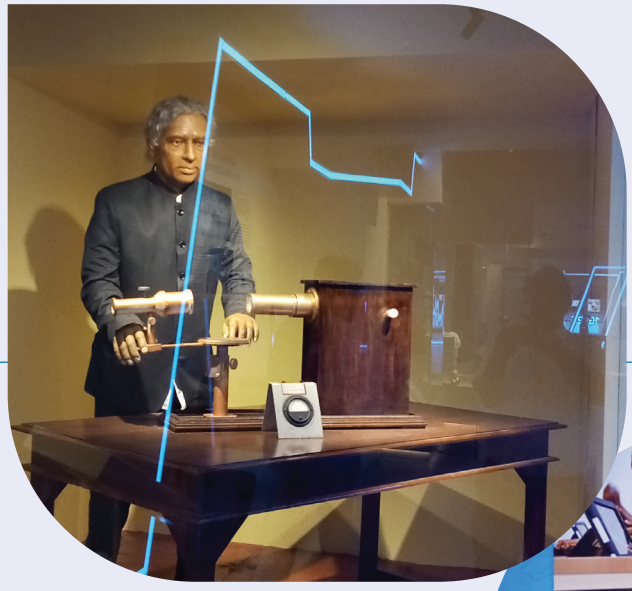
Impact Assessment of Infrastructure / Facilities created in Educational Institutions, Museum and laying of RCC Road by Bharat Electronics Limited (BEL) under Corporate Social Responsibility (CSR)



Submitted to

भारत इलेक्ट्रॉनिक्स
BHARAT ELECTRONICS
QUALITY, TECHNOLOGY, INNOVATION.

Submitted by

Center for CSR

INSTITUTE OF PUBLIC ENTERPRISE
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(Under the aegis of ICSSR, MoE, GoI)
Shameerpet, Hyderabad

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Executive Summary

Bharat Electronics Limited (BEL) is a Navratna Public Sector Enterprises established in 1954, under the Ministry of Defence. BEL is a multi-product, multi technology, multi-unit conglomerate with over 350 products and customers include the Army, Navy, Air Force, Paramilitary, Coast Guard, Paramilitary Force, Police, State government departments and consumers of professional electronics products.

BEL is one of the forerunners among the Defence enterprises in the CSR. Endeavouring to fulfil Social Responsibilities, BEL's CSR encompasses holistic community development, institution building and sustainability-related initiatives. BEL interventions contribute to inclusive growth and equitable development in society through capacity building measures, empowerment of the marginalized and underprivileged sections / communities. Key focus is in the areas of improving health infrastructure & preventive healthcare, supporting education & vocational skill development, rural development and sustainable development of environment.

BEL has assigned Institute of Public Enterprise (IPE), Hyderabad, with the responsibility of conducting an Impact Assessment for five CSR projects implemented by BEL in key areas such as Education and Environmental Sustainability across the states of Karnataka, Tamil Nadu, Andhra Pradesh and Telangana. The IPE team interacted with BEL executives and gathered primary documents and certificates for each project to gain insights into their relevance, initiation, design, and execution. Utilizing the secondary data collects, the IPE team identified direct and indirect beneficiaries of each CSR project and developed data collection tools, including key informant interviews, focused group discussions, and structured questionnaires, employing a combination of qualitative and quantitative data analysis techniques. To evaluate the outcomes and impacts of each CSR initiative, the IPE team conducted visits to multiple project locations, utilizing these tools and methods to gather primary data from stake holders.

The project wise key observations findings and impact details are as follows.

Project 1: Smart Classroom Systems Installed by BEL in 135 Schools of Aspirational District, Raichur District in Karnataka State

The Raichur District in Karnataka has been identified as one of the 112 aspirational districts in India. To address the challenges faced by the district in the area of educational infrastructure, Bharat Electronics Limited (BEL) introduced smart classroom systems in 135 government higher primary schools during the fiscal year 2020-21 and the project was completed in 2023. This initiative aimed to enhance the classroom instruction and improved student learning outcomes. BEL spent Rs. 389.54 lakhs towards the project.

Observations and Findings

- The team has assessed all 35 schools and found that the installation of smart classrooms has been successful. However, 8 schools have been facing functionality challenges from three to six months, due to damage / technical difficulties with smart TV displays or solar power installations, or mini-PCs, as reported.
- The digital learning initiative has garnered significant participation from both Teachers and students. Mathematics and Science have shown usage rates exceeding 70%, indicating their popularity.
- It was observed that the schools conduct 18-20 sessions weekly.
- The preloaded content (digilearn) in Smart classroom systems for different subjects is in accordance with the syllabus established by the Karnataka state government.
- It is also observed that there is a reduce student absenteeism by 12%.

Impact: This initiative has established a conducive learning environment in government schools by supplying preloaded audio-visual content that adheres to the Karnataka state syllabus. Students have been empowered to interact with lessons autonomously, enhancing their grasp of subjects including science, mathematics, social studies, Kannada, English, and Hindi, and allowing them to pursue related

exercises and projects. Moreover, teachers could download teaching materials for their classrooms, while students enjoy access to a rich repository of online information. Collectively, these measures have greatly enriched the educational experience within government schools.

Project 2: Support for Renovating 'BEL Hall of Electronics Gallery' at Visvesvaraya Industrial and Technological Museum (VITM)

BEL has renovated and upgraded the existing Gallery 'BEL Hall of Electronics' at the Visvesvaraya Industrial & Technological Museum, Bengaluru, at a cost of Rs. 2 crores, as part of CSR initiatives of the BEL during the FY 2023-24. The 'BEL Hall of Electronics' offers a diverse array of exhibits spanning the realms of Electronics – from basic electronics to communication, radar and autonomous systems to electro-optics, medical electronics, smart city solutions, smart manufacturing, artificial intelligence & virtual reality. The objective is to popularise science & technology among students in particular and public in general through a host of innovative concepts & interactive exhibits. This exhibition utilizes the 5500 square feet with 33 Nos of exhibits, which are interactive digitally and mechanically.

Observations and Findings

- BEL Electronics Gallery provided the real time or practical experience solutions with students and others what students learnt theory textbooks concepts in their classrooms.
- The gallery was well received by the public, especially by school students
- Many educational institutions across Karnataka and other parts of the country arrange field trips for their students to VITM-Bangalore. These excursions offer students valuable, practical experience through the "BEL-electronics gallery," which includes a range of interactive displays that enhance their theoretical understanding of electronics applications used in various industries and sectors that correspond with the educational knowledge acquired during this visit.
- This exhibition offers comprehensive insights into the invention of the electron, the diverse branches of electronics
- Cent percent of visitors acknowledged that there was an improvement in their scientific knowledge about electronics and its applications into various fields after visiting the BEL's electronics gallery.
- The impact of these advancements on human development in areas such as smart cities, communication, transportation, healthcare, digital marketing, robotics, defence, and science and technology, among others is very high.

Impact: This initiative greatly improved the comprehension of scientific concepts and theories associated with electromechanics, basic electronics, microelectronics, optoelectronics, analogue electronics, telecommunications, Integrated circuits, semiconductor devices, embedded systems, nano electronics, digital electronics & among others and their applications across various industries and sectors. Students gained a deeper understanding of the latest advancements in science and technology, particularly those related to electronics in defence, healthcare, communication, and other sectors. Overall, this project had a profound impact on the community.

Project 3: Construction of School Building and Connecting CC Road in Adopted village Chowdammagutta Thanda, Mahabubnagar District, Telangana state

BEL constructed a government primary school building and Anganwadi centre in the Chowdammagutta Thanda village of Farooqnagar Mandal, Mahbubnagar District, Telangana as part of the village adoption programme under Swachh Bharat flagship programme of the Government of India. BEL also constructed the toilets, compound wall and laid the CC road at school premises. The new school building has two floors with six classrooms and separate toilets for boys and girls. Notably, both the institutions cater to the poor, needy and underprivileged scheduled tribe students from surrounding areas. Total cost of the project was Rs. 132.83 lakhs.

Observations and Findings

- The project provided six ventilated and spacious classrooms along with kitchen and storage facilities for the Anganwadi center.
- This project also included a compound wall, CC road, kitchen, and arrangements for midday meals. The project was completed as per schedule.
- A significant 95% of students (n = 30 students) reported their strong satisfaction with improved classroom teaching and learning environment at their school.
- A significant 93% of students indicated a strong satisfaction regarding the improved safety and security of schoolchildren following the construction of the new school building by BEL

Impact: The project successfully fulfilled its objective of establishing a conducive learning environment for students at a government primary school and Anganwadi centre in Chowdaramma gutta thanda. This initiative notably transformed teaching and learning practices, as well as resource accessibility, by offering educational infrastructure that included spacious classrooms with proper air and ventilation. Consequently, the quality of education saw significant improvement, resulting in better student performance in school evaluations and other educational settings. Furthermore, the project positively affected children's health by ensuring access to drinking water, sanitation, mid-day meals, and opportunities for sports activities.

Project 4: Setting up of 25 Smart Classrooms in Sainik School – Korukonda, Andhra Pradesh

To enhance the teaching and learning environment at Sainik School Korukonda for students in grades VI to XII, BEL has installed 25 interactive panels during the fiscal year 2023-24 at a total cost of Rs. 29.73 lakhs.

Observations and Findings

- Sainik School integrates 25 interactive panels to facilitate daily classroom instruction, practical experiences, and a variety of activities across 16 class sections from grades VI to XII. Each section engages in smart classroom sessions for six hours daily, covering all subjects. In addition, students utilize smart panels for practical classes, as well as for art and culture, counselling, and competitive examination preparation.
- All Interactive panels come with pre-installed educational applications and software, supplying tools for lesson planning, interactive quizzes, and annotations. This allows teachers to draw, highlight, and annotate directly on the panel, resulting in more engaging and flexible lessons.
- Interactive panels are ideal for STEM education, allowing students to engage in interactive simulations, perform coding exercises, and visualize scientific concepts in three dimensions.
- Students produce digital artwork, develop design projects, and work together on multimedia presentations directly using the panel located in art room.
- A significant 90% of students (n = 30 students) expressed strong satisfaction with the enhanced teaching and learning environment following the installation of interactive panels at Sainik School, Korukonda.
- An impressive 87% of students (n = 30 students) conveyed strong satisfaction with the availability of digital content and educational resources that enhance their learning environment for exam preparation, assignments, and projects

Impact: BEL project successfully achieved its main objective of creating a nurturing educational environment at Sainik School - Korukonda. The initiative established a fully functional modern classroom setting by equipping all classrooms, laboratories, activity rooms, audio-visual spaces, and conference halls with 25 interactive panels. Furthermore, the school made subject materials available

for students in grades VI to XII. Teachers leveraged these interactive panels to conduct lessons, utilizing interactive whiteboards, preloaded educational content, multimedia tools, online resources, and audio-visual components such as animations, graphics, and videos. This method not only captivated students' attention but also enhanced their comprehension of various subjects.

Project 5: Laying of RCC Road (BEL-ARMY Road) in the Vicinity of BEL-Chennai, Tamil Nadu

The initiative focused on improving the road connectivity between Nandambakkam-Porur road junction to Army Public School sports ground, addressing the challenges faced by daily commuters. The unpaved road has been a major concern, causing difficulties for vicinity residents, students at the Army School, patients visiting the Military Hospital, residents of Rama koil street, Burma colony etc. The BEL aimed to construct a well-paved and durable road to ensure smoother and safer transportation. By enhancing infrastructure, this initiative improved accessibility, reduced travel time, and contributed to the overall development of the region, benefiting both the local community and visitors. 1,260-meter-long RCC road, covering a total carpet area of 8,820 square meters has been constructed by BEL for easy accessibility for the commuters. The road laid by BEL has taken safety measures such as laying speed breakers, signs considering the presence of a school in the vicinity. Light motor vehicles viz., two-wheelers, three-wheelers, cars, vans etc., are only allowed while prohibiting heavy vehicles on the road. The initiated project reduces the commuters time by accessing the road. This project aims to provide a smoother, safer, and more efficient commuting experience for the community.

Observations and Findings

- The initiative has significantly decreased both travel time and distance for the residents of Nandambakkam, Rama Koil Street, Burma Colony, and surrounding areas, facilitating easier access to the military hospital and military school.
- The road constructed by BEL incorporates safety features, including the installation of speed bumps and signage, in light of the nearby school.
- Ninety-two percent of the commuters (n = 60) were strongly satisfied with the quality of the road provided by BEL.
- Ninety-three percent of the commuters (n = 60) reported that there was a time reduction for commuting to military hospital, military school, and other places.

Impact: The newly paved road has also boosted connectivity to key locations such as the Army School, Military Hospital, and nearby residential areas, positively impacting the community. Additionally, the installation of speed breakers has improved road safety, making the area more pedestrian-friendly.

Chapter I Introduction

Corporate Social Responsibility in India

Corporate Social Responsibility (CSR) has progressed from being merely an ethical duty to becoming a significant transformative force that can redefine the developmental landscape of Country. The CSR framework introduced by the Indian Companies Act of 2013 was a pioneering initiative, establishing India as the first nation to legislate mandatory CSR contributions. The Companies Act 2013, Section 135, imposes a legal obligation for CSR on companies that satisfy certain criteria. The main agenda for CSR initiatives is to accomplish sustainable development goals and reshape India for a sustainable future.

Bharat Electronics Limited and Corporate Social Responsibility

Bharat Electronics Limited (BEL) is a Navratna Public Sector Undertaking (PSU) established in 1954, under the Ministry of Defence. BEL is a multi-product, multi technology, multi-unit conglomerate with over 350 products and customers include the Army, Navy, Air Force, Paramilitary, Coast Guard, Paramilitary Force, Police, State government departments and consumers of professional electronics products. The Company has nine manufacturing Units spread across eight States of the country.

BEL is one of the forerunners among the Defence enterprises in the CSR. Endeavouring to fulfil Social Responsibilities, BEL's CSR encompasses holistic community development, institution building and sustainability-related initiatives. BEL interventions contribute to inclusive growth and equitable development in society through capacity building measures, empowerment of the marginalized and underprivileged sections /communities. Key focus is in the areas of improving health infrastructure&preventive healthcare, supporting education & vocational skill development, rural development and sustainable development of environment.

BEL CSR Policy Statement

- BEL recognizes its role and responsibility as a corporate entity and constantly endeavours to actively participate in the social and economic development of the communities in which it operates through CSR initiatives.
- BEL is committed to its stakeholders to conduct CSR activities in an economically, socially and environmentally sustainable manner that is transparent and ethical.

The projects undertaken to address these concerns are either be in the vicinity of company's Business Units / or other backward areas, such as aspirational districts, as defined by NITI Aayog, GoI.

Chapter 2

Impact Assessment and Research Methodology

The impact assessment of CSR initiatives represents a vital process through which a company can determine the success of its CSR programs and their effects on stakeholders, including the broader society. This assessment focuses on evaluating both the immediate and enduring impacts of CSR projects on social, economic, and environmental aspects. It includes a comprehensive analysis of the company's CSR policy guidelines, initiatives, outcomes, and the utilization of financial resources in relation to their effects. This systematic evaluation examines the implications of BEL's CSR activities ranging from stakeholders, including workers, customers, local communities, and the environment at large.

Objective of the Study

To carry out Impact Assessment of Infrastructure / Facilities created in Educational Institutions, Museum and laying of RCC Road at various locations in four states by BEL under CSR's initiatives for the FY 2022-23.

Table-2.1: CSR Projects under Impact Assessment

S. No.	Name of the Project	Project Completed Year	Project Cost (in Lakhs)	Project Objectives
1	Smart classrooms in 135 Govt. Schools of Aspirational district, Raichur, Karnataka	2023	389.54	To study the relevance and effectiveness of classroom teaching and student learning outcomes by installing smart classroom systems in government schools
2	Support for renovating 'BEL Hall of Electronics Gallery' at Visvesvaraya Industrial and Technological Museum (VITM), Bengaluru, Karnataka.	2023	200.00	To study the impact of technology on society including students and other stakeholders
3	Construction of School building and connecting CC road in adopted village Chowdammagutta Thanda, Mehaboobnagar District, Telangana	2023	132.83	To study the impact of educational infrastructure on learning outcomes among students
4	Setting up of 25 Smart Classrooms in Sainik School, Korukonda, Andhra Pradesh	2023	29.73	To study the relevance and effectiveness of classroom teaching and student learning outcomes by installing smart classroom systems in government schools
5	Laying of RCC Road (BEL-ARMY Road) in the vicinity of BEL-Chennai, Tamil Nadu	2023	206.38	To study the impact of connectivity by laying RCC road

About Impact Assessing Agency

BEL has assigned Institute of Public Enterprise (IPE), Hyderabad, with the responsibility of conducting an Impact Assessment for five CSR projects implemented by BEL in key areas such as Education and Environmental Sustainability across the states of Karnataka, Tamil Nadu, Andhra Pradesh and Telangana.

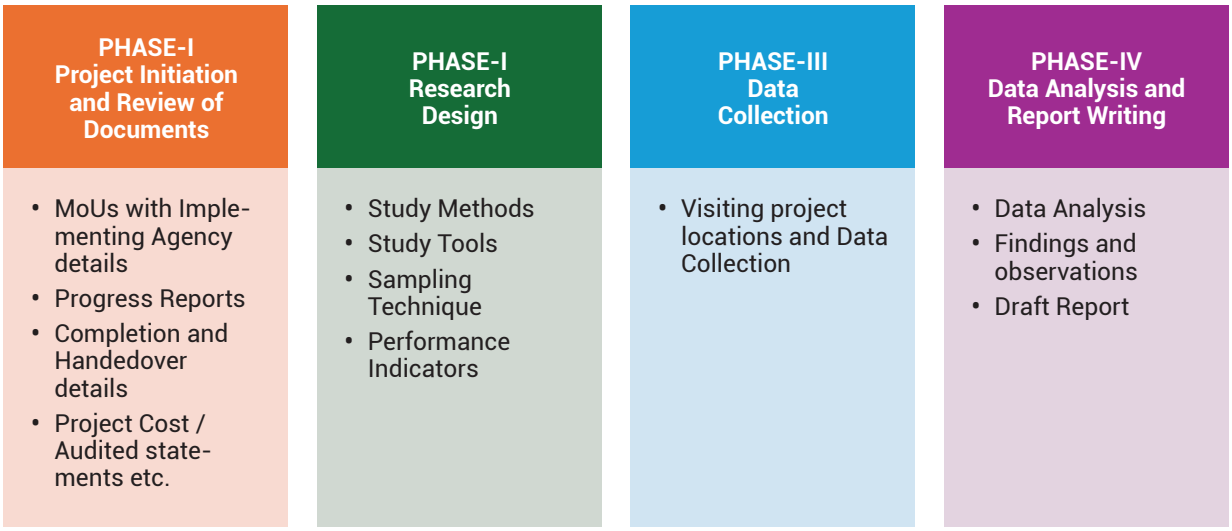
The IPE team interacted with BEL executives and gathered primary documents and certificates for each project to gain insights into their relevance, initiation, design, and execution. Utilizing the secondary data collects, the IPE team identified direct and indirect beneficiaries of each CSR project and developed data collection tools, including key informant interviews, focused group discussions, and structured questionnaires,employing a combination of qualitative and quantitative data analysis techniques.

To evaluate the outcomes and impacts of each CSR initiative, the IPE team conducted visits to multiple project locations, utilizing these tools and methods to gather primary data from stake holders.

Detailed Research Methodology

The impact study adopted a four-phase structured approach for conducting the impact assessment. To accurately assessing the effects of the programs, the adopted methodology has four phases. Figure-2.1 depicts the phase-wise process of research conducted for the study.

Figure-2.1: Four-Phase Structured Approach



As per the detailed of scope of work, the following Table-2.2 depicts the Impact Assessment (IA) parameters, impact assessment of CSR project for BEL are as follows:

Table-2.2: Impact Assessment Methodology

Sl. No.	Assessment Parameter	Salient Features
1	Relevance	Did the CSR intervention of creating Infrastructure / Facilities in Educational Institutions & Anganwadi Building, Museum, Rural village, and Road Infrastructure meet the needs of the beneficiaries?
2	Utility	Extent of utility (Partial / Full / Not in use) with Justification
3	Operation & Maintenance	Operation & Maintenance of the infrastructure / facilities provided by BEL under CSR
4	Effectiveness	(A) **Education Sector** (i) Digital learning outcomes in among rural students (ii) Increase in student enrolments / attendance (iii) Increase in footfall of curious visitors / students in museum **(B) Environmental Sustainability** (i) Increased usage of Road (ii) Increased economic activity **(C) Common across Sectors** (i) Prudent utilisation of the facilities provided by BEL (ii) Sustenance of the facilities created by BEL, over a period of time

Sl. No.	Assessment Parameter	Salient Features
5	Impact	**(A) Education Sector** (i) Did the project achieve the overall objective of creating a conducive learning environment in Government Schools? (ii) Did the digital learning system augment the traditional learning methods & was it effective? **(B) Environmental Sustainability Sector** (i) Did the RCC Road improve the connectivity to people in the village? (ii) Did the Road infrastructure enables safe movement & enhanced quality of usage? **(C) Common across Sectors** (i) Tangible & Intangible benefits (ii) Perception of BEL as a socially responsible company.

(Source: as per RFP BEL)

Weightage marks are assigned to each BEL suggested parameters, and each parameter's scores are computed according to their performances. Based on the sum of all parameters' weightage scores, the IPE team developed a 5-point rating scale with colour coding as depicted in the below Table-2.3:

Table-2.3: Impact Assessment rating Scale

Very Low	Low	Moderate	High	Very High
<50%	50% – 59%	60%-69%	70%-79%	80% >

The following table outlines detailed methodology for data collection and research methods adopted for the study

S. No.	Name of the Project	Data Collection Tools	Research Method	Sampling Technique	Name of the Stakeholder	Sample Size
1	Smart classrooms in 135 Govt. Schools of Aspirational district, Raichur, Karnataka	Key Informant Interviews, Structured Questionnaires	Qualitative and Quantitative Data Analysis	Purposive	Education Officer	05 (each taluka one education officer)
					Headmasters / Headmistress	35 (35 schools, each school one headmaster or headmistress)
					Parents	70 (35 schools, each school - 2 parents)
					Students	Total talukas: 05 Survey: 7 schools each for one taluka Total schools for survey (7 schools * 5 talukas): 35 Each school sample: 10 Total sample: 350
					Teachers	Total talukas: 05 Survey: 7 schools each for one taluka Total schools for survey (7 schools * 5 talukas): 35 Each school sample: 5 Total sample: 350

S. No.	Name of the Project	Data Collection Tools	Research Method	Sampling Technique	Name of the Stakeholder	Sample Size
2	Support for renovating "BEL Hall of Electronics Gallery" at Visvesvaraya Industrial and Technological Museum (VITM), Bengaluru, Karnataka	Key Informant Interviews	Qualitative Data Analysis	Purposive	VITM staff members	03
		Structured Questionnaires	Qualitative and Quantitative Data Analysis	Random	Students and visitors	Students: 70 Visitors: 30
3	Construction of School building and connecting CC road in adopted village Chowdammagutta Thanda, Mehaboobnagar district, Telangana	Key Informant Interviews	Qualitative Data Analysis	Purposive	Headmaster	01
					MEO	01
		Structured Questionnaires	Qualitative and Quantitative Data Analysis	Random	Students	30
					Parents	05
					Teachers	03
4	Setting up of 25 Smart Classrooms in Sainik School, Korukonda, Andhra Pradesh	Key Informant Interviews	Qualitative Data Analysis	Purposive	Education Officer	01
					Headmasters / Headmistress	01
					Parents	03
		Structured Questionnaires	Qualitative and Quantitative Data Analysis	Random	Students	30
					Teachers	05
5	Laying of RCC Road (BEL-ARMY Road) in the vicinity of BEL-Chennai, Tamil Nadu	Key Informant Interviews	Qualitative Data Analysis	Purposive	Traffic/Patrol Officer	01
		Structured Questionnaires	Quantitative Data Analysis	Random	Commuters	50

Chapter 3 Project Wise Impact Analysis

Project 1: Smart Classroom Systems installed by BEL in 135 schools of Aspirational District, Raichur district in Karnataka State

Total Project Cost	Rs. 389.54 lakhs
Project Execution Unit	BEL-Bangalore
Project Execution Period	36 months
CSR Area	Promoting Education, Schedule VII, Section 135, Item Number 2
SDG Alignment	

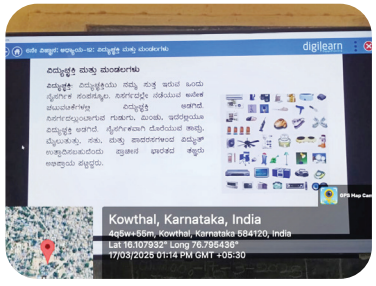
1.1 About the Project

The Raichur district in Karnataka has been identified as one of the 112 aspirational districts in India. To address the challenges faced by the district in the area of educational infrastructure, Bharat Electronics Limited(BEL) introduced smart classroom systems in 135 government higher primary schools during the fiscal year 2020-21 and the project was completed in 2023. This initiative aimed to enhance the classroom instruction and improved student learning outcomes. BEL spent Rs. 389.54 lakhs towards the project.

1.2 Need for the Project

In the Raichur district, there are 1,646 government schools, encompassing Lower Primary, Upper Primary, and High Schools, spread across five taluks: Raichur, Manvi, Sindhanur, Lingasugur, and Deodurga. The district administration reports that only 10% of these schools had smart classroom systems prior to the project's commencement. To fill the gap, smart classroom systems were provided by BEL to 135 schools in Raichur district. The smart classes systems enable to access to digital learning methods access to libraries, e-books, and online research resources, thereby enhancing students' educational experience.

1.3 Project Objectives



The Objective of this initiative is to enhance the learning outcomes of school children using diverse techniques. Smart class facility uses digital learning methods which is interactive using multimedia

techniques. This is going to help in enhancing educational skills of rural and back ward high school students of aspirational district Raichur. These high schools are catering to about 6 to 7 village's students in and around Raichur district.

1.4 Project Initiatives

Chief Executive officer of Zilla Panchayath, Raichur district has requested to provide smart class facility for 135 high schools in Raichur district. BEL provided 135 smart classrooms for higher primary schools (1-8 class) in Raichur district. The initiative has brought about significant improvements in both teaching methodologies and the learnings for students. This initiative has fostered greater student focus, enhancing classroom engagement, and the use of a variety of audio-visual aids, graphics, and information in formats such as Word, PDF, and Excel.

Table-3.1: Taluka-wise smart classroom system in Raichur

Taluka	Smart Schools
Raichur	28
Deva Durga	27
Lingasur	27
Sindhanur	27
Manvi	26
Total Schools and samples	135

The exhibit '1' details the various Infrastructure provided in the smart classes.

Exhibit 1: Smart classroom systems

Physical Infrastructure – Standalone solar PV power system with battery: 1 set, Display Unit-FHD LED display with mount kit: 1 set, Mini PC with accessories (Mouse, Keyboard & Remote): 1 set, Cabinet for safety of equipment's: 01, Digital content for students (installed): 1 set, Green Board (5' X 4'): 1 set, Electrical wiring & Misc. Civil works including safety devices: 1 set

Table-3.2: Taluka-wise School Strength

Taluka Name	Total Strength
Devadurga	1816
Lingasgur	2545
Manvi	2135
Sindhanur	2054
Raichur	2316

1.5 Impact Analysis Framework

Impact analysis is measured using the RUOEI framework. Where the study measures the project relevance, project effectiveness, utility, impact and project sustainability.

Table-3.3: Projects Impact Analysis

Relevance	The project established a modern educational framework in 135 government schools across the Raichur district, focusing on reducing the digital disparity that existed between government and private schools.
Utility	According to a survey conducted among 35 schools, 78% are making full use of smart classroom systems to download diverse information from external devices and stored digital content, including lessons for grades 1 to 8, through mini-PC systems. 22% schools reported that they have not engaged with smart classroom systems over the last three to six months due to operational issues.

Operation & Maintenance	Among 35 schools surveyed, 78% of the schools are engaged in regular operation and maintenance of their smart classroom systems. While BEL has successfully installed these systems, inadequate maintenance and operational practices by school management have led to non-function of the smart classrooms. The reason for non-functioning identified as damaged display units, non-maintenance of solar batteries, regular power fluctuations, etc.,
Effectiveness	**Digital learning outcomes** • The integration of Smart TV systems has significantly enhanced teaching methodologies for educators and has clarified various subjects for students by incorporating multimedia tools into traditional instructional approaches. • Digital literacy skills among schoolchildren have seen notable improvement. • This initiative provided students with access to digital content libraries and various online resources, leading to enhanced academic performance. • There has been a marked improvement in listening, speaking, reading, and writing (LSRW) skills in both Kannada and English among schoolchildren. • Basic numeracy skills and foundational mathematics topics have improved among schoolchildren through project assignments and practice assessments. • Students have gained a better understanding of various scientific concepts, including nature, the environment, human anatomy, healthy eating habits, modes of transportation, family dynamics, and more. • Observation skills among schoolchildren have been enhanced. • There has been a noticeable increase in children's interest in education. **Increase in students' number:** An enhancement in school enrolment has been observed, with an increase ranging from 3% to 7% in 18 schools. **Sustenance of the Project**: The project implementers, Bharat Electronics Limited, have extended a five-year warranty to the beneficiary schools to guarantee the effective operation of the systems. It is observed that eight schools reported operational issues
Impact	This initiative has established a conducive learning environment in government schools by supplying preloaded audio-visual content that adheres to the Karnataka state syllabus. Students have been empowered to interact with lessons autonomously, enhancing their grasp of subjects including science, mathematics, social studies, Kannada, English, and Hindi, and allowing them to pursue related exercises and projects. Moreover, teachers could download teaching materials for their classrooms, while students enjoy access to a rich repository of online information. Collectively, these measures have greatly enriched the educational experience within government schools. In traditional learning methods, students often memorize information, which can lead to quick forgetfulness. This issue arises from a lack of understanding and interest, particularly when there is no incorporation of experiential learning or real-world applications. Government schools in Raichur have also faced similar challenges due to the reliance on conventional teaching and learning methods prior to this initiative. This project has introduced digital learning opportunities for students in government schools, allowing them to better understand concepts through various illustrations, practical experiences, explanatory materials, assignments, and more, which aids in the long-term retention of knowledge. Consequently, students are now capable of solving mathematical problems, enhancing their grasp of scientific concepts, and improving their language skills. Even in the absence of teachers, students can engage with audio-visual lessons and complete their assignments independently. They can listen to lessons repeatedly, resolve their queries, and gain a deeper understanding by merging digital learning with traditional educational practices. **Tangible and Intangible Benefits** • Increase in students' number • Improved students' logical thinking and creativity • Improved classroom teaching and learning environment • Enhanced the teaching methodologies • Improved children's academic performances • Enhanced the quality of education levels in government schools

1.6 Impact Matrix

The project's overall impact was assessed through an examination of its relevance, efficiency, effectiveness, coherence, impact, and sustainability. The project met the overall expectations of beneficiary stakeholders and achieved high scores in terms of its overall impact.

Table-3.4: Impact Matrix

Impact (Rating)	1 (Very low)	2 (Low)	3 (Moderate)	4 (High)	5 (Very high)
Relevance					
Efficiency					
Effectiveness					
Coherence					
Impact					
Sustainability					

1.7 Stakeholders Survey

1.7.1 Student Satisfaction Level Survey

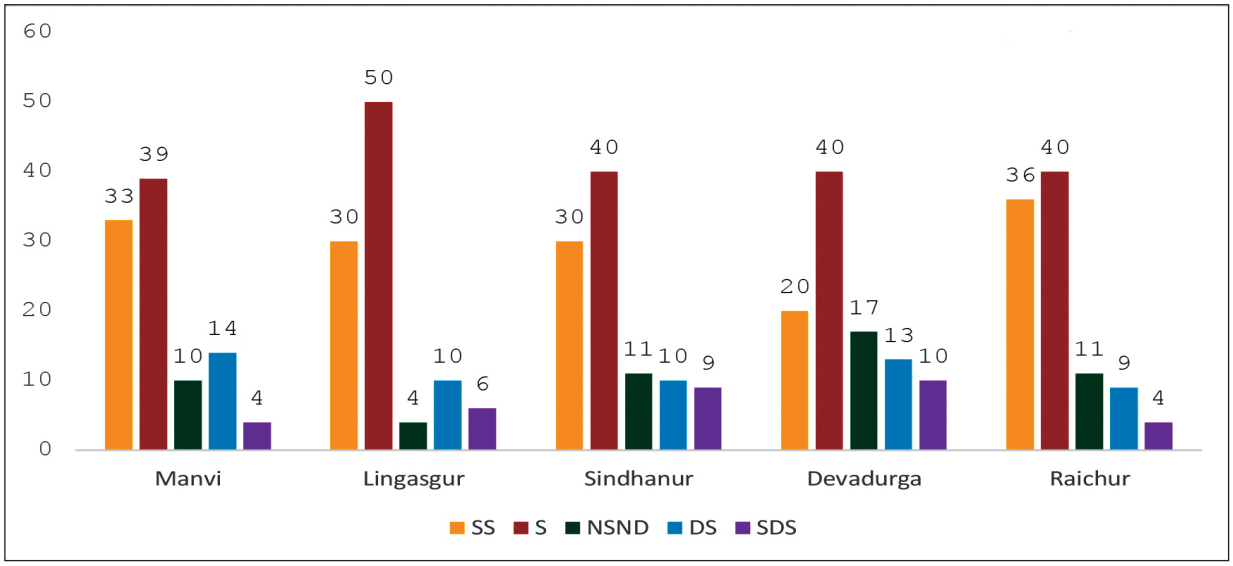
Table-3.4 depicts the taluka-wise number of schools, sample size and sampling techniques

Table-3.5: Taluka-wise School Sample

Talukas	Manvi	Lingasgur	Sindhanur	Devadurga	Raichur
Number of schools	7	7	7	7	7
Higher Primary Schools List	Sirwar, Kanya-Kavital, Markamdinni, Torandinni, Malladgudda, Malkapur and Byagawat	Lingasgurnagar, Kasabalingasgur, Hunakunti, Mavina Bavi, Bhupur, Anahousur, Echanal	Jawalagera, Aralahalli, 7 Mile Camp, Gunjalli, Hosalli, Venkateswara Camp and Gandhi Nagar	Gabbur (2 schools), Khanapur, Ramadurg, Chikkahonnakuni, Devadurga (2 schools)	LBS Nagar, Station Bazar, Police Colony, Siyatalab, Zaheerabad, Maddipet, Gajagarapet
Sample	10	10	10	10	10
Sampling technique	Random	Random	Random	Random	Random

Improved classroom teaching and learning (Transformational changes)

Chart-3.1: Classroom Teaching & Learning (Figures in %)



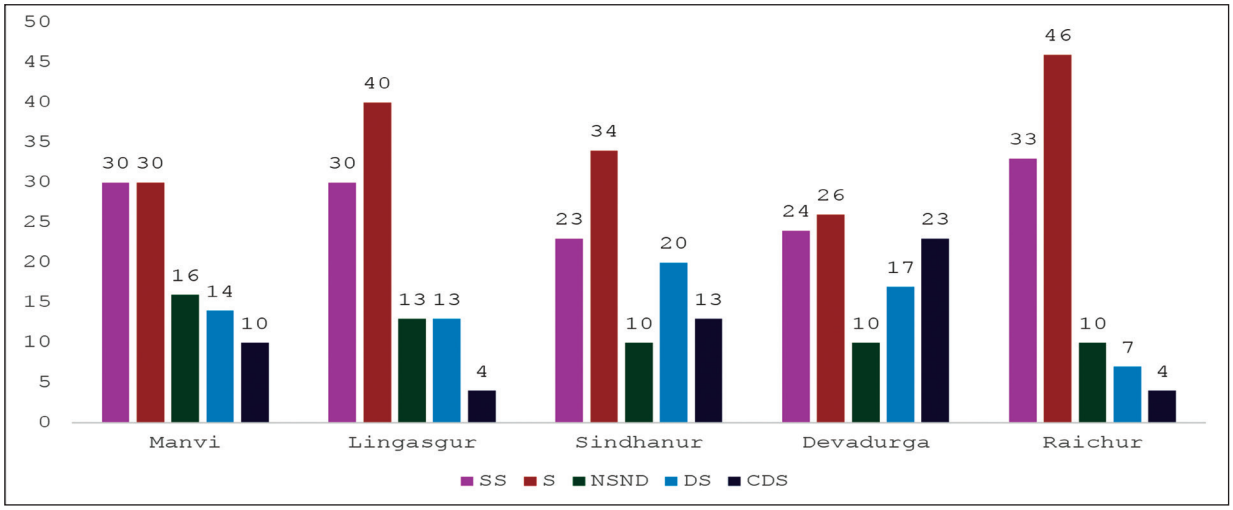
SS: *Strongly Satisfied;* **S**: *Satisfied:* **NSND**: *Neither Satisfied nor Dissatisfied;* **DS**: *Dissatisfied;* **SDS**: *Strongly Dissatisfied*

In the Lingasur taluka, 80% of students reported satisfaction in enhancement of their classroom learning following the introduction of the smart classroom system. This percentage represents the highest level of satisfaction among the five talukas in the Raichur district. In comparison, the other four talukas exhibited satisfaction levels ranging from 60% to 76%. Notably, 23% of students from Devadurga taluka expressed dissatisfaction.

Availability of Digital Content in Smart Classroom systems

In Raichur taluka, 78% of respondents indicated that they were strongly satisfied. This positive feedback is largely due to the availability of a variety of digital content, including audio-visual lessons in subjects such as Science, Mathematics, Social Studies, English, Kannada, and Hindi (provided through digilearn software) for students in grades I to VIII, which has significantly enhanced the classroom experience. 40% of students from Devadurga taluka reported feelings of strong dissatisfaction. This issue stems from challenges in accessing digital content in those schools, primarily due to the problems with the storage devices of mini-PCs.

Chart-3.2: Availability of Digital Content in Smart Classroom



SS: *Strongly Satisfied;* **S**: *Satisfied:* **NSND**: *Neither Satisfied nor Dissatisfied;* **DS**: *Dissatisfied and* **SDS**: *Strongly Dissatisfied*

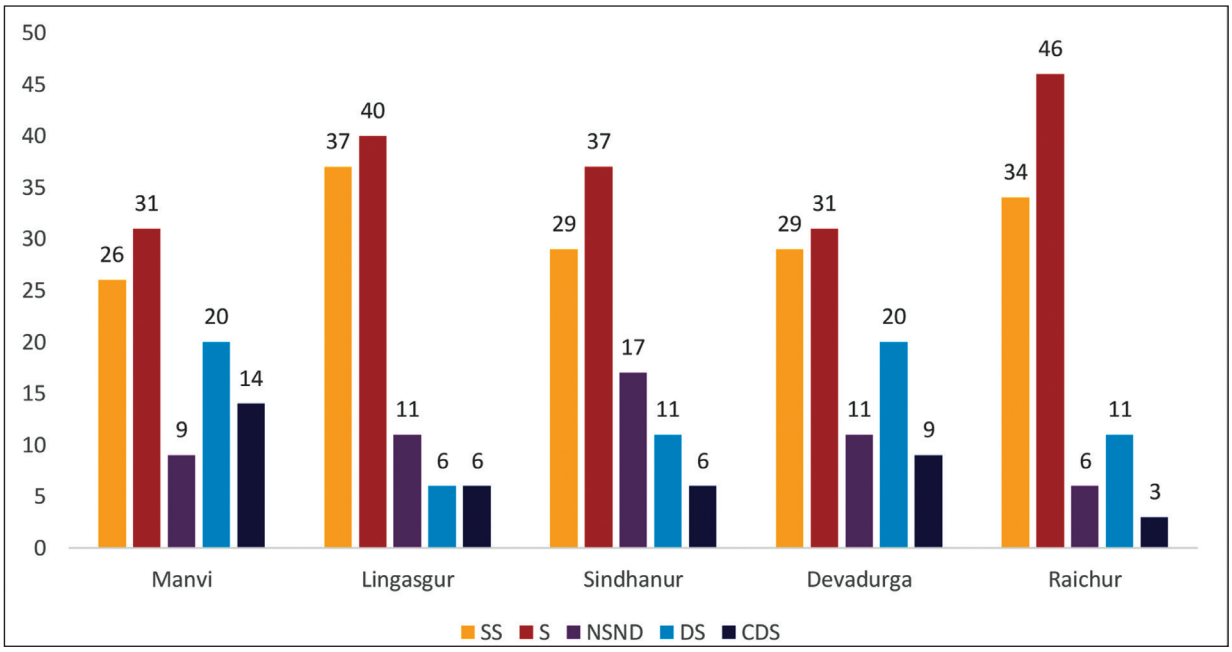
Table-3.6: Teachers' Satisfaction Level Survey

Talukas	Manvi	Lingasgur	Sindhanur	Devadurga	Raichur
Number of schools	7	7	7	7	7
Teachers sample for each school	5	5	5	5	5
Sampling technique	Random	Random	Random	Random	Random
Survey Higher Primary Schools List	Sirwar, Kanya-Kavital, Markamdinni,Torandinni, Malladgudda, Malkapur and Byagawat	Lingasgurnagar, Kasabalingasgur, Hunakunti, Mavina Bavi, Bhupur, Anahousur, Echanal	Jawalagera, Aralahalli, 7 Mile Camp, Gunjalli, Hosalli, Venkateswara Camp and Gandhi Nagar	Gabbur (2 schools), Khanapur, Ramadurg, Chikkahonnakuni, Devadurga (2 schools)	LBS Nagar, Station Bazar, Police Colony, Siyatalab, Zaheerabad, Maddipet, Gajagarapet

Use of Improved Smart Classrooms by Teachers

80% of teachers in the Raichur district expressed strong satisfaction regarding their capability to optimally download information via mobile data and store various subject materials for classroom use, which has positively influenced students' understanding skills in science, mathematics, social and language subjects. In comparison, the satisfaction rates among educators from the other four taluks fluctuated between 57% and 77%. Moreover, 34% of teachers in the Manvi taluka reported strongly dissatisfaction to utilize different information types due to lack of training and maintenance of the smart class system.

Chart-3.3: Use of Improved Smart Classrooms

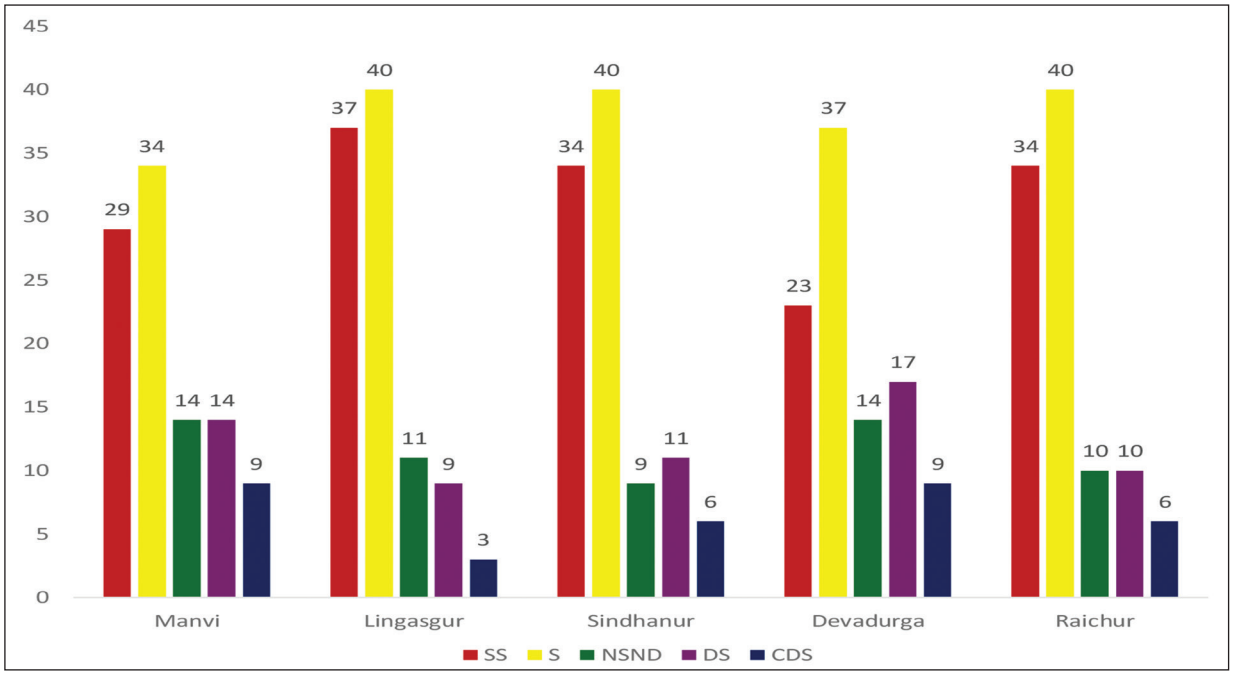


SS: *Strongly Satisfied;* **S**: *Satisfied:* **NSND**: *Neither Satisfied nor Dissatisfied;* **DS**: *Dissatisfied and* **SDS**: *Strongly Dissatisfied*

Improved students' academic performances in government schools

77% of educators reported strongly satisfied with the enhancement of their students' academic achievements following the implementation of smart classrooms system. In the absence of teachers, students access preloaded lesson content and actively participate in their learning new topics. Meanwhile, teachers from four other talukas indicated satisfaction level ranging from 60% to 74%. 26% of teachers in Devadurga taluka expressed strong dissatisfaction regarding the improvement of their students' academic performances, indicating a need for greater student engagement with the smart classroom systems.

Chart-3.4: Improved Use of Smart Classrooms



SS: *Strongly Satisfied;* **S**: *Satisfied:* **NSND**: *Neither Satisfied nor Dissatisfied;* **DS**: *Dissatisfied and* **SDS**: *Strongly Dissatisfied*

1.8 SDG Alignment

BEL's efforts to digitalize classrooms at Government Schools in Raichurdistrict, Karnataka state achieved Sustainable Development Goal 4: Quality Education, which calls for universal access to high-quality, inclusive education. This change demonstrates how smart classrooms have the power to completely rethink education by focusing contemporary technology with traditional principles, making it more approachable, interesting, and successful.

1.9 CSR Schedule

This initiative aligns with BEL's Corporate Social Responsibility (CSR) policy and complies with the CSR provisions outlined in the Companies Act 2013, specifically in Schedule VII, Section 135, Item number 2, which focuses on the promoting education.

1.10 National Objectives

This project aligns with the Government of India's esteemed "Samagra Shiksha Abhiyan" program, which advocates for digital education in government schools. Additionally, this project supports the National Education Policy (NEP) 2020, which emphasizes the importance of integrating technology into classroom environments to enhance the overall quality of education in the school system.

1.11 Case Studies

"Teaching in a smart classroom environment provides us with enhanced explanations and real-time experiences in diverse subjects, including science, social studies, and mathematics, thereby improving our ability to retain the content over time".

Anasurya

Student, VII class, GHPS-Kasabalingasgur, Lingasgur Taluka, Raichur district

"The Smart Class system sessions have greatly benefited me in enhancing my understanding of mathematics and science, thereby expanding my career

prospects. Previously, I achieved only 60% in my VII class annual exams for these subjects. However, since the implementation of smart classroom sessions at our school, I have become actively involved in numerous learning activities, such as project assignments and quiz competitions. I utilize digital resources across various subjects to boost my academic performance. I am grateful to Bharat Electronics Limited for introducing this innovative learning experience in our school through the smart classroom initiative".

Harish Ramappa

Student, Class VIII, GHPS-Hunakunti, Lingasgur Taluka, Raichur district

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"This method of smart classroom instruction conserves teachers' time when reviewing all subjects with students ahead of examinations. Resources obtained from the Internet, along with subject content, offer deeper insights to schoolchildren, facilitating better retention of topics over time. The application of smart technologies significantly affects the classroom teaching and learning environment, raising teaching quality and boosting children's learning potential.".

Smt Seeta

Maths Teacher, Government Model Higher Primary School, Police Colony, Raichur

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"The smart class system fosters the development of students' analytical skills while offering step-by-step solutions to complex mathematics problems. Students utilize English exercise worksheets to enhance their vocabulary and LSRW competencies. They can readily identify the geographical locations of various countries, along with their latitudes and diagrams. Furthermore, students listen to topics that they do not fully grasp multiple times until they achieve comprehension."

Shri Madhu B

Science Teacher, Government High School, Mallat, Manvi Taluka, Raichur district

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"Smart classroom system is not just about providing supplementary visual content to the students, more about making the student sharp. The use of visual content helps the students to understand their capabilities and improves their memory powers. The introduction of innovative teaching methodology and additional teaching tools also enable teachers to provide more inputs to students for easy understanding of all subjects' doubts."

Shri Holiyappa

Headmaster, GMHPS, J Venkateshwara Camp, Sindhanur taluka, Raichur district

1.12 Overall Observations and Findings

Observations

- The team has assessed all 35 schools and found that the installation of smart classrooms has been successful. However, 8 schools have been facing functionality challenges from three to six months, due to damage /technical difficulties with smart TV displays or solar power installations, or mini-PCs, as reported.
- The digital learning initiative has garnered significant participation from both Teachers and students. Mathematics and Science have shown usage rates exceeding 70%, indicating their popularity.
- It was observed that the schools conduct 18-20 sessions weekly.
- The benefits of the digital learning program include simplified explanation of new concepts, increased student engagement, modernized teaching methods, and efficient management with fewer instructors.
- The preloaded content (digilearn) in Smart classroom systems for different subjects is in accordance with the syllabus established by the Karnataka state government.

Findings

- Among the surveyed schools, Science and Mathematics are prioritized subjects, which has led to an increased reliance on uploaded content and the downloading of resources from YouTube and other informational platforms during their teaching practices.
- It is observed that there are frequent fluctuations on the internet causing teachers to use mobile data to retrieve and download information needed for classroom activities.
- 22% reported lack of awareness regarding the regular maintenance and operation of batteries needed to achieve optimal solar power levels for their smart classroom systems.
- An enhancement in school enrolment has been observed, with an increase ranging from 3% to 7% in 18 schools.
- It is also observed that there is a reduce student absenteeism by 12%.
- The project has shown an impact ranging from high to very high.

1.13 Conclusions

BEL has accomplished the installation of smart classroom systems in 135 government schools throughout five talukas in Raichur district, significantly improving the quality of teaching and the overall learning environment. BEL has also provided a five-year warranty for all solar power systems and mini-PCs. However, eight from 35 schools have reported challenges related to operational and maintenance of these systems from the last three to six months.

Project 2: Support for renovating "BEL Hall of Electronics Gallery" at Visvesvaraya Industrial and Technological Museum (VITM)

Total Project Cost	Rs. 200 lakhs
Project Execution Unit	BEL-Bangalore
Project Execution Period	36 months
CSR Area	Promoting Education, Schedule VII, Section 135, Item Number 2
SDG Alignment	

2.1 About the Project

Visvesvaraya Industrial and Technological Museum, Bangalore (VITM), a constituent unit of National Council of Science Museums (NCSM), Ministry of Culture, Government of India, was established in memory of Bharat Ratna Sir M. Visvesvaraya. A modest building with a built-up area of 4000 sq. mtrs., was constructed in the serene surrounding of the Cubbon Park, housing various industrial products and engines, which was opened by the first Prime Minister of India, Pandit Jawaharlal Nehru on 14.07.1962. The first gallery set up at VITM on the theme Electricity was opened to the public on 27.07.1965 by the then Union Minister for Information & Broadcasting & Bharat Ratna Indira Gandhi.

The Science on a Sphere at VITM, the only one in Asia, is a large visualization system that uses multimedia projections to display animated data on the sphere converting it into an immersive animated globe showing dynamic, animated images of the atmosphere, oceans and land area of a planet, combined with narration. VITM has 7 permanent exhibition galleries titled Engine Hall, Fun Science, Electrotechnic, Space Emerging Technology in the Service of Mankind, Biotechnological Revolution, BEL Hall of Electronics and Children Science.

BELhas renovated and upgraded the existing Gallery "BEL Hall of Electronics" at the Visvesvaraya Industrial & Technological Museum, Bengaluru, at a cost of Rs. 2 crores, as part of CSR initiatives of the BEL during the FY 2023-24. The "BEL Hall of Electronics" offers a diverse array of exhibits spanning

the realms of Electronics – from basic electronics to communication, radar and autonomous systems to electro-optics, medical electronics, smart city solutions, smart manufacturing, artificial intelligence &virtual reality. The objective is to popularise science &technology among students in particular and public in general through a host of innovative concepts & interactive exhibits.

2.2 Need for the Project

The BEL Hall of Electronics, inaugurated on June 29, 2004, by His Excellency the Governor of Karnataka, Shri T.N. Chaturvedi, was established with significant financial and material contributions from Bharat Electronics Ltd. The initial gallery aimed to highlight the practical applications of electronics through engaging mechanical interactive models.

Over the last two decades, the electronics industry has profoundly impacted human life, transforming once-unimaginable innovations into essential elements of daily living. It was essential to showcase advancements in digital electronics, communication, defence technology, imaging, telemedicine, virtual reality, the internet and among others to students and the general public.

2.3 Project Objective

This approach aims to broaden their understanding of electronics, stimulate curiosity, and cultivate the scientific and research skills necessary for their future career growth of students. In line with its commitment to corporate responsibility, BEL decided to refurbish the electronics gallery. The revamped gallery by BEL skilfully combines the story of innovation with its real-world applications, featuring both mechanical and digital interactive models as well as dioramas.

2.4 Project Initiatives

This exhibition utilizes the 5500 square feet with 33 Nos of exhibits, which are interactive digitally and mechanically. The details of exhibits at "BEL Gallery" given below:

Table-3.7: List of Exhibits at BEL Gallery

Conductor and Insulators	Semiconductors	Transistor	Integrated Circuit
Moore's Law	Modulation	Secure communication	Fiber optics
Tactile communication	Mobile Communication	Air Traffic controller	RADAR
Weather Radar	Li-Fi	Autonomous Vehicle	Driver Less Cars
IR Camera	Night Vision Goggles	Smart City	Ventilator and Oxygen Concentrator
Wearable Electronics	Smart Manufacturing	3 D Printing	JC Bose
Milestones in Electronics	J J Thomson	Augmented Reality	Block Chain
Haptics	Artificial Reality	Robotics	BEL Corner and Digital Corridor

2.5 Impact Analysis Framework

Impact analysis is measured using the RUOEI framework. Where the study measures the project relevance, utility, operations & maintenance, effectiveness and impact.

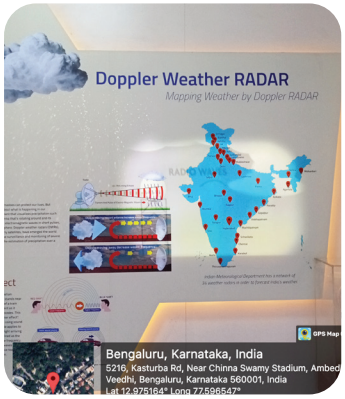
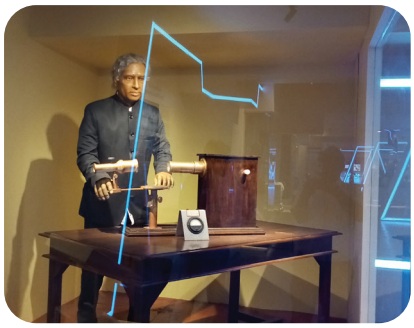
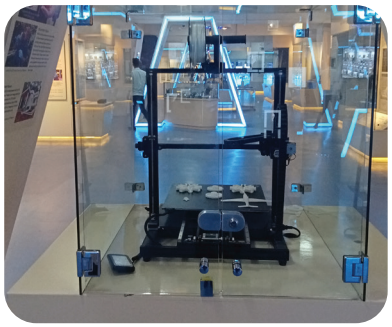


Table-3.8: Projects Impact Analysis

Relevance	The renovated BEL gallery seamlessly combines the innovation narrative with its practical applications. It features mechanical and digital interactive models, as well as dioramas, which are crucial for students and the general public to understand the latest developments in the field of electronics.
Utility	The gallery offers a complete utility experience, featuring a total of 33 exhibits, which are interactive digitally and mechanically.
Operation & Maintenance	VITM in Bangalore does the routine maintenance and operation of the museum to ensure that the facilities in the galleries remain in excellent condition.
Effectiveness	The gallery incorporates a futuristic design language in its exhibits. It features transparent display technology and several other cutting-edge innovations in exhibit design and fabrication. Both engineering and non-engineering students visit the gallery to experience these new technologies, with some incorporating the exhibition into their dissertation work. The general public also appreciates the inspiring stories of inventions in electronics.
Impact	This initiative greatly improved the comprehension of scientific concepts and theories associated with electromechanics, basic electronics, microelectronics, optoelectronics, analogue electronics, telecommunications, Integrated circuits, semiconductor devices, embedded systems, nano electronics, digital electronics & among others and their applications across various industries and sectors. Students gained a deeper understanding of the latest advancements in science and technology, particularly those related to electronics in defence, healthcare, communication, and other sectors. Overall, this project had a profound impact on the community. **Tangible and Intangible Benefits** • Improved scientific probing and research skills among students • Enhanced the student's problem solving, critical thinking and effective communication • This project improved the students' skills in applying theoretical science knowledge to real-world problems, fostering a deeper understanding of concepts • Improved logical skills and creativity among schoolchildren





2.6 Outcomes of the Project

- This project provided insights into fundamental concepts of electronics, communication, radar and autonomous systems, electro-optics, medical electronics, smart city initiatives, smart manufacturing,

artificial intelligence, and virtual reality to schoolchildren and visitors. As a result, it enhanced the students' practical understanding by bridging the gap between their theoretical knowledge and real-world applications.

- The BEL Gallery of electronics motivated students to pursue careers in Electronics and related fields
- This initiative showcased exemplary figures and success narratives of numerous scientists who have made significant inventions and contributions to the advancement of electronics and related disciplines.
- Increase in students' number: In the year 2023-24 the footfall of visitors has increased by 10%.

  Present footfall for visitors at "BEL Electronics Gallery" in VITM is as follows:

  Working days: 1000 visitors (400 students & 600 general public)

  Weekends: 1500 visitors (600 students & 900 general public)
- Sustenance of the Project: BEL unwaveringly supports VITM, Bangalore, in the development of exhibits in the realm of electronics from time to time. This initiative is dedicated to exhibits emerging and popular scientific and technological advancements in the related areas of electronics at BEL galleries that are particularly advantageous for students & professionals in their academic and professional environments further while also allowing the general public to learn about the scientific technologies and electronic applications utilized in multiple sectors.

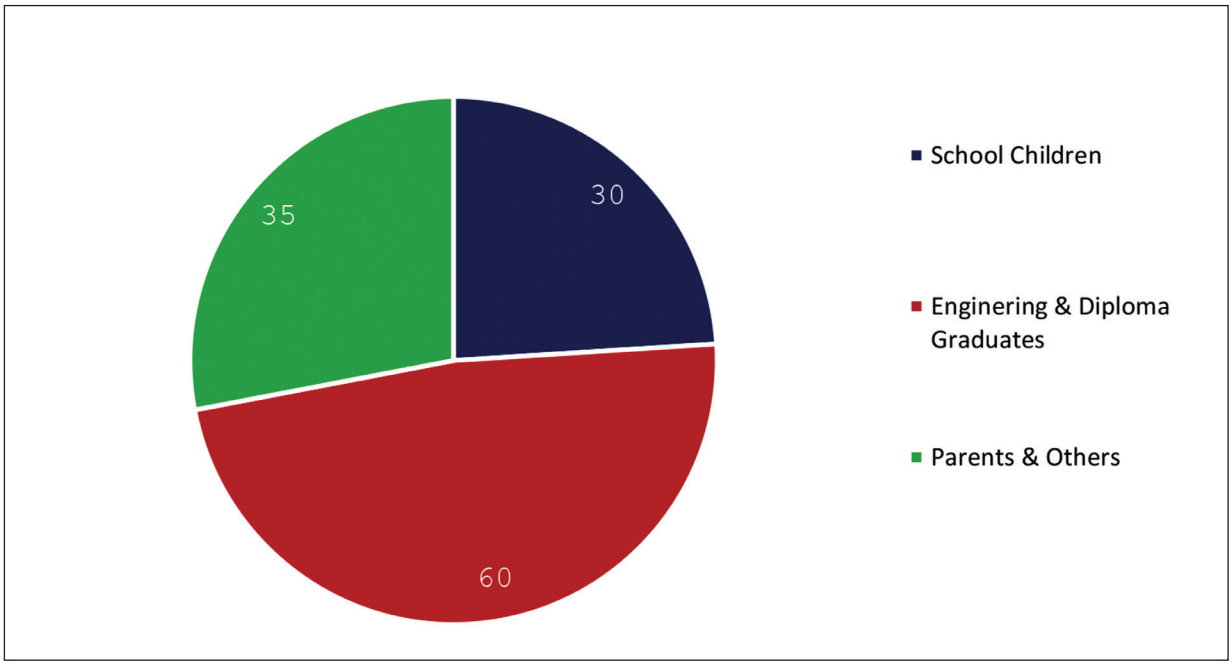
2.7 Stakeholders Survey

IPE team field visit survey

2.7.1 BEL Electronics Gallery Visitors Survey

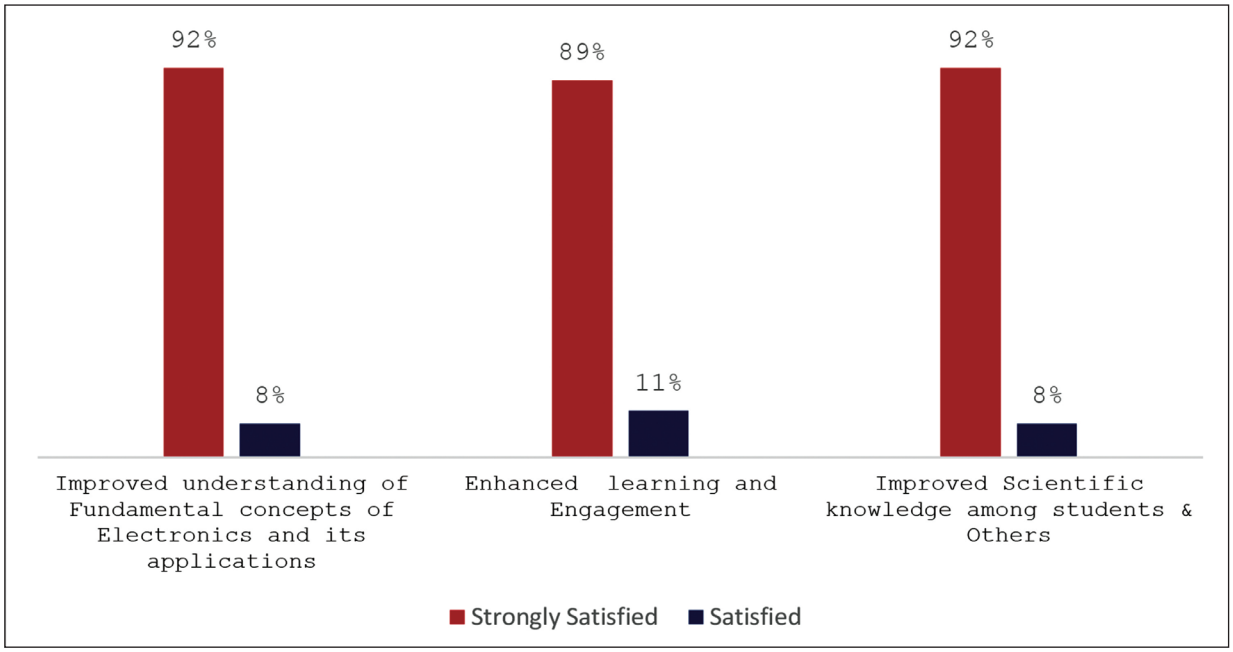
Total Sample Size: 100 Type of Sampling: Random

Chart-3.5: Sample Size



The team interacted with 125 visitors, including schoolchildren, engineering and diploma graduates, parents and others, to assess how "BEL Electronics Gallery" fostered scientific awareness regarding fundamental electronics, radar and autonomous systems, electro-optics, medical electronics, smart city solutions, smart manufacturing, robotics, artificial intelligence, and virtual reality and others by exhibiting objects.

Chart-3.6: Satisfaction Survey



- Improved understanding of fundamental concept of electronics and its applications: 92% of visitors expressed strongly satisfied and 8% satisfied with improved understanding of fundamental concept of electronics and its applications following their visit to this BEL electronics gallery, VITM-Bangalore. They highlighted their newfound knowledge regarding various types of electronics and their roles in fields including industrial electronics, the automotive sector, healthcare, aerospace, utility services, medical applications, image processing, smart grid systems, power appliances, and beyond.
- Enhanced learning and engagement: 89% of the visitors expressed their strong satisfaction and 11% satisfaction with the enhanced learning and engagement post gallery visit. They highlighted that these gallery exhibitions played a crucial role in enhancing their knowledge through inquiry-based, hands-on experiences, which in-turn fostered the development of critical thinking, creativity, communication, presentation skills, teamwork, and project management skills.
- Improved scientific knowledge among students and others:92% visitors expressed high level of satisfaction and 8% satisfied regarding enhancement of scientific knowledge among students and others. They noted that the gallery's exhibits played a significant role in fostering this scientific mindset by exhibiting a range of new advancements across various industries and sectors, particularly in the realm of electronics. As a result, visitors gained awareness of numerous scientific inventions and concepts, including robotics, virtual reality, self-driving vehicles, LiFi technology, doppler weather radar, autonomous systems, the Akash missile system, modulation, blockchain technology, mobile communications, electrical conductivity, Moore's Law, and smart manufacturing technologies associated with Industry 4.0, among others, at the BEL Electronics Gallery.

2.7.2 VITM staff members

Total Sample: 3 staff / Sample type: Random

The IPE team held discussions with three employees from VITM, who unanimously shared their strong satisfaction with the increase in visitor attendance and the growth of exhibits featuring diverse electronic displays and applications across multiple sectors. They highlighted that the earlier BEL's Electronics gallery placed greater emphasis on the applications of electronics through mechanical interactive models. However, the revamped gallery now combines the history of invention with its applications, seamlessly integrating both mechanical and digital interactive models as well as dioramas.

2.8 SDG alignment

BEL's initiative to Support for renovating "BEL Hall of Electronics Gallery" at Visvesvaraya Industrial and Technological Museum (VITM), Bangalore has successfully contributed to Sustainable Development Goal 4: Quality Education. This goal emphasizes"Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all".

2.9 CSR Schedule

This initiative aligns with BEL's Corporate Social Responsibility (CSR) policy and complies with the CSR provisions outlined in the Companies Act 2013, specifically in Schedule VII, Section 135, Item number 2, which focuses on the promoting education.

2.10 National Objectives

This initiative supports the efforts of the National Council of Science Museums, an Autonomous Society under the Ministry of Culture, Government of India, which is focused on enhancing science museums and exhibition galleries throughout the country. Bharat Electronics Limited has also been instrumental in the development of the electronics gallery at the Visvesvaraya Industrial and Technological Museum (VITM) in Bangalore, which includes a wide variety of exhibits that explore both basic and advanced electronics applications relevant to different sectors, government entities, and industries. This collaboration has enriched the exhibitions in the electronics gallery at VITM and furthered the NCSM's mission to provide significant science exhibits and educational demonstration aids.

2.11 Case Studies

"The experience of exploring this gallery was quite rewarding. The self-driving car system, Akash Missile System, and thermal imaging technologies were all exceptionally well presented. I learned about the development of transistors and the principles behind Li-Fi technology. The implementation of each system and technology was executed effectively. The displays of the Doppler effect and radar systems were also impressive. This gallery offers a cost-effective educational opportunity and is strongly recommended for students passionate about science and technology".

G Bhavana

B.Tech Student, Age 22, Sambhram Institute of Technology, Bangalore

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"Within the gallery, visitors can engage with hands-on exhibits that facilitate the exploration of scientific principles, including radar, thermal imaging, and autonomous systems. Additionally, there are areas focused on space exploration, enriching the visitor experience. Overall, this gallery offered a rewarding experience."

Ram Singh

Engineering Student, Bangalore

"This gallery, offered by BEL, is highly engaging and serves as a valuable resource for people of all ages. I firmly believe it will aid everyone, from students to professionals, in enhancing their understanding of both fundamental and advanced electronics applied in different industries, along with the scientific and technological aspects of real-world electronics featured in the exhibition. I hope to see the creation of more galleries like this across the nation".

Dr Avanish Shindy

Doctor, 23 years, Yenepoya Medical College, Mangalore

"My name is Vidya, and I work as a Software Engineer. I recently visited the BEL gallery at VITM in Bangalore with my husband and our 12-year-old son. At first, my son was reluctant to go, thinking it would be similar to a typical museum. However, once we entered the Electronics gallery, he became genuinely fascinated by the various modern electronic devices, including radar technology and the process of car assembly. He showed a keen interest in learning about the scientific principles behind the exhibits. This experience was truly rewarding for us as parents of a teenager. I hope this visit sparks his curiosity in science and inspires him through the innovative equipment and the work of scientists. I commend BEL and VITM for their outstanding efforts in making this exhibition a remarkable success.."

Vidya

Software Engineer, Age: 40, Citi Bank, Chennai

"My time at the BEL Electronics Gallery in VITM was truly remarkable. I explored topics such as Radar, Autonomous systems, and the evolution of Wireless Communication from 1G to 5G. I also had the opportunity to see an underwater vehicle operating in the water. This experience was incredibly beneficial, as it provided a visual learning experience that enhanced my understanding, contrasting with the traditional method of learning solely from textbooks."

Sahana Bai S

B.Tech Student, Age 21, Sambhram Institute of Technology, Bangalore

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"This was kind of good experience at the BEL Electronics Gallery in VITM. I learned about semiconductors and smart city how it is implemented, AI, Robotics and wearable electronics. We learnt in IOT of this but we got the visual treatment about the IOT werable electronics".

Divya

B.Tech Student, Age 21, Sambhram Institute of Technology, Bangalore

2.12 Overall Observations and Findings

Observations

- BEL Electronics Gallery provided the real time or practical experience solutions with students and others what students learnt theory textbooks concepts in their classrooms.
- The gallery was well received by the public, especially by school students
- Many educational institutions across Karnataka and other parts of the country arrange field trips for their students to VITM-Bangalore. These excursions offer students valuable, practical experience through the "BEL-electronics gallery," which includes a range of interactive displays that enhance their theoretical understanding of electronics applications used in various industries and sectors that correspond with the educational knowledge acquired during this visit.
- This exhibition offers comprehensive insights into the invention of the electron, the diverse branches of electronics
- The impact of these advancements on human development in areas such as smart cities, communication, transportation, healthcare, digital marketing, robotics, defence, and science and technology, among others is very high.

Findings

- Cent percent of visitors acknowledged that there was an improvement in their scientific knowledge about electronics and its applications into various fields after visiting the BEL's electronics gallery.
- All students reported that there has been an improvement in real time or practical knowledge, which complemented their classroom instruction.

2.13 Conclusions

The gallery provided a great learning and visual experience. It achieved its project objective by renovating an Electronics gallery at VITM Bangalore. This initiative served as an informative resource for students, professionals, and the general public, offering insights into the history of electronics, various branches of electronics and its applications used in various fields, its vital role in enhancing human life, and its contributions to the progress of various industries. By showcasing innovative technologies and inventions, the gallery illustrated how electronics simplify our daily lives. The initiative was met with a positive reception from visitors, who expressed a desire for additional exhibitions that would focus on recent technological advancements in electronics and related sectors to enhance their learning experience.

Project 3: Construction of School building and Connecting CC Road in adopted village Chowdammagutta Thanda, Mahabubnagar District, Telangana state

Total Project Cost	Rs.132.83 Lakhs
Project Execution Unit	BEL-Hyderabad
Project Execution Period	24 months
CSR Area	Promoting Education, Schedule VII, Section 135, Item Number 2
SDG Alignment	

3.1 About the Project

BEL constructed a government primary school building and Anganwadi centre in the Chowdammagutta Thanda village of Farooqnagar Mandal, Mahbubnagar District, Telangana as part of the village adoption programme under Swachh Bharat flagship programme of the Government of India. BEL also constructed the toilets, compound wall and laid the CC road at school premises. The new school building has two floors with six classrooms and separate toilets for boys and girls. Notably, both the institutions cater to the poor, needy and underprivileged scheduled tribe students from surrounding areas.

3.2 Need for the Project

The Government Mandal Parishad Primary School and Anganwadi centre located in ChowdammaguttaThanda, Farooqnagar Mandal, Mahbubnagar District, Telangana were in a dilapidated condition with leaking roof and rundown walls. Both buildings and toilet facilities were in disrepair state. It was difficult for both school and anganwadi centre to conduct the classroom teaching and provide toilet facilities for children. Based on the villagers' request, BEL constructed school building, anganwadi centre, boundary wall and furthermore laid the CC road for creating proper road facility for the School and Anganwadi centre. The project directly benefitted 41 schoolchildren, from I to V classes and 35 Anganwadi children benefitted from this project.

3.3 Project Objective

The project aims to provide a school building connecting road to village and provide an Anganwadi centre in Chowdammaguttathanda, Mahabubnagar District, Telangana.

3.4 Project Initiatives

BEL constructed school building and Anganwadi centre in Chowdammaguttathanda, Mahabubnagar District during the FY 2022-23 with a cost of Rs. 132.83 lakhs. The school building consists of six classrooms on two floors with kitchen cum storage room, two toilets & urinals for boys and two toilets for girls. In addition to this, BEL laid the CC road and constructed the boundary wall. Toilet facility, Kitchen and store were also constructed for Anganwadi centre.

3.5 Impact Analysis Framework

Impact analysis is measured using the RUOEI framework. Where the study measures the project relevance, utility, operations & maintenance, effectiveness and impact.

Table-3.9: Projects Impact Analysis

Parameters	Alignment
Relevance	The project successfully developed a safe and secure teaching and learning atmosphere, along with enhanced infrastructure facilities at the government primary school and Anganwadi Centre located in Chowdaramma Gutta, Mahabubnagar district, Telangana.
Utility	It is found that there has been 100% utility for school building, CC Road and Anganwadi centre.
Operation & Maintenance	The concerned school and Anganwadi Centre consistently perform operations and maintenance on the school building, Anganwadi Centre structure, restrooms, and other facilities to ensure that all amenities remain in good condition.
Effectiveness	The project significantly supported the school administration and Anganwadi centre in providing students with a high-quality education and enhanced facilities. It was instrumental in helping them create a learning-friendly environment that prioritizes the safety and security of students. Key features of the project include spacious classrooms which foster a more effective learning atmosphere. the project also included the construction of a kitchen and storeroom to support the mid-day meals program in the School and Anganwadi centre. Moreover, the project ensured the availability of drinking water, handwashing stations, and separate toilet facilities for both girls and boys. Additionally, this project facilitated proper road connectivity for schoolchildren by laying the CC facility. All these facilities reshaped the school infrastructure facilities.

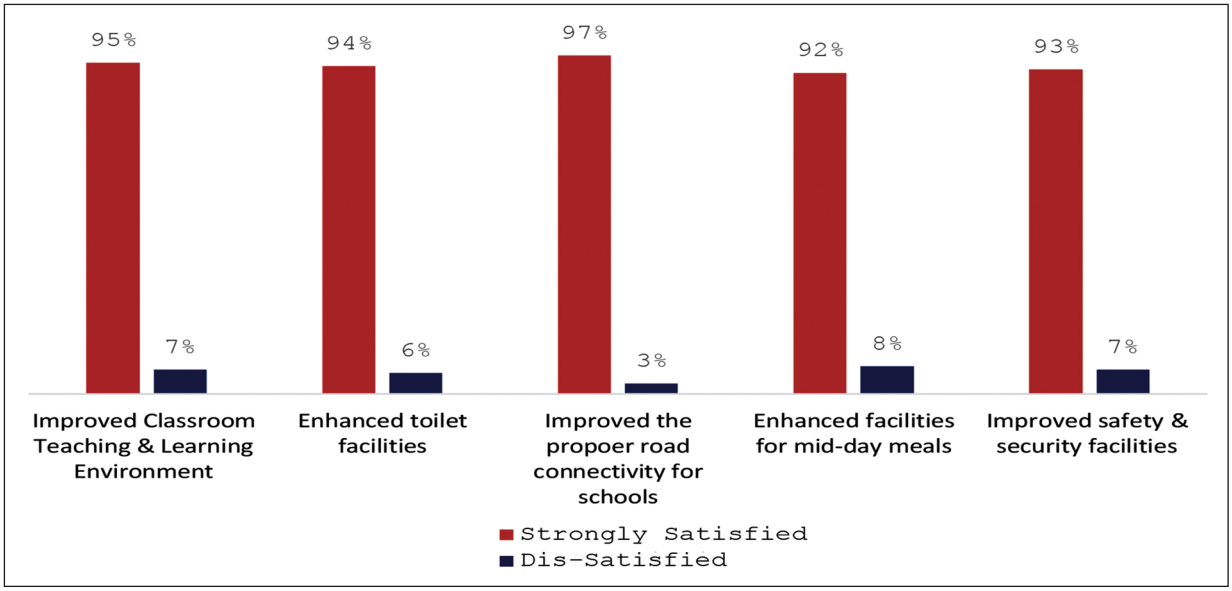
Parameters	Alignment
	Sustenance of the Project: High-quality construction of the school building, Anganwadi center, toilets, CC roads, and compound walls leads to sustainable positive outcomes. This is ensured by the ongoing maintenance and operation conducted by the concerned authorities of the school and Anganwadi centers, who manage their available funds effectively over time.
Impact	The project successfully fulfilled its object of establishing a conducive learning environment for students at a government primary school and Anganwadi centre in Chowdaramma gutta thanda. This initiative notably transformed teaching and learning practices, as well as resource accessibility, by offering educational infrastructure that included spacious classrooms with proper air and ventilation. Consequently, the quality of education saw significant improvement, resulting in better student performance in school evaluations and other educational settings. Furthermore, the project positively affected children's health by ensuring access to drinking water, sanitation, mid-day meals, and opportunities for sports activities. **Tangible and Intangible Benefits** • Sufficient classrooms are available for classroom teaching and extra-curricular activities. • Improved the facilities for mid-day meals, sanitation and drinking water for schoolchildren. • Enhanced facilities for mid-day meals program • This project enhanced schoolchildren's positive outlook on education • The project fostered a belief in schoolchildren about their future career paths, boosting their self-confidence. • Increased the level of privacy for girls to use the toilets.

3.6 Stakeholders Survey

3.6.1 Student Satisfaction Level Survey using Questionnaires

Sampling technique: Random; **Total sample size:** A total of 30 questionnaires collected from 15 boys and 15 Girls

Chart-3.7: Students' Satisfaction Level Survey on School Building



- Improved Classroom Teaching and Learning Environment: A survey conducted among 30 students revealed that 95% reported being strongly satisfied with the improved teaching and learning environment resulting from the new school building constructed by BEL, while 5% expressed their dissatisfaction. The students expressed that high-quality construction, along with spacious classrooms equipped with adequate air circulation and ventilation, significantly contributed to creating a more conducive classroom environment for their education.
- Enhanced toilet facilities: The survey indicated that 94% of students expressed strong satisfaction with the enhanced toilet facilities provided by this project, while 6% of respondents reported dissatisfaction. This improvement has contributed to a decrease in open defecation, significantly benefiting the health of school children.
- Improved proper road connectivity facility for schoolchildren: An impressive 97% of students indicated a strong satisfaction with the improved road connectivity provided and 3% expressed dissatisfaction by this project. The students collectively acknowledged that this initiative effectively tackled the primary concern of inadequate road facilities and drainage that had been a problem earlier.
- Enhanced the facilities for Mid-day meals: A notable 92% of students expressed a strong satisfaction, while the remaining 8% conveyed dissatisfaction of the enhanced facilities for mid-day meals. All students informed that earlier school prepared mid-day meals in a temporary setup, which did not have proper storing rice and other food materials. They used to store food material in the classroom disrupting classroom instructions. This project has established a permanent cooking area and storage facilities for mid-day meals.
- Improved the safety and security for schoolchildren: 93% of students indicated a strong satisfaction regarding the improved safety and security of schoolchildren following the construction of the new school building by BEL. Students acknowledged an improvement in safety and security due to the new school building, which included the addition of a boundary wall as part of the project. In contrast, this new project has successfully provided a secure environment with well-constructed classrooms and a boundary wall.

3.6.2 Teachers Satisfaction levels Survey using Questionnaires

Total Sample: 2 teachers; Sample type: Random

Two educators participated in the survey conveyed their high level of contentment with the enhanced learning environment resulting from this project, which contributed to improved academic performance among students. They also informed that the initiative positively impacted the school's infrastructure in several ways, including the enhancement of the midday meals program through the establishment of a proper kitchen shed and storage room. Additionally, the project upgraded toilet facilities for both boys and girls, improved road access to the school, and provided a boundary that bolstered security for students and school property. These improvements have significantly strengthened the educational facilities in the tribal area of Chowdarammagutta Thanda in Mahbubnagar district.

3.6.3 Parents Satisfaction levels Survey using Questionnaires

Total Sample: 5 parents; Sample type: Random

In conversations with five parents of schoolchildren, the team found that many were initially hesitant to enrol their children due to the poor condition of the school building before the 2022-23 academic year. Financial constraints made private schools unviable, forcing them to remain with this school. However, after the implementation of BEL's project, parents now express considerable satisfaction with the improved infrastructure, including spacious classrooms, clean restrooms, sports areas, dining and storage halls, as well as better road access and a boundary wall. They expressed that these enhancements improved classroom teaching and learning as well as students' better facilities that helped schoolchildren in both academically and physically growth.

3.7 SDG Alignment

BEL's initiative "Construction of School building and Connecting CC Road in adopted village Chowdammagutta Thanda, Mahabubnagar District, Telangana state" has successfully contributed to

Sustainable Development Goal 4: Quality Education. This goal emphasizes the importance of universal access to high-quality and inclusive education, which require proper school infrastructure. This goal was accomplished by BEL successfully by establishing a range of facilities, including spacious classroom, CC Road, a playground for various sports, kitchen and storeroom facilities for the mid-day meals program, as well as a boundary wall and other safety measures to ensure the security of the children.

3.8 CSR Alignment

This initiative aligns with BEL's Corporate Social Responsibility (CSR) policy and complies with the CSR provisions outlined in the Companies Act 2013, specifically in Schedule VII, Section 135, Item number 2, which focuses on the promoting education.

3.9 National Objectives

This initiative is in accordance with the Samagra Shiksha Abhiyan of the Government of India, which seeks to ensure that all children have universal access to education from pre-school through senior secondary levels in an inclusive and equitable manner. The program emphasizes the importance of educational quality alongside enhanced school infrastructure. Additionally, this project aligns with the Right to Education (RTE) Act of 2009, which stipulates essential infrastructure standards for schools, including sufficient classrooms, sanitation facilities, drinking water access, playgrounds, and other necessary amenities. Furthermore, this initiative is consistent with the New Education Policy 2020, which advocates for the provision of appropriate resources and infrastructure, such as well-equipped libraries, classrooms, laboratories, technology, recreational areas, student discussion spaces, and dining facilities, all aimed at fostering a supportive learning environment that promotes student achievement.

3.10 Case Studies

"My learning experience in the newly constructed school building has been remarkable, featuring spacious classrooms, proper ventilation, and generous natural light, all made possible by BEL. Furthermore, the inclusion of restrooms with running water has greatly improved our health conditions. The development of adequate road facilities and a compound wall has also contributed to a more pleasant school environment. I am sincerely appreciative of BEL for providing us with a school building that includes such important facilities."

N Deepthi

Class V, Government Primary School,
Chowdammaguttathanda village, Mahbubnagar district

"The construction of a school building at Chowdaramma Gutta Thanda has fostered a supportive learning environment for students. This new facility has facilitated the school's ability to conduct classroom instruction, prepare midday meals, and ensure adequate road access and sanitation facilities. As a result of this project, there has been a significant enhancement in both teaching and learning resources, as well as improvements in student amenities. We extend our gratitude to BEL for creating a positive school atmosphere through this initiative."

J C Venkataiah

Headmaster, Government Primary School,
Chowdammaguttathanda village, Mahbubnagar district

3.11 Overall observations and Findings

Observations

- The project provided six ventilated and spacious classrooms along with kitchen and storage facilities for the Anganwadi center.
- This included a compound wall, CC road, kitchen, and arrangements for midday meals. The project was completed as per schedule.

- As part of the project, installation of electricity and electrical equipment was provided.
- Dais/blackboard facilities are available, school furniture, including benches and chairs, has not been supplied.

Findings

- A significant 95% of students (n = 30 students) reported their strong satisfaction with improved classroom teaching and learning environment at their school.
- A significant 93% of students indicated a strong satisfaction regarding the improved safety and security of schoolchildren following the construction of the new school building by BEL

3.12 Conclusions

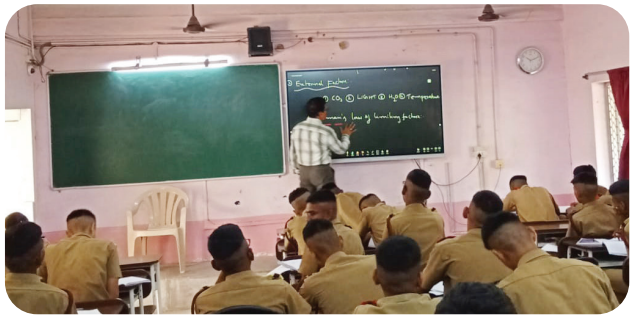
The school building and Anganwadi centre constructed by BEL at Chowdarammaguttathanda has significantly enhanced the teaching and learning environment, as well as the sanitation and preparation of midday meals. The durability of the project is assured due to the high-quality construction of the school building. It is crucial for the school and Anganwadi centre to maintain these facilities over time, as the long-term value of this project will rely on their future actions. Nevertheless, BEL has successfully met its project objectives.

Project 4: Setting up of 25 smart classrooms in Sainik School – Korukonda, Andhra Pradesh

Total Project Cost	Rs. 29.73 lakhs
Project Execution Unit	BEL-Machilipatnam
Project Execution Period	18 months
CSR Area	Promoting Education, Schedule VII, Section 135, Item Number 2
SDG Alignment	

4.1 About the Project

Sainik School Korukonda, Andhra Pradesh is one amongst the 33 Sainik Schools across the country, which prepares boys and girls academically, physically and mentally to join National Defence Academy / Indian Naval Academy. The school spread over sprawling area of 205.20 acres has a beautiful campus with well laid out roads and buildings. The school started with four houses in 1962 and today it has nine houses for both boy and girl cadets (students). The school offers VI to XII classes and intake strength is about 567 cadets (students) current year. Students are selected based on merit of entrance test conducted by sainik school Korukonda. Over the span of more than 60 years of its journey, 6418 cadets have passed out from the school out of which more than 744 cadets have entered National Defence Academy and Indian Naval Academy.



To enhance the teaching and learning environment for students in grades VI to XII, BEL has installed 25 interactive panels during the fiscal year 2023-24 at a total cost of Rs. 29.73 lakhs. These panels

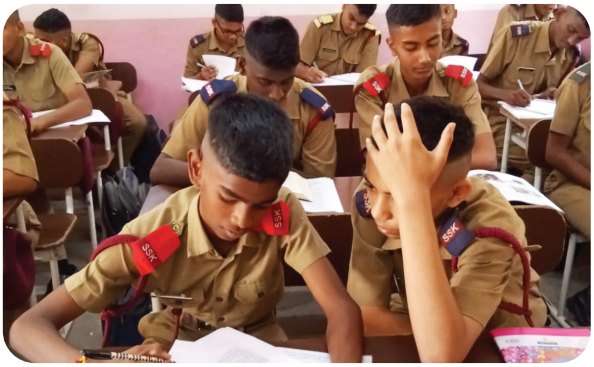
have been placed in classrooms, the AVA (Conference Room), laboratories, and various departments, significantly improving the effectiveness and engagement of the training and learning processes. The classrooms and departments are interconnected via LAN/Internet and LAN monitoring software, enabling instructors to access and integrate content from the computer lab, which serves as a central control hub for the interactive panels, into their upcoming lessons. Additionally, internet access is provided to classrooms according to the specific requirements of teachers.

4.2 Need for the Project

The Sainik School in Korukonda had previously implemented smartboards linked to projectors and computer systems for classroom instruction. To reduce the high operational and maintenance costs associated with smart classroom systems, the school management reached out to BEL-Machilipatnam, highlighting the advantages of interactive panels in enhancing the teaching and learning environment. These panels integrate all necessary functions into a single device, eliminating the need for separate projectors and computers. In response to the school's request, BEL installed 25 interactive panels at the institution during the fiscal year 2023-24.

4.3 Project Objective

The primary aim of this school is to prepare boys and girls academically, physically and mentally to join the National Defence Academy (NDA) and the Indian Naval Academy (INA). Since inception, the school has been rendering yeoman service to the nation in providing quality education and all-round development to the cadets across the country and has fed more than 700 officers to the defence forces out of which many have risen to the highest ranks in the Army, Navy and the Indian Air Forces. Smart Class has been influential in paving way for the digital learning methods in schools and this initiative aims at better digital learning outcomes.



4.3 Project Initiatives

BEL successfully installed 16 interactive panels across classrooms and 9 panels in laboratories for subjects including computer science, physics, chemistry, and biology, in addition to various rooms designated for art, counselling, AVA, and the conference hall.

Exhibit 2

Interactive Panels: An interactive flat panel display is a sophisticated touchscreen device that integrates the roles of a conventional whiteboard, projector, and computer into a single, streamlined system. These displays are crafted to promote engagement, improve collaboration, and facilitate the delivery of lessons. Equipped with multi-touch functionality, integrated educational software, and smooth compatibility with digital devices, they are revoutionizing classrooms globally.

Specification of Interactive Panels: Pentagon PenTouchPTw 75 with WMK & OPS

Interactive flat panel displays are collaboration solutions designed for interactive whiteboarding, videoconferencing, screen sharing, and more.

4.4 Impact Analysis Framework

Impact analysis is measured using the RUOEI framework. Where the study measures the project relevance, utility, operations & maintenance, effectiveness and impact.

Projects Impact Analysis

Parameters	Alignment
Relevance	This project provided an advanced teaching and learning environment for both teachers and students. The interactive panels featured in this project offer a superior technological solution compared to standard smart classroom setups that depend on computers and projectors. This advancement conserves space and incorporates a computer, projector into a single device with a 75-inch high-resolution screen. This initiative also supports the Government of India's notable project, "Digital Education in India."
Utility	25 interactive panels are completely utilized by the school. These panels facilitate classrooms for instruction and laboratories for subjects such as computer science, physics, chemistry, and biology. Furthermore, there are designated rooms for art, counselling, audiovisual activities, and a conference hall. The entirety of the teaching and learning environment is delivered through these interactive panels. There are 16 classroom sections, with each section engaging in six hours of daily teaching for students from grades VI through XII.
Operation & Maintenance	The school collaborates with a technical agency to ensure continuous maintenance and operational support for the panels. This partnership also includes managing the preloaded subject content from Extramarks, as well as overseeing LAN and Internet connectivity, all aimed at creating an effective teaching and learning environment.
	Digital learning outcomes **Enhanced Student Engagement:** Educators integrated interactive panels that showcased diverse visuals, multimedia elements, and engaging features into their lessons. This strategy not only attracted students' attention but also fostered a more vibrant and stimulating learning atmosphere, promoting active involvement and enthusiasm for the topics being taught **Fostered Collaborative Learning**: The use of smart panels facilitated a collaborative learning atmosphere, allowing students to engage in teamwork on various projects. This setup encouraged them to exchange ideas, collaborate on problem-solving, and reach insightful conclusions collectively, thereby enhancing their social and academic skills. **Improvement in Advanced Multimedia Teaching Techniques:** Instructors took advantage of preloaded educational resources, online materials, and a range of multimedia tools, including videos, animations, and interactive simulations.
Effectiveness	These resources were instrumental in clarifying complex concepts across diverse subjects, making learning not only more enjoyable but also more accessible for students, ultimately enriching their educational experience. **Increase in students' number:** The number of students remains consistent each year. Due to a high demand for admissions, candidates are selected on a merit basis following an entrance test, contingent upon the availability of seats. **Sustenance of the Project**: The project yields lasting results, as this sainik school engaged technical agency for the operation and maintenance of interactive panels and provided educational content for classes VI to XII. Further, the school received support from BEL to enhance the power backup facilities for these 25 interactive panels. Together, these strategies ensure that the project results remain sustainable for many years.
Impact	BEL project successfully achieved its main objective of creating a nurturing educational environment at Sainik School - Korukonda. The initiative established a fully functional modern classroom setting by equipping all classrooms, laboratories, activity rooms, audio-visual spaces, and conference halls with 25 interactive panels. Furthermore, the school made subject materials available for students in grades VI to XII. Teachers leveraged these interactive panels to conduct lessons, utilizing interactive whiteboards, preloaded educational content, multimedia tools, online resources, and audio-visual components such as animations, graphics, and videos. This method not only captivated students' attention but also enhanced their comprehension of various subjects. For example, students could tackle math problems directly on the screen using 3D models, graphs, animations, math games, and puzzles, stimulating their creativity, problem-solving skills, and logical reasoning.

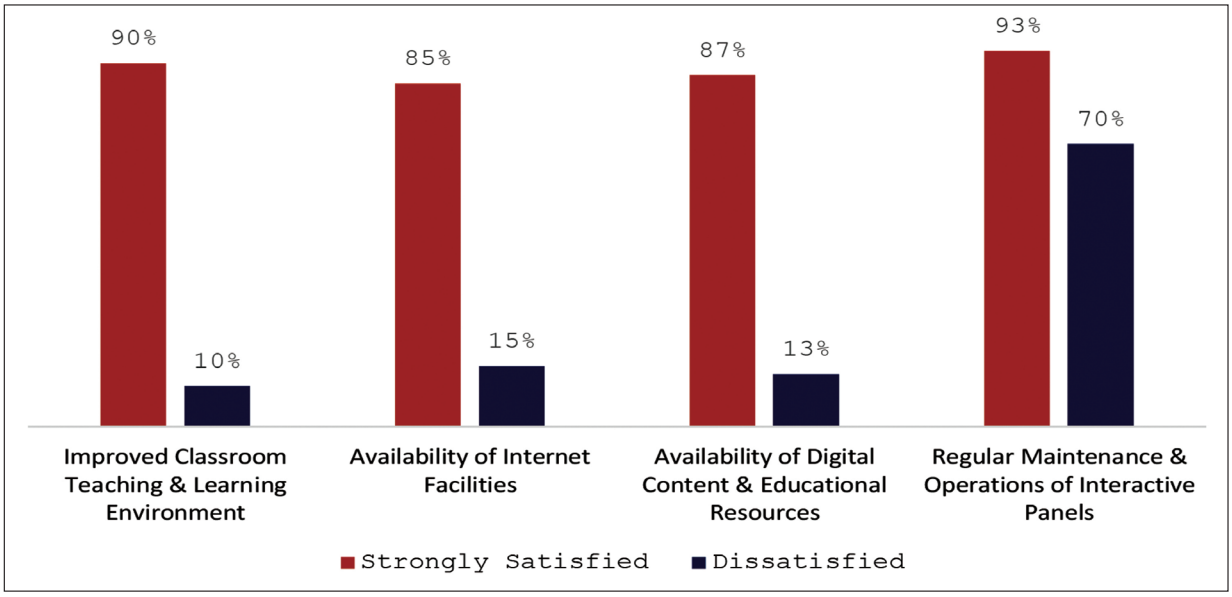
Parameters	Alignment
	Additionally, science lessons were enriched by showcasing various online experiments, which broadened students' scientific understanding and clarified numerous scientific concepts. Likewise, students demonstrated improved academic performance in social studies and various language subjects by these interactive panels. These interactive panels helped students to write computer coding and programs relating to their curriculum. Moreover, these interactive panels helped students to prepare for competitive exams and other. Interactive panels have revolutionized the educational landscape at Sainik School, Korukonda. These panels, which are seamlessly connected to the internet, grant access to a wide range of educational resources, including uploaded subject materials and various applications, thereby enriching the teaching and learning experience. This modern approach has significantly diminished the need for physical textbooks, reliance on printed materials, and the extensive preparation of handouts by both educators and students. With the interactive flat panels, teachers can instantly access online videos, articles, and databases, thereby enhancing the overall learning experience. These panels support a variety of educational applications, facilitating the integration of third-party resources into lessons. Educators utilize platforms like YouTube and uploaded subject content to augment their teaching materials. With high-definition displays and vibrant colors, the interactive panels offer a rich visual experience for those who learn best through imagery. Kinaesthetic learners can engage physically with the screen, manipulating objects or writing directly on the panel, which makes lessons more immersive. These advancements have significantly enhanced the traditional learning environment at Sainik School, Korukonda. **Tangible and Intangible Benefits** • Improved classroom teaching and learning environment • Enhanced the teaching methodologies • Improved children's academic performances • Enhanced the quality of education levels • This project reduced paper consumption and fostered an environmentally sustainable learning environment. • Improved students' logical thinking and creativity • Enhanced the collaborative learning approaches among students

4.5 Stakeholders Survey

4.5.1 Student Satisfaction Level Survey using Questionnaires:

Total sample size: 30 (Boys 25 and Girls 05) Sampling technique: Random

Chart-4.1: Students' Satisfaction Level Survey on Interactive Panels



- **Improved Classroom Teaching and Learning Environment**: A survey of 30 students indicated that 90% were strongly satisfied with the improved teaching and learning environment following the installation of Interactive panels from BEL. The students highlighted that these panels have significantly transformed their educational experience by providing a diverse selection of online resources, including Word documents, PDFs, graphics, audio-visual content, Excel spreadsheets, and PowerPoint presentations. Additionally, the panels enable the use of various educational applications, simulations, and uploaded course materials, allowing students to easily access essential information, solutions to achieve their academic goals. These interactive panels enhance their skills in constructing geometric shapes and angles, acquiring scientific knowledge, coding for computer programs, and preparing for competitive examinations such as UPSC and NDA.
- **Availability of Internet Facilities**: The survey revealed that 85% students are strongly satisfied with the Internet facilities that support interactive panels, which play a crucial role to access various educational resources for both teachers and students. 15% expressed dissatisfaction, pointing out that the Internet access is limited exclusively to the interactive panels.
- **Availability of Digital Content and Various Educational Resources**: An impressive 87% of students conveyed strong satisfaction with the availability of digital content and educational resources that enhance their learning environment for exam preparation, assignments, and projects. Meanwhile, 10% of the respondents expressed satisfaction with these resources, and a mere 3% of students were undecided.
- **Regular Maintenance and Operation of Interactive panels**: A significant 93% of students reported high levels of satisfaction, while the remaining 7% also indicated their contentment with the ongoing maintenance and functionality of the interactive panels. The Sainik School in Korukonda has engaged the technical agency to oversee the regular upkeep and operation of these panels, in addition to controlling a range of digital content and educational applications tailored to the teaching and learning needs of both educators and students. These initiatives facilitate seamless access to educational resources and digital materials, enhancing the classroom experience for all involved.

4.5.2 Teachers Satisfaction levels Survey using Questionnaires

Total Sample: 10 teachers Sample type: Random

Team conducted discussions with ten teachers, all of whom reported a high satisfaction with the advancements in their teaching practices. They acknowledged the timely updates to digital content, ongoing maintenance and functionality of interactive panels, and positive impact on their students' academic achievements and career opportunities following the installation of these panels by BEL. The educators expressed that their ability to deliver content had improved through the effective incorporation of various educational resources.

4.6 SDG Alignment

BEL's initiative to enhance the modern teaching and learning environment through the installation of interactive panels at Sainik School, Korukonda, in Andhra Pradesh has successfully contributed to Sustainable Development Goal 4: Quality Education. This goal emphasizes the importance of universal access to high-quality and inclusive education. This transformation illustrates the potential of smart classrooms to revolutionize education by integrating modern technology with traditional educational principles, thereby making learning more accessible, engaging, and effective.

4.7 CSR Schedule

This initiative aligns with BEL's Corporate Social Responsibility (CSR) policy and complies with the CSR provisions outlined in the Companies Act 2013, specifically in Schedule VII, Section 135, Item number 2, which focuses on the promoting education.

4.8 National Objectives

This project aligns with the Government of India's esteemed "Samagra Shiksha Abhiyan" program, which advocates for digital education in government schools. Additionally, this project supports the National Education Policy (NEP) 2020, which emphasizes the importance of integrating technology into classroom environments to enhance the overall quality of education in the school system.

4.9 Case Studies

"In a highly competitive environment, we encounter a multitude of rigorous examinations where mathematics is essential. Topics like conic sections, quadratic equations, and straight lines, which involve graphical comprehension, are greatly supported by the PhEt simulation. Being a computer science student offers the benefit of coding practice even in the absence of a computer lab. This also enables us to keep a record of past NDA question papers and facilitate seminars, both of which are vital to our success. I look forward to BEL's development of HOLOGRAM technology and appreciate the provision of these interactive panels by BEL".

Vivek Aditya Putti

Student, Class XII-B, Sainik School, Korukonda

"My school cadets and I are fortunate to have access to interactive electronic panels, which provide us with the opportunity to enhance our knowledge through applications like Extramarks. These applications allow us to download and store concepts, enabling us to revisit them as often as necessary for our learning. As students of computer science, it is crucial for us to delve deeply into programs, folders, and documents. The colorful displays of these resources, combined with our teachers' explanations, facilitate our understanding of the material effortlessly. This technology does not require a high level of interest to engage with; we can seek information with the consent of our teachers. Overall, this significantly contributes to our academic success.".

G Sathwik

Student, Class XI B, Sainik School, Korukonda

"The introduction of pen touch interactive panels marks a transformative development, as these whiteboards come with colourful pens that aid in comprehending intricate equations. As students of computer science, we can utilize the Thonny app to write Python programs. Additionally, the panels offer a user-friendly experience in terms of interaction and functionality. I look forward to future updates that will sustain this quality of learning for upcoming generations".

Avinash Chauhan

Student, Class XII-B, Sainik School, Korukonda

"The smart board panel has been instrumental in the educational experience of students at Sainik School, Korukonda. As a Class XII student, I have faced challenges in accessing a wide range of academic resources, making the smart board an invaluable tool. For UPSC preparation, the ability to download and review classes later has proven particularly beneficial. Ultimately, this technology serves as a vital resource for both students and teachers. I look forward to the development of more innovative products that will further enhance student learning, as students are the foundation of our nation's progress."

Aryan Kumar Thakur

Student, Class XII, Sainik School, Korukonda

"The integration of technology, innovative pedagogical approaches, and a commitment to fostering inclusive, engaging, and interactive environments have led to substantial advancements in classroom teaching and the overall learning atmosphere at Sainik School, Korukonda" .

Shri Binoy Sebastian

Science Teacher, Sainik School, Korukonda

4.10 Overall Observations and Findings

Observations

- Sainik School integrates 25 interactive panels to facilitate daily classroom instruction, practical experiences, and a variety of activities across 16 class sections from grades VI to XII. Each section engages in smart classroom sessions for six hours daily, covering all subjects. In addition, students utilize smart panels for practical classes, as well as for art and culture, counselling, and competitive examination preparation.
- All Interactive panels come with pre-installed educational applications and software, supplying tools for lesson planning, interactive quizzes, and annotations. This allows teachers to draw, highlight, and annotate directly on the panel, resulting in more engaging and flexible lessons.
- Interactive panels are ideal for STEM education, allowing students to engage in interactive simulations, perform coding exercises, and visualize scientific concepts in three dimensions.
- Students produce digital artwork, develop design projects, and work together on multimedia presentations directly using the panel located in art room.

Findings

- A significant 90% of students (n = 30 students) expressed strong satisfaction with the enhanced teaching and learning environment following the installation of interactive panels at Sainik School, Korukonda.
- An impressive 87% of students (n = 30 students) conveyed strong satisfaction with the availability of digital content and educational resources that enhance their learning environment for exam preparation, assignments, and projects

4.11 Conclusions

At Sainik School, Korukonda, the implementation of interactive panels has greatly improved the classroom teaching and learning experience. This advancement is a result of the school's initiatives to promote the effective use of various educational resources and digital content, leading to enhanced academic performance and a higher standard of education. To ensure the continuation of these successes, the school management has improved its power backup systems with the help of Bharat Electronics Limited, which has further aided in sustaining these results. However, the absence of the BEL logo on the interactive panels installed in classrooms, laboratories, and other facilities restricts the visibility of BEL's contributions to corporate social responsibility. To avoid this situation, it is necessary to imprint the BEL logo on interactive panels as this project's achievements may inspire other corporations to contribute similarly for the benefit of the community.

Project 5: Laying of RCC Road (BEL-ARMY Road) in the vicinity of BEL-Chennai, Tamil Nadu

Total Project Cost	Rs. 206.38 lakhs
Project Execution Unit	BEL-Bangalore
Project Execution Period	36 months
CSR Area	Infrastructure Development
SDG Alignment	

5.1 About the Project

The project focused on improving the road connectivity between Nandambakkam-Porur road junction to Army Public School sports ground, addressing the challenges faced by daily commuters. The unpaved road has been a major concern, causing difficulties for vicinity residents, students at the Army School, patients visiting the Military Hospital, residents of Rama koil street, Burma colony etc. The BEL aimed to construct a well-paved and durable road to ensure smoother and safer transportation. By enhancing infrastructure, this initiative improved accessibility, reduced travel time, and contributed to the overall development of the region, benefiting both the local community and visitors.

5.2 Need for the Project

The road connecting Nandambakkam-Porur road junction to Army Public School sports ground was unpaved, making travel difficult for commuters. This road is frequently used by those heading to the Army School which holds classes from 1st – 12th grades, Military Hospital which has all the health care facilities including Labs, MRI, X-ray etc., the residents ofNandambakkam, Rama Koil Street, and Burma Colony and others. The poor road conditions created significant challenges, particularly for students commuting to school and patients seeking medical care. Previously, the time taken to pass through the laid road was above 30 mins, but now it takes only five mins to cross the same path. The lack of proper road construction not only caused inconvenience but also affected accessibility to essential services, highlighting the urgent need for improvement. BEL considered the problem faced by the commuters and constructed the road to help the commuters.

5.3 Project Objective

The road is from the Nandambakkam-Porur road junction to Army Public School sports ground & this road lies in the area under Military cantonment board. The road is mainly used by the Nandambakkam village local residents, retired and in-service Army staff, and the army school going students, and also by BEL staff for commuting from residence and back. This road was chip carpeted during August 2015, by BEL Chennai under CSR, taking the necessary permission from the garrison Engineer, Army. This time in principle approval is given by Army cantonment Station Head Quarters St George Fort Chennai. Presently the condition of the road is bad due to floods and required relaying. To avoid frequent relaying, it lying of RCC (reinforced cement concrete) is proposed. Military Hospital has requested to relay with bituminous/with concrete in order to make the road suitable for commutation.

5.3 Project Initiatives

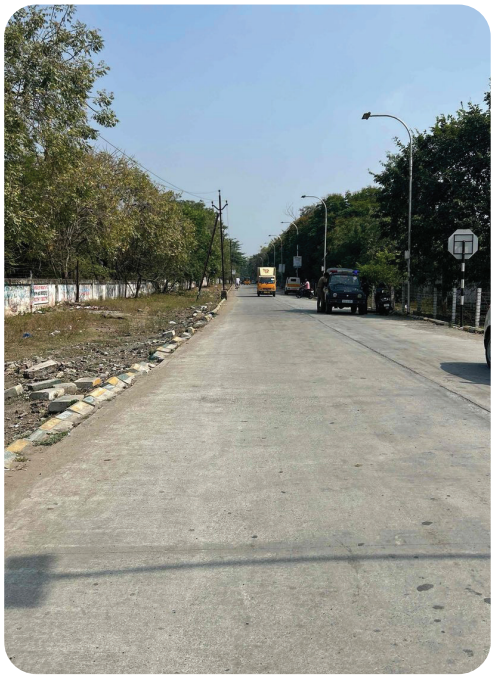
1,260-meter-long RCC road, covering a total carpet area of 8,820 square meters has been constructed by BEL for easy accessibility for the commuters. The road laid by BEL has taken safety measures such as laying speed breakers, signs considering the presence of a school in the vicinity. Light motor vehicles viz., two-wheelers, three-wheelers, cars, vans etc., are only allowed while prohibiting heavy vehicles on the road. The initiated project reduces the commuters time by accessing the road. This project aims to provide a smoother, safer, and more efficient commuting experience for the community.

5.4 Projects Impact Analysis

Impact analysis is measured using the RUEIS framework. Where the study measures the project relevance, project effectiveness, utility, impact and project sustainability.

Table-5.1: Impact Methodology

Parameters	Alignment
Relevance	The newly constructed road has greatly improved connectivity, reducing travel time for residents, students, and hospital staff. It ensures quicker access to essential services, enhancing convenience and efficiency. This development has positively impacted daily commutes, making transportation smoother and more reliable
Utility	Army school and Hospital and other nearby communities' residents are making extensive use of this road. Every day, approximately 1,400 school students along with 80 teachers & staff and 500 hospital patients rely on this road for their daily travel, highlighting its significance in ensuring smooth and accessible transportation.
Effectiveness	This project has not only reduced transportation expenses but also provided valuable time savings for the community members. Previously, during the rainy season, traveling on this road took around 30 minutes. However, with the newly constructed road, the same journey now takes just 5 minutes, greatly enhancing convenience and efficiency
Impact	The newly paved road has also boosted connectivity to key locations such as the Army School, Military Hospital, and nearby residential areas, positively impacting the community. Additionally, the installation of speed breakers has improved road safety, making the area more pedestrian-friendly.
Sustainability	Construction improved sustainability by enduring heavy traffic and harsh weather conditions, ensuring safer and more efficient transportation.



5.5 Stakeholders survey

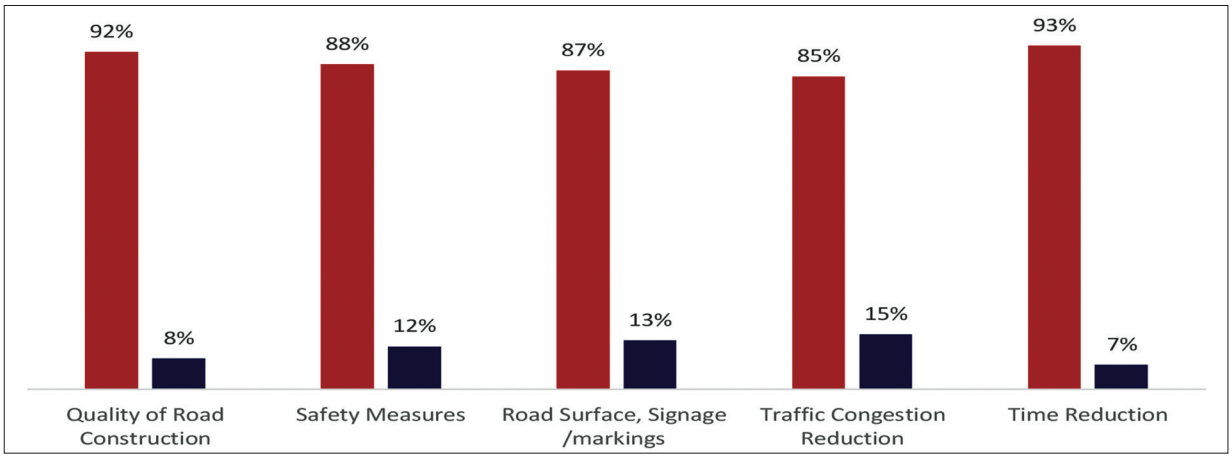
5.5.1 Profile of stakeholders

The list of stakeholders

Head of Military Hospital	01 member
Vice Principal	01 member
BEL officials	01 member
Police	01 member
Teachers	05 members
Parents	05 members
Students	06 members
Patients / patient attenders	10 members
Auto Drivers	10 members
Nearby community residents	20 members

5.5.2 Findings and Analysis

Chart-5.1: Satisfaction Survey of the Commuters



A Survey was conducted with a total of 66 stakeholders assessing parameters like quality of construction, safety measures, time reduction, in traffic congestion reduction. The results indicate that 92% of the stakeholders were strongly satisfied and 8% were satisfied with the quality of the road. Additionally, 93% of the commuters were strongly satisfied and 7% were satisfied with the time reduction for the commuting. Regarding traffic congestion, 85% were strongly satisfied and 15% satisfied. Further, 87% of the stakeholders were strongly satisfied with the road surfaces, signages and 13% were satisfied with the same.

5.6 SDG Alignment

The project aligns with the SDG 3: Good health & wellbeing, SDG 7 Decent work & economic growth and SDG 11: Sustainable Cities and Communities

5.7 CSR Schedule

This initiative aligns with BEL's Corporate Social Responsibility (CSR) policy and complies with the CSR provisions outlined in the Companies Act 2013, specifically in Schedule VII, Section 135, Item number 4, which focuses on the Environmental Sustainability.

5.8 National Objectives

The project supported the Nation's commitment to building a safe, sustainable, and interconnected road infrastructure for the future.

5.9 Overall Observations and Findings

Observations

- The initiative has significantly decreased both travel time and distance for the residents of Nandambakkam, Rama Koil Street, Burma Colony, and surrounding areas, facilitating easier access to the military hospital and military school.
- The road constructed by BEL incorporates safety features, including the installation of speed bumps and signage, in light of the nearby school.

Findings

- Ninety-two percent of the commuters were strongly satisfied with the quality of the road provided by BEL.
- Ninety-three percent of the commuters reported that there was a time reduction for commuting to military hospital, military school, and other places.

5.10 Conclusions

The BEL project successfully met its objectives by establishing adequate road connectivity for the residents of Burma Colony, Nandambakkam, Rama Koil Street, and surrounding areas. This improvement facilitates access to essential locations such as the military hospital, military school and other places thereby enhancing daily activities, saving valuable time, and alleviating physical strain. Previously, residents faced challenges traveling on unpaved roads; however, this initiative has significantly improved access to nearby colonies. Commuters have expressed their gratitude for BEL's efforts in enhancing road connectivity.

Chapter 4 Observations and Conclusions

BEL recognizes its role and responsibility as a corporate entity and constantly endeavours to actively participate in the social and economic development of the communities in which it operates through CSR initiatives. The impact assessment of CSR initiatives represents a vital process through which a company can determine the success of its CSR programs and their effects on stakeholders, including the broader society. This systematic evaluation examines the implications of BEL's CSR activities of five projects in areas such as Infrastructure / Facilities created in Educational Institutions, Museum and laying of RCC Road. The overall observations of the projects are as follows:

Project 1: Smart Classroom Systems installed by BEL in 135 Schools of Aspirational District, Raichur District in Karnataka State

The Objective of this initiative is to enhance the learning outcomes of school children using diverse techniques. Smart class facility uses digital learning methods which is interactive using multimedia techniques. The digital learning initiative has garnered significant participation from both Teachers and students. Mathematics and Science have shown usage rates exceeding 70%, indicating their popularity. It was observed that the schools conduct 18-20 sessions weekly. The benefits of the digital learning program include simplified explanation of new concepts, increased student engagement, modernized teaching methods, and efficient management with fewer instructors.

Project 2: Support for Renovating 'BEL Hall of Electronics Gallery' at Visvesvaraya Industrial and Technological Museum (VITM)

The aim of the project is to broaden their understanding of electronics, stimulate curiosity, and cultivate the scientific and research skills necessary for their future career growth of students. BEL Electronics Gallery provided the real time or practical experience solutions with students and others what students learnt theory textbooks concepts in their classrooms. The gallery was well received by the public, especially by school students. This exhibition offers comprehensive insights into the invention of the electron, the diverse branches of electronics. The impact of these advancements on human development in areas such as smart cities, communication, transportation, healthcare, digital marketing, robotics, defence, and science and technology, among others is very high.

Project 3: Construction of School Building and Connecting CC Road in Adopted Village Chowdammagutta Thanda, Mahabubnagar District, Telangana state

BEL constructed school building and Anganwadi centre in Chowdammagutta thanda, Mahabubnagar district during the FY 2022-23 with a cost of Rs. 132.83 lakhs. The school building consists of six classrooms on two floors with kitchen cum storage room, two toilets & urinals for boys and two toilets for girls. In addition to this, BEL laid the CC road and constructed the boundary wall. Toilet facility, Kitchen and store were also constructed for Anganwadi centre. The project provided six ventilated and spacious classrooms along with kitchen and storage facilities for the Anganwadi center. As part of the project, installation of electricity and electrical equipment was provided. Dais/blackboard facilities are available, school furniture, including benches and chairs, has not been supplied.

Project 4: Setting up of 25 Smart Classrooms in Sainik School – Korukonda, Andhra Pradesh

The primary aim of this school is to prepare boys and girls academically, physically and mentally to join the National Defence Academy (NDA) and the Indian Naval Academy (INA). All Interactive panels come with pre-installed educational applications and software, supplying tools for lesson planning, interactive quizzes, and annotations. This allows teachers to draw, highlight, and annotate directly on the panel, resulting in more engaging and flexible lessons. Students produce digital artwork, develop design projects, and work together on multimedia presentations directly using the panel located in art room.

Project 5: Laying of RCC Road (BEL-ARMY Road) in the Vicinity of BEL-Chennai, Tamil Nadu

The road is from the Nandambakkam-Porur road junction to Army Public School sports ground & this road lies in the area under Military cantonment board. The road is mainly used by the Nandambakkam village local residents, retired and in-service Army staff, and the army school going students, and also by BEL staff for commuting from residence and back. The initiative has significantly decreased both travel time and distance for the residents of Nandambakkam, Rama Koil Street, Burma Colony, and surrounding areas, facilitating easier access to the military hospital and military school. The road constructed by BEL incorporates safety features, including the installation of speed bumps and signage, in light of the nearby school.

About the Centre for Corporate Social Responsibility (CCSR), IPE

The Centre for Corporate Social Responsibility (CCSR) was set up during 2011 to promote training, research, consultancy assignments and document case studies in thrust areas of CSR. The Centre works on the existing body of knowledge, systems, structures, models, and mechanisms associated with different CSR initiatives; it also provides a platform for discussing CSR guidelines and the latest developments in the field. The Institute of Public Enterprise (IPE) has been part of the Department of Public Enterprises (DPE), Government of India initiative on introducing Corporate Social Responsibility (CSR) as an element of the performance matrix in Central Public Sector Enterprises (CPSEs). IPE was invited to attend the meetings of the Working Group on CSR in 2007-08 and 2009-10 and was nominated by DPE as a Member of the Executive Committee on CSR in 2011 to develop, design and implement courses for CPSEs. Recognizing the importance of the subject and the realization that there is a dearth of experts in this emerging field, it was decided that IPE could play a major role in research, development, and advocacy of CSR. This idea led to the establishment of the Center for Corporate Social Responsibility in 2011 at IPE. The main objectives of the center are:

- To conduct interdisciplinary and collaborative research and document case studies in thrust areas of CSR dealing with contemporary issues and challenges.
- To integrate the existing body of knowledge, systems, structures, models, and mechanisms associated with different CSR initiatives by interfacing with industry and academia.
- To disseminate information about the latest happenings in the CSR field to the people engaged in policy making, policy analysis, policy research, practitioners, and other stakeholders.

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About Institute of Public Enterprise (IPE)

The Institute of Public Enterprise (IPE) was established in 1964 as an autonomous non-profit society. IPE is a premier AICTE approved management Institute focusing on transforming students into leaders of tomorrow in organizations and society. IPE's key objectives include management education, research, consultancy, and training. In 1995, the Institute launched its first two year full-time Post Graduate Diploma in Management (PGDM) program to provide skilled human resources to meet the requirements of industry.

Keeping in view the market demand, the Institute also launched sector specific PGDM programs in the areas of Marketing, Banking Insurance and Financial Services, International Business and Human Resource Management. IPE's engagement with long-term management education has received wide appreciation from the industry, government, and social sector enterprises. The Institute continuously endeavours to update the content and teaching methodology of its courses based on feedback from the end-users, ensuring the quality, relevance, and utility of all its programs and courses.

IPE is consistently ranked among the leading B-Schools in India in most well-known ranking surveys. IPE has also been awarded a premium accreditation label of the SAARC region, 'The South Asian Quality Assurance System' (SAQS). Over the years IPE has won several awards and honours for its academic & research excellence.

IPE has a very successful track record of running MDPs over a long period of time. IPE also has a strong Research and Consultancy division, which provide consulting services and undertakes research projects for various national organizations. The Institute has been recognized as a 'Center of Excellence' by the Indian Council of Social Science Research (ICSSR), Ministry of Education, and Government of India.

The Governance of the Institute is overseen through a Board of Governors composed of eminent policy makers, academicians, and CEOs of public and private sector enterprises.

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