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ICT Integration in Secondary Schools of Bankura District, West Bengal: Problems and Prospects

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Abstract

Modern life is dominated by technology, and while technology alone cannot solve all educational problems, the integration of Information and Communication Technology (ICT) is essential in the era of globalization. In Bankura, secondary schools lag in ICT adoption, with much instructional and administrative work still done manually. Major obstacles include the high cost of hardware and software, weak infrastructure, limited teacher ICT skills, and a lack of culturally relevant software. Funding constraints further limit schools' ability to provide basic facilities, let alone high-tech equipment, and Internet access remains costly. Despite these challenges, ICT is crucial for improving teaching, learning, and school management and for fostering economic and technological development. To bridge the digital divide, Bankura must prioritize ICT integration in its secondary education system.

Keywords: *ICT in Education, Secondary Schools, Digital Divide, Infrastructure Challenges, Teacher ICT Competency, Educational Technology, Funding Constraints, ICT Integration, Educational Management*

Introduction

There is no doubt that modern life is dominated by technology. Although it has been rightly observed that technological solutions alone cannot fix all the challenges in education, there is a widespread recognition of the need to integrate Information and Communication Technology (ICT) into education. In the era of globalization, where the free flow of information via satellites and the Internet shapes the dissemination of knowledge, ICT has become an indispensable tool for teaching, learning, and educational administration. There has been a rapid growth in the use of ICT in education around the globe, especially in developed and developing countries (Mangundu et al., 2025). In a global context, many projects have been implemented to facilitate technology integration and incorporate ICT tools such as interactive whiteboards, tablets, laptops, and projectors in the schools in addition to educational software, internet connectivity infrastructure, and other ICT-related equipment (Falloon, 2015 & MoNE, 2017). As ICT integration advances in schools, it is evident that research on technology integration has increased. Various studies investigating the effects of the use of several technologies in education have determined that integration of ICT positively affects teaching and learning when applied with proper pedagogical methods (Albaaly & Higgins, 2012; Erbas, Ince, & Kaya, 2015; Malik & Shanwal, 2017).

However, Bankura lags in bridging the international digital divide, as it has made limited efforts to incorporate ICT into the secondary school curriculum. Much of the instructional and administrative work in secondary schools in Bankura is still carried out manually. This paper, therefore, examines the major obstacles hindering the effective use of ICT in secondary education in the district. Among the key challenges are the high

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cost of computer hardware and software, weak infrastructure, inadequate ICT skills and knowledge among teachers, and the lack of culturally relevant and locally appropriate software.

Moreover, secondary schools in Bankura face severe funding constraints, which limit their ability to provide necessities such as furniture, textbooks, and adequate classrooms, let alone invest in high-tech equipment. The cost of an Internet subscription is also prohibitively high for many underfunded schools. Despite these challenges, ICT remains essential for enhancing teaching, learning, and school management and serves as a critical instrument for economic and technological development in the 21st century. To remain competitive and avoid being further marginalized by the digital divide, Bankura must prioritize the integration of ICT in its secondary schools.

Bankura District of West Bengal has a mix of urban, semi-urban, and rural secondary schools. While efforts have been made to introduce smart classrooms, computers, and digital content, many schools still face infrastructural limitations, inadequate training, and uneven access to ICT facilities. These challenges affect meaningful ICT integration in classroom practices.

Despite government initiatives to promote ICT in education, the level of ICT integration in secondary schools of Bankura District remains inconsistent. Problems such as inadequate infrastructure, lack of teacher training, poor maintenance, limited internet connectivity, and resistance to change hinder effective ICT usage. At the same time, ICT offers significant prospects for improving teaching quality and student learning. Hence, there is a need to systematically study the problems and prospects of ICT integration in secondary schools of Bankura District.

Review of Related Literature

Digital technologies help educators become more connected; however, it is important to integrate technology with modern educational techniques. That as educators build relationships, they can share knowledge and learn from each other, and when this happens, learning improves for all students (Diyal & Pandey, 2022) . In addition, ICT provides teachers and learners not only with access to information but also with opportunities to participate in and contribute to the knowledge economy (UNESCO, 2015). The openness of the web puts students into an exploratory mode which often challenges effective learning in time-constrained formal school systems. Without a teacher's supervision, students might misuse the technology for leisure time activities and have less time to learn and study. With e-learning technologies, teachers may provide knowledge to students more effectively and with better proficiency.

With ICT, teachers can design interactive lesson plans that encourage inquiry, projects, and collaboration. ICT integration gives students the ability to use learning applications without the direct supervision of a teacher. ICTs and computer-aided instruction can potentially increase the amount of instruction students receive overall, while also providing teachers with the opportunity to monitor students' academic progress. More than ever, contemporary educators act as educational facilitators rather than the center of attention in the classroom because of ICT integration (Mbune et al., 2025; Donaldson & Jackman, 2025; Njoka et al., 2020; Kithungu et al., 2020). Teachers can now provide students with a variety of personalized learning experiences thanks to the use of technology. Technology in education may also enable teachers to teach a variety of subjects to a larger student body. Pedagogical approaches must change from the traditional lecture method to the incorporation of the newest technology because ICT integration is highly desired in today's academic environment. Through ICT integration, teachers can link their local classrooms to locations throughout the globe. ICT resources can be used in classrooms to give students a taste of what is going on in the world. For instance, video conferencing systems offer educators a chance to interact with people worldwide. (Dogo et al., 2022; Kithungu et al., 2020; Chepkonga, 2015; Mangundu et al., 2025).

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Rationale of the Study

Information and Communication Technology (ICT) has emerged as a powerful tool for transforming the teaching–learning process in secondary education. The integration of ICT in schools enhances instructional effectiveness, promotes student engagement, supports individualized learning, and prepares learners for participation in a knowledge-based digital society. In line with national initiatives such as Digital India, ICT@Schools Scheme, and PM e-Vidya, the Indian education system emphasizes the meaningful use of technology at the secondary level to improve educational quality and equity (Divaharan & Lim, 2010, Kithungu et al., 2020).

Despite these policy initiatives, the extent and effectiveness of ICT integration in secondary schools vary widely across regions, particularly between urban and rural areas. Bankura district of West Bengal, characterized by socio-economic diversity and a significant rural population, faces unique challenges in educational resource management. Issues related to availability of ICT infrastructure, irregular internet connectivity, limited teacher training, inadequate maintenance, and underutilization of existing facilities often restrict the effective use of ICT in classroom teaching (Waiganjo & Mwalengwanasho, 2024).

While some secondary schools possess basic ICT facilities such as computers and projectors, their actual classroom utilization, integration into lesson planning, and maintenance practices remain questionable. Moreover, students' access to and encouragement for using ICT resources for academic purposes is often uneven, which may widen the digital divide and affect learning outcomes. Therefore, it becomes essential to assess not only the availability of ICT infrastructure but also its usage, pedagogical integration, student engagement, and sustainability within schools (Mbune et al., 2025, Donaldson & Jackman, 2025).

The present study is undertaken to systematically examine the problems and prospects of ICT integration in secondary schools of Bankura district. By focusing on key aspects such as infrastructure adequacy, frequency of ICT uses in teaching, teacher integration of ICT in lesson planning, student encouragement, and maintenance of ICT facilities, the study seeks to provide a comprehensive understanding of the ground reality. The findings of the study are expected to help identify critical gaps and challenges while also highlighting opportunities for strengthening ICT-enabled education.

The outcomes of this research will be beneficial for educational administrators, policymakers, school heads, teachers, and curriculum planners in formulating effective strategies for improving ICT infrastructure, teacher preparedness, and institutional support systems. Furthermore, the study will contribute to the existing body of research on ICT integration in secondary education, particularly in the context of rural and semi-urban districts of West Bengal, and offer practical recommendations for achieving sustainable and meaningful ICT integration in schools.

Objectives of the Study

1. To examine the availability and adequacy of ICT infrastructure (computers, projectors, and internet facilities) in secondary schools.
2. To study the extent of utilization of ICT facilities in classroom teaching by teachers.
3. To assess the level of integration of ICT tools in lesson planning by subject teachers.
4. To investigate the encouragement and opportunities provided to students for using ICT resources for learning purposes.
5. To analyse the maintenance, functionality, and management of ICT facilities in secondary schools.

Research Questions

1. To what extent do secondary schools have adequate ICT infrastructure, such as computers, projectors, and internet connectivity?
2. How frequently are ICT facilities used in classroom teaching at the secondary school level?

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3. To what extent do subject teachers integrate ICT tools into their lesson plans?
4. Are students encouraged to use ICT resources for academic and learning purposes?
5. How effectively are ICT facilities maintained and kept functional in secondary schools?

Methodology

The present study adopts a descriptive survey method of research. This approach is appropriate as the study aims to describe the existing status, problems and prospects of ICT integration in secondary schools.

Population of the Study

The population of the present study comprises all secondary school teachers and Headmasters/Headmistresses working in government, government-aided, and private secondary schools of Bankura District, West Bengal. These schools represent diverse administrative structures and socio-educational contexts, providing a comprehensive base for examining the status, problems and prospects of ICT integration at the secondary level.

The inclusion of both teachers and school heads is essential, as teachers are directly involved in classroom instruction and the pedagogical use of ICT, while Headmasters/Headmistresses play a key role in planning, implementation, supervision, and maintenance of ICT facilities. Thus, the selected population offers a holistic perspective on the availability, utilization, integration, and management of ICT resources in secondary schools of the district.

Sample

The sample for the present study consists of secondary school teachers and 30 Headmasters/Headmistresses selected from government and government-aided secondary schools of Bankura District, West Bengal. The teachers included in the sample are those who are actively engaged in teaching at the secondary level and are directly involved in the instructional use of ICT in classroom practices.

The inclusion of 30 Headmasters/Headmistresses ensures adequate representation of school leadership perspectives related to planning, implementation, utilization and maintenance of ICT facilities. The selected sample is considered appropriate and representative for examining the problems and prospects of ICT integration in secondary schools of Bankura district.

Tools

For the present study, a self-developed Likert-type questionnaire on ICT Integration was used as the primary tool for data collection. The questionnaire consisted of five major dimensions, namely: availability of ICT infrastructure, utilization of ICT in classroom teaching, integration of ICT in lesson planning, student use and encouragement of ICT, and maintenance and functionality of ICT facilities.

Responses were obtained using a five-point Likert scale ranging from Strongly Agree, Agree, Undecided, Disagree, to Strongly Disagree. Separate but similar versions of the questionnaire were administered to teachers and Headmasters/Headmistresses to obtain comprehensive perspectives on ICT integration in secondary schools.

Statistical Techniques for Data Analysis

The data collected for the present study were analysed using percentage analysis to determine the distribution of responses. Graphical representations, such as pie charts, were used to present the data in a clear and meaningful manner. These statistical techniques helped in interpreting the status, problems, and prospects of ICT integration in secondary schools of Bankura District.

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Result of the Study

Objectives 1

The percentage analysis of responses reveals that the present status of ICT integration in secondary schools is largely inadequate.

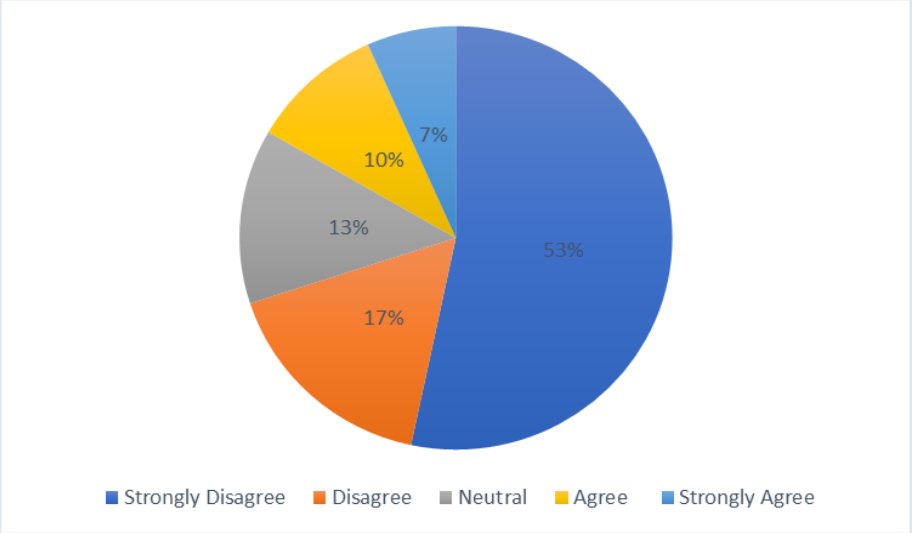

Figure 1: Availability of ICT Infrastructure in Secondary Schools

The pie chart above visually represents respondents' views on the availability of ICT infrastructure in secondary schools.

The pie chart shows that a large majority of respondents expressed dissatisfaction with the availability of ICT infrastructure in their schools. More than half of the respondents 53.33% strongly disagreed and 16.67% disagreed that adequate ICT facilities such as computers, projectors, and internet connectivity are available. Only a small proportion 10.00% agreed and 6.67% strongly agreed reported satisfactory availability, while 13.33% respondents remained neutral. This distribution clearly indicates serious infrastructural deficiencies in ICT facilities across secondary schools.

Objectives 2

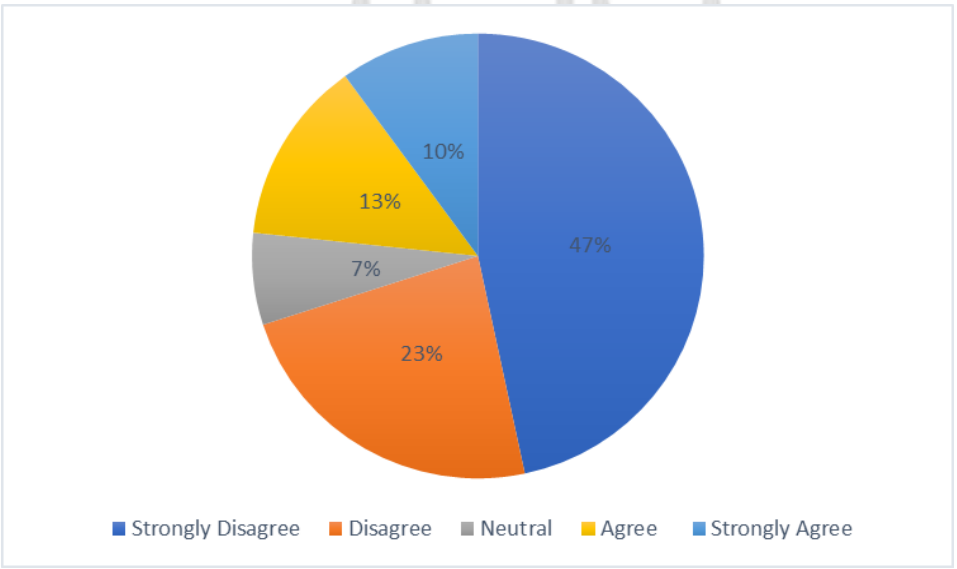

Figure 2 : Regular Use of ICT in Classroom Teaching

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The pie chart above illustrates respondents' perceptions regarding the regular use of ICT in classroom teaching.

The pie chart indicates that a substantial majority of respondents (70.00%) expressed disagreement regarding the regular use of ICT in classroom teaching. Among them, 46.67% strongly disagreed and 23.33% disagreed, suggesting that ICT facilities are not regularly integrated into classroom practices. Only 13.33% respondents agreed and 10.00% strongly agreed, accounting for 23.33% positive responses, while 6.67% respondents remained neutral. This distribution clearly reflects limited classroom-level integration of ICT in secondary schools.

Objectives 3

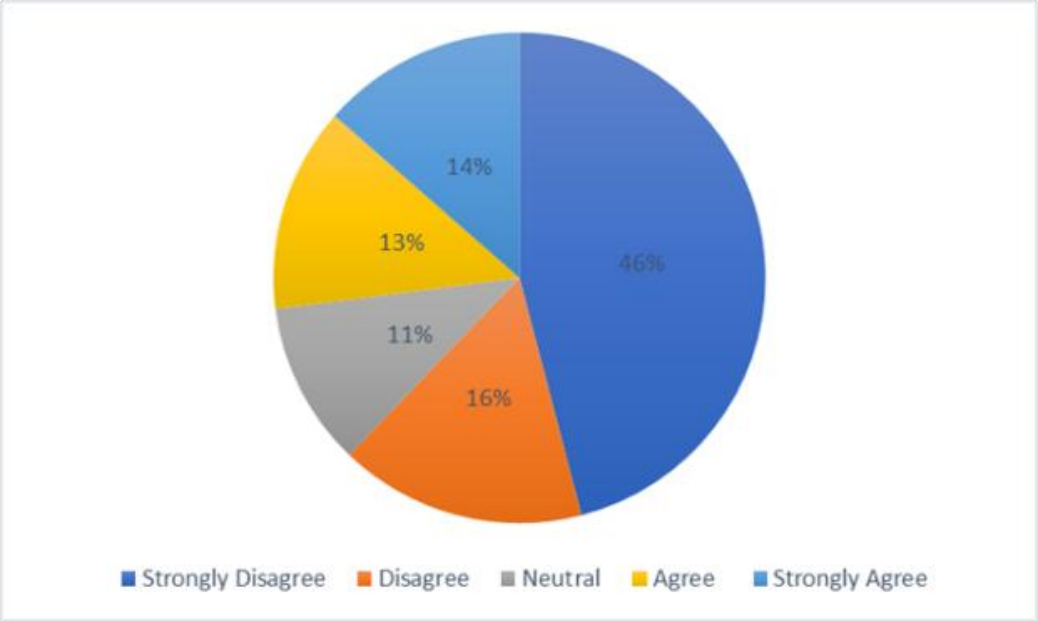

Figure 3: Teachers' integration of ICT tools in lesson planning

The pie chart illustrates respondents' views on teachers' integration of ICT tools in lesson planning.

The chart clearly shows that a substantial majority of respondents (76.67%) expressed disagreement, with 56.67% strongly disagreeing and 20.00% disagreeing that teachers integrate ICT tools into their lesson plans. Only 16.67% respondents agreed and strongly agreed, while 13.33% remained neutral. This distribution reflects the poor pedagogical use of ICT in instructional planning and indicates that ICT integration at the lesson-planning level is largely inadequate.

Objectives 4

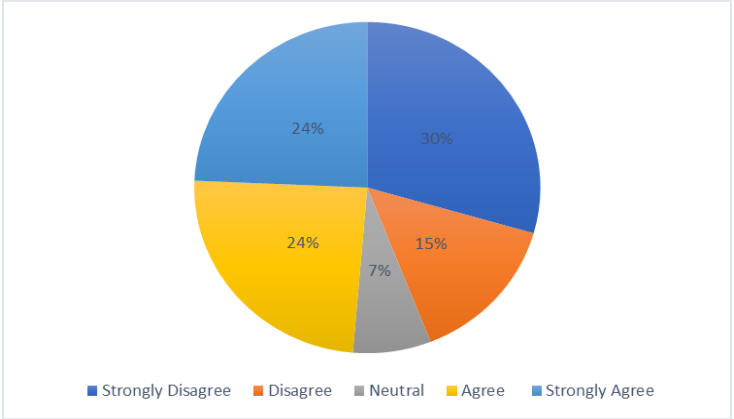

Figure 4: Encouragement of students for using ICT resources in learning.

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The pie chart depicts respondents' views regarding encouragement provided to students for using ICT resources in learning.

It is evident that a majority of respondents (63.33%) expressed disagreement, indicating that students are generally not encouraged to use ICT resources. However, 33.33% respondents agreed or strongly agreed, while 10.00% remained neutral, suggesting that encouragement of students to use ICT is partial and inconsistent across secondary schools.

Objectives 5

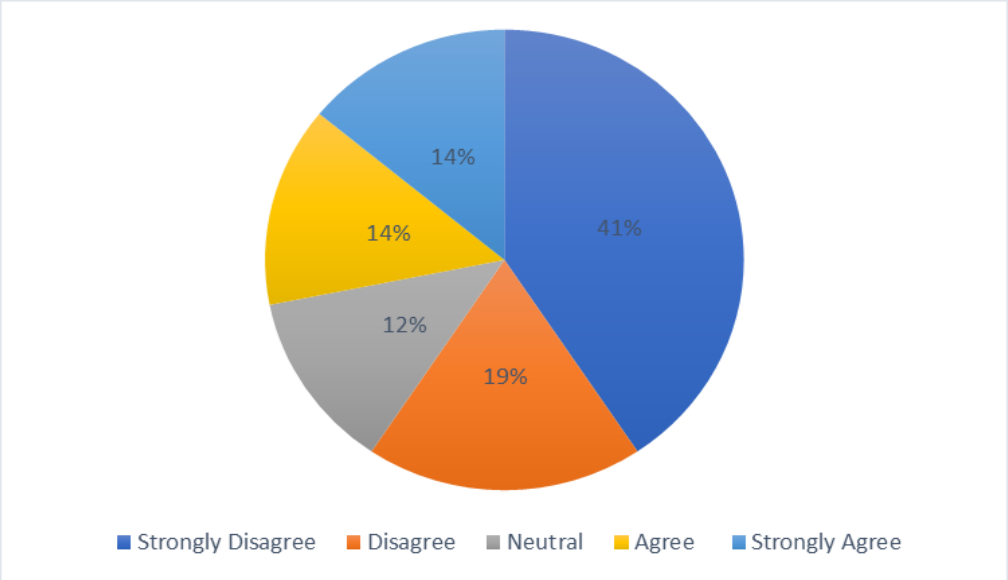

Figure-5: Maintenance and functionality of ICT facilities

The pie chart illustrates respondents' views regarding the maintenance and functionality of ICT facilities in secondary schools.

The chart shows that a majority of respondents (63.33%) expressed dissatisfaction, with 43.33% strongly disagreeing and 20.00% disagreeing that ICT facilities are properly maintained and functional. In contrast, 30.00% respondents agreed and strongly agreed, while 13.33% remained neutral. This distribution highlights maintenance issues and technical challenges, which act as major barriers to effective ICT integration in schools.

Interpretation of Findings

The study reveals that ICT integration in secondary schools of the Bankura district is largely inadequate. Across various dimensions availability, usage, pedagogical integration, encouragement, and maintenance the responses indicate significant gaps between policy goals and actual implementation.

Objectives 1

Availability of ICT Infrastructure

A substantial majority of respondents (70% combining strongly disagree and disagree) indicated that schools lack adequate ICT infrastructure, including computers, projectors, and internet connectivity. Only a small proportion (16.67%) agreed that the infrastructure is sufficient. This suggests that infrastructural deficiencies are a major barrier to effective ICT integration.

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Objectives 2

Regular Use of ICT in Classroom Teaching

Most respondents (70%) reported that ICT is not regularly used in classroom teaching, implying that even when some resources exist, they are underutilized. Only 23.33% acknowledged regular ICT use, highlighting that classroom-level adoption of technology is limited.

Objectives 3

Teachers' Integration of ICT in Lesson Planning

The data shows that a majority of teachers do not incorporate ICT tools in lesson planning (76.67% disagreed or strongly disagreed). This indicates that the pedagogical use of ICT is minimal and that teachers may lack training, motivation, or support to integrate technology effectively into teaching.

Objectives 4

Encouragement of Students to Use ICT Resources

About 63.33% of respondents indicated that students are not sufficiently encouraged to use ICT resources. While 33.33% reported positive encouragement, the inconsistency suggests that student engagement with ICT is sporadic and dependent on individual teachers or schools.

Objectives 5

Maintenance and Functionality of ICT Facilities

A significant portion of respondents (63.33%) expressed dissatisfaction with the maintenance and functionality of ICT facilities, indicating technical challenges such as non-functional computers, poor internet connectivity, or lack of technical support. This can directly affect the sustainability and reliability of ICT use in teaching-learning processes

Conclusion

The study concludes that the integration of ICT in secondary schools of Bankura district is largely inadequate. Significant gaps exist in the availability of ICT infrastructure, with most schools lacking sufficient computers, projectors, and reliable internet connectivity. Even when resources are available, their use in classroom teaching remains limited, reflecting poor pedagogical integration by teachers. Students are inconsistently encouraged to utilize ICT tools, and existing facilities often face maintenance and technical challenges, further hindering effective implementation. Overall, the findings indicate that both infrastructural and operational factors constrain the adoption of ICT in teaching–learning processes. To enhance ICT integration, there is a pressing need for upgrading infrastructure, providing teacher training, ensuring regular maintenance, and fostering a culture of ICT use among students and educators. Addressing these issues is essential for leveraging technology to improve educational quality, engagement, and digital literacy in secondary education.(Chowdhury, 2021).

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