer skills.	7 14%	6 12%	21 42%	16 32%	2.92	1.01
2	I find it easier to teach by using ICT	4 8%	5 10%	26 52%	15 30%	3.04	0.86
3	I am aware of the great opportunities that ICT offers for effective teaching.	4 8%	7 14%	27 54%	12 24%	2.94	0.84
4	I think that ICT supported teaching makes learning more effective.	3 6%	3 6%	33 66%	11 22%	3.04	0.73
5	The use of ICT helps teachers to improve teaching with more updated materials.	4 8%	4 8%	27 54%	15 30%	3.06	0.84
6	I think the use of ICT improves the quality of teaching.	3 6%	3 6%	29 58%	15 30%	3.12	0.77
7	I think the use of ICT helps to prepare teaching resources and materials.	3 6%	6 12%	30 60%	11 22%	2.98	0.77
8	I can still have an effective teaching without the use of ICT.	1 2%	7 14%	31 62%	11 22%	3.04	0.67
9	I think the use of ICT in teaching is a waste of time.	10 20%	22 44%	12 24%	6 12%	2.28	0.93
10	I am confident that my student's learn best without the help of ICT.	5 10%	16 32%	25 50%	4 8%	2.56	0.79
11	The classroom management is out of control if ICT is used in teaching.	5 10%	26 52%	15 30%	4 8%	2.36	0.78
12	Students pay less attention when ICT is used in teaching.	5 10%	22 44%	19 38%	4 8%	2.44	0.79
13	Students makes no effort for their lesson if ICT is used in teaching.	2 4%	21 42%	19 38%	8 16%	2.66	0.80
14	The ICT facilities in my school are well functioning and can be used.	3 6%	18 36%	26 52%	3 6%	2.58	0.70
15	The technical supports are provided if teachers are faced with difficulties.	5 10%	12 24%	27 54%	6 12%	2.68	0.82
16	Little access to ICT prevents me from using it in teaching.	3 6%	12 24%	32 64%	3 6%	2.70	0.68
17	Lack of supports from the school/top management discourages me from using ICT.	3 6%	12 24%	31 62%	4 8%	2.72	0.70
18	Teaching time are not enough for me to use the ICT for teaching and learning purposes.	0	7 14%	32 64%	11 22%	3.08	0.60
19	Enough training and professional development provided for teachers about ICT use in teaching.	4 8%	18 36%	24 48%	4 8%	2.56	0.76
20	I can create my own ppt, videos , E learning materials for teaching.	4 8%	5 10%	29 58%	12 24%	2.98	0.82
21	All ICT tools in my school go to waste and less used by teachers.	5 10%	31 62%	10 20%	4 8%	2.26	0.75
22	Teachers are given more time to learn and be comfortable with the use of ICT in teaching.	3 6%	12 24%	22 44%	13 26%	2.90	0.86

This is a survey results table with 22 items related to the use of Information and Communication Technology (ICT) in teaching. The survey participants rated their level of agreement or disagreement with each item on a four-point Likert scale (strongly disagree, disagree, agree, strongly agree). The table includes the frequency and percentage of responses for each rating point, as well as the mean and standard deviation (S.D.) for each item.

The mean is a measure of the central tendency that represents the average score of respondents' ratings for each item on a scale of 1 to 4, where 1 represents "Strongly Disagree" and 4 represents "Strongly Agree." The standard deviation (SD) is a measure of the variability or spread of responses around the mean. The mean values range from 2.26 to 3.12, with a possible range of 1 to 4. A mean value of 3 indicates that the respondents, on average, agreed with the statement. A mean value below 3 indicates disagreement, while a mean value above 3 indicates agreement.

The standard deviations ranged from 0.6 to 1.01, suggesting that there was some variability in responses, but generally, respondents tended to agree or strongly agree with most statements. The standard deviation was lowest for item 18, which indicates that there was a high level of agreement that teaching time is not enough to use ICT for teaching and learning purposes.

However, there are some concerns and barriers to the use of ICT, such as lack of access, technical difficulties, lack of support, and the perception that it can be a waste of time.

The results are based on the opinions of the survey respondents and may not be representative of the larger population or other contexts.

General positive attitude towards ICT's role in enhancing teaching and learning.

Challenges include technical issues, limited access, and perceived ineffectiveness in some cases.

The findings offer valuable insights into the current state of ICT integration in schools and highlight areas for improvement. The study's results will inform future strategies for enhancing educational practices through effective use of technology.

Interpretation and Conclusion

Data analysis tools and Test used in the study are

T-test: It is used for testing the significance of a sample mean or for judging the significance of difference between the means of two samples.

We would use a t test if we wished to compare the reading achievement of male and females. With a t test, we have one independent variable and one dependent variable. The independent variable (gender in this case) can only have two levels (male and female). The dependent variable would be use of ICT.

Two-sample t-test on summary data			
Sun May 7 18:56:37 2023			
Results			
Summary results			
	FEMALE	MALE	Difference
Mean	2.75	2.79	0.04
Standard deviation	0.88	0.68	0.782
n	24	26	50
Standard error	0.18	0.133	0.221
90% CI for mean	2.442 - 3.058	2.562 - 3.018	-0.742
DF	23	25	48
t			0.181
P-value			0.429
Tails			1-tailed
Conclusion	Accept null hypothesis: means not significantly different		

The table presents summary results of a comparison between two groups (females and males) based on some variable. The mean of the variable is slightly higher for males (2.79) than for females (2.75), but this difference is very small (0.04) and may not be significant.

The standard deviation of the variable is higher for females (0.88) than for males (0.68), and the standard error (a measure of the precision of the mean estimate) is also higher for females (0.18) than for males (0.133).

The table also provides a 90% confidence interval for the mean difference between the two groups (-0.742), as well as the degrees of freedom (DF), the t-value, and the p-value. The p-value of 0.429 is not less than the conventional alpha level of 0.05, indicating that the difference between the two groups is not statistically significant. Finally, the table concludes that the null hypothesis should be accepted, which means that there is no significant difference between the two groups on the variable being studied.

Two-sample t-test on summary data			
Sun May 7 18:54:43 2023			
Results			
Summary results			
	FEMALE	MALE	Difference
Mean	2.75	2.79	0.04
Standard deviation	0.88	0.68	0.782
n	24	26	50
Standard error	0.18	0.133	0.221
95% CI for mean	2.378 - 3.122	2.515 - 3.065	-0.89
DF	23	25	48
t			0.181
P-value			0.857
Tails			2-tailed
Conclusion	Accept null hypothesis: means not significantly different		

This table presents the summary results of a statistical comparison between two groups, a female group and a male group. The table reports various statistics related to the mean, standard deviation, sample size, standard error, confidence interval, degrees of freedom, t-value, p-value, and conclusion.

The mean score for the female group is 2.75 and for the male group is 2.79, with a difference of 0.04 between the means. The standard deviation for the female group is 0.88 and for the male group is 0.68, with an overall pooled standard deviation of 0.782. The sample size is 24 for the female group and 26 for the male group, for a total sample size of 50.

The standard error is 0.18 for the female group and 0.133 for the male group, with a pooled standard error of 0.221. The 95% confidence interval for the mean difference between the groups is -0.89, indicating that the means are not significantly different.

The degrees of freedom for the t-test are 23 for the female group and 25 for the male group, with a total of 48 degrees of freedom. The t-value is 0.181, and the p-value is 0.857. The test is two-tailed, and the conclusion is to accept the null hypothesis that the means are not significantly different.

Statement of hypotheses Hypotheses Testing (Teaching, Learning)

1. There is Implementation of Information and communication technology in schools.

Statistical Hypothesis:

H01: Schools do not implement Information and communication technology

H11: Schools do implement Information and communication technology

From the above analysis it shows that there is Implementation of Information and communication technology in schools. Therefore null hypothesis (H01) is rejected and alternative hypothesis (H11) is accepted.

2. Information and communication technology has a significant role in teaching

Statistical Hypothesis:

H02: Information and communication technology does not help teachers in teaching process

H12: Information and communication technology does help teachers in teaching process

From the above analysis it shows that Information and communication technology has a significant role in teaching. Therefore null hypothesis (H02) is rejected and alternative hypothesis (H12) is accepted.

3. Information and communication technology has a significant role in Learning

Statistical Hypothesis:

H03: Information and communication technology does not help students in learning process

H13: Information and communication technology does help students in learning process

From the above analysis it shows that Information and communication technology has a significant role in Learning. Therefore null hypothesis (H03) is rejected and alternative hypothesis (H13) is accepted.

4. Information and communication technology enhances quality of teaching

Statistical Hypothesis:

H04: Information and communication technology does not help in enhancing the quality of teaching

H14: Information and communication technology does help in enhancing the quality of teaching

From the above analysis it shows that Information and communication technology enhances quality of teaching. Therefore null hypothesis (H04) is rejected and alternative hypothesis (H14) is accepted.

The appropriate use of Information and Communication Technology (ICT) in education can create a positive learning environment by promoting student autonomy, active learning, and engagement. It helps shift the focus from teacher-centered to student-centered pedagogy, allowing students to explore and experiment, work on real-life problems, and bring the world into their classrooms. ICT also assists teachers in managing various responsibilities and facilitates the delivery of academic content and monitoring of student progress.

However, there are several challenges to integrating technology in the classroom. These include extrinsic factors such as limited resources, lack of time, support systems, and training facilities, as well as intrinsic factors such as teacher attitudes, beliefs, practices, and resistance to change. The digital divide, especially in countries like India, where access to ICT tools can be limited in rural areas, further hinders the adoption of technology in education. Insufficient digital literacy and inadequate training also contribute to the difficulties teachers face in using technology effectively.

Despite these challenges, ICT has the potential to transform teaching practices and improve the quality of education in India. It allows teachers to create and share high-quality lesson plans and transition from instructors to guides supporting student learning journeys. However, addressing infrastructural issues, providing digital content, allocating sufficient time, and implementing effective training programs are crucial for leveraging the full potential of technology in education.

ICT offers various benefits for both students and teachers. Students can gain autonomy, access tailored ta-

sks, demonstrate achievement in unique ways, and overcome communication difficulties. Teachers can enhance their teaching effectiveness, make lessons more interesting and interactive, and improve professional development through collaboration with peers. However, barriers such as teacher competency, lack of infrastructure, disinterest, and limited ICT schemes need to be addressed for a successful transition to an ICT-based education system.

Conclusion

The successful integration of ICT in education requires proper implementation, continuous support, and adequate training for teachers and students. It can lead to significant improvements in the quality and standards of education, enhance access to resources, and prepare learners for the demands of the 21st century. Overcoming barriers and changing teachers' beliefs and attitudes towards ICT integration is crucial. Further research and studies should focus on identifying and addressing specific challenges faced by teachers in using ICT effectively in classrooms, and comparisons between different types of schools and their approaches to ICT integration can provide valuable insights

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