



**ICT Integration in classrooms of Haryana Government schools :
Issues and Solutions**

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Abstract

The primary focus of my research paper is to investigate the challenges encountered by government schools in Haryana regarding the accessibility of various ICT-related infrastructure and initiatives. There has been a noticeable decline in the academic performance and achievements of students with normal intelligence, particularly those enrolled in government institutions. This decline can be attributed to a variety of factors, including the lack of updated infrastructure, inadequate maintenance, low levels of motivation among teachers and staff, and insufficient academic and financial support from parents. Upon closer examination of students who struggle in traditional and less engaging classrooms, it becomes apparent that there is a pressing need for an entirely new approach to education, especially for those requiring special attention. Recognizing the need for a cost-effective and efficient method of instruction, it was acknowledged that technology could serve not only as a tool for imparting education and training but also as a means to deliver tailored instructions that cater to individual needs at a relatively low cost. My study has furnished comprehensive information about the availability and condition of ICT infrastructure in government schools across Haryana. This data is indispensable for the successful implementation of any new ICT-based interventions in the state.

Background

The ICT@Schools scheme was launched in 2004 as part of the National Policy on Education (NPE) 1986 and the Program of Action (PoA) 1992. The primary objective of the scheme was to



leverage technology to improve the teaching and learning process in government schools, bridge the digital divide, and enhance the overall quality of education. The scheme targeted government and government-aided schools across all states and union territories of India. The scheme had various components, including the provision of computer labs, procurement of hardware and software, development of e-content, training of teachers, and support for internet connectivity. One of the key components was the establishment of computer labs in schools, equipped with computers, printers, projectors, and other necessary hardware. This infrastructure aimed to provide students and teachers with access to digital resources. The scheme emphasized the integration of ICT into the curriculum, encouraging teachers to use technology as a teaching tool and students to use it for learning purposes. To ensure effective implementation, the scheme included extensive teacher training programs. Teachers were trained to use ICT tools and integrate technology into their teaching methods. The scheme supported the creation of digital content and e-learning materials to make learning more engaging and interactive for students. In later phases of the program, efforts were made to provide schools with internet connectivity, enabling access to online resources and facilitating communication and collaboration. The scheme included mechanisms for monitoring and evaluating its progress and impact, with a focus on improving the quality of ICT education. The program was funded by the central government, and states were encouraged to allocate a portion of their education budgets to support ICT@Schools initiatives.

The ICT@Schools scheme played a significant role in enhancing digital literacy and improving the overall quality of education in government schools across India. It aimed to prepare students for the digital age by providing them with the skills and resources needed to thrive in an increasingly technology-driven world. Over the years, the program evolved to adapt to changing technological advancements and educational needs. It also contributed to reducing the digital divide by bringing technology to schools that lacked access to it.

Introduction

The National Education Policy (NEP) 2020 emphasizes the seamless integration of technology into classrooms to enhance the teaching and learning experience. It envisions technology as a

tool for personalized and interactive learning, empowering students with digital resources and teachers with innovative teaching methods. The policy encourages the use of digital platforms, smart classrooms, and online resources to create a tech-savvy and globally competitive education ecosystem in India. Now to accomplish these objectives, the availability of opportunities and resources for a diverse country like India is always remain a challenge. The students of Govt. schools sometimes find it difficult to compete public school students in terms of these resources, opportunities and support.

In its policy, for introducing IT in Education, the Haryana state is committed to introduce Technology in schools, both urban & rural, at appropriate levels to prepare the next generation to face the challenges thrown up by globalization of economy and establishment of information highways. Subject to availability of resources, the state endeavor to introduce Computers as aids in education at the elementary level also, for better appreciation of the subjects taught. In addition to the usual courses in colleges, the state has introduced Skill based/Vocational/NEQF Courses in govt schools which is relevance to the industry.

In light of this, the proposed study is an attempt to investigate-

- the infrastructure provided for ICT@schools in Haryana
- the coverage of the ICT@school in Haryana .
- the implementation of various initiatives under this scheme, in improving the teaching learning environment in schools.
- The challenges faced by schools in implementing the policies related to ICT integration in classroom.

Review of existing Literature:

- **Kay, R. (2006). Evaluating strategies used to incorporate technology into preservice education: A review of the literature. Journal of Research on Technology in Education, 38(4), 383-408.**

This study reviews literature on the challenges and strategies related to integrating technology in teacher education programs, which can shed light on broader classroom integration challenges.

- **Cuban, L. (2001). Oversold and underused: Computers in the classroom. Harvard University Press.**
A seminal work that explores the challenges of technology integration in education, providing historical context and insights into persistent issues.
- **Zhao, Y., & Frank, K. A. (2003). Factors affecting technology uses in schools: An ecological perspective. American Educational Research Journal, 40(4), 807-840.**
This study takes an ecological perspective to examine factors influencing technology integration in schools, including classroom challenges.
- **Hew, K. F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. Educational Technology Research and Development, 55(3), 223-252.**
Provides an overview of research gaps and challenges in integrating technology into K-12 classrooms, offering recommendations for future research.
- **Davis, N., Preston, C., & Sahin, I. (2009). ICT teacher professional development: The impact of a school-based program on teacher confidence, skills, and integration. Computers & Education, 53(1), 369-379.**
Examines the challenges faced by teachers during ICT integration and the impact of professional development programs on teacher confidence and skills.
- **Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. Journal of Research on Technology in Education, 42(3), 255-284.**
Explores the intersection of teachers' knowledge, confidence, beliefs, and school culture in the context of technology integration challenges.
- **Becker, H. J. (2000). Pedagogical motivations for student computer use that lead to student engagement. Educational Technology, 40(5), 5-17.**
Investigates the pedagogical motivations for student computer use and how they relate to student engagement, addressing challenges in engaging students with technology.

The gaps in existing studies:-

While these research studies provide valuable insights into the challenges of ICT integration in the classroom, there are several gaps and avenues for further exploration in this area:

Teacher Professional Development Models: Many of these studies touch on the importance of teacher professional development, but there is room for more in-depth research into effective professional development models and strategies that address specific challenges faced by teachers during technology integration.

Long-Term Impact: While some studies discuss short-term outcomes, more research is needed to understand the long-term impact of ICT integration on student learning outcomes, teacher professional growth, and school culture.

Student Perspectives: Most studies focus on teacher perspectives and challenges. Exploring students' perspectives on technology integration, including their preferences, experiences, and challenges, could provide a more comprehensive understanding.

Cross-Disciplinary Comparisons: Future research could compare technology integration challenges and strategies across different subject areas or grade levels, as the challenges may vary based on the subject matter.

Digital Equity: The digital divide and issues related to access and equity in technology integration need more in-depth investigation, especially considering the increasing reliance on technology for education.

Pedagogical Approaches: While some studies briefly discuss pedagogical motivations, more research could focus on specific pedagogical approaches that effectively incorporate technology for different subjects and age groups.

Teacher Resistance: Research into teacher resistance to technology integration and strategies for overcoming it is essential, as resistance can be a significant barrier.

Policy and Governance: Understanding the role of policies and governance structures in shaping technology integration challenges and solutions is crucial for effective implementation.

Exploring these gaps in the context of ICT integration in the classroom will provide a more comprehensive understanding of the challenges and potential solutions, ultimately benefiting teachers, students, and educational institutions as a whole.

Relevance of Reviewed Material in present context of study: The Need and Significance:-

In all available studies so far, integration of technology to education, various challenges in its implementation and possible suggestions to address the issues are discussed. None out these studies specifically studies any one initiative or policy. As far as ICT@school scheme of MHRD is for Haryana is concerned, there is no research on its status or implementation gaps, outcomes in school of a particular state etc. are unavailable.

It is with the aim of filling these gaps, existing in this area that this study has been undertaken. It is a qualitative study of all **3217 schools of Haryana**, with a specific focus on the use and integration of ICT by the school, teachers, administrators and students. It delves deep into the challenges in usage of ICT at all levels, by relevant stakeholders, and examines the teaching - learning processes in detail. It seeks to analyze the processes, analyze differentials, discover trends and make suggestions for schools and policy makers.

Types of Research and the Category of existing Research:

The proposed research study is a descriptive survey as it is intended to find the description of the state of affairs as it exists at present. thereis no control over its variables. Here reporting will be as what has happened or what is happening. The methods of research to be utilized in this research are survey methods of all kinds including comparative and co relational methods

Possible problems and limitations of the research:

- Proposed research, being a descriptive research, confidentiality may become the primary weakness. Often people are not so truthful as they feel the need to tell the

researcher what they think the researcher wants to hear. This is particularly difficult during interviews.

- Participants may also refuse to provide answers to questions they view to be too personal. Furthermore, the idea that someone is watching can turn an observation into an event where people are acting how they perceive they should act.
- It also presents the possibility for error and subjectivity. For example, when a researcher while designing a questionnaire, questions are predetermined and prescriptive.
- Furthermore, the study may contain errors, as the researcher may record what he/she wants to hear and ignore data that does not conform to the research project's hypothesis. Overcoming a research bias is an extreme difficulty for descriptive research practitioners and those who chose to use a descriptive research approach must be aware of their influence on the outcome of the research.

Limitation of the proposed study is that it is confined only to

- one initiative towards integration of ICT to education- the ICT@school scheme under RMSA and related schemes.
- state Haryana only.
- Govt. schools covered under this scheme (3217 schools).

Data-Sources in the Proposed Research

The data is collected from both primary as well as secondary sources. In first phase secondary data from Education Deptt. Govt. of Haryana, Chandigarh, UTKARSH Society Panchkula SPD (SSA) Chandigarh, were collected in order to ascertain the implementation of the scheme in various schools. In second phase information through questionnaire and focus group discussions was collected from DEO, Principals, teachers, community members and students, as the primary data.

Research Design

In the proposed study the researcher must be able to define clearly what he wants to measure and must find adequate method for measuring it along-with a clear-cut definition of ‘population he wants to study. Since the aim is to complete and accurate information, in the said study the procedure is to be used must be carefully planned. The research design must make enough provision for protection against bias and must maximize reliability with due concern for the economic completion of the research study.

Research Design	Proposed study(Descriptive)
Overall Design	Rigid Design(design will make enough provision for protection against bias and must maximize reliability)
(i)Sampling Design	Probability sampling Design(Random sampling)
(ii)Statistical design	Pre planned design for analysis
(iii)Observational design	Structured or well thought out instruments for collection of data
(iv)Operational Design	Advanced decision about operational procedures

- **Selection of parameters**

Quantitative parameters for the study include the no. of schools benefited by the state govt.’s ICT schemes, data of the supplied infrastructure including computer systems, Study will also include number of teachers in place having received training to handle the ICT equipment and the number of students benefited.

Qualitative parameters include the improvement in the classroom climate, bottlenecks, challenges faced by organization, teachers and the students during implementation and scope for the sustainability of the practice.

- **Sample**

The scheme at present is running in 3217 schools, covering all the 21 districts in the state. Schools of diverse specifications(Rural/urban /Boys/Girls/Coed./high/Sr.Sec/ etc.)will be selected to cover the overall representation of schools of the state.

- **Tools**

The following tools will be used for data collection

1)Questionnaires

2) Interview schedule

3) Focus group discussions with

- State Project Coordinator(RMSA)
- District Education officers/District Project Coordinators
- Principals
- Teachers
- Community members and
- Students.
- Since present study is a descriptive survey, the questionnaire will normally use nominal and ordinal scales because it concerns primarily with the particular characteristics of a specific population of subjects. It does not require the examination of dependent and independent variables.

FINDINGS

Status of Installation of ICT infrastructure in Schools

From all surveyed schools of Haryana, in 71% of schools, installation of ICT infrastructure is completed, in 14% schools, installation is in progress; however, in 8% of schools, installation of ICT infrastructure is not yet initiated.

Who set up the ICT infrastructure?

In Haryana, in 50% of surveyed schools, ICT infrastructure has been setup by Government and in 40% schools, by External Agency and 9% schools did not respond.

Availability of Computer Lab

In Haryana, 92% principals of surveyed schools reported availability of computer lab in their schools; only 5% reported that there is no computer lab in their schools and 2% did not reply. Across districts in Ambala, Fatehabad, Jhajjar, Kurukshetra, Mahendergarh, Sirsa, Sonipat and Yamuna Nagar, 100% principals reported availability of computer lab in their schools followed by 95% in Faridabad, Gurugram, Kaithal and Rewari, 94% in Palwal and Rohtak.

Availability of EDUSAT Room

In Haryana, 70% principals of surveyed schools reported availability of EDUSAT room in their schools; 21% reported that EDUSAT room is not available in their schools. Across districts in Yamuna Nagar, 100% principals reported that EDUSAT room is available in their schools. Also 92% principals in Jhajjar, 90% in Mahendergarh, 89% in Fatehabad, 88% in Rohtak, 80% in Panchkula, 75% in Panipat and Sirsa reported the availability of EDUSAT room in their schools.

Current Status of ICT Facilities:

Projector

Current Status of ICT facilities like, Projector, Computers and EDUSAT are described in to three categories e.g. Functional, Partially functional but needs repair, Non- Functional. In Haryana, 52% principals reported that projector is functional in their schools, 13% reported that projector are partially functional but needs repair and 25% reported projectors are non-functional and remaining 10% did not answer this question.

Computers

In Haryana, 40% of principals reported that computers are currently functional in their schools, 42% reported its partially functional but needs repair and 12% reported that computer are non functional.

Across districts, 65% principals of Hisar informed that computers are functional in their schools, 58% in Fatehabad, 55% are functional in Kaithal, 53% in Palwal and Yamuna Nagar, 50% in Sirsa, 46% in Jhajjar, 45% in Ambala, Kurukshetra and Sonipat also reported functional computers.

Across districts, 37% principals of Mewat informed that computers are non-functional, 26% in Bhiwani, 24% in Rohtak and 23% in Jhajjar are non-functional.

School Budget Provided by the Government for the maintenance of ICT Infrastructure

In Haryana, only 4% reported that school budget is provided by the Government for the maintenance of ICT infrastructure, 89% reported that school budget is not provided by government. Across districts, 100% principals of Faridabad, Karnal and Mahendergarh reported that no school budget is provided by government for the maintenance of ICT infrastructure. In Bhiwani, Gurugram, Kaithal, Kurukshetra, Mewat and Sonipat, 95% principal reported no budget is provided by government. In Rohtak and Palwal, 94% principal reported no budget is provided.

Availability of ICT Coordinator/Computer Teacher

In Haryana, 73% principals informed that there is ICT Coordinator/Computer teacher in School and 22% reported that there is no computer teacher. Across districts, in Kaithal and Panipat, 90% principals said there is computer teacher in the schools. In Ambala and Sirsa, 85% principal said that computer teachers are available in their schools. In Karnal, 83%, in Kurukshetra and Panchkula, 80% principals reported the availability of computer teachers.

Across districts, 53% principals of Mewat, 47% of Faridabad, 35% of Sonipat, 33% of Palwal, 32% of Bhiwani and 30% of Gurugram reported Computer teacher is not available in their schools.

Employment Status of Computer Teacher

In Haryana, only 4% reported that computer teacher is a permanent faculty in their schools; however, 63% reported that computer teacher is outsourced by External Agency. Across districts, this figure is highest in KaithalPanchkula and Sirsa (80% each) followed by Yamuna Nagar (79%) , Panipat (75%), and Fatehabad (74%).

Total Functional Computers

In Haryana, 56% of total given computers are functional. Across districts, this figure is the highest in Rewari, 71% followed by Jhajjar and Yamuna Nagar 70%, Karnal 69%, Sonipat 66%, Panchkula 65%, Hisar 62%, in Ambala, Faridabad and Kaithal 60%.

Total Functional Computers with Active Internet Connection

In Haryana, total functional computers with active internet connection, is 11%. Across districts, total functional computers is highest in Panipat 23% followed by Gurugram 17% ,Fatehabad 16% and Hisar 14%.

Access of Cable TV

Access to Cable TV in Haryana schools is only 4%, however, 86% schools do not have access to Cable TV. Across districts, access to cable TV is somewhat significant in only Yamuna Nagar 26%. Across districts, 100% schools of Rohtak district do not have access to Cable TV. In Fatehabad, Kaithal and Mewat, 95% schools followed by in Gurugram, Panchkula, Rewari, Sirsa and Sonipat, 90% schools do not have access to Cable TV.

Access of Supplied Electricity

In Haryana, 92% principals reported that schools have access to supplied electricity and only 4% reported no supplied electricity in their schools. Across districts, in Bhiwani, Kurukshetra,

Mahendergarh and Yamuna Nagar, 100% principals followed by in Fatehabad, Panchkula, Rewari, Sirsa, Sonipat, 95% principals reported that their schools have supplied electricity.

Access of Internet

In Haryana, 86% of total survey schools have access to internet. Across districts, in Bhiwani, Gurugram, Karnal and Rohtak, 100% of surveyed schools have internet connections. In Mahendergarh and Yamuna Nagar, 95% and in Sonipat 90% have internet connection.

Access of Generator

In Haryana, 81% schools have generators. Across districts, 100% of Rohtak followed by 95% of Bhiwani, Kurukshetra, Mahendergarh and Rewari, 89% of Fatehabad and Yamuna Nagar, 85% of Kaithal, 80% of Hisar and Panchkula have generators.

Computers Established in Schools

In Haryana, 56% school principals reported that computers are provided in their schools during last 4 to 8 years followed by 26% principals reported that computers are given more than 8 years back, 8% during 2-4 years back. Only 1% principals reported that computers are given during less than 1 year and 1% between 1 to 2 years. 8% principals did not reply this information.

Across districts, in Mahendergarh, 80% principals reported computers were given during last 4-8 years followed by 79% in Fatehabad, 77% in Jhajjar, 75% in Karnal, 74% in Mewat, 70% in Panipat, 65% in Ambala and Gurugram, 60% in Kurukshetra.

Across districts, 55% principals of Sirsa reported that computers were given to their school more than 8 years back followed by 45% in Kaithal, 42% in Faridabad, 38% in Rewari, 37% in Bhiwani and 35% in Kurukshetra and Panchkula.

Knowledge of Computer Basics

From all surveyed schools in Haryana, in 23% schools, subjectteachers reported that they have high level knowledge of computer basics, 45% have medium level knowledge of computer

basics, 28% have low level of knowledge of computer basics and remaining 4% did not answer this question.

Ability to Prepare Subject Related Power Point Presentation

From all surveyed schools, only in 16% of schools, subject teachers reported that they have high level ability to prepare subject related power point presentation. 29% have medium level ability to prepare subject related power point presentation and 48% subject teachers reported that they have low level ability to prepare subject related power point presentation and remaining 7% did not answer this question.

Ability to search internet regarding subject content

From all surveyed schools, in 39% of schools, subject teachers reported that they have high level ability to search internet regarding subject content. 33% have medium level ability to search internet regarding subject content and 24% have low level ability to search internet regarding subject contents and remaining 4% did not answer this question.

Ability to use E-Contents/ICT in Classroom Teaching

From all surveyed schools, only in 19% of schools, subject teachers reported that they have high level ability to use E-content/ICT in classroom teaching. 27% have medium level ability to use E-content/ICT in classroom teaching and 48% have low level ability to use E-content/ICT in classroom teaching and remaining 6% did not answer this question.

Teaching Time is not enough to use ICT for teaching and learning purpose

From all surveyed schools, in 34% of schools, subject teachers agreed that teaching time is not enough to use ICT, 24% reported that sometimes teaching time is not enough to use ICT, however, 35% subject teachers disagreed that teaching time is not enough to use ICT and remaining 7% did not answer this question.

Subject Teachers feel the need to undergo training in computers

From all surveyed schools, in 75% of schools, subject teachers agreed that they need to undergo training in computers, 11% partially agreed that they need to undergo training in computers, however, 10% subject teachers disagreed that they need to undergo training in computers and remaining 4% did not answer this question. Across districts, 96% subject teachers of Mahendergarh followed by 95% of Jhajjar agreed that they need to undergo training in computers.

Implications of the study

- 1)The study showed available ICT infrastructure in Govt. schools of Haryana
- 2)The study gave condition of available equipment for ICT related activities in schools.
- 3)The study also helped in identification of the bottlenecks/challenges as well as possible solutions in implementing ICT initiatives in Govt. Schools of Haryana.
- 4)Study provided inputs for further improvement in the implementation of similar schemes.

CONCLUSION

The integration of Information and Communication Technology (ICT) into classrooms has the potential to revolutionize education by enhancing learning experiences and outcomes. However, this transformation is not without its challenges. Through this study I could explore some of the most common obstacles faced by educators and institutions when integrating ICT into the classroom:

Access and Infrastructure: Disparities in access to technology and internet connectivity persist, particularly in remote areas. Schools often lack the necessary hardware, software, and reliable internet connections, hindering effective ICT integration.

Teacher Training and Preparedness: As data indicates, many teachers have not received adequate training in using ICT effectively in teaching. A lack of confidence and proficiency among teachers impedes the successful integration of technology into their pedagogical practices.

Resistance to Change: Some teachers remain resistant to adopting new technology due to fear of change, concerns about their own competence, or a preference for traditional teaching methods. Overcoming this resistance is a significant challenge.

Sustainability: The responses reveal that, funding, maintenance, and updates for hardware and software seems difficult. Also, securing ongoing support is also a challenge making the long-term sustainability of ICT initiatives, difficult.

Digital Equity: Bridging the digital divide is a persistent challenge. Students with limited access to technology at home may be at a disadvantage compared to their peers, resulting in unequal opportunities for learning.

Constant Technological Evolution: The technology becomes obsolete and less usable with time. The rapid pace of technological change means that educators must continually update their skills and adapt to new tools and platforms. Keeping up with these advancements can be overwhelming.

Teacher-Student Ratio: Maintaining an appropriate teacher-student ratio in technology-rich classrooms can be challenging, as teachers may need to provide individualized support to students navigating ICT tools.

In conclusion, while ICT integration in the classroom offers tremendous potential for improving education, it is not without its challenges. Addressing these challenges requires a concerted effort from educators, administrators, policymakers, and stakeholders. By investing in infrastructure, providing ongoing professional development, and fostering a culture of innovation, schools can navigate these obstacles and harness the full benefits of ICT in education.

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