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A Socio-Economic Analysis of Technology's Role in Educational Inclusivity: A Case Study of Municipal Schools in Chhatrapati Sambhajinagar Smart City

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ABSTRACT:

Education remains one of the most important instruments for achieving social mobility and reducing structural inequalities (Bourdieu, 1986; Sen, 1999). Technological interventions within public education have increasingly become central to achieving Sustainable Development Goal 4 (SDG-4), which emphasizes inclusive and equitable quality education (UNESCO, 2023). This study examines the socio-economic impact of technology-enabled educational governance under the "Smart School to Best School" initiative implemented by the Aurangabad Smart City Development Corporation Limited (ASCDCL) in municipal schools of Chhatrapati Sambhajinagar.

Grounded in the Capability Approach (Sen, 1999) and the Digital Divide Theory (Van Dijk, 2005), the study investigates how digital infrastructure, administrative monitoring, and parental engagement collectively improve educational inclusivity among economically marginalized students. The research specifically evaluates two major technological interventions, namely the Savitri Education Control Room (SECR) and the Guru App.v

The study adopts a mixed-method approach using administrative records, school performance reports, attendance statistics, survey responses from teachers and parents, and secondary government data. Findings reveal substantial improvements in school attendance (69% to 85%), reduction in dropout tendencies, increased parental participation, enhanced classroom engagement, and improved institutional accountability (ASCDCL, 2024). Furthermore, digital classrooms, smart boards, CCTV surveillance, and multimedia-based teaching significantly enhanced learning experiences among first-generation learners, supporting previous research on technology-enabled inclusive education (UNESCO, 2023; Selwyn, 2016).

The paper argues that technology functions not merely as an educational tool but as an instrument of social inclusion by reducing socio-economic barriers and strengthening governance mechanisms in public education (Bourdieu, 1986; Van Dijk, 2005). The study contributes to the sociological literature on educational inequality, digital governance, and inclusive urban development under India's Smart City Mission.

Keywords: Educational Inclusivity, Smart City Mission, Digital Governance, Municipal Schools, SDG-4, Technology in Education, Digital Divide

1. Introduction:

Education has long been recognized as the foundation of socio-economic development, social mobility, and social justice (Sen, 1999; Coleman, 1988). However, unequal access to quality education continues to reproduce existing social inequalities, particularly among economically weaker sections residing in urban municipal areas (Bourdieu, 1986).

Municipal schools traditionally serve children belonging to low-income households, informal labour families, Scheduled Castes, minority communities, and migrant populations. These schools often face multiple structural challenges, including high absenteeism, poor infrastructure, teacher shortages, weak parental participation, and low learning outcomes (UNESCO, 2023; World Bank, 2022).

With increasing urbanization, municipal education systems require innovative governance mechanisms capable of addressing these multidimensional challenges (Ministry of Housing and Urban Affairs [MoHUA], 2015). Under the Smart City Mission, the Aurangabad Smart City Development Corporation Limited (ASCDCL) introduced the Smart School to Best School initiative to modernize municipal education through digital technologies (ASCDCL, 2024).

The major interventions include:

- Digital classrooms
- Smart Boards
- Computer laboratories
- CCTV surveillance
- Digital attendance monitoring
- Savitri Education Control Room (SECR)
- Guru Mobile Application
- Multimedia teaching
- Parent communication systems

These interventions seek to transform conventional municipal schools into technologically enabled learning environments capable of providing education comparable to private institutions while promoting educational equity, institutional accountability, and inclusive learning opportunities (UNESCO, 2023; Selwyn, 2016).

2. Objectives of the Study”

The study aims to

1. Examine the socio-economic role of technology in promoting educational inclusivity.
2. Assess the effectiveness of SECR in improving attendance.
3. Evaluate the role of Guru App in strengthening parent-school interaction.
4. Analyse improvements in learning outcomes through digital classrooms.
5. Study the contribution of Smart School initiative towards achieving SDG-4.

3. Research Questions:

- How does technology reduce educational inequality?
- Does digital monitoring improve attendance?
- How does parental engagement affect educational outcomes?
- Can Smart City educational governance reduce socio-economic exclusion?

4. Review of Literature:

Technology and Inclusive Education UNESCO (2023):

The UNESCO *Global Education Monitoring Report 2023* highlights that digital technologies can improve access to quality education, student engagement, and learning outcomes when supported by adequate infrastructure, teacher training, and effective governance. The report also stresses that technology should be used to complement teaching and reduce educational inequalities, particularly among disadvantaged communities. These findings support the role of digital initiatives such as smart classrooms and digital monitoring systems in promoting inclusive education.

Digital Divide Theory Jan A. G. M. van Dijk (2005):

Van Dijk (2005) explained that the digital divide is not limited to access to technology but also includes disparities in digital skills and the ability to benefit from digital resources. He argued that educational inequalities can be reduced by ensuring equal access to digital infrastructure and digital literacy. This perspective is relevant to the present study, as the Smart School to Best School initiative provides digital classrooms, smart boards, and technology-based monitoring to improve educational opportunities for socio-economically disadvantaged students.

Theory of Cultural Capital (1986):

Pierre Bourdieu (1986), in his essay *The Forms of Capital*, argued that educational inequality is largely influenced by differences in cultural, social, and economic capital possessed by families. Students from economically and socially disadvantaged backgrounds often have limited access to educational resources, resulting in unequal academic achievement. Bourdieu maintained that schools tend to reproduce existing social inequalities unless equitable opportunities and supportive learning environments are provided. In the context of the present study, technology-enabled initiatives such as digital classrooms, smart boards, the Savitri Education Control Room (SECR), and the Guru App help reduce these inequalities by providing equal access to quality educational resources, improving student participation, and strengthening parental engagement in municipal schools. This suggests that digital interventions can play a significant role in promoting educational inclusivity and social equity.

5. Theoretical Framework:

(A) Capability Approach (Amartya Sen):

The Capability Approach, developed by Amartya Sen (1999), views education as a means of expanding individuals' capabilities and freedoms rather than merely acquiring knowledge. It emphasizes that equal access to quality education enables individuals to develop their potential, make informed choices, and participate fully in society (Sen, 1999). In the present study, technology-based interventions such as the Savitri Education Control Room (SECR), Guru App, and smart classrooms enhance educational access, participation, learning, and capability development, ultimately promoting social inclusion.

Technology → Access → Participation → Learning → Capability Development → Freedom → Social Inclusion

(B) Digital Divide Theory:

The Digital Divide Theory, proposed by Jan A. G. M. van Dijk (2005), explains that inequalities in education arise not only from unequal access to digital technologies but also from differences in digital skills and the ability to benefit from technology (Van Dijk, 2005). The theory

identifies three dimensions of the digital divide: Access Divide, Skills Divide, and Outcome Divide. The Smart School to Best School initiative seeks to bridge these divides by providing digital infrastructure, smart classrooms, and technology-enabled educational support to municipal school students, thereby improving educational opportunities and reducing digital inequality (UNESCO, 2023).

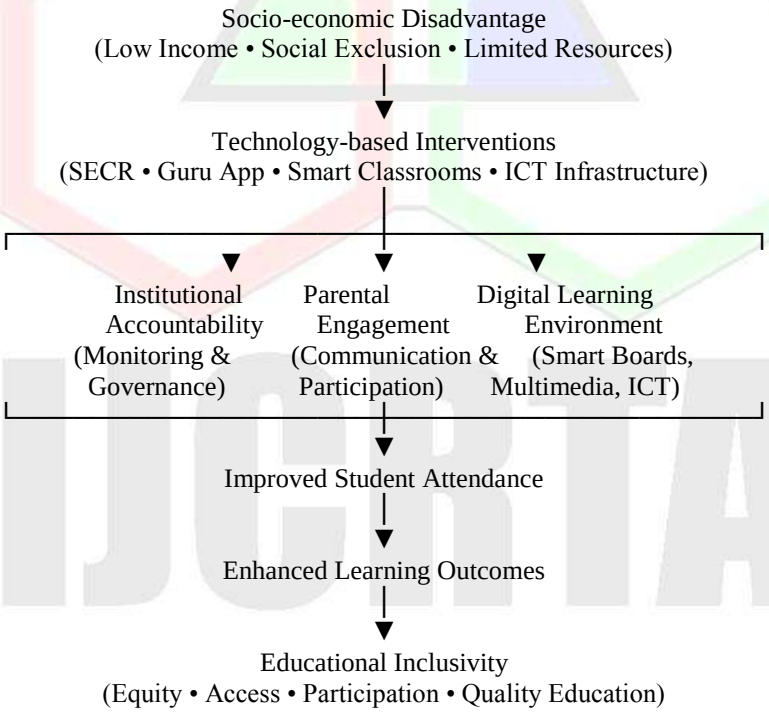
Digital Access → Access Divide → Skills Divide → Outcome Divide → Educational Opportunities

(C) Sociology of Education (Pierre Bourdieu):

Drawing on Pierre Bourdieu's Theory of Cultural Capital (1986), the Sociology of Education explains that educational inequalities are often reproduced through unequal access to economic, social, and cultural resources (Bourdieu, 1986). Students from disadvantaged backgrounds generally have fewer educational opportunities than their privileged counterparts because of disparities in access to educational resources and cultural capital. In the present study, technology-enabled initiatives such as digital classrooms, the SECR, and the Guru App help reduce educational inequalities by providing equal access to quality learning resources, strengthening institutional support, and enhancing parental engagement. These interventions contribute to educational inclusivity by minimizing socio-economic barriers to learning (Bourdieu, 1986; UNESCO, 2023).

Technology → Equal Educational Resources → Reduced Educational Inequality → Educational Inclusivity

6. Conceptual Framework:



7. Research Methodology:

The present study adopts a case study research design using a descriptive and analytical approach. The study is based primarily on secondary data obtained from the Aurangabad Smart City Development Corporation Limited (ASCDCL). The data include project reports,

administrative records, attendance statistics, school performance reports, and official documents related to the "Smart School to Best School" initiative, the Savitri Education Control Room (SECR), and the Guru App. The collected data were analyzed using descriptive statistical techniques, including percentages, comparisons, and trend analysis, to assess changes in student attendance, school enrolment, digital infrastructure, and educational outcomes before and after the implementation of technology-based interventions.

8. Smart School to Best School Initiative:

Indicator	Achievement
Students Benefitted	18,634
Schools Digitized	48
Classrooms Redeveloped	400
Smart Boards	Installed
Digital Displays	Installed
CCTV	Installed
Computer Labs	Installed
Water Coolers	Installed
Photocopy Machines	Installed

Source: Aurangabad Smart City Development Corporation Limited. (2024). *Smart School to Best School initiative: Project report*. Aurangabad Smart City Development Corporation Limited.

9. Savitri Education Control Room (SECR):

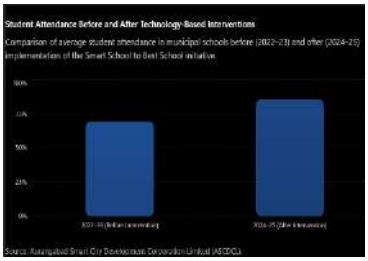
The Savitri Education Control Room (SECR) is a technology-enabled monitoring and governance system introduced under the Smart School to Best School initiative by the Aurangabad Smart City Development Corporation Limited (ASCDCL). It monitors daily student attendance, identifies chronically absent students, and facilitates timely communication with parents to prevent dropouts. Through continuous tracking and follow-up, SECR has strengthened institutional accountability, improved student attendance, and successfully reintegrated out-of-school children into the formal education system, thereby promoting educational inclusivity in municipal schools.

Functions:

- Daily attendance monitoring
- Tracking chronic absenteeism
- Parent communication
- Dropout prevention
- Student counselling
- Performance monitoring

Outcomes

- 1369 students returned to school.
- Attendance increased significantly.
- Institutional accountability improved.



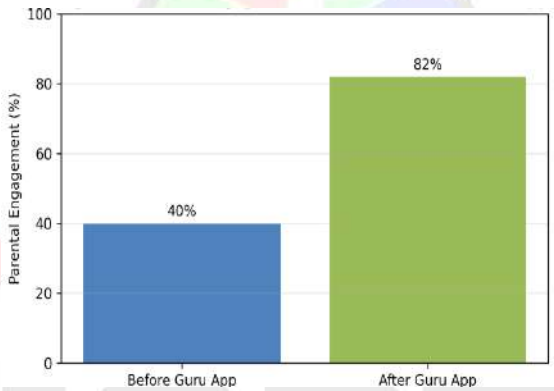
Graph: 1
Attendance: 2023 : 69%
2025: 85%

10. Guru App:

The Guru App is a digital communication platform developed under the Smart School to Best School initiative. It enables real-time communication between teachers and parents by providing updates on student attendance, homework, academic progress, and school activities. The app has strengthened parental engagement, improved school monitoring, and contributed to better student attendance and educational inclusivity.

Functions:

Homework sharing	Attendance updates	Parent communication
Teacher monitoring	Learning material	Feedback



Graph: 2

11. Findings:

Major findings include:

- Attendance increased from 69% to 85%.
- 1369 children rejoined education.
- Digital classrooms increased classroom participation.
- Teachers reported improved lesson delivery.
- Parents became more involved.
- Students demonstrated greater digital literacy.
- Institutional transparency increased.
- Educational inequality reduced.

12. Conclusion:

The Smart School to Best School initiative demonstrates that technology can be a transformative force in advancing educational inclusivity within municipal school systems. Through the integration of digital infrastructure, governance innovations such as the Savitri Education Control Room and the Guru App, and enhanced parental engagement, the initiative has improved attendance, strengthened institutional accountability, and created more equitable learning opportunities for socio-economically disadvantaged students. The observed increase in attendance from 69% to 85%, along with the reintegration of 1,369 students into formal education, indicates that technology can effectively address long-standing structural barriers in urban public education. From a sociological perspective, the findings affirm that digital governance contributes to reducing educational stratification when combined with institutional support and community participation. Rather than serving merely as a technological upgrade, these interventions represent a broader process of social inclusion and human capital development aligned with Sustainable Development Goal 4. The Chhatrapati Sambhajinagar case thus offers a replicable model for other urban local bodies seeking to modernize municipal education through inclusive, technology-enabled governance.

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