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EFFECTIVENESS OF TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION ON ACADEMIC SUCCESS OF SCHOOL STUDENTS IN RADHAPURAM ASSEMBLY CONSTITUENCY

Project Funded by
The Honourable Speaker
Thiru. M. Appavu
Tamil Nadu Legislative Assembly



Rev. Sr. Dr. L. Vasanthi Medona ICM
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Mrs. C. Deepa

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**In Gratitude and Appreciation to
The Honourable Speaker
Thiru. M. Appavu
*Tamil Nadu Legislative Assembly***

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CHAPTER-I

1.1. INTRODUCTION

“Integration of Information and Communication Technologies (ICT) into schooling needs serious consideration. Teacher educators, Curriculum developers, Evaluators and others will have to redefine their roles to tackle ICT rich environment and harness its full potential for the benefit of learners”

-National Curriculum Framework (2005)

Education is the process of developing the capacities and potentials of the individual to prepare that individual to be successful in a specific society or culture. The next-gen learners are techno-savvy and rapidly use technologies such as Facebook, WhatsApp, and Google. Demands a more interactive teaching-learning process focusing on ‘why and how’ than the traditional method of focusing on ‘what’ (Varghese, J.2017). Similar to the students, the teachers also see the promise of this digital classroom as "the charts, diagrams, and props are replaced with beating hearts and animated stories" something that is far more interesting to the students. Teaching strategies have undergone a paradigm shift from education’s traditional methods to the most recent ones. Moreover, the function of the teacher has also shifted from the solitary information provider to the learning coordinator. The role of the student has also evolved from absorbing information from a teacher directly to exploring learning (Monserate, C.A.2018). A competency-based curriculum can be a basis for bringing change and new rationale about instructional approaches in teaching, learning and assessment processes in schools to improve the quality of education. Active methods could enhance teaching and learning (Ngendabanga, C.et al.2021).

A technology-based learning environment called a "Smart Classroom" is suggested to improve students' abilities. The idea of a smart class helps students learn theoretical concepts more engagingly than only as an interactive audio-visual aid. It is one of the crucial teaching methods that can upgrade a traditional educational system into a more modern one (Mailewa T. et al., 2020). The educational system is made more appealing and participatory by using this teaching and learning

approach, which also aids teachers in creating engaging lessons (Phoong S.Y et al., 2019). Compared to the traditional classroom, it offers many more advantages, such as enhancing students' technology proficiency and enabling global connectivity (Yue, S., Naoki, M., Toru, I. & Yuanchun, S. 2008). Additionally, children are more likely to study there because learning in an innovative classroom is more engaging and pleasant than in a regular classroom.

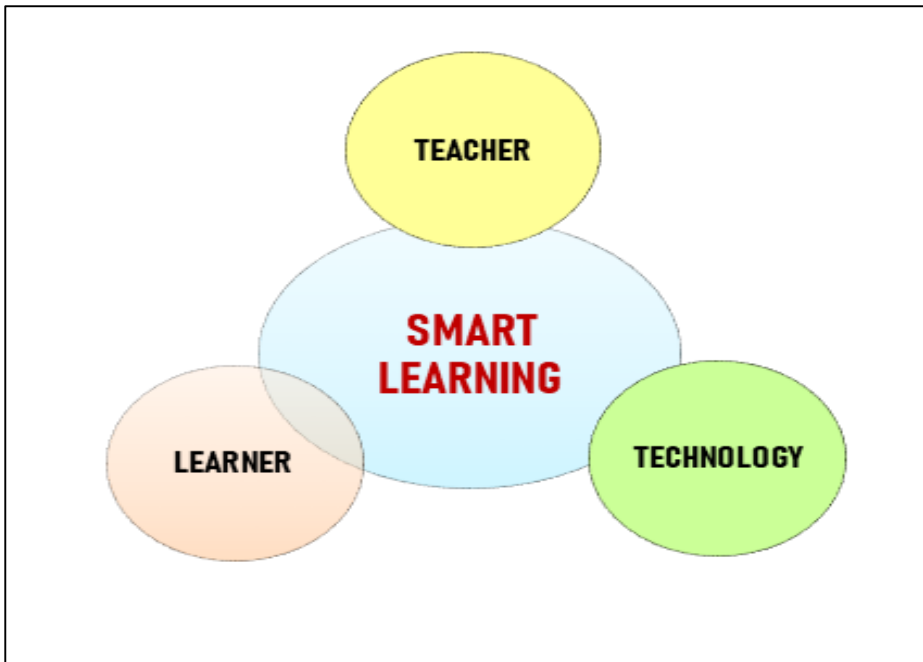
Smart Classes offer greater knowledge through presentations and videos. According to Mailewa T. et al. (2020), curiosity in the students learning improves students' academic performance. Visualization aids in learning; this method of instruction captures students' interest. So, the smart class technique is better for maintaining the student's interest and focus by engaging them fully for the entire learning experience, especially in learning their second language (Bhai J.A. & Bharwad. 2015). Therefore, with the aid of information and communication technology, smart classrooms have emerged as a method of enhancing the skills of upcoming generations (Jena, 2013). The role of a teacher needs to change from being an instructor to being a coach or mentor for students because technology now makes it possible for more student-centered techniques, such as active learning, mathematics experiments, or discovery learning. In order to manage the multi-skill requirements of a curriculum, intelligent "Digital Literate" Teachers must be multi-skilled (Anju, 2016). There is a lot of potential for information and communication technology as a teaching tool. It is possible for students to develop their own meaning through dynamic collaboration and interaction with the content and teaching resources. In the era of science and technology, traditional teaching approaches are unable to engage students' interests or to address their mental, emotional, or psychological needs in the new millennium. Technology in school improves student comprehension (Ayyppan, S.B. 2018), fosters self-learning, collaborative learning, and problem-solving skills in students, and boosts the effectiveness of classroom instruction. Bringing fresh knowledge closer to the teachers and the students facilitates the

planning and organization of lessons and lowers informational barriers (Mugani, P. 2020). Students quickly grasp complex and abstract subjects using images and animations, making learning pleasurable. A smart classroom also helps teachers to assess student's learning progress using cutting-edge assessment technologies (Celestin, N.2021).

1.2. Smart Learning Environment

Smart learning is crucial for boosting lifetime learning since it enables students to address such issues utilizing their unique circumstances and skills effectively. (Zhu et al., 2016 & Baumgartner, 2020). Smart gadgets and intelligent technology are necessary to apply innovative learning (Gros, 2016). Smart gadgets include computers, cell phones, iPads, and other comparable equipment. Intelligence technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), and clouds (Chen et al., 2016). It is significant to note that the two components mentioned above were combined to create the "smart" learning environment. Generally speaking, Smart Learning Environment (SLE) encompasses more than name-based instruction. On the other hand, it is a novel approach to fostering everyone's creativity and thinking. It is a rich physical environment with digital adaptive devices aiming to promote better and faster learning by accessing these devices and receiving the necessary learning guidance, suggestions or supportive tools in the suitable form at the right time and place (Hwang, 2014). Smart devices and intelligent technologies are the foundation of the new learning methodology known as "Smart Learning" (Shami, Sedik, Rashid, & Hussin, 2018). These two components are meaningless without the involvement of teachers in the creation of a "Smart Learning Environment" (Zhu et al., 2016). The following figure depicts one of the potential educational platforms with the student, teacher, and technology three mutually interactive elements that work together to achieve smart learning included.

Figure.1. Mutual Interactive Elements of Smart Learning



A new paradigm for universal education has emerged with the goal of enhancing lifelong learning and offering straightforward methods for information transmission. Smart education is generally described as contextually customized and boosting problem-solving skills in intelligent surroundings. The primary goal of smart education is to reduce cognitive burden on students while simultaneously enhancing their ability to concentrate and promote ontology construction.

The system's capacity to sense, infer, and foresee self-learning is how well it has adapted to smart learning analytics. Self-regulation should support as many learning activities as feasible in addition to visualization and receiving feedback from students. Due to the many ways that smart technology is being implemented to make sure that smart learning is accessible regardless of time and location, smart learning environments are today vital. Despite students' varied attitudes and objectives, it is widely believed that smart learning has the technology to accomplish this goal (Boulanger et al., 2015). Intelligent

learning settings must confirm the supposition that all people are sporadically rational. People's individual differences should be respected and treated carefully. This applies to all communities, not just some of them. It should nevertheless be utilized.

1.2.1. SMART CLASS

Smart Class provides a teaching and learning solution that includes rich media digital learning materials to help students and teachers. The learning material repository consists of thousands of highly animated, lesson specific, 3D and 2D multimedia modules. Smart Class is also used to automate some time consuming and tedious tasks like attendance, class test, test evaluation, and assignments. It also generates a monthly report based on student's performance, attendance record, and test report. Smart Class used a special class layout to provide better environment for learning. To make the teaching and learning procedure easy and efficient with the help of computers, projector, and speakers. It also contains features like query records, teacher grading system, and library update helps to analyze and enhance the way of teaching.

1.2.2. SMART CLASSROOM

Smart Classroom teaching space that has technological equipment's to be used to aid and enhance instruction and to enthuse all learners. Classrooms are categorized based on the equipment's available: A search of the literature does not yield a single unified definition of smart classroom. Most articles characterize a classroom as "smart" depending on the equipment installed. The equipment found in a smart classroom may vary due to the requirements of the institution that created the classroom. Many institutions have several configurations of smart classrooms. Some contributing factors to the configuration decision are the size of the classroom, the needs of the discipline being taught in the classroom, the budget, and the technology availability.

1.2.3. TYPES OF SMART CLASSROOM

Based on the availability of equipment's it can be further divided into the following:

- **Advanced Smart Technology:** Features a smart podium with a touch panel control system, PC and laptop connection, document camera, DVD/VCR Player, projector, and screen.
- **Intermediate Smart Technology:** Features a smart podium with a control panel, PC and laptop connection, projector, and screen. May also have an overheard transparency projector.
- **Basic Technology:** Includes a laptop connection, projector, DVD/VCR player, and screen. May also have an overhead transparency projector.

1.2.4. CONCEPT OF SMART CLASSROOM

Smart Classroom is one equipped with multimedia components designed to enhance teaching and learning. Although some classrooms may have slight variations, most Smart Classrooms contain the following devices: Smart Board (Interactive Whiteboard), Ceiling mounted Digital projector, Laptop Computer, Wireless mouse, Control devices such as switchers and remotes Wall Screen, Dry Erase whiteboard, V.C.R. and D.V.D. player, Document Camera, Stylus pens (resting in pen tray), SMART Notebook software, Amplifier and classroom speaker. “Smart school and smart class” is an innovative concept in education. These classrooms are also called Digital or New-Media classroom. ICT is the backbone of smart classroom.

Philosophical Rationale: In parlance of educational philosophy, three terms are encountered viz. Metaphysics, Philosophy and Axiology. Out of these branches of philosophy, Epistemology and Metaphysics provide the rationale for the inclusion of smart classroom practices in teacher education programmed. Epistemology is the study of our method of acquiring knowledge. It is concerned with how our minds are related to reality, and whether these relationships are valid or invalid. Flaws in epistemology will make it harder to accomplish anything. Methods of teaching and pedagogy are undoubtedly related to Epistemology. As per epistemology of Nyaya Darshan, there are four means of acquiring knowledge (Pramanas) as under: Perception

(Pratyaksha), Inference (Anumana), Comparison (Upmana), Verbal Testimony (Shabd Pramanikta).

Smart education has successfully created technology standards in contemporary culture; nonetheless, there are still difficulties. Among these challenges are the formalization of pedagogical theory, the leadership of educational organizations, the preparation and training of qualified instructors, the creation of the educational structure, and the ideology for this education. The integration of diverse scenarios to create data-centric smart education is another problem. As smart education develops, finding integrated and interoperable learning services between the smart education system and other systems could be a hurdle in the future. Additional difficulties emerged from several factors, including modifications in systems and policies, ongoing changes in learning settings, and responses from various cultural groups. Changing the traditional educational system to one where teachers, students, parents, and other stakeholders work together is challenging. Smart Classroom aims to combine entrepreneurial pedagogy, collaborative teaching, and the latest technological teaching tools to create a modern and effective education service environment in an education setting.

There are three main themes in the SMART Classroom concept:

- **Smart Pedagogy**-Smart Pedagogy is based on entrepreneurial pedagogy and methodologies. Smart Classroom project aims to foster the application of these methodologies in an institutional setting and hereby provide more interactive alternatives to traditional teaching.
- **Smart teaching Solutions**-Smart Teaching Solutions deals with various practical teaching tools and materials for teachers, including teaching games and simulations. Smart Teaching Materials include, for example, exercises and examples that teachers can apply to their courses.
- **Smart Learning Space**-Smart Teaching Spaces cover physical and virtual teaching spaces in the institution. The Smart Teaching Spaces concept defines the essential furniture and technical specifications of

ideal physical classrooms and the most important features of virtual learning platforms. Also, facilities and functions for lecture halls and collaborative teaching spaces will be defined in this package. The Smart Teaching Spaces as a whole bring flexibility to learning.

1.2.5. SMART CLASSROOM EDUCATIONAL RESOURCES

A key component of planning and carrying out work in the smart classroom is educational resources. To emphasize this aspect, a wide range of instructional methods and materials that blended analogue and digital support were employed in all the classrooms under study. Manipulative materials were deemed to be very significant in terms of analogue instructional tools. Teachers claimed that because these tools enable the implementation of experiential and hands-on learning opportunities, they favor the development of skills and abilities. Models, videos, experimentation and science materials, puzzles and construction pieces, and particularly games of various kinds (board games, logic games, and symbolic games) stand out within this category. It should be emphasized that all of the smart classrooms examined had gamified learning as a definition (Baldovi et al.2023)

1.2.6. ROLE OF INTERACTIVE WHITEBOARD IN SMART CLASSROOM

In the smart classroom, one of the major and vital components is Interactive Whiteboard. Without this board the concept of smart classroom is meaningless. So discussion about this component is essential The interactive whiteboard is an instructional tool that allows computer images to be displayed on a board using a digital projector. The instructor can then manipulate the elements on the board by using his finger as a mouse, directly on the screen. Items can be dragged, clicked and copied and the lecturer can handwrite notes, which can be transformed into text and saved.

1.2.7. INTERACTIVE WHITE BOARD AND STUDENT ENGAGEMENT

Learning are the most important things in the educational system. In the learning process reading, asking questions and interacting with other people are important ways. Current learning theories promote student engagement and consider it to be a key component of knowledge construction. These learning theories include the following:

- **Constructivism**

It relies on the learner to select and transform information, construct hypotheses to make decisions and synthesize learning through personalizing knowledge.

- **Active learning**

The learners actively engage in the learning process through reading, writing, discussion, analysis, synthesis and evaluation, rather than passively absorbing instruction (e.g. lecture model of instruction).

- **Whole-class teaching**

It brings the entire class together, focuses their attention and provides structured, teacher-focused group interaction. The interactive whiteboard offers a sizable work area for practical application of multimedia tools. A room that is big enough for everyone to view creates a pathway for more student engagement in teacher-led and group-based discussions. Due to the interactive whiteboard's size, teachers can interact with it in front of the class as students participate in learning.

1.2.8. ROLE OF SMART TECHNOLOGIES IN SCHOOLS

Education is encouraged as a way to transition from an industrial to an emerging information age, with the advent of technology being considered the main factor behind growth. Schools are under pressure to swiftly offer students access to educational technology (Cuban et al., 2001). The school is the epicentre of societal and national development and the centre of learning. Schools in India operate in a variety of scholarly and social contexts. As the fastest-growing industry in India, information and communication technology (ICT), equipping

institutions with cutting-edge technology ensures a high return on investment. Information and communication technologies (ICTs) have considerably impacted the conventional educational system. Modern teaching and learning opportunities have been made possible by them, and improvements in the study of how individuals learn have resulted from them. Nearly a century ago, Dewey (2001) observed the current education and learning situation: "From the child's standpoint, the tremendous waste in school may stem from his failure to apply the experience he gains outdoors. On the other hand, he cannot put what he is learning in class into practice. This is the school's isolation from the outside world. "Schools today have undergone significant change, most of which can be attributed to technical advancements in our world, including access to a wealth of information and advancements in computers, the internet, communications, and networking.

1.2.9. SMART TECHNOLOGY AND THE TEACHER

Educational change depends on what teachers do and think. In classrooms today, the role of the teacher needs to change from the traditional role of prescription to that of the orchestrator of learning which necessitates the designing of ICT-integrated classrooms promoting higher-order cognitive skills (Fullan, 1991). Teachers are rich resources in implementing any innovation, for they bring rich practical knowledge. The classroom-based material developed jointly by teachers and external consultants provide resources that can be practically used in the mathematics lessons (Isoda, et al. 2007). Teaching is becoming one of the most challenging professions in our society where knowledge is expanding rapidly and much of it is available to students and teachers simultaneously (Perraton et. al.2001). As new learning concepts have evolved, teachers are expected to facilitate learning and make it meaningful to individual learners rather than just to provide knowledge and skills. Modern developments of innovative technologies have provided new possibilities to the teaching profession, but at the same time, have placed more demands on teachers to learn how to use these new technologies in their teaching (Robinson

& Latchem, 2003). ICT has highlighted some significant changes in the teacher's role:

- Change in relationship with pupils.
- Change in the role of facilitators and managers who support learning.
- Change in the content and scope of teaching.
- Changing the Locus of control from teachers to learners

ICT does not meet the task to the attachment or supplement to teacher's preparation, but they offer the infinite access to information accessible without effort due to internet (Gilmore, 1995). Teachers should use technology to enhance their students' learning opportunities by selecting or creating mathematical tasks that take advantage of what technology can do effectively and well-graphing, visualizing and computing (Cuban et al., 2001). On reviewing the teacher's function in classrooms equipped with computers, it was asserted that teachers should focus more on teaching the learning process than its outcomes. It is imperative to explicitly shift the traditional learning abilities to the center of the curriculum, including finding, gathering, and summarizing material as well as spotting links and inconsistencies in a body of knowledge. The development of these talents requires the use of the proper software. This necessitates "explicitly teaching ways of organizing cooperative computer-related activities, whether in face-to-face groups around a single machine or through cooperation at a distance via email or conferencing" (Scrimshaw, 1997).

On examining the teacher's role in classrooms with computers, argued that teachers must teach the learning process rather than its products. The conventional learning skills, such as locating, collating and summarizing information and identifying connections and contradictions within a body of information, must all be explicitly moved to the centre of the curriculum. Developing such skills needs to be supported using appropriate forms of software. This requires explicitly teaching ways of organizing cooperative activities involving computers whether in face-to-face groups around a single machine or

through cooperation at a distance via conferencing or email (Scrimshaw, 1997).

Integration of technology in classrooms can significantly transform teaching and learning. New technologies offer new ways of dealing with traditional content in many areas (Pedtti et al., 1999). Teachers are the key to whether technology is used appropriately and effectively, and technology increases conversation, sharing and learning among students and between students and teachers. Technology Aided Learning (TAL) takes students to a higher level of thinking/processing. It enables them to become self-learners with the convergence of technologies the computer, CD-ROMs, video and web- conferencing, internet, broadband and television, to make it possible for cradle-to-grave learning to become a reality. Today's digital world enables children to learn anything from mathematics to music from teachers across the country and the globe. Numerous results of studies into the impact of ICT on students' learning have provided convincing evidence of its positive impact on learning gains and students' motivation. A digitally competent society requires smart teachers who are "Digital Literate". Teachers must be multi-skilled to manage the multi-skill demands of a curriculum. Information and communication technology as a learning tool has enormous potential. There is enough scope for learning to dynamically interact and collaborate with content and teachers learning resources to construct their meaning. In the ongoing age of science and technology, the traditional teaching practices are not adequate to arouse interest among the students, nor do they fulfil the learners' intellectual, psychological and emotional needs in the new millennium. Traditional methods of imparting knowledge such as lectures, books and conference papers are characterized by a linear progression of information. Human minds are more adaptable than this, using non-linear strategies for problem-solving, representation, storage, and retrieval of information (Collins & Quillian, 1969; Collins and Loflus, 1975). Hypertext software enables teachers to provide their students with the non-linear means to match non-linear thinking processes (Semenov, 2000). "Computer tools can help students or

teachers to manipulate complex data sets and help develop mathematical understanding" (Cobb and McClain, 2002) tools can help learners to picture scientific ideas or to develop conceptual understanding (Jonassen, 2000). ICT use by pupils and teachers in the case study schools led to positive motivational outcomes, supporting a focus on learning and tackling learning tasks. Technology environments allow teachers to adapt their instruction and teaching methods more effectively to their students' needs. Teachers can offer innovative ways to promote students' learning and encourage the acquisition of knowledge and abilities by incorporating instructional tools into their regular teaching practices (Passey et al, 2004). ICT changes rapidly, and innovations offer new possibilities.

Smart Board Technology is found to be appropriate in the modern classroom for the following reasons:

- Its flexible nature provides tools related to curricular and co-curricular activities, such as animations, virtual laboratories, Maths labs, media, nuggets, videos, quizzes, and games.
- It provides every learner and educator with enriched teaching-learning strategies.
- Its interactive and individualistic nature enables the students to participate actively in different classroom activities.
- It has minimal maintenance.
- It enables the teachers and students to avail themselves of the facilities available on the internet.
- It is eco-friendly, as it reduces the use of chalks, ink and paper.
- It enhances the positive classroom environment.
- It helps in distance learning and correspondence courses.

1.2.10. IMPACT OF TECHNOLOGY IN EDUCATION

Educational technology in the classroom enhances teaching and learning and enables teachers and students to engage as people in a setting where people control their surroundings for their objectives. ICTs offer a wide range of potent tools that could assist in transforming the current segregated, teacher-dominated, and stodgy classrooms into

appealing, student-centred, interactive learning environments. It is a comprehensive group of technological resources and tools that make creating, propagating, storing and managing knowledge easier. Since the advent of a class structure based on technology, the relationships between students and teachers have significantly transformed. The teacher no longer rules the classroom; instead, they are a liaison between the students and the information. The pupils have evolved into active informational architects who actively gather and present information, as opposed to being passive sponges taking up knowledge. The younger generation is growing up at a time when technology is constantly available to them. The growing social media environment and online presence are contributing to the rise in popularity of children. Today, there is a great deal of demand to provide kids with a high-quality education grounded in standards suitable for the 21st century. Among those requirements is equipping students with the informational and technological competencies necessary to succeed in a world constantly evolving and driven by technology (Carstens, et al.2021).

Flipped classroom approach allows students to study the material at home and come to school to engage in more discussions, exercises, and activities. It helps to develop students' problem-solving skills and enhance their conceptual understanding in the flipped classroom. Today, increasing student accomplishment while utilizing technology as a tool is a prevalent goal. Policymakers and educators reaffirm their dedication to initiatives and teaching methods that maximize the impact of instruction and student outcomes. The use of technology in teaching and learning is crucial if we are to have a long-lasting effect on students' learning because of how widely it is used in our society (Cristen, 2009). The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn." Technically skilled youngsters and professionals are needed in the current environment and are in demand every year. Teachers must have a solid understanding of ICT Tools, including computers, the internet, and its related technologies, as well as audio, video, and other media and

multimedia equipment that help people work effectively at work and in their daily lives. These tools include spreadsheets for calculation, budgeting, and scenario building, graphic and multimedia software for presentations, databases for research, and networks for making connections with others. Using ICTs in the classroom to effectively prepare young students for a variety of tasks has become widespread practice.

1.3. SIGNIFICANCE OF THE STUDY

In today's world, technology has made a wealth of knowledge available to students. Information is present in almost every possible way that any learner, whether gifted or slow learners, can find and use the necessary material to gain knowledge. Teachers need to prepare students for a technical world requiring self-initiative in learning, precision in processes and the ability to identify and analyze information. The traditional approach of giving lectures and taking notes has lost its effectiveness around education. In efforts to grow academics, it must be considered that differentiated teaching and learning modalities are necessary for better conceptual development. It is the education system's responsibility to use these ideas to comprehend student interests and orchestrate educational progression throughout childhood and adolescence. Information and Communication Technologies (ICT), has changed from being a technology of information & communication to a curriculum creation and transmission system for learners. With the development of technologies, new teaching strategies are being introduced in the curriculum, known as the "Smart Classroom". It uses instructional material, 3D animated modules and videos to make students understand. Nowadays, students are excited at this idea of innovation and interactive learning methods. The smart learning approach provides people of all ages a framework and a bunch of smart thinking tools that encourage higher levels of understanding and innovative ideas. In today's education system, "Smart Classroom" concept is a great innovation and a one-stop resource for students needing analysis and technology. Nowadays, teachers and students

have become technology-inclined; students adapt to new technologies or concepts very quickly, which helps them professionally. Smart devices like cameras, projectors, and remotes result in a lot of engaged learning for students and adaptation to a spread of learning designs.

Integrating technology into classroom instruction means more than teaching basic computer skills and software programs in a separate computer class. Effective technology integration must happen across the curriculum in ways that research shows deepen and enhance the learning process. In particular, it must support four key components of learning: active engagement, group participation, frequent interaction and feedback, and connection to real-world experts." Technology helps change the student/teacher roles and relationships: Students take responsibility for their learning outcomes, while teachers become guides and facilitators. Technology has spread to all sectors of the economy, such as education, where it is used for everyday activities in supporting teaching and learning. Electronic gadgets in learning and teaching are now the order of the day in many schools. It is a growing influence in many educational institutions in developed countries, and it is being used in many countries worldwide.

The launch of smart classrooms was welcomed by learners, teachers, principals, and the community (Javan, 2015). This can take the country's education to greater heights and improve results if effectively implemented. It can assist in producing competent learners that have technological skills that can be used anywhere in the world. Recent studies show that the successful installation of technological devices in classrooms for instruction improves learners' test scores, promotes learners' freedom, and develops teachers' technological skills (Bates, 2014). Today, people require innovative systems and technological devices in many aspects of daily life. We now depend on and are often addicted to the use of technology. Learners and teachers use technological devices more often during teaching and learning (Cox, 2019). Advancements, inventions and developments in science and technology have resulted in recent innovations becoming part of smart classrooms' learning and teaching process.

Technology is of great importance in educating learners that will provide them with the skills and knowledge required for the world of work. In the job market, only some jobs need 21st-century technological skills (Ramey, 2013). These skills prepare learners to be effective workers, leaders and citizens in the new digital global world, including creativity and innovation, communication and collaboration, as well as critical thinking and problem-solving (Gunter & Gunter, 2012). All these skills are acquired through incorporating technology into the instructing and learning process as it changes how we work, learn and live. Technology encourages teamwork and enhances interactive relationships between learners and teachers. Technology needs to be continuously designed for schools to use it. It needs to be designed with the understanding that it will be utilized in the future. The sustainability of these advancements is what makes them successful. (Kafyulilo,2014). For sustainable and effective implementation of the smart classroom in teaching and learning, it needs well-planned teachers' professional training and development. Teachers must be well-trained and alerted to new challenges to come. Another view on the aspect of digital competence was expressed by Howard, 2013, who commented that teachers' resistance to the use of technology was naive as they felt inferior because they were born before technology (BBT), which results in resistance to adopting new technological systems.

Radhapuram is the first constituency in Tamil Nadu to get smart classrooms for all its schools. The dream project of the **Tamil Nadu Assembly Speaker Thiru M. Appavu** was creating 'Smart Classrooms' in all government and government-aided schools in Radhapuram Constituency. It was inaugurated by the **Honourable Chief Minister Thiru M. K. Stalin** through videoconferencing on 31st July 2023. Smart Classrooms' have been created in all 295 government and government-aided primary, middle, high and higher secondary schools in the Radhapuram Assembly Constituency. Schools are provided with uninterrupted power in all these smart classrooms with touch screens and webcams with the intention that there should be no interruption during teaching. The webcam facility enables the students

to acquire new skills, mainly spoken English, with an expert teaching them from a particular place. Students in these schools are given spoken English training daily in three-time slots.

So, smart classrooms enhance the student's interest in teaching and learning. The technology-enhanced classrooms provided them with foster learning opportunities. Integrating technology engages students and gives them greater control of their learning. Teachers need to be aware of the characteristics of their learners and develop lessons that address both the strengths and the needs of their students. New pedagogics generates dependent grouping of creativity and appropriateness to empower a digital access to educational content. It allows teachers to adapt their teaching styles to meet the needs of their students. By using various technologies and intelligent classroom management, teachers support their student's educational and additional needs and cater to each child's learning plan. It allows students to learn, collaborate and innovate in incredible ways, while supporting the needs of every learner. In this regard, the investigators planned to assess the effectiveness of technology integration in curricular transaction on academic success of school students in Radhapuram Assembly Constituency.

1.4.STATEMENT OF THE PROBLEM

A smart classroom is a physical classroom integrated with Artificial Intelligence technologies to support the students and the teacher in the teaching and learning process. The smart classroom is a face-to-face classroom that employs active learning processes in combination with advanced forms of educational technology to deliver customized learning experiences A basic feature of a Smart Classroom is the ability to adapt itself to student needs in terms of the curriculum, course content, strategy and support. This is possible as smart classrooms are physical spaces endowed with digital devices to ease processes, but teachers and learners are the ones that must drive learning situations and, as a consequence, they must have the digital competencies and the ability to manage advanced solutions. The use of smart classroom

enables students to source for information collaboration with others while they are creating, attaching, connecting, and taking data with them from one location to another and from one group to the next. With the aid of modern technology, it has become easier for the students and teachers across the world to get a good grasp of the theoretical as well as practical knowledge. Through technology it has become easier to visualize anything in 3D and therefore the technology helps us to be conversant of the nuances of any concept. The smart classroom is rectification to various problems that teacher as well as student faces inside the classroom. A student can learn better through visualization. All the students may not understand the teaching methodology of a teacher, but can understand by smart classes. This type of teaching creates an attention called as interest in them. So smart class technique is absolutely better. Such teaching helps to maintain the student's interest and focus by engaging them fully for the entire learning experience. Secondly, from the teacher's point of view, with the arrival of this digital initiative which is so practical to modern time and friendly to use, teachers can instantly evaluate/assess the learning achieved by their students in his/her class. If a concept taught is not understood, then teacher can repeat with greater clarity and emphasis. He/she can identify areas of student's strength as well as weaknesses. These ultimately help the students for better understanding. Smart classrooms are very much beneficial in teaching-learning process in a school. We make use of an appeal to audio-visual senses of students in using smart boards. These smart boards are like a computer screen which is finely handled by a teacher and also by students to provide active participation. Some of the advantages for Smart board used inside a classroom. All the renowned institutions are setting a benchmark for using this concept. Now the students are thrilled at the concept of innovative and interactive learning process. The concept of digitized classroom has not only made the education easy but it gave the students power to enhance their performance. So the present study focuses on

“Effectiveness of technology integration in curricular transaction on academic success of school students in Radhapuram Assembly Constituency”.

1.5. TITLE OF THE STUDY

It is entitled as *“Effectiveness of technology integration in curricular transaction on academic success of school students in Radhapuram Assembly Constituency”.*

1.6. OPERATIONAL DEFINITIONS OF IMPORTANT KEY TERMS

Technology Integration

Technological integration is the use of technology to deepen learning and achieve pedagogical goals. Teachers can incorporate computers, smartphones, virtual reality tools and other innovative devices to help students learn. Effective technological integration supports the existing curriculum and is one part of the educational experience, along with traditional teaching methods and group work. The Smart Classroom is technology-improved study room that nurtures possibilities for teaching and studying techniques, together with computers, specific software, audience reaction technology, assistive listening devices, networking, and audio/visible capabilities. In the present study Smart Class is defined as a classroom, prepared with multimedia additives which includes a pc with a net link, screen, projector, and, Smart board, virtual versatile floppy player, microphone and amplifier(speakers), manipulate devices it includes switch, remotes, and softcopy of content material established through software program. Classrooms that use technology effectively typically have a low ratio of students to devices, so every student gets ample opportunities to use the technology.

Curricular Transaction

Curriculum transaction refers effective planning for providing learning experiences for its learners, organization of planning, administration implementation of the organized planning and evaluation of the implementations by the implementer and the experts in the relevant

field. Curriculum transaction is the most important process of an education system and if it is educated well at teacher's level it will produce quality teaching professionals. It is the process of planning and organizing the curriculum in a particular subject area for different levels of education. Specifically, curriculum transaction or implementation not only refers to the teaching of the contents of various theory subjects out also to the practical work to be done in each area of study as prescribed.

Academic Success

Student success is defined as academic achievement, engagement in educationally purposeful activities, satisfaction, acquisition of desired knowledge, skills and. competencies, persistence, attainment of education. Academic success is putting forth effort to improve oneself through the learning and understanding of classroom content to such a level where a 'good' grade is attained. According to Goods (1973) "Academic Achievement as a knowledge attain or skill develop in school subject usually designate by test score or by mark assign by teachers or by both". According to Hawes (1982) "achievement is successful accomplishment or performance in particular subject areas or courses usually be reasons of skilled hard work and interest typically summarized in various types of grades, marks score on descriptive commentary.

Radhapuram Assembly Constituency

Radhapuram is a legislative assembly constituency in Tirunelveli district. The constituency is in existence since 1957 election. It is one of the 234 State Legislative Assembly Constituencies in Tamil Nadu.

1.7. OBJECTIVES OF THE STUDY

1. To study the effectiveness of Smart classroom teaching and conventional mode of teaching on academic success of primary school students in Radhapuram Assembly Constituency.

2. To study the effectiveness of smart classroom teaching and conventional mode of teaching on academic success of middle school students in Radhapuram Assembly Constituency.
3. To study the effectiveness of smart classroom teaching and conventional mode of teaching on academic success of high school students in Radhapuram Assembly Constituency.
4. To study the attitude of primary school students in Radhapuram Assembly Constituency towards technology integration in curricular transaction with respect to gender, medium of study, locality of school environment, type of family, type of management, type of school, father's educational qualification, and mother's educational qualification.
5. To study the attitude of middle school students in Radhapuram Assembly Constituency towards technology integration in curricular transaction with respect to gender, medium of study, locality of school environment, type of family, type of management, type of school, father's educational qualification, and mother's educational qualification.
6. To study the attitude of high school students in Radhapuram Assembly Constituency towards technology integration in curricular transaction with respect to gender, medium of study, locality of school environment, type of family, type of management, type of school, father's educational qualification, and mother's educational qualification.
7. To assess the influence of technology integration in curricular transaction on academic success of primary school students in Radhapuram Assembly Constituency.
8. To assess the influence of technology integration in curricular transaction on academic success of middle school students in Radhapuram Assembly Constituency.
9. To assess the influence of technology integration in curricular transaction on academic success of high school students in Radhapuram Assembly Constituency.

1.8. HYPOTHESES

- 1) There is no significant difference between the effectiveness of Smart classroom teaching and conventional mode of teaching on academic success of primary school students in Radhapuram Assembly Constituency.
- 2) There is no significant difference between the effectiveness of smart classroom teaching and conventional mode of teaching on academic success of middle school students in Radhapuram Assembly Constituency.
- 3) There is no significant difference between the effectiveness of smart classroom teaching and conventional mode of teaching on academic success of high school students in Radhapuram Assembly Constituency.
- 4) There is no significant difference between male and female primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 5) There is no significant difference between rural and semi-urban primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 6) There is no significant difference between Tamil and English medium primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 7) There is no significant difference between joint and nuclear family primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 8) There is no significant difference between Government and Government Aided primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 9) There is no significant association among boys, girls and coeducation primary school students in their attitude towards

technology integration in curricular transaction in Radhapuram Assembly Constituency.

- 10) There is no significant association between father's educational qualification of primary school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 11) There is no significant association between mother's educational qualification of primary school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 12) There is no significant difference between male and female middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 13) There is no significant difference between rural and semi-urban middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 14) There is no significant difference between Tamil and English medium middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 15) There is no significant difference between joint and nuclear family middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 16) There is no significant difference between Government and Government Aided middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 17) There is no significant association among boys, girls and coeducation middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

- 18) There is no significant association between father's educational qualification of middle school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 19) There is no significant association between mother's educational qualification of middle school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 20) There is no significant difference between male and female high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 21) There is no significant difference between rural and semi-urban high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 22) There is no significant difference between Tamil and English medium high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 23) There is no significant difference between joint and nuclear family high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 24) There is no significant difference between Government and Government Aided high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 25) There is no significant association among boys, girls and coeducation high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 26) There is no significant association between father's educational qualification of high school students and their attitude towards

technology integration in curricular transaction in Radhapuram Assembly Constituency.

- 27) There is no significant association between mother's educational qualification of high school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
- 28) There is no significant influence of technology integration in curricular transaction on academic success of primary school students in Radhapuram Assembly Constituency.
- 29) There is no significant influence of technology integration in curricular transaction on academic success of middle school students in Radhapuram Assembly Constituency.
- 30) There is no significant influence of technology integration in curricular transaction on academic success of high school students in Radhapuram Assembly Constituency.

1.9. LIMITATIONS

Limitations are those conditions beyond the control of the researches that may place restrictions on the conclusions of the study and their application to other situations. As far as the study is concerned the investigators find certain limitations. They are

- The investigators have limited to test 5% level of significance.
- The investigators expect the sampling error.
- The truthfulness of the responses by the respondents.
- Respondent's mood, whim, interest, while answering.

1.10. DELIMITATIONS

"Delimitations are the boundaries of the study". Owing to the constraint of time the investigators have fixed certain boundaries for his study: they are

10. The present study has been delimited to Certain demographic variables namely gender, medium of study, locality of school environment, type of family, type of management, type of school,

father's educational qualification, and mother's educational qualification.

- The investigators have taken samples only from Radhapuram Assembly Constituency.
- The investigators have confined their study only to the students studying in primary, middle and high school.
- The samples were collected from the students studying in Government and Government aided schools.
- The school students in the rural and semi-urban areas were alone involved in the study.
- The investigators have selected only 2072 students as samples for this research.

1.11. CHAPTERISATION

Chapter-I of this study contains a brief Introduction to smart learning environment, Role of smart technologies in schools, Smart technology and effectiveness of Smart Classroom and a note about the need and significance of the study, objectives, hypotheses, limitations, and delimitations.

Chapter-II contains review of the studies related to the present investigation, done in India and in other countries related to effectiveness of Smart Classroom and academic success.

Chapter-III talks about the Methodology. Method used to collect the data, variables, and tools employed, sample and Statistical techniques for the analysis were discussed in this chapter.

Chapter-IV contains the analysis and interpretation of the data.

Chapter-V contains the summary of procedure with, major findings and educational implications. It also includes recommendations and suggestions for the future research.

1.12. CONCLUSION

The structure and arrangement of traditional classroom space do not go with changes happening in educational agents, methodology and social context. Smart classrooms rethink learning space and learners'

expectations about what this space, along with resources and methodologies, should be like. The concept of smart classrooms rests on the intersection of three axes: design of its space and ergonomics; integration of ICT in a functional, invisible, justified and intensive way; and an innovative pedagogical methodology, based on teaching principles such as collaborative learning, project-based learning, curricular globalization, students' autonomy, and educational co-responsibility. Smart Class is a digitized classroom, which is rapidly transforming the way teachers teach and students learn in school with innovative and meaningful use of technology, powered by the world's largest repository of digital content mapped to the Indian school curriculum, Smart Class brings in technology right next to the blackboard for teachers in the classrooms. Information and communication technology provides revolutionary opportunities in the educational system. It influences from elementary to higher education in different levels. When this ICT is used within a classroom, the environment of the classroom changes automatically. For the influence of ICT the concept of "smart classroom" develops. From the above discussion, it is clear that the smart classroom concept is very fruitful in the educational system. This chapter provided a general introduction, need for the study, significance and objectives of the research, statement of the problem and limitations of the study. In the following pages, the review of related studies on the areas of effectiveness of Technology integration and academic success have been discussed.

CHAPTER – II

REVIEW OF RELATED LITERATURE

2.1. INTRODUCTION

“A familiarity with literature in any problem area helps the students to discover what is already known what others have attempted to find out, what methods of attack have been promising and disappointing and what problems remain to be solved” (Best & Kahn). According to Aggarwal J.C “Is the right in stating that ‘The study of related literature implies locating, reading and evaluating reports of research as well as reports of observation and opinion that are related to the individual’s planned research project’. W.Best says “Practically all human knowledge can be found in books and libraries. Unlike other animals that must start a new with each generation, man builds upon the accumulated and recorded knowledge of the past. His constant adding to the vast store of knowledge makes possible progress in all areas of human endeavour”.

The phrase ‘Review of Related Literature’ comprised of two different words, which are, Review and Literature. The term ‘Review’ means to “Re-Look” or to look again or to collect the knowledge of particular area of research in a systematic way, to involve a collection of knowledge to show that the study would be an addition of knowledge to the field. The term “Literature” refers to the knowledge of a particular field of study of a stream which includes theory, practical and its research or literature as the mirror that reflects the past view and presents the future perspective. Review of related literature means, “to locate, to read and to evaluate the past as well as current literature of the research concerned with the planned investigation”. Such literature provides the researcher with the footprints of earlier travellers gone ahead on the same route. The time spent in survey of related literature is invariably a wise investment. It is a crucial step which minimizes the risk of dead ends, wasted efforts, rejected topics and even more important errorless findings based on a faulty research design. Review of literature also makes a researcher aware of the nature, kind and magnitude of the work done in the field and indicates the direction of further studies on the subject. Sometime, from such reviews of the relevant literature, the probable and possible topics of research may also emerge. To conceptualize the research problem explicitly and meaningfully,

there lies the significance of review of related literature gone through by the investigator. Keeping in mind the stated arguments, the researcher has reviewed the relevant literature, followed by a systematic analysis of studies, ideas, concepts and views of different researchers, are presented here in two parts: Studies done abroad; and Studies in India

2.2. OBJECTIVES OF REVIEW OF LITERATURE

1. To provide theories, ideas, explanations or hypotheses which may prove useful in the formation of a new problem
2. To indicate whether the evidence already available solves the problem adequately without requiring further investigation. It avoids the replication
3. To provide the sources for hypotheses. The researcher can formulate research hypotheses on the basis of available studies.
4. To suggest method, procedure, sources of data and Statistical techniques appropriate to the solution of the problem.
5. To locate comparative data and findings useful in the interpretation and discussion of results. The conclusions drawn in the related studies may be significantly compared and may be used as the subject for the findings of the study.
6. To help in developing expertise and general scholarship of the investigator in the area investigated.
7. To contribute towards the accurate knowledge of the evidence or literature in one's area of activity is a good avenue towards making oneself. Whether one is employed in an institution of higher learning or a research organisation this knowledge is an asset.
8. To provide some insight regarding strong points and limitations of the previous studies. To enable the researcher to improve his / her own investigation.

2.3. NEED OF REVIEW OF LITERATURE

A summary of the writings of recognized authorities and of previous research provides evidence that the researcher is familiar with what is already known and what is still unknown and untested. Since effective

research is based upon past knowledge, the review of related literature helps to eliminate the duplication of what has been done and provides useful suggestions for significant investigation. This helps in understanding the nature and design of research investigation

2.4. IMPORTANCE OF THE RELATED LITERATURE

Study of related literature helps in acquiring information about the studies done in the field, protects against unnecessary duplication and guides in carrying out the investigation successfully and makes the investigator familiar with steps. A survey of related literature serves the following purposes.

1. It gains background knowledge of the research topic
2. It provides valuable ideas, theories, explanations or hypotheses in formulating the problem.
3. It identifies the concepts relating to its potential relationships between them and to formulate researchable hypotheses.
4. It defines appropriate methodology, research design and methods of measuring concepts and techniques of analysis.
5. It locates comparative data useful in the interpretation.
6. It identifies data sources used by other researchers and learn how others structured the reports.

2.5. PURPOSE OF THE STUDY

Review of the related literature besides, allowing the researcher acquaints himself with current knowledge in the field or area in which he is going to conduct his research serves the following.

1. The review of related literature enables the researcher to define the limits of his field. It helps the researcher to delimit and define his problems. The knowledge of related literature, brings the researcher up-to-date on the work which others have done and thus to state the objectives clearly and concisely.
2. By reviewing the related literature, the researcher can avoid unfruitful and useless problems areas. He can select those areas in

which positive findings are very likely to result and his endeavours would be likely to add to the knowledge in a meaningful way.

3. Through the review of related literature, the researcher can avoid unintentional duplication of well-established findings. It is no use to replicate a study when the stability and validity of its results have been clearly established.
4. The review of related literature gives the researcher an understanding of the research methodology which refers to the way the study is to be conducted. It helps the researcher to know about the tools and instruments which proved to be useful and promising in the previous studies. The advantage of the related literature is also to provide insight into the statistical methods through which validity of results is to be established.
5. The final and important specific reason for reviewing the related literature is to know about the recommendations of previous researchers listed in their studies for further research.

2.6. TWO PHASES OF REVIEW OF LITERATURE

Reviewing the literature has two phases.

Identification and Reading – It includes identifying all the relevant published material in the problem area and reading that part of it with which we are not thoroughly familiar. One develops the foundation of ideas and results on which his own study will be built.

Writing – The second phase of the review of literature involves writing this foundation of ideas into a section of the research report for the joint benefit of the researchers and readers. For the researchers, it establishes the background in the field. For the readers it provides a summary of the thinking and research necessary for them to understand the study.

2.7. CLASSIFICATION OF REVIEW OF RELATED LITERATURE

The investigators have classified the studies into two major categories namely,

1. Indian studies
2. Foreign studies

2.8. INDIAN STUDIES

Sharma and Pattanayak (2022) in their research paper titled, “A Study on Effectiveness of Smart Classrooms through Statistical Analysis”. The purpose of their study was to compare the effect of smart classroom through statistical analysis. The objectives of the study were to study of mean difference between boys and girls of smart class, to study of mean difference between boys and girls of traditional class. The population of the study was 10th grades students comprised of 120 students. Investigators used traditional way of teaching and one smart teaching learning process. From this analysis getting that students are more interested to join smart class than traditional classes. The analysis was conducted the way of pre-test score and post test score of two groups. Through their study they find that the smart classroom has more positive effect on education than traditional class. Through this study they insisted the importance of smart classroom learning is a way of digital learning. From the beginning it was an imagination of the student. This type of classroom has digital equipped with a huge variety of teaching learning methods using technology. In these days many more classrooms are doing or using audio and visual components to a lesson. A smart classroom helps a teacher through technology as well.

Mailewa et al (2020) studied, “The Impact of Smart Classrooms on the Academic Success of Sri Lankan Government School Students”. The objectives of the study were to identify the determinants factors of a smart classroom, to evaluate the impact of a smart classroom on a school student’s academic success, to determine the relationship between the variables of the study and to provide practical suggestions to the government to improve the digital educational system. The study used a mixed approach to analyze both primary data and secondary data. A survey questionnaire was created and distributed among the students. Past research articles were used as a secondary data collecting methods for the analysis. The sample size for the study was 200 students from four government schools. The purposive sampling method was used for data collection. 250 questionnaires were distributed among the students and 200 usable responses were gathered. The study analyzed

the data using multiple regression and Pearson correlation. The analytical tool was SPSS. Through the analysis, the researchers found that all the objectives were achieved and the hypotheses were supported. The significance of this study is that it is able to provide suggestions and recommendations to the relevant authorities regarding the implementation of Smart classrooms in primary and secondary schools.

Dey (2019) in their research paper titled, “A Comparative Study on Smart Classroom and Traditional Classroom in terms of Academic Achievement of 10th Standard Students”. The research paper focuses on a comparative study between achievements of 10th standard students on smart classroom and traditional classroom. The study based on primary data and presented in quantitative method. The researcher was taken 20 students from Govt. High Secondary school in Santipur, Nadia District, West Bengal and followed stratified random sampling method. Researchers considered 10 students in each group. Group ‘A’ was taught in Smart classroom and group ‘B’ through Traditional classroom. It found that comparatively smart classroom more improving achievement of the student than traditional classroom. And also revealed that no difference between boys and girls in their achievement through learning by smart classroom. Through this study they insisted the importance and the application of Educational Technology has brought a numerous change in the field of education. At the present day smart classroom is very engrossing dreams for both the learners and teachers. E-learning and Smart Classrooms motives that improving students learning ability and achievements. So that, their progress and curiosity increases in study. And also increased their interest on study and enhance their bright future.

Hero (2019) conducted a research, “The Impact of Technology Integration in Teaching Performance”. This research tries to look into a way to understand the impact of technology integration in the teaching performance of Social Studies teachers in public high schools in the Division of City Schools Valenzuela City. Using a descriptive-

correlation survey method, the researcher believes in finding a link between and among variables. The respondents of this study consist of one-hundred (100) Social Studies teachers. The result indicates that the six dimensions of technology integration were described in a great extent by Social Studies teachers. More so, findings reveal that for all the seven indicators of teaching performance measured, Social Studies teachers were described as very satisfactory. Using regression analysis, the results of the study proved that technology integration exerts a significant impact on teaching performance. And among the six dimensions of technology integration, the best predictor was productivity and professional practice. It is recommended that the Department of Education should not stop providing programs, seminars, training workshops on technology integration to improve further the performance of Social Studies teachers.

Choudhuri and Husain (2017) in their research paper, “Impact of Smart Class on Academic Achievement of Government aided Secondary School Learners of South Delhi”. The objectives of the study are to analyse the impact of smart class on the biology concept of the secondary school learner of government aided school, to compare the academic achievement of secondary school learners of government aided school having or not having the smart class. The study was confined to 60 students of IX class of govt. aided school in south Delhi and biology subject of IX class. Seven achievements test was prepared, out of which one was used as Pre-Test based on the Chapter Cell; rest six was used as post-test. These six post-test was further categorized into two types. The one which of 20 marks based on individual chapters of biology and a final post-test of 100 marks which contain all the five chapters of biology of IX Class. These achievement tests were reviewed by the biology teachers of secondary level. The achievement test was objective type based on the NCERT syllabus of biology of IX class. The test items were in simple easy to understand language. They checked the basic knowledge, comprehension, application and skill of the

student. Finding of the study shows that smart class has positive impact on learning environment as it has enhanced the learning process.

Sandhya et al (2018) in their research study, “Impact of Smart Class Room Learning Environment on Academic Achievement of the Students”. Before 21st century, in India the education was provided by traditional methods. The main objective of the study was to explore the impact of smart classroom environment on academic achievement of the students. The sample consists of 60 Secondary school students especially of IX class only of Jind district of Haryana. Randomized Groups Pre-test- Post- Test Design was used by the investigators. Data were analysed with the help of Mean, S.D. and t-test. The result shows that the smart class room environment enhances the level of academic achievement of students. The traditional method includes long-hour sitting of students to teacher monologues. More emphasis was given on theory and less importance was given to practical based education. But in 21st century, the use of science and technology has been increased. In the present scenario the expectations of the stockholders are also increased about schools. Interactive classroom is the demand of the society by which their kids can gain knowledge in short time and in interesting way also.

Noufal (2018) in his research study, “Role of ICT Integration in Effective Transaction of Science Education”. This theoretical paper focused up on the integration of ICT in general perspectives and also with respect to the science education. The digital revolution in the present century, brought a new dimension of visualizing teaching, learning, designing the learning experiences and the evaluation process. Information and Communication Technology (ICT) can be used in different ways as prominent tool for ensuring the effective transaction of the modern education system. In the ‘Science’, there occur so many latest discoveries and innovations. Science education is the area where the teachers and educationalists can experiment latest discoveries in order to cope up with the present generation. With the help of the ICT integration, the educational system can be changed in to a different

perspective. Role of the science teachers and the different ways they can able to integrate the ICT in the normal teaching learning process is also discussed.

Baby and Chellamani (2018) in their research paper titled, “Implementation of Smart Classrooms among Secondary Schools in Puducherry Union Territory”. The researchers had the finding out its utility in reality. This study focuses on work done in the Pondicherry Union territory. The objectives of this study was to identify the physical facilities available in a smart classroom, to identify the different teaching methods being used in smart classroom, to identify the uses of smart class in teaching learning process, to give an overview of the operation of smart classrooms in general and educational context in specific, to determine the frequency and application of smart board use. The High school students from secondary schools in the Union Territory of Pondicherry were the participants. A Stratified random sampling technique was used for analysis to identify participants to determine if rigor was evident and at what levels. Therefore, the findings helped the policymakers to make necessary actions in future implementation. The results reveal that smart classroom is more effective in efficient learning process. Smart classrooms rethink learning space and learners' expectations about what this space, along with resources and methodologies should be like. They showed that smart classroom is a platform where teachers and students can make attempts to learn all available techniques and tools for maximum utilisation of resources for widening up their knowledge. This investigation brought out awareness among the authorities and stakeholders on the actual status of the implemented Smart classroom program of RMSA. Technology based teaching has been supported for nearly five decades in India. The Universalisation of Secondary Education policy of our government (India) in its Rashtriya Madhyamik Shiksha Ashiyan (RMSA) programme introduced Smart classroom and provided amenities for operation. Support for the significance in teaching learning programme is clear through the mandates and

program development yet the question still arises related to the rigor of this approach to teaching and learning.

Gill (2017) in their study, “Role of ICT in effective curriculum transaction and evaluation”. The main objective is to look at the role of ICT in primary and secondary education. It emphasizes computer technology and television media because of their availability in our schools and their great impact on teaching and learning processes. The objectives are to discuss the importance of ICT in education and their implication to the world of work; discuss effective pedagogical issues surrounding the use of ICT in the classroom; and highlight some changes ICT might have on the role of the teacher in the classroom.

Das (2016) conducted study on “Modern Education with Smart Classroom”. The purpose of the present study was to review the effectiveness of Smart classroom in modern teaching-learning situation. The objectives were to study the meaning of Smart Classroom, to study the concept of smart class originated, to study the position of smart class room in India, to study the concept model of smart class room, to study the principle of smart classroom, to study the role of Interactive Whiteboard in Smart classroom. The study was mainly analytical in nature. The data has been collected from various publications, reports, monographs, books, journal, newspaper and internet source etc. The researcher found that Smart Classroom is very effective in educational system. But in India this concept was not widely spread throughout the country. Only few cases are to be noticed. The Concept of smart classroom was Scientific and psychological. So students must be benefited from this concept. Smart whiteboard provides the opportunity of joyful learning. Information and communication technology provides revolutionary opportunity in educational system. It influences from elementary to higher education in different level. When this ICT uses within a class room, the environment of classroom changes automatically. For the influence of ICT, the concept of “smart classroom” develops. From the above discussion it is clear that smart classroom concept is very much fruitful in educational system.

Bano (2016) in her research paper titled, “Impact of Smart Classroom Learning Environment on the Performance of First Grade Students in English”. The present study was an experimental one and was conducted in Srinagar district of Kashmir. The investigator has taken 30 first grade students from Govt. High school Bakshipora. The investigator conducted experiment on the basis of pre-test and post-test. Performance test standardized by the investigator was used for the collection of data and t-test (correlated groups) was used to analyse the data. The result reveals smart classroom learning positively affects the performance of students in English”.

Pancholi and Bharwad (2015) in their research paper titled, “Effectiveness of Smart Class among Secondary School’s students of Ankur Vidyalay, Ahmedabad”. The present paper focuses to make an experimental study of schools having smart class room in relation to academic achievement of 9th grade Science students’. The objectives of the study was to study the effectiveness of different Classroom techniques i.e. Smart Classroom teaching and conventional mode of teaching on achievement of 9th grade students in Science subject, to study the academic achievement in Science of 9th grade students when taught through Smart Classroom teaching and conventional teaching with respect to gender. In this study smart class and traditional class room environment was Independent variable while academic achievement of students in Science subject was dependent variable. The population of the study comprises of Gujarati medium students of Ankur Vidyaalay, Ahmedabad constitute the population. Stratified Random sampling technique was employed by the investigator for the selection of the sample. The sample selected for the study was the (N= 60) students of 9th grade from the Ankur Vidyalay of Ahmedabad city. Out of 60 students, they were randomly divided into two groups with reference to their score of preliminary exam of Science subject. Self - Made power point presentation as a smart class technique with the help of Computer and Laptop, Projector are included in the smart class. Achievement test in Science subject is being used in this study. The findings of the study were there existing a significant mean difference

in the effect of smart class room learning environment on academic achievement in Science subject. The result shows that the students taught through smart class have scored better achievement than subject taught through traditional method. Boys and the girls do not differ in their achievement in Science in the post test. This shows that package is equally effective with boys and girls.

Srivastva (2015) in his research paper studied, “Efficacy of Educomp Smartclass, the effectiveness of Educomp smart class for enhancing student’s academic performance and studied the attitude of students when multimedia was used in classroom. The objective of this study was to examine the effectiveness of using an interactive whiteboard Active Board, to increase student participation in the classroom. The study revealed that Multimedia Instructional Strategy enhanced the student’s cognitive achievement and also interest in Mathematics. The students' cognitive achievement and interest in Maths were enhanced mostly by the multimedia strategy and minimally by the conventional strategy irrespective of sex. It is evident that the use of video tape in teaching math’s concepts provides precise visual feedback and hence incontrovertible evidence of what happened in the class. The Educomp Smart Class program had an overall positive impact on students more in terms of generating curiosity and grasping complex concepts rather than capturing attention, while it helped teachers in managing time better. The use of an interactive whiteboard as an instructional tool in a ninth grade classroom proved to be Statistically significant in increasing student participation. The results indicated that the students who participated in the survey enjoy the use of the multimedia as an instructional tool and believed that it helps to provide additional opportunities for learning.”

Menon (2015) in her research paper analysed, “the effectiveness of smart classroom teaching on the achievement in Chemistry of secondary school students. The study investigated 320 Class IX students from Amritsar city. Achievement test in Chemistry of 82 50 items was used to collect the data. Experimental group was taught in smart classrooms and control group was taught by conventional mode

of instruction. The results revealed that students achieved higher when taught in smart classes as compared to conventional mode of instruction. Learning styles of students did not affect their achievement in experimental and control group. No interaction effect of instructional strategies and learning styles was found.”

Chachra (2015) in his research paper titled, “Effect of smart classroom assisted teaching on academic achievement of students of different intelligence level in Social Science”, tried to study the effectiveness of Smart classroom assisted teaching over the traditional method of teaching in social science on the academic achievement of students of different intelligence level namely below average, average and above average (classification as per Stanford-Binet Scale fifth edition). The study was conducted in Dehradun district of Uttarakhand. The study was experimental in nature and the sample of the study consisted of 100 students of class eighth drawn from five different English medium schools having smart classroom facility. Data was analyzed using ‘t’ test. The result showed that the teaching through smart class room was more effective at all the three intelligence levels.” Gupta and Thakur (2014) in their research paper titled, “The Effectiveness of IT Enabled Teaching in Classroom Environment concluded that ICT, through an e-learning intervention, can improve student performance as measured in test scores. Critically, this improvement was not global, and some students showed reduced numerical outcomes despite a reported enjoyment of the altered environment. All learning environments are complex, and arguably, there is difficulty in drawing global conclusions from any setting. The stinging nettles for research in ICT education are identified here as being ICT as an agent of learning, site specificity, and global improvement. ICT can be a positive agent in learning in both the attainment of knowledge and more effective outcomes, but the agency will not be evidenced in the same way by all students”.

Jo and Lim (2015) conducted their study on “A Study on Effectiveness of Smart Classrooms Through Interaction Analysis”. The purpose of the study was to compare the effect of the Smart Classrooms through

interaction analysis of the given classroom. For an effective analysis, 5th graders in an elementary school had participated, the teacher had taught the same class twice, once in the traditional teaching and learning method, and the second class was carried out with the smart devices and smart teaching and learning methods applied from the ITLA System. Based on Flanders's Interaction Analysis Category System, interaction between teacher and students were analyzed. The results of the experiments showed, Teacher's indirection ratio and teacher's question ratio were shown higher in Smart Classroom than non-system classroom. On the other hand, students' talk ratio was shown almost the same. Teacher's lecture ratio was analyzed at a lower frequency within the Smart Classroom than the non-system classroom. Therefore, Smart Classrooms proved more indirect class than non-system classroom. Finally, we can refer that Smart Classrooms have more positive effects on education than traditional classroom.

Cheung and Slavin (2013) in their study examined, "The effectiveness of educational technology applications for enhancing mathematics achievement in K-12 classrooms: A meta-analysis". The study examines research on the effects of educational technology applications on mathematics achievement in K-12 classrooms. The researchers were investigated to examine the relationship between educational technology applications and study features. A total of 74 qualified studies were included in our final analysis with a total sample size of 56,886 K-12 students: 45 elementary studies and 29 secondary studies. Consistent with the more recent reviews, the findings suggest that educational technology applications generally produced a positive, though modest, effect ($ES = +0.15$) in comparison to traditional methods. However, the effects may vary by educational technology type. Among the three types of educational technology applications, supplemental CAI had the largest effect with an effect size of $+0.18$. The other two interventions, computer-management learning and comprehensive programs, had a much smaller effect size, $+0.08$ and $+0.07$, respectively. Differential impacts by various study and

methodological features are also discussed. Technology has infiltrated every aspect of modern life. Classrooms are no exception.

Mehra and Mital (2007) conducted a study to explore, “Integrating technology into the teaching-learning transaction: Pedagogical and technological perceptions of management faculty”. The objectives of the study was to investigate the relationship between age of the institute and the adoption of instructional technology, to investigate the relationship between demographic factors and the adoption of instructional technology tools, to evaluate the relationship between perceived usefulness and choice of pedagogy, to analyse the relationship between ease-of-use and choice of pedagogy. The responses were measured on a Likert scale of 1 to 5. The survey was distributed using paper-based mail and e-mail. Complete data was obtained from 150 respondents, 25 of whom completed the web-based survey and 125 the paper-based version. Respondents were on 37.5years old, had an average of 12.5 years’ experience as faculty member. To find out the causal relationships between certain variables, some Statistical tests were conducted to validate the results. The Statistical methods used were Chi-square test, Z-tests and factor analysis. The study has examined the relationships among teachers' levels of technology use and a number of key factors including years of experience, ease-of use, and access to resources. Achieving meaningful technology use is a slow process that is influenced by many factors.

2.9. FOREIGN STUDIES

Zhu et al (2023) conducted a study to explore, “Utilizing the Push-Pull-Mooring Framework to Explore University Teachers' Intention to Switch from Traditional Classrooms to Smart Classrooms in China”. This study explores the factors that promote university teachers' switching intention from a traditional classroom to a smart classroom based on the push-pull-mooring (PPM) framework to enrich the theoretical research on the smart classroom and provide a reference for smart classroom promotion. Design/methodology/approach: The proposed conceptual framework was developed from a comprehensive

review of the related literature. This study tested and validated the proposed framework using a partial least square structural equation model based on 269 valid questionnaires. Findings of the study were Perceived inefficiency, inquiry-based learning, future expectation and technical self-efficacy had significant effects on switching intention, while low participation, perceived usefulness and habit had no significant effects on university teachers' switching intention in the smart classroom. In the process of decision-making, the course category significantly moderates the impact of perceived inefficiency and technical self-efficacy on switching intention, while the user experience of smart classrooms significantly moderates the impact of perceived inefficiency on switching intention. Originality/value: This study explains university teachers' switching intention from a traditional classroom to the smart classroom, which enriches the application area of the PPM framework.

Moraes et al (2023) conducted a study on, “Integration of Industry 4.0 Technologies with Education 4.0: Advantages for Improvements in Learning”. The purpose of this study is to identify the uses of Industry 4.0 technologies in the area of education and how they contribute to learning in addition to highlighting at what educational level they are used. Design/methodology/approach: A systematic literature review was carried out in the Scopus (Elsevier), Web of Science and Science Direct (Elsevier) databases, starting in 2011. In total, 51 articles were selected for a quantitative analysis, and 23 of them were read to answer the questions of the research from a qualitative analysis. Findings: The results show a greater use of augmented reality, simulation, Internet of Things and virtual reality. The level of education at which they are most present is higher education. They collaborate to increase immersion in content, student engagement, interpersonal interaction, reduce costs and risks, simulate real work scenarios, expand study possibilities, without limited time and space, develop soft skills and learn about technologies, their uses and modes of operation. It is concluded that the technologies of Industry 4.0 support the entire learning process, but they are not used

as much as they should. They are still largely restricted to universities and courses related to manufacturing. It is hoped that this work can contribute to the development of Education 4.0 at all stages of teaching.

Underwood and John (2022) in his research titled, “Teachers' Technology Self-Efficacy and Technology Integration in Social Studies Classes in Rural and Non-Rural Schools”. The purpose of this quantitative comparative study was to determine to what extent differences exist between rural and non-rural schools in terms of teachers' technology self-efficacy and technology integration in social studies classes in the United States. Two research questions guided this study: (1) Is there a significant difference in teachers' technology self-efficacy between rural and non-rural schools? (2) Is there a significant difference in technology integration between rural and non-rural schools. Bandura's theory of self-efficacy and Davis' Technology Acceptance Model were the theoretical foundations of this study. Primary data were collected from a convenience sample of 154 high school social studies teachers in the United States. The online survey was hosted on Google Forms. The survey questionnaire included the Computer Self-Efficacy Scale and the Level of Technology Integration Attitude Scale. A Mann-Whitney U-test analysis revealed no Statistical ly significant differences between rural and non-rural school on measures of teachers' technology self-efficacy ($U = 2649.50$, $p = 0.258$) and technology integration ($U = 3149.50$, $p = 0.499$). This study added to the body of literature by providing data comparing teachers' technology self-efficacy and technology integration in social studies classes in rural and non-rural high schools in the United States.

Ramaila et al (2022) in his research titled, “The Role of Technology Integration in the Development of 21st Century Skills and Competencies in Life Sciences Teaching and Learning”. Development of 21st century skills and competencies in teaching and learning remains a key strategic imperative. Coherent development of skills and competencies requires adoption of innovative pedagogical strategies. Technology integration can be harnessed to foster effective teaching and learning. The study

examined the role of technology integration in the development of 21st century skills and competencies in Life Sciences teaching and learning. The empirical investigation adopted an explanatory sequential mixed method design and involved 15 purposively selected teachers from five South African suburban schools. The study is underpinned by social constructivism as the underlying theoretical framework. Quantitative data was collected through the administration of a survey questionnaire with the participants while qualitative data was collected through semi-structured interviews. Technology integration was perceived to promote the acquisition of 21st century skills and competencies in Life Sciences teaching and learning. In particular, the teachers indicated that technology integration facilitates the development of skills such as communication, critical thinking, collaboration, problem solving and computational thinking. In addition, technology integration was largely perceived to create exciting teaching and learning environment which fosters the enhancement of academic achievement and motivation of learners.

Amanda et.al. (2021) in their study, “Using Technology Integration Frameworks in Vocational Education and Training”. Technology-enhanced learning and blended learning delivery have been growing in popularity in vocational education and training contexts. Different technology integration frameworks have been developed to assess the extent and nature of this technology integration for learning, using frameworks primarily developed in school and higher education contexts. This article explores the usefulness of two of these technology integration frameworks Substitution Augmentation Modification Redefinition (SAMR) and Technology Integration Matrix (TIM) to understand the adoption of technology blended into courses within a vocational education and training context. Using a case study of technology integration and moves towards blended learning within an Australian Defence Force (ADF) Vocational College, this article raises important questions for VET colleges about the relevance of such frameworks to guide integration of technology into learning in VET contexts.

Yilmaz (2021) in their study, “The Effect of Technology Integration in Education on Prospective Teachers' Critical and Creative Thinking, Multidimensional 21st Century Skills and Academic Achievements”. In this study, it was aimed to examine the critical and creative thinking, multidimensional 21st century skills and the change in academic achievements as a result of technology integration of prospective teachers who have science education in pedagogy fields. Research was carried out in Turkey's western Black Sea region in a state university. 144 prospective teachers, who were educated in the faculty of education and who were in science, classroom and pre-school education departments, participated in the research. The research was carried out in 3 stages. In the first stage, technology integration is not provided. In the second stage, basic and medium level technology integration is provided. In the third stage, advanced technology integration is provided. Quantitative and qualitative approaches were used together in the research. Academic success test, critical and creative thinking test developed by the researcher as a means of quantitative data collection, and three different scales with validity and reliability were used previously. In addition, project, exam, homework, presentation and group work scores are included in the process. Semi-structured interview, observation and field notes, document review, were used as qualitative data collection tools. The quantitative data obtained were subjected to descriptive and inferential statistics. While doing these operations, SPSS 23.0 and LISREL 9.2 package programs were used. qualitative data were subjected to descriptive analysis and content analysis. The results of the research show that gradual integration of technology into the education process provides a positive change in prospective teachers' critical and creative thinking, multi-dimensional 21st century skills and academic achievements.

Jung et al (2020) in their study, “Course-Level Modelling of Preservice Teacher Learning of Technology Integration”. An analytic approach to examine preservice teachers' technology integration learning as a process mapped against their technology-related course experience in a

technology integration course. The approach assumes that the preservice teachers have common course learning experience; their data are collected pre- and post-course and paired; the sample size is large enough to generate a structural covariance model; the measurement is contextualized to the course characteristics around the types of technology tasks/tools used in the course and whether or not they were explicitly taught. The approach was applied to 368 preservice teachers' paired data to illustrate how the approach addresses the methodological issue of construct validity in TPACK measures, highlights the importance of technology integration course experience, and provides useful insights into a particular technology integration learning to its stakeholders.

Howard & Sarah (2019) in their study, “Working the System: Development of a System Model of Technology Integration to Inform Learning Task Design”. There has been extensive investigation into factors affecting digital technology integration in learning and teaching, but the complexity of integration continues to elude understanding. Thus, questions about how digital technologies can be best used to support learning persist. This paper argues that methods designed to address complex systems are needed to understand the interplay between teaching, learning and digital technologies. Starting with a developing system model of teachers' technology integration, this study revises the model to include factors of students' experience using digital technologies and beliefs about learning. The revised model is then used to demonstrate possible effects of student experiences in a technologically integrated group learning task. Analysis draws on data from a large-scale Australian study of technology innovation (N = 7406). Data mining techniques are used to identify patterns of students' technology use and perceptions of group work. Findings inform revision of the model to include factors of students' experience and learning and their effects on teachers' practice. Implications for learning design and students' learning experiences are explored.

Yang et al (2018) conducted a research, “Evaluation of smart classroom from the perspective of infusing technology into pedagogy”. Smart classroom was regarded as one of the essential methods to transform the traditional instructional mode. The research and practice of smart classroom became popular since 2012. However, there were few research on the large scale survey of smart classroom from the both technological and pedagogical perspective to provide baselines for smart classroom building. In this study, a large-scale survey of smart classroom was conducted in China. A total of 13, 495 students from 135 primary and middle schools participated in the survey. Data were analyzed in SPSS 23. Results indicated that participants generally did not perceive much smart learning in classrooms, especially in the dimension of resource and enhancement. The results also confirmed that digital device and Internet were the basis for equipping smart classroom. Technology equipment plus advanced technology could lead to the success of learning.

Anju and Sharma (2016) in their research paper titled, “Effectiveness of Edu comp smart classroom teaching on achievement in mathematics at elementary level analysed 80 the effect of Edu comp Smart classroom teaching on achievement in Mathematics at elementary level. The study consists of 80 students of class VIII of Navyug Public School, Sonipat (Haryana). Achievement test containing 60 Questions was used to collect the data. Experimental group, consisting of 40 students, was taught using Edu comp Smart classroom and control Group of 40 students was taught using Conventional classroom. It was found that mean scores of achievement in mathematics of Edu comp Smart class teaching group was higher than Conventional Classroom teaching group. Sex has no effect on the achievement in mathematics among VIII Graders using Edu comp Smart class. Sex has no effect on the achievement in mathematics among VIII Graders using Conventional Classroom teaching”

Taleb and Hassanzadeh (2015) in their study described, “Toward Smart School: A Comparison between Smart School and Traditional

School for Mathematics Learning”. The aim of this study is to compare smart training method and traditional training method in learning-retention processes of Mathematics. Among 9724 grade 3 students in Yazd, 60 students were selected from a traditional school by using cluster random sampling method. They randomized into two equal classes. After getting a pre-exam, the multiplying section of grade 3 Mathematics was presented in six sessions every week by using the researcher-made multimedia software in “smart class” and traditionally in other class. The “learning score” was assessed at the end of every session, while the “retention score” was assessed two weeks after each session. Independent-samples T test was used to compare learning and retention scores between two groups and paired-samples T test to compare retention and learning scores in each group. The mean learning score is significantly higher in the smart training group (19.33 ± 0.9 vs. 17.66 ± 0.68 ; $P < 0.001$) than traditional group. Also, the mean retention score is significantly higher in the smart training group (18.57 ± 1.91 vs. 16.65 ± 1.95 ; $P < 0.001$) than traditional group. We propose that developing and using appropriate educational technology could enhance Mathematics learning and retention in primary schools.

Khamis and Wafa (2014) in their research paper titled, “The Effect of Using Smart Board on Mathematics Achievement and Retention of Seventh Grade Students investigated, the effect of using smart board on mathematics achievement and retention of seventh grade students. To achieve this purpose a study sample of (103) students was selected from the seventh grade. This sample was divided into two groups. One group was randomly chosen to be the experimental group that studied mathematics using smart board; the other was the control group that studied mathematics using traditional method and board. The instrument of the study was an achievement test which was used to measure mathematics achievement and retention of the students. Data analysis procedures using T-test for independent samples revealed a positive effect of using smart board on students’ achievement and retention in mathematics”.

Ali et al (2013) in their research paper titled, “The Role of ICT to Make Teaching Learning Effective in Higher Institutions of Learning in Uganda found that the use of ICT in teaching-learning process is a relatively new phenomenon and it has been the educational researchers' focus. The effective integration of this technology into classroom practices poses a challenge to teachers and administrators. This empirical study aimed at finding out the factors influencing use of ICT to make teaching learning effective in higher institutions of learning in Uganda and identifying the innovations that ICT has brought into teaching-learning process, particularly in higher institutions of learning in Uganda. A survey was employed and in order to empirically investigate the study. The findings of this study revealed that teaching staff and administrators had a strong desire to integrate ICT into teaching-learning processes. The innovations that ICT has brought in teaching learning process include: E-learning, e-communication, quick access to information, online student registration, online advertisement, reduced burden of keeping hardcopy, networking with resourceful persons, etc. However, the presence of all these factors increased the chance of excellent integration of ICT in teaching-learning process. Therefore, the training of teaching staff in the pedagogical issues and administrators in administration should be increased if teachers and administrators are to be convinced of the value of using ICT in their teaching-learning process and administration”.

Amare (2011) analysed, “The performance and attitudes of technical writing students in PowerPoint-enhanced and in non-PowerPoint Lectures. Four classes of upper-level undergraduates ($n = 84$) at a mid-sized, Southern University taking a one-semester technical writing course were surveyed at the beginning and end of the course about their perceptions of PowerPoint. Of the four sections, two classes were instructed using traditional lecture materials (teacher at podium, chalkboard, and handouts); the other two sections were instructed with PowerPoint presentations. All four classes were given the same pre- and post-test to measure performance over the course of the semester. Traditional lecture or PowerPoint presentations consisted of at least

50% of the course, with the remaining time spent on exercises and small group work. Results revealed that while most students preferred PowerPoint, performance scores were higher in the sections with the traditional lecture format.”

Xu and Moloney (2011) in their paper reported, “A case study undertaken in the university’s undergraduate Chinese beginner course, which began to use IWB learning activities in 2009. Their study was undertaken to obtain students’ perceptions of the IWB pedagogy in Chinese language acquisition in general and in particular, of the effectiveness of IWB in the retention of Chinese characters. To many students whose first language was non-logographic, the recognition and retention of characters were the most difficult tasks in learning Chinese. Their findings indicated that the IWB’s affordance to create a variety of visual activities had impacted, most saliently, the retention of characters and syntactical elements. Students also reported that the IWB had enhanced the learning experience, reflected in increased motivation and engagement through interaction with this technology. The tertiary students revealed particular learning priorities, in appreciating interaction, intellectual demand and participation, as components of effective learning. The feedback process itself proved to be useful in facilitating critical awareness in both teacher and students, of teaching strategies and learning respectively.”

Akbas and Pectas (2011) studied, “The effects of using an interactive whiteboard on the academic achievement of university students. The aim of this study was to identify the effects of the use of an interactive whiteboard on the academic achievement of university students on the topic of electricity in a science and technology laboratory class. The study was designed as a pre-test/post-test control group experimental study. Mean, standard deviation and t- tests were used for data analysis. An independent group’s t-test was used to test for the differences between the pre-test and post-test mean of experimental and control group. No significant difference was observed between the academic achievement of the students in the experimental group, who were taught

with both interactive whiteboard and laboratory practices, and the control students, who experienced only laboratory practices. The post-test standard deviation values in the experimental group were relatively lower than those in the control group. The electric motor, electric bell, and generation of the induction current models were prepared on the computer by the researchers using Macromedia Flash 8, and its application was undertaken by the students 54 on the interactive whiteboard (smart board). It was seen that although interactive whiteboard use might not significantly alter students' academic achievement, it encouraged them to participate more in the lesson, created an interesting and enthusiastic atmosphere, and led to more enjoyable lessons. At the same time, many students from the experimental group stated that the interactive simulations and virtual experiments were superior to real experiments and enabled them to better visualize the topic."

Hamzah et.al (2010) in their study examined, "ICT and Diversity in Learners' Attitude on Smart School Initiative". This paper investigates the impact of technology change in Malaysian Smart Schools on students of Islamic Education. In this paper, the finding of survey will be presented and discussed. The data in this study was drawn from 365 students in twelve Smart Schools. This study found that the attitudes of students are very positive towards the current change in Smart Schools. Most of the students use computers weekly or monthly (61%), 12% of them can be categorized as heavy users as they use computer every day. This research uses a cross-sectional design survey with data collected from at least 12 groups of Smart Schools at one point in time and comparing the extent to which they differ. The questionnaire provides information about respondents' background and computer skills background. Attitudinal questions were posted to understand student attitudes the use of computer in Smart School. Questions about computer use in Smart Schools were designed purposely to discover respondents' attitudes toward the computer itself and their attitude towards its use in teaching and learning process. Seventeen questions were posed to the students and their reactions were measured by

positive (Strongly Agree or Agree), negative (Strongly Disagree or Disagree) and neutral attitudes (Undecided). Throughout this study, the results found that the attitudes of Islamic Education teachers and students are very positive towards the technology use in Smart Schools. Obviously, the changes occurring in Smart Schools are positively related to the emergence of new technology in ICT and the use of computers in Smart Schools. As a result of the need to use computers and ICT in Smart Schools, the survey found that the majority of students agreed that need a firm mastery of computers for learning purposes. The findings show that ICT is very popular among the participants. 91% of the Islamic Education students and 98% of their teachers said they enjoy using computers. Most of the participants (88% of the teachers and 87% of the students) believe this new initiative has given them a chance to obtain some training in computer literacy. The widely use of ICT in schools reflects the good status of their schools and being selected as a Smart School is perceived as an advantage to the schools. This is not as strange as might be expected. It is important to note that Smart Schools are not typical Malaysian schools. First, they are schools which have been specifically set up by the Ministry of Education to support educational reform using computer technology. Second, they have significantly more technology equipment per-capita than the average school in Malaysia. Third, they are in excellent condition to support curricular and pedagogical change in the classrooms.

2.10. CRITICAL REVIEW

The studies conducted during last few years contribute to the problem of use of Smart Technologies, use of power point presentations, use of computers and other technologies in the classroom; though very few contribute in the field of Edu comp Smart class. The review of studies shows that use of smart technologies affects academic achievement, motivation, interest, intelligence, creativity, student participation and retention. Being a multi prolonged problem, it remains still the question of further research: as the deeper it is studied, the more tangible it is liable to yield the yet more explored areas to be probed in, to contribute to the teaching-learning process, hence its relevance for the study in

hand. The investigators have reviewed 35 studies related to the variables effectiveness of technology integration and smart classes. Among them 17 are foreign studies and 18 are Indian studies. Most of the studies have been done by using survey. In many of the studies random sampling techniques has been used for selecting the sample. Questionnaires were mostly used as tools for the studies and other tools used were observation, interview, checklist, document analysis. For analysing data, Statistical tests used were 't' test, 'F' test, ANOVA, Chi-Square and regression. Further, the present study differs from the studies discussed above in terms of population, area and samples. So the investigators have conducted a study on Effectiveness of Technology Integration in Curricular Transaction on Academic success of School students in Radhapuram Assembly Constituency.

CHAPTER-III METHODOLOGY

3.1. INTRODUCTION

“Research is to see what everybody else has seen, and to think what nobody else has thought.” - Albert Szent-Gyorgyi

A research methodology in specific techniques that are adopted in research process to collect, assemble and evaluate data. It defines the tools are used to gather relevant information in a research study. In short research methodology is the organised questioning and exploration by hypotheses formation or scientific testing of any inquisition or by following a set of standard rules for that procedures. The success of any research study depends up on the appropriateness of the method, tool and technique. The present study is Effectiveness of technology integration in curricular transaction on academic success of school students. The research design refers to the overall strategy selected to integrate the different components of the study in a coherent and logical way. It includes all the planned techniques and strategies in carrying out the study. The design of the study is of prime importance in conducting any research in a scientific manner. It ensures how the objectives are to be achieved, how population is to be defined and sampled, what tools are to be used for collecting the data, and how the data is to be analyzed. Infact, it is the blueprint of the detailed procedures for testing the hypotheses and analyzing the obtained data. In this way, the research design helps the researcher in testing the hypotheses by drawing valid and objective conclusions regarding the relationship between independent and dependent variables. Methodology is a process, which discloses all those methods and tools used by the researcher during the course of research. The role of methodology is to carry out the research in a scientific and valid manner. The present exploration is aimed to study the Effectiveness of technology integration in curricular transaction on academic success of school students in Radhapuram Assembly Constituency. This chapter is organized under different heads namely, Method of study, Sampling procedure, Tools employed

in the study, statistical techniques used for analysis of data and procedure followed in different stages of the analyses of study.

The Methodology employed by the research investigators to conduct research includes the following aspects.

- Statement of the Problem
- Operational definitions of the study
- Variables of the study
- Tools used for the study
- Population of the study
- Sample of the study
- Methods of collecting the data
- Formulation of hypothesis
- Statistical analysis of the study.

3.1.1.NEED FOR THE RESEARCH DESIGN

The research design is a detailed plan for the study. It is a “Blueprint” for the study which helps the investigator in testing the hypothesis. A suitable research design can provide an idea about which way to proceed for efficient research. In the system of education, effective research has long felt needed especially following the privatization and globalization of education. There has been rising apprehension and hence insist for greater accountability of the education system in India. An appropriate methodology of research can only understand the challenges faced in the education system and helped to bring this accountability to the Indian education system. The research design can keep the investigator on the pathway at all stages of research. It helps to organize procedures to save effort, time and give direction to the study undertaken. It explains in detail the entire blueprint. It involves a closed description of the tools used, methodology, a sample, and methods applied for the analysis of the collected data.

3.2 METHODS FOR RESEARCH

According to Hill way, “To describe in detail the specific method being used, incidentally, constitutes a very good way of determining whether the method chosen has been worked out properly and is likely to prove

effective. If the scholar cannot describe his method, the chances are that it is too vague and general to yield him satisfactory results. According to Francis Bacon. “Research is a power of suspending judgment with the patience of mediating with pleasures, of asserting with caution of correcting with readiness and of arranging with scrupulous pain. Any research remains invalid unless its conclusions are found true. The findings of the research are true if they are valid and reliable. They are valid when findings are justified and are reliable when the desired results are replicated. Thus veracity and dependency of the research require the preparation of inquiry i.e. the thorough study of strategy of how the research will be conducted.

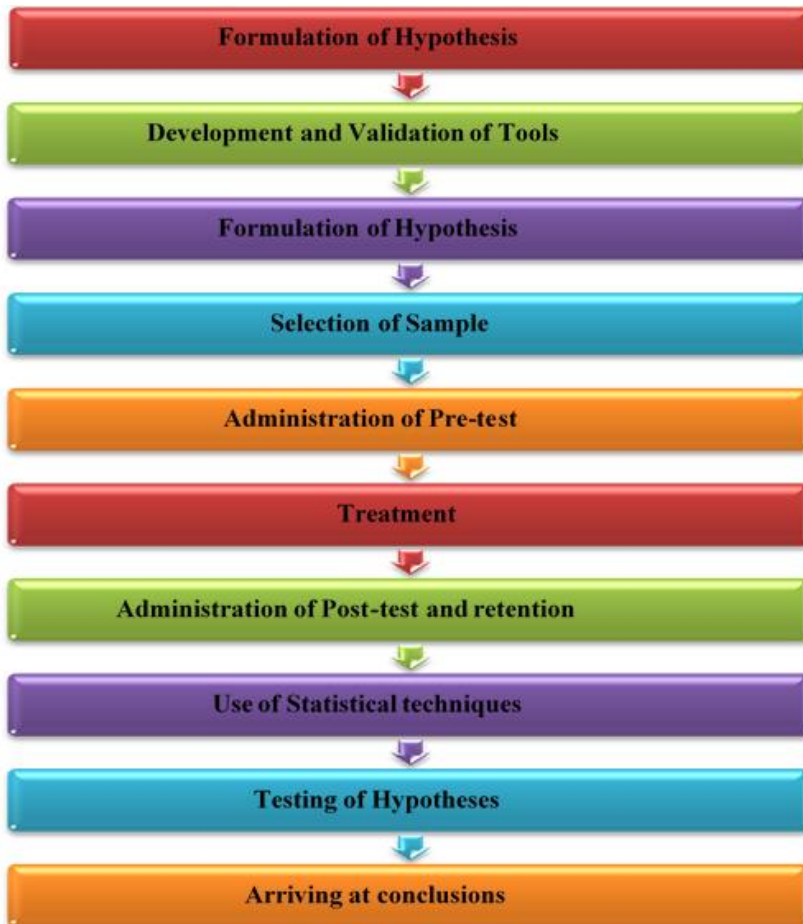
Good research depends mainly on three aspects of its design:

- a. What researcher wants to find out appropriately posing the problem or properly wording the issues to be studied with a rational structure of inquiry?
- b. How to do it collecting data using scientific methods, effective techniques of data analysis, and lucid and meaningful deductions.
- c. Why does it find effective and efficient solutions that persist in society and further the knowledge pool of humanity as a species. Therefore, the designing or procedure of research is concerned with building controlled and precise scientific inquiry.

Methodology is essential in systematic research. Methodology is a science of orderliness. It is a technique adopted for an orderly arrangement of fact and principles. The success of any research depends on the largely on the suitability of method, the tools and techniques used for the collection of data. Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done. The various steps that are generally adopted by a researcher in are studying his research problem along the logic behind them and explain the importance of using a particular method or technique. So that research results are capable of being evaluated either by the researcher himself or herself or by others, in what way and why the hypothesis has been formulated, what data have been used and a host of similar other question are usually

answered when research methodology is concerning a research problem of study.

Figure 3.1. The research algorithm Formulation of Hypothesis Development and Validation.



Methods of research may be classified from many points of view, the decision about the method or methods to be employed always depends upon the nature of problem selected and the kinds of data necessary for its solution. The methods of sociological research applicable to study related to education are as follows;

➤ **Historical research**

This process involves investigating, recording, analyzing and interpreting the events of the past for the purpose of discovering generalization that are helpful in understanding the past and to ascertain the extent in anticipating the future.

➤ **Experimental research**

Experimental research is the most sophisticated and powerful method for discovering and developing an organized body of knowledge. Experimentation is the classic method of science laboratory where elements are manipulated and effects are observed and controlled.

➤ **Descriptive research**

Descriptive research is also known as non-experimental research which deals with relationship of variables, testing of hypothesis and the development of generalization of principles or theories that have universal validity. It involves description, recording, analysis and interpretation of conditions that exist.

➤ **Normative survey research**

This method describes and interprets what exists at present in the form of conditions, practices, trends, effects and beliefs.

Content Selection for the Treatment

As per the requirement of the study, the investigators had chosen the content to be taught. This task was completed with the help of the class syllabus, textbooks, and subject experts and as well as smart class. The topics and content have been chosen on account of the mental level of primary, middle and high schools students. The contents of subjects from the textbook were selected for the research purpose.

Development of Tool & Administration of Pre-test

For examine the effect of smart class on academic success of the students the marks of the students before the smart class installation was taken. This helps to evaluate the extent of student's performance in the beginning before the exposure to smart classroom teaching. The pre-test was administered on selected students from 58 selected schools.

Treatment for Experiment

It is crucial that the treatment for an experiment is performed periodically and systematically by the school teachers. The school administrator was consulted to determine the timings and dates to meet this requirement beforehand.

Post-Test Administration

To enumerate the degree of alteration on dependent variable after the completion of treatment, the achievement test was administered as a post-test to the students.

3.2.1 NATURE OF THE STUDY

For the present study, the investigators collected the academic scores obtained by the students before and after the integration of technology in the teaching learning process. They also collected the data to analyse the attitude of school students towards the Technology Integration in Radhapuram Assembly Constituency. Therefore, it is more appropriate to elicit the response of the students on various items of the Tools included in the study. For this study survey method was found to be more appropriate. Therefore, survey method is followed for the study. Survey research is often used to assess attitude, aptitude, knowledge, opinions, and feelings. Survey research can be accurate and specific or narrow, or it can have more global, widespread goals. Today, survey research is used by a variety of groups. Psychologists, Educational Psychologists and Sociologists often use survey research to analyze behavior of the people of present days, while it is also used to meet the more pragmatic needs of the media, such as, in evaluating political candidates, public health officials, professional organizations, and advertising and marketing directors. A survey consists of a predetermined set of statements or questions that is given to a selected sample. With a representative sample, that is, smaller portion of the larger population of interest, one can describe the attitudes of the population from which the sample was drawn. A good sample selection is key as it allows one to generalize the findings from the sample to the population, which is the whole purpose of survey research.

3. 3 STEPS IN SURVEY METHOD

According to William Wireman (1985) the detailed steps in a survey method are as follows;

1. Planning
2. Development and application of sampling plan
3. Construction of questionnaire
4. Data collection
5. Translation of data
6. Data analysis
7. Conclusion and Reporting

3.3.1 Planning

The plan of action has to be drawn up to ensure scientific and objective merits of the study. Definition of the problem, operational definitions of variables, review and development of the survey design should be clearly drawn out.

3.3.2 Development and Application of Sampling Plan

The geographical area to be covered, the sample to be selected and detailed sampling procedure, should be defined and formulated.

3.3.3 Construction of Interview Schedule or Questionnaire

The tools of investigation generally used are interview schedule or questionnaire and the like. A specified investigation should require specified tools of inquiry. If no readymade tool is available, a suitable one will be prepared in a systematic manner. The tools should be tested in a pilot sample before it is administered to the vast sample.

3.3.4 Data Collection

The data will be collected from the proposed group of persons or sources with the help of the tool to be employed in the study. The participation of primary, middle and high school students are imperative to ensure comprehensiveness and authenticity of the data.

3.3.5 Translation of Data

Depending upon the extensiveness of the survey data and upon the nature of the material collected the handling of data usually takes initial tabulation and construction of category systems as necessary and

technical preparation for analysis.

3.3.6 Data Analysis

Analysis of data comprises, various approaches designed to restrict the phenomena in their constitutional parts with a view to obtain greater insight into specified aspects. The statistical analysis of data is principally based on counts of numbers of units that fall into different classes and subclasses, where quantitative responses have been obtained total for the classes are secured. From these numbers and totals, the arithmetic means can be computed for the different classes. Basic summary table can then be compiled more critical analysis can be applied to the data.

3.3.7 Data Collection Procedure

The collection of data is an extremely important of all research endeavours, for the conclusion of a study are based on what data reveal. As the result, the kind of data to be collected, the method of collection to be used, and the scoring of the data need to be considered with care. The term data is referred by Fraenkel & Walen (1993,) as the kinds of information researchers obtain on the subjects of their research. An important decision for every researcher to make during the planning phase of an investigation, therefore, is what kinds of data he or she intends to collect. The device the researcher used to collect data is called an instrument. After deciding on the sample for present study, the researcher contacted the principals of the selected schools and requested permission through a permission letter to administer the test and to collect data.

3.3.8 Conclusion and Reporting

After collecting and analyzing the data, the researches have to accomplish the tasks of drawing inferences following by reporting. It is only through interpretation that the research can expose relations and processes that come under his findings. Research report is considered a major component of the research study for the research task remains incomplete till the report has been presented. As the problem selected

for the present study is concerned with one of the current problems, the investigators decided to employ the survey method for the collection of data.

3.4 SAMPLE

The investigators collected data from primary, middle and high school students in Radhapuram Assembly Constituency. 2072 students were involved in the study.

The following demographic variables were selected for the present investigation.

Gender	Male / Female
Medium of Study	Tamil/ English
School Locality	Rural/ Semi-Urban
Type of the School	Boys/ Girls / Coeducation
Type of Management	Govt./ Govt. Aided
Type of Family	Joint / Nuclear
Father's Education	Uneducated/School/ Undergraduate/ Postgraduate
Mother's Education	Uneducated/School/ Undergraduate/ Postgraduate

Table 3.1. Schools wise distribution

S.No	SCHOOLS INVOLVED	SAMPLE
1.	HINDU Primary School, Nathiparai	11
2.	Panchayat Union Primary School, Valliyoor	25
3.	St.Joseph RC Primary School, Panagudi	39
4.	Alagu Primary School, Sivagamipuram	09
5.	Panchayat Union Primary School, Annanagar	05
6.	St.Marys Primary School, Kootapuli	16
7.	Panchayat Union Primary School, Marankulam	06
8.	Panchayat Union Primary School, Adankarkulam	06
9.	TDTA Primary School, Chettikulam	18
10.	Panchayat Union Primary School, Therku karungulam	14
11.	Panchayat Union Primary School, Puthumanai,Chettikulam	22
12.	Panchayat Union Primary School,Singarathopu	07
13.	Panchayat Union Primary School, Silathikulam	61
14.	Panchayat Union Primary School,Radhapuram	52
15.	T.D.T.A Primary School, Kumpilapadu	07
16.	Panchayat Union Primary School,Papangulam	06
17.	Panchayat Union Primary School, Kasthurirangapuram	22
18.	RC Primary School, Prakasapuram	12
19.	Panchayat Union Primary School, Thotavillai	10
20.	Panchayat Union Primary School, Parkaneri	10
21.	MVS Primary School, Erumakulam	10
22.	Panchayat Union Primary School,Kuttam	07
23.	T.D.T.A Primary School,Thisayanvillai	07
24.	Nadar Hindu Primary School, Thopuvillai East	09
25.	Sri Ramakrishna Primary School, Thisayanvillai	25
26.	St.Annammal RC Primary School, Koodankulam	94
27.	Hussey Middle School, Panagudi	74
28.	Holy Cross Middle School, Valliyoor	22
29.	T.D.T.A Middle School, Kalanthapanai	30
30.	Nehru Middle school, Vadakankulam	25
31.	St.Aloysius Middle School,Kallikulam	29
32.	St.Aloysius Middle School, Soundrapandiyapuram	15
33.	T.D.T.A Middle School, Radhapuram	68
34.	PSS Middle School,Mudavankulam	18

35.	Panchayat Union Middle School, Sankarapuram	06
36.	Panchayat Union Middle School,Kunjanvillai	10
37.	T.D.T.A Middle School,Idayankudi	71
38.	RC Periyayagi Middle school, Radhapuram	41
39.	R.K.R.Middle School, Parameswarapuram	66
40.	TDTA Middle school,Perpilangulam	53
41.	Theresa RC Middle School, Puspavanam	17
42.	Panchayat Union Middle School Vijayapathi	81
43.	North Hindu Middle School,Panagudi	30
44.	Nirmala RC Middle School, Therku Vallioor	65
45.	St.Xaviers Middle School, Avudayarapuram	75
46.	Salvation Army High School, Valliyoor	43
47.	Government High School, Rosemiyapuram	46
48.	Government High School,Kavalkinnaru	25
49.	Government High School, Madhaganeri	109
50.	T.D.T.A High School,Yokapuram	33
51.	Governement High school,Koliankulam	67
52.	Government High School, Therku karungulam	25
53.	Government High School, Silathikulam	50
54.	Government High School, Kasthurirangapuram	75
55.	Government High School, Athukurichi	61
56.	Government High School, Shanmugapuram	58
57.	Sri Ramakrishna High School, Thisayanvillai	128
58.	St.Kitheri High school, Koothenkuzhi	46
	TOTAL	2072

Table 3.2. Primary schools involved in the study

S.No	PRIMARY SCHOOLS	SAMPLE
1.	HINDU Primary School, Nathiparai	11
2.	Panchayat Union Primary School, Valliyoor	25
3.	St.Joseph RC Primary School, Panagudi	39
4.	Alagu Primary School, Sivagamipuram	09
5.	Panchayat Union Primary School, Annanagar	05
6.	St.Marys Primary School, Kootapuli	16
7.	Panchayat Union Primary School, Marankulam	06
8.	Panchayat Union Primary School, Adankarkulam	06
9.	TDTA Primary School, Chettikulam	18
10.	Panchayat Union Primary School, Therku karungulam	14
11.	Panchayat Union Primary School, Puthumanai, Chettikulam	22
12.	Panchayat Union Primary School, Singarathopu	07
13.	Panchayat Union Primary School, Silathikulam	61
14.	Panchayat Union Primary School, Radhapuram	52
15.	T.D.T.A Primary School, Kumpilapadu	07
16.	Panchayat Union Primary School, Papangulam	06
17.	Panchayat Union Primary School, Kasthurirangapuram	22
18.	RC Primary School, Prakasapuram	12
19.	Panchayat Union Primary School, Thotavillai	10
20.	Panchayat Union Primary School, Parkaneri	10
21.	MVS Primary School, Erumakulam	10
22.	Panchayat Union Primary School, Kuttam	07
23.	T.D.T.A Primary School, Thisayanvillai	07
24.	Nadar Hindu Primary School, Thopuvillai East	09
25.	Sri Ramakrishna Primary School, Thisayanvillai	25
26.	St. Annammal RC Primary School, Kulangulam	94
	TOTAL	510

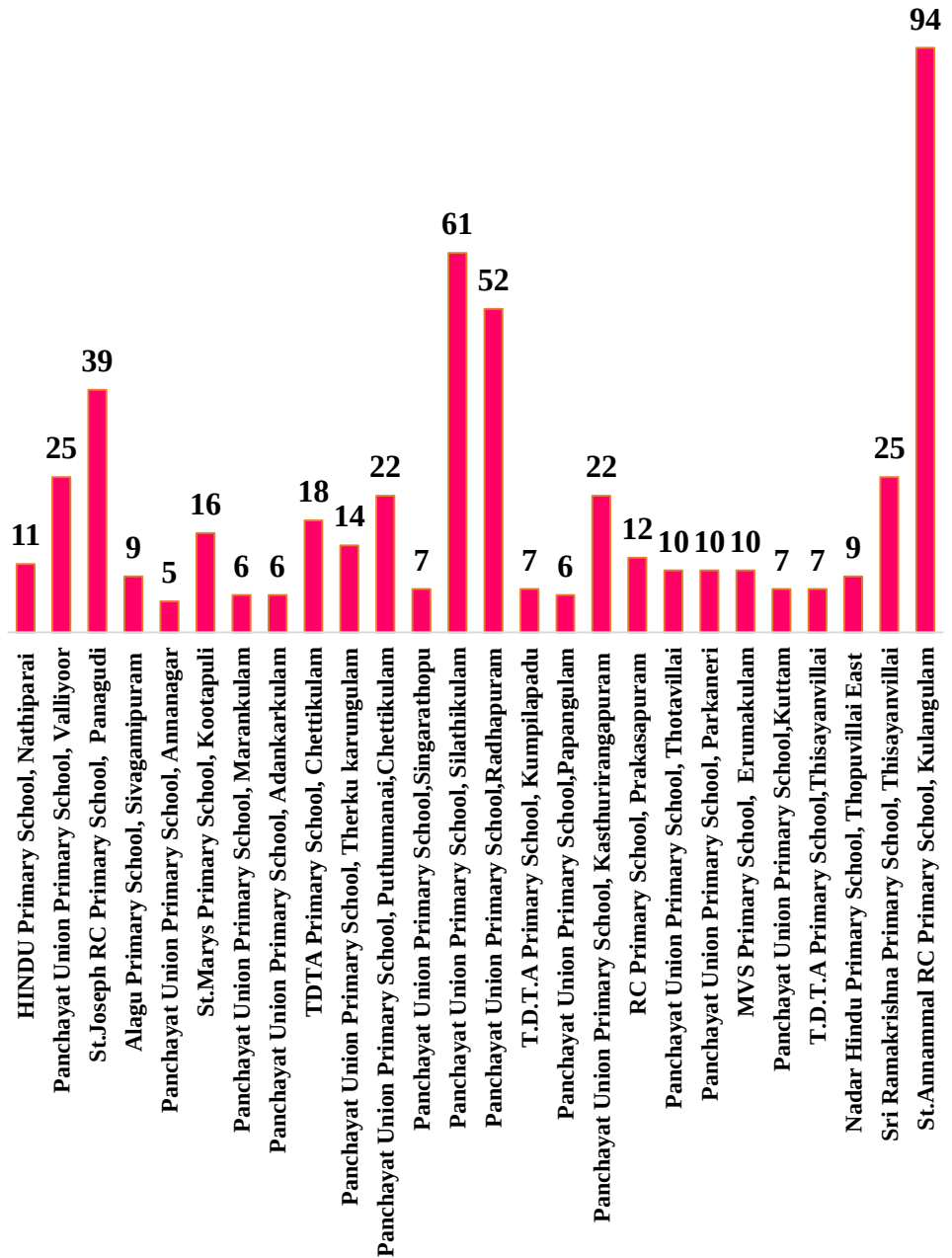
Fig.3.2. Primary schools Involved in the Study

Table 3.3. Middle schools involved in the study

S.No	MIDDLE SCHOOLS	SAMPLE
1.	Hussey Middle School, Panagudi	74
2.	Holy Cross Middle School, Valliyoore	22
3.	T.D.T.A Middle School, Kalanthapanai	30
4.	Nehru Middle school, Vadakankulam	25
5.	St.Aloysius Middle School,Kallikulam	29
6.	St.Aloysius Middle School, Soundrapandiyapuram	15
7.	T.D.T.A Middle School, Radhapuram	68
8.	PSS Middle School,Mudavankulam	18
9.	Panchayat Union Middle School, Sankarapuram	06
10.	Panchayat Union Middle School,Kunjanvillai	10
11.	T.D.T.A Middle School,Idayankudi	71
12.	RC Periyannayagi Middle school, Radhapuram	41
13.	R.K.R.Middle School, Parameswarapuram	66
14.	TDTA Middle school,Perpilangulam	53
15.	Theresa RC Middle School, Puspavanam	17
16.	Panchayat Union Middle School Vijayapathi	81
17.	North Hindu Middle School,Panagudi	30
18.	Nirmala RC Middle School, Therku Vallioor	65
19.	St.Xaviers Middle School, Avudayarapuram	75
	TOTAL	796

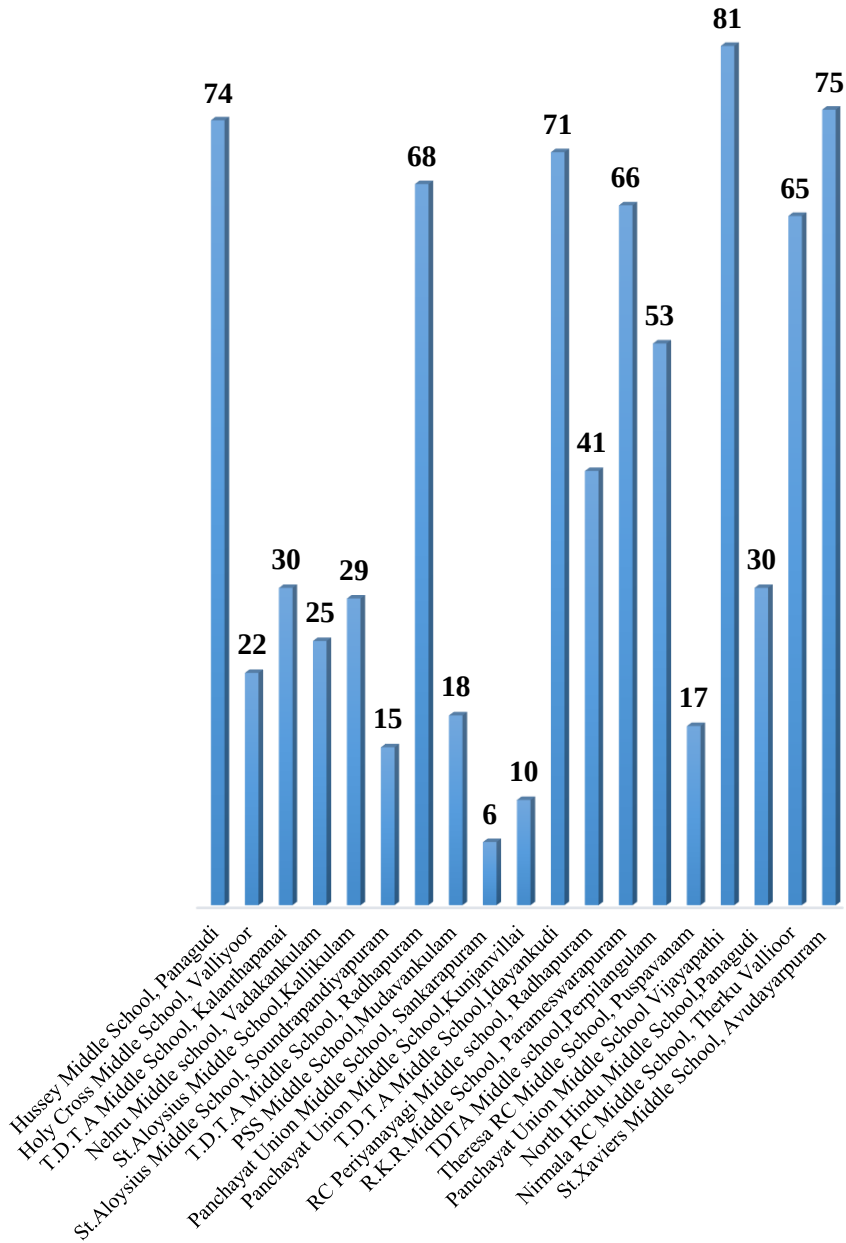
Fig.3.3.Middle schools involved in the study

Table 3.4. High Schools involved in the Study

S.No	HIGH SCHOOLS	SAMPLE
1.	Salvation Army High School, Valliyoor	43
2.	Government High School, Rosemiyapuram	46
3.	Government High School,Kavalkinnaru	25
4.	Government High School, Madhaganeri	109
5.	T.D.T.A High School,Yokapuram	33
6.	Governement High school,Koliankulam	67
7.	Government High School, Therku karungulam	25
8.	Government High School, Silathikulam	50
9.	Government High School, Kasthurirangapuram	75
10.	Government High School, Athukurichi	61
11.	Government High School, Shanmugapuram	58
12.	Sri Ramakrishna High School, Thisayanvillai	128
13.	St.Kitheri High school, Koothenkuzhi	46
	TOTAL	766

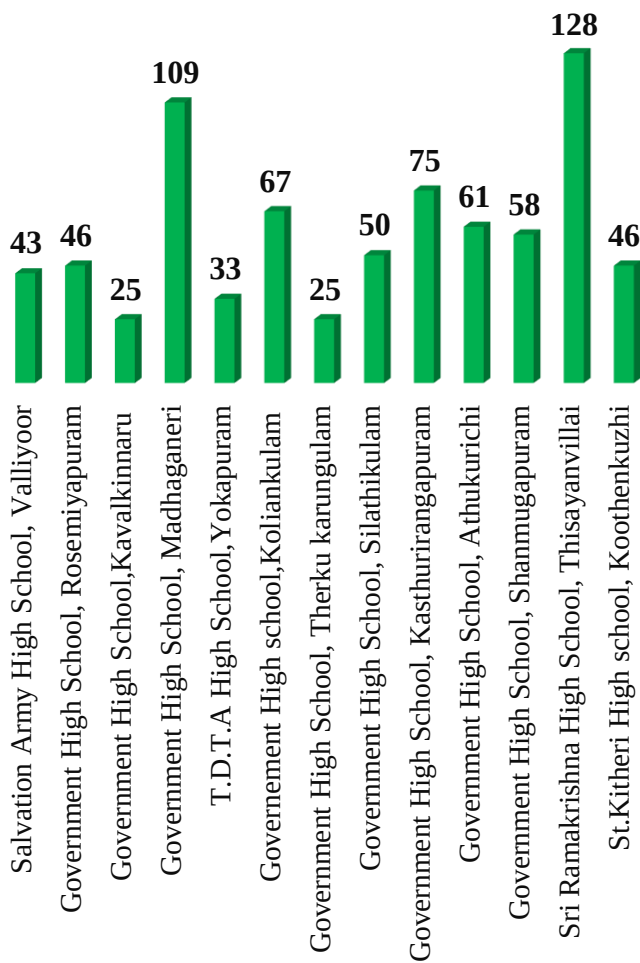
Fig.3.4.High schools involved in the Study

Table 3.5. Distribution of the Sample

Variables	Category	Sample	Percentage
Gender	Male	1102	53
	Female	970	47
Medium of Study	Tamil	1760	85
	English	312	15
Locality of School	Rural	1920	93
	Semi-urban	152	07
Type of Family	Joint	202	10
	Nuclear	1870	90
Type of Management	Government	817	39
	Government Aided	1255	61
Type of School	Boys	50	02
	Girls	16	01
	Coeducation	2006	97
Fathers Educational Qualification	Uneducated	68	03
	School Level	1924	93
	Under Graduate Level	78	04
	Post Graduate level	2	0
Mothers Educational Qualification	Uneducated	62	3
	School Level	1917	93
	Under Graduate Level	91	04
	Post Graduate level	2	0

TABLE 3.6
DISTRIBUTION OF THE SAMPLE IN TERMS OF GENDER

Variables		No. of Students	Percentage
Gender	Male	1102	53
	Female	970	47
Total		2072	100

The above table shows that 53% are male students and 47% are female students in the sample.

Figure- 3.5 Distribution of the sample in terms of gender

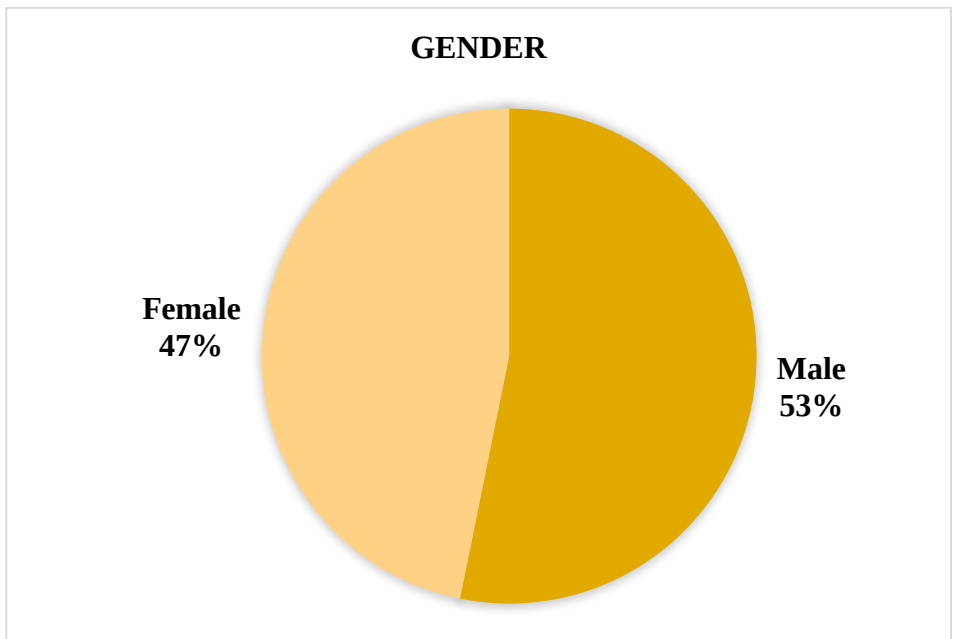


TABLE 3.7**DISTRIBUTION OF THE SAMPLE IN TERMS OF MEDIUM OF STUDY**

Variables		No. of Students	Percentage
Medium of Study	Tamil	1760	85
	English	312	15
Total		2072	100

The above table shows that out of 2072 students, 85% of students are studying in Tamil Medium, 15% of students are studying in English Medium.

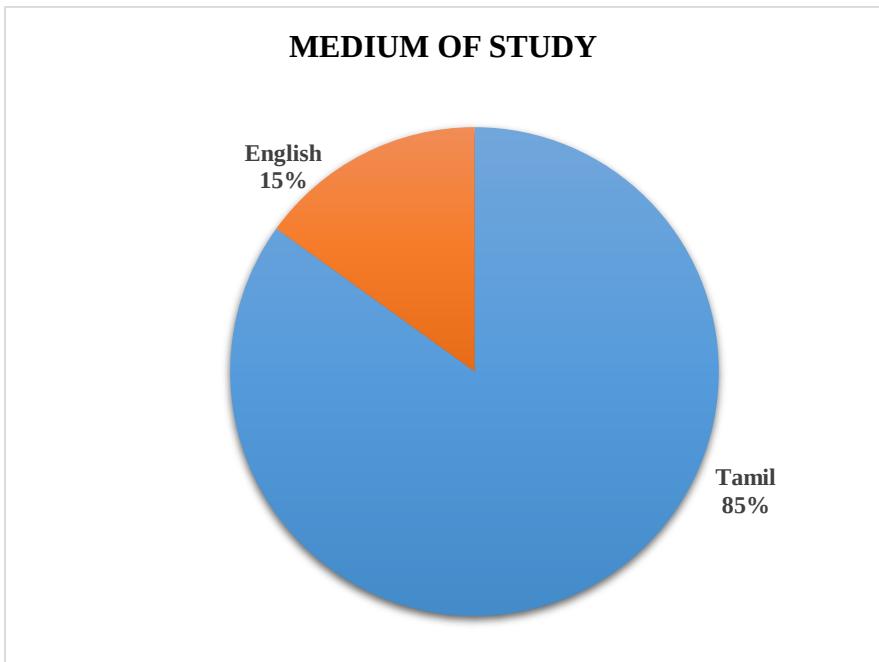
Figure 3.6 Distribution of the sample in terms of medium of study

TABLE 3.8
DISTRIBUTION OF THE SAMPLE IN TERMS OF LOCATION OF SCHOOL

Variables		No. of Students	Percentage
Location of School	Rural	1920	93
	Semi-Urban	152	07
Total		2072	100

The above table shows that out of 2072 students, 93% of students are studying in rural area schools, 7% of students are studying in semi-urban area schools.

Figure 3.7 Distribution of the sample in terms of location of school

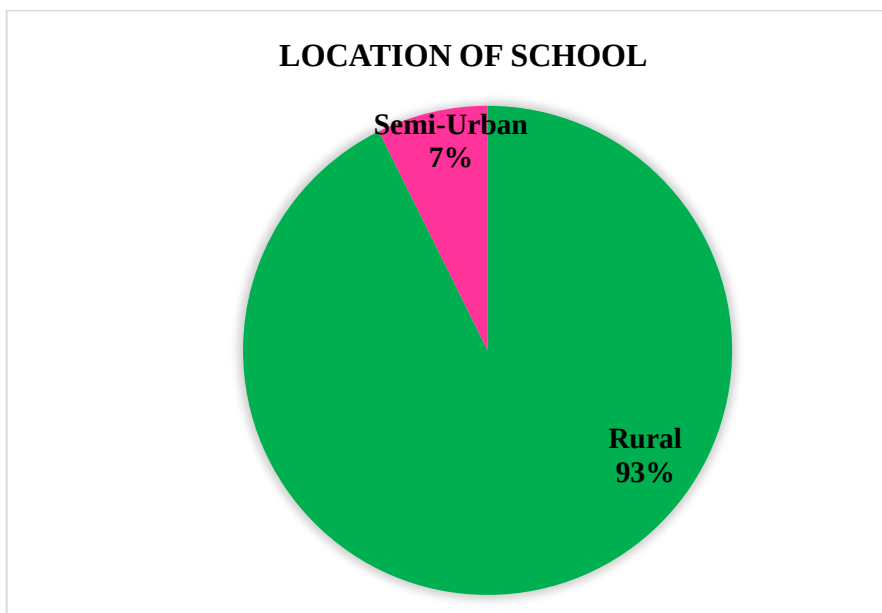


TABLE 3.9**DISTRIBUTION OF THE SAMPLE IN TERMS OF TYPE OF SCHOOL**

Variables		No. of Students	Percentage
Type of School	Boys	50	2
	Girls	16	1
	Co-Education	2006	97
Total		2072	100

The above table shows that out of 2072 students, 2% of students are studying in Boys schools, 1% of students are studying in Girls schools, and 97% of students are studying in Co-Education schools.

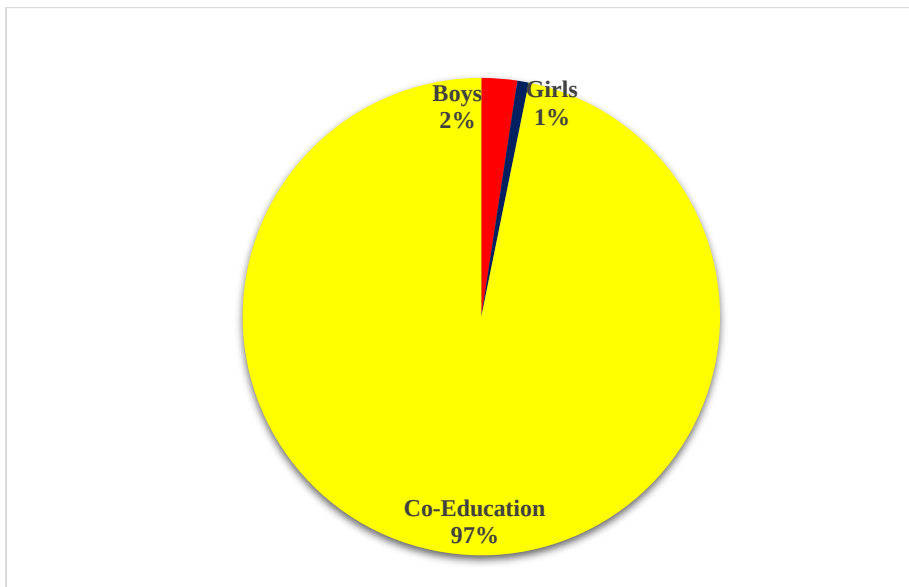
Figure 3.8 Distribution of the sample in terms of type of school

TABLE 3.10**DISTRIBUTION OF THE SAMPLE IN TERMS OF TYPE OF MANAGEMENT**

Variables		No. of Students	Percentage
Type of Management	Govt.	817	39
	Govt. Aided	1255	61
Total		2072	100

The above table shows that out of 2072 students, 39% of students are studying in Govt. schools, and 61% of students are studying in Govt. Aided schools.

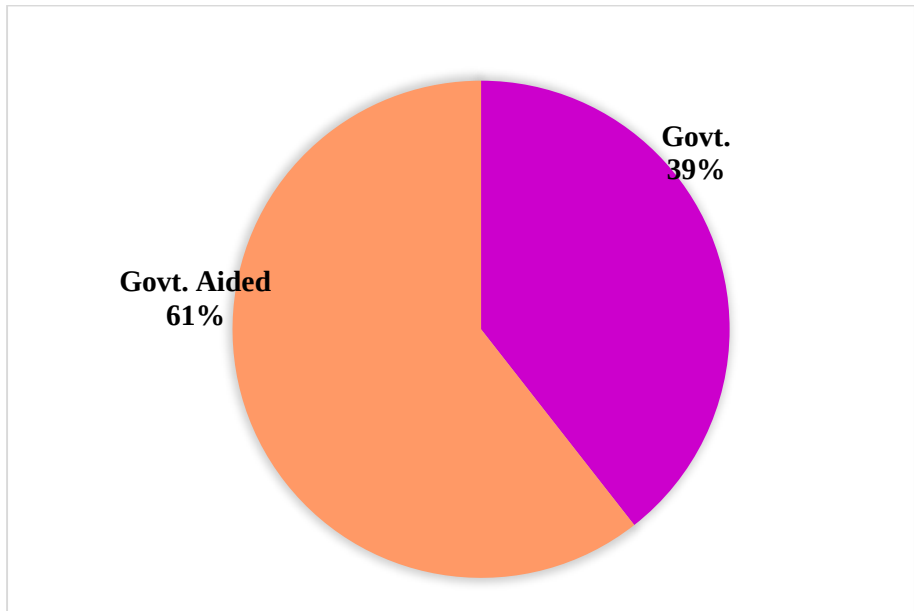
Figure 3.9. Distribution of the sample in terms of type of management

TABLE 3.11**DISTRIBUTION OF THE SAMPLE IN TERMS OF TYPE OF FAMILY**

Variables		No. of Students	Percentage
Type of Family	Joint	202	10
	Nuclear	1870	90
Total		2072	100

The above table shows that out of 2072 students 10% of students are studying from Joint family, and 90% of students are studying from Nuclear family.

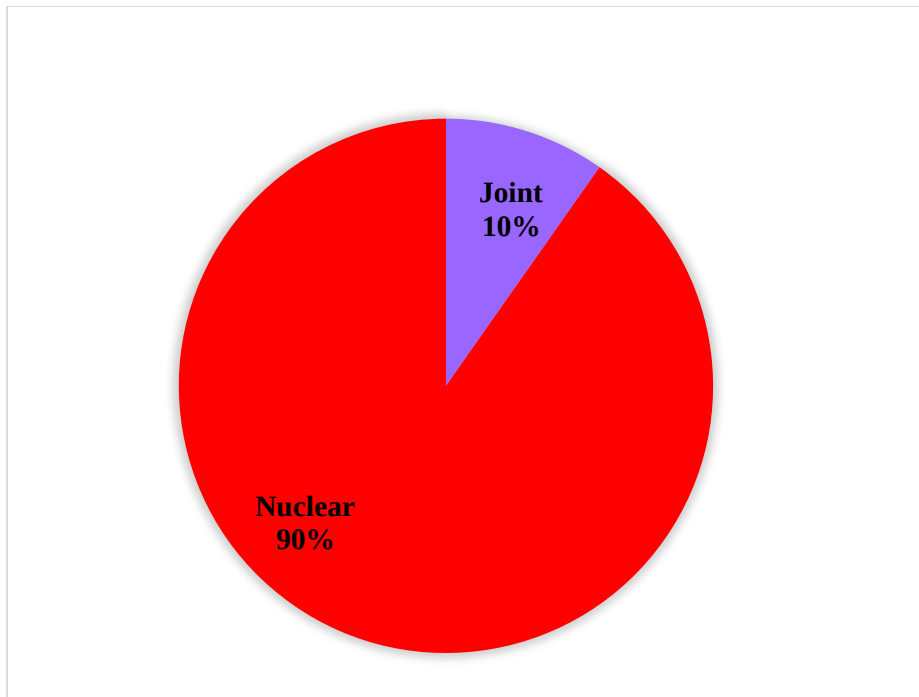
Figure 3.10. Distribution of the sample in terms of type of family

TABLE 3.12**DISTRIBUTION OF THE SAMPLE IN TERMS OF FATHERS EDUCATION**

Variables		No. of Students	Percentage
Fathers Education	Uneducated	68	3
	School Level	1914	92
	Under Graduate Level	78	4
	Post Graduate level	12	1
Total		2072	100

The above table shows that out of 2072 students 3% of student's fathers are uneducated, 92% of students fathers have school level education, 4% of students fathers have completed under graduate level and 1% of students fathers have completed post graduate level education.

Figure 3. 11 Distribution of the sample in terms of father's education

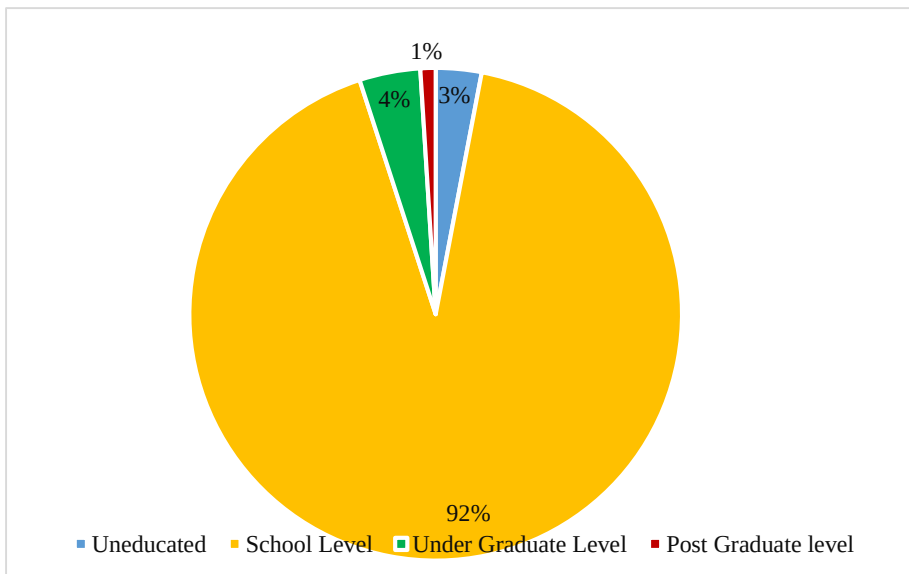
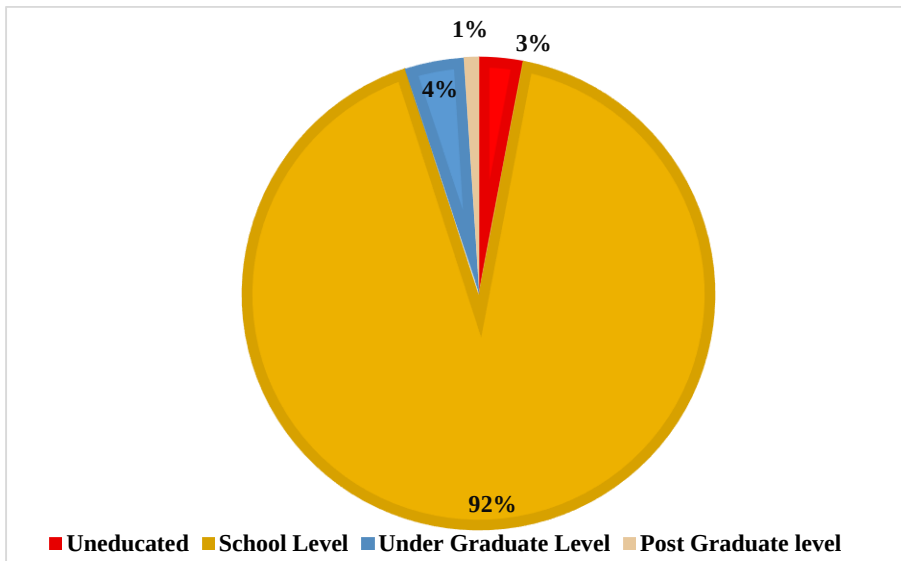


TABLE 3.13**DISTRIBUTION OF THE SAMPLE IN TERMS OF MOTHERS EDUCATION**

Variables		No. of Students	Percentage
Mothers Education	Uneducated	52	3
	School Level	1907	92
	Under Graduate Level	91	4
	Post Graduate level	22	1
Total		2072	100

The above table shows that out of 2072 students 3% of student's mothers are uneducated, 93% of students mothers have school level education, 4% of students mothers completed under graduate level and 1% of students mothers have completed post graduate level education.

Figure 3.12 Distribution of the sample in terms of mother's education



3.4.1. RESEARCH TOOL USED FOR THE PRESENT STUDY

By keeping various objectives and purposes of the study in mind, the investigator prepared the following tools.

1. Personal data sheet prepared by the investigators.
2. Technology Integration Attitude Scale (TIAS) prepared by the investigators.

3.4.2. POPULATION AND SAMPLE FOR THE STUDY

POPULATION OF THE STUDY

Population is the most important part or element of research procedure. To draw inferences about the research problems a well specified and identifiable group is required which will be selected on the basis of some selected measures and this entire group is known as population or universe of the study. The main purpose of research is to discover the principles that have universal application but to study a whole population to arrive at generalizations would be impossible. John Best and Khan go on to say that, “Some populations are so large that their characteristics cannot be measured”. Meanwhile Moore supposes that “It is very seldom that it is possible to survey the complete population.” However, in ordinary usage population may consist of any kind of members whatever. Hence a population is any group of individuals that have one or more characteristics in common which are of interest to the researcher. The population may be all the individuals of a practical type or a more restricted part of the group. Population in the opinion of Moore is that “All people or objects under observation.” While Cochran says that the word population denotes the aggregate from which the sample is chosen. According to J. C. Aggrawal, “Population means aggregate of totality of objectives, subjects or individuals regarding which inferences are to be made”. The present research is an attempt to find out the effectiveness of smart classroom in the teaching learning process. It is also an attempt to study the attitude of school students

towards technology integration in curricular transaction. The researchers have selected 2072 school students for the sample of the research. The primary, middle and high school students from Radhapuram Assembly Constituency are taken as the population for the present study.

3.4.3.DATA COLLECTION

Investigators visited 58 schools in the Radhapuram Assembly Constituency and collected data from the primary, middle and high school students.

3.4.3.1. TOOL OF THE RESEARCH

For collecting unknown data required for the study of any problem, it is necessary to adopt a systematic procedure and this can be done by using various devices, these devices thus employed are called as tools. Factual material or data unknown or untapped so far is essential in every study. They can be obtained from any sources direct or indirect. It is necessary to adopt or evolve a systematic procedure to collect essential data. Relevant data, adequate in quantity and quality should be collected. They should be sufficient reliable and valid. The major tools of research in education can be classified broadly into the following categories: — Inquiry forms - Questionnaire Schedule , Check list, Rating Scale, Score Card, Opinionnaire A) Observation B) Interview C) Sociometry — Psychological tests - Achievement Test, Aptitude Test, Intelligence Test, Interest Test and Personality Measures Inquiry forms are a class of data gathering devices which make use of properly prepared. Performs or forms for inquiring into and securing information about certain phenomena under study out of a number of such inquiry forms perhaps the used and most abused of tools in the questionnaire. The researchers have used Technology Integration Attitude Scale to collect data from school students in Radhapuram Assembly Constituency.

3.4.3.2. QUESTIONNAIRE

According to Goode and Hat, “In general the word questionnaire refers

to a device for securing answers to questions by using a form which the respondents fill in him.” Barr, Davis and Johnson defines questionnaires “a systematic compilation of questions that are submitted to a sampling of population from which information is desired. The apparent ease of planning and using a questionnaire tend to make it appealing to novices in research. Often referred to as the lazy man’s way of gaining information, questionnaire is yet the most flexible of tools which possesses unique advantages over other kinds of tools in collecting both quantitative and qualitative information. Careful preparation of a good questionnaire however takes a great deal of time, ingenuity and hard work. Usually the questionnaire sent out by the fresh research workers suffer from certain errors with the result that the reaction to questionnaires is often unfavorable and response is slow scanty and frequently disappointing providing a very flimsy basis for generalization.” Moore says, “Questionnaires are extremely flexible and can be used to gather information on almost any topic from large or small numbers of people.” According to Nunan, “the questionnaire is a relatively popular means of collecting data. It enables the researcher to collect data in field setting. While John Best and Khan consider questionnaire as the most appropriate and useful data gathering device in a research project.

3.5. DEVELOPMENT PROCESS OF THE TOOL

The Technology Integration Attitude Scale (TIAS) was constructed by the investigators with the objective to measure the awareness level of college students. Systematic procedures were followed in the process of tool construction like:

- i. Planning,
- ii. Preparing,
- iii. Trying out and
- iv. Evaluating

1. Planning

The following steps include the activities and task performed in the planning for construction of the tool:

The objective of the tool was fixed to measure the attitude of school students towards technology integration in curricular transaction

- The content area and dimensions was defined.
- Decisions over the type and number of items to be included in the scale under each dimension were outline.
- A two-point scale with scoring key according to nature of items, positive and negative was sketched out.

2. Preparation of items

This step requires understanding and mastery of the subject content and skill for preparing the statements. Hence the items are drawn out from various sources and the items were preliminary item pool is prepared.

Sources of items

- Review of Indian and international studies and literature based on Technology Integration Attitude Scale.
- Ideas, opinions, suggestions, information's regarding technology integration in curricular transaction were gathered from experts, professors, teachers, parents and students.
- After a vigilant scrutiny of the available sources 55 statements were framed by the investigators.

Criteria for selection of items

- It should be in simple and clear statement form, with no sort of ambiguity in its meaning or language.
- Items should be appropriate to respondent's level.
- It should be arranged in an order from easy to difficult.
- Compound and complex sentences should be avoided.
- An item should express only one opinion and
- The statement should not lead to multiple interpretations.

Pooling of items

The Technology Integration Attitude Scale (TIAS) was constructed primarily with 63 statements.

Establishing Validity

According to Lee Chronbach "validity is the extent to which a test

measures what it purposes to measure”. Prior to the administration of the tool, the investigator to bring forth the expert’s judgement, regarding the suitability, adequacy, objectivity and clarity of the pooled items.

- The newly constructed tool was given to experts, in the field of education for the establishment of “Face Validity”, which is a subjective statement that the tool appears to cover the relevant content, and “content validity”, which involves the systematic examination of the content to determine whether it covers a representative sample of the domain to be measured.
- Expert’s opinion on the clarity, and suitability in measuring the particular dimension.
- Arrangements of items in random order and were subjected to expert’s scrutiny.
- Some items were modified, deleted and rearranged based on their suggestions. Thus the face validity and content validity of the tool was established. Thus, 55 statements were retained in TIAS.

3. Trying Out

The main task of try out is to improve and modify the language ambiguity and difficulty. The subjects are selected from the population for which the test is designed. It helps to:

- To refine the instrument.
- To identify the difficult items and to delete the ambiguous or difficult statements.
- To estimate reliability index of the tool.
- It enables the investigators to select the required number of items for inclusion in the final form of scale. Final tool is prepared.

3.6 PILOT STUDY

Pilot study is a preliminary try out of the instrument with a small number of individuals. The purpose of pilot study is to refine the instrument including the correlation of deficiencies. A pilot study is not the major data collection of the data. Before finalizing, the rough draft of the scale consisted of statements. The tool was administered to the

schools in Radhapuram Assembly constituency with prior permission from the head of the institution. The questionnaire was distributed to 150 students from primary, middle and high school to know whether the items included in the questionnaire measure what they have to measure viz. On basis of their responses Scoring was done and Item vs. Item whole correlation was calculated. Ambiguous items were deleted. Only items having high level precision were retained.

3.7 ITEM WHOLE CORRELATION

Karl Pearson's product moment correlation co-efficient was calculated between the item score and the total score to find validity index of the item. In this method "each item score is correlated with the total scale mean score. The items which are significant at 5% level are accepted and selected. The table value at 5% significance level is 0.195. Hence, statements with correlation value above or equal to 0.195 were selected. Items having validity index below 0.2 were deleted from the draft questionnaire, thus 8 items were deleted. So the final tool contained 55 items. Thus, the validity of the tool was established. The validity indices are given in the following.

Table 3.14

**ITEM VS WHOLE CORRELATION OF TECHNOLOGY INTEGRATION
ATTITUDE SCALE**

Item No.	r value	Item No.	r value	Item No.	r value
1.	0.324	22.	0.385	43.	0.246
2.	0.298	23.	0.298	44.	0.219
3.	0.316	24.	0.294	45.	0.103
4.	0.431	25.	0.318	46.	0.386
5.	0.386	26.*	0.116	47.	0.342
6.	0.342	27.	0.405	48.	0.331
7.	0.331	28.	0.299	49.*	0.049
8.	0.299	29.	0.326	50.	0.301

9.	0.301	30.	0.346	51.	0.386
10.*	0.086	31.	0.376	52.	0.413
11.	0.413	32.*	0.086	53.	0.367
12.*	0.116	33.	0.336	54.	0.299
13.	0.249	34.*	0.364	55.	0.311
14.	0.347	35.	0.342	56.	0.323
15.	0.316	36.	0.298	57.	0.256
16.	0.410	37.	0.231	58.	0.377
17.	0.386	38.	0.290	59.	0.324
18.	0.374	39.	0.294	60.	0.289
19.	0.213	40.*	0.112	61.	0.231
20.	0.376	41.	0.307	62.*	0.086
21.	0.427	42.	0.086	63.	0.412

The reliability of the tool was calculated by Karl Pearson Product Moment Correlation Coefficient between the pretest and post test scores. It was found to be 0.646

3.8 ESTABLISHING RELIABILITY

Reliability refers to the consistency of scores and stability of test for a certain population. The investigators employed split half method to establish the reliability of the tool. This method of estimating reliability involves both the characteristics of stability and equivalence. In this method result obtained from one half of the scale items being checked against the result from other half of the items. This method is appropriate for testing co-efficient of homogeneity. The whole tool was split into two halves-odd and even numbered statements. The responses were scored and reliability coefficient of correlation between the two sets of scores was calculated. The reliability index of the tool was estimated by the Spearman Brown formula. The reliability index of Technology Integration Attitude Scale is found to be 0.646.

SPLIT-HALF RELIABILITY VALUE OF THE TOOL

Tool	Spilt-half 'γ' value
Technology Integration Attitude Scale (TIAS)	0.646

3.9 DESCRIPTION OF THE TOOL

Personal Data form

The personal data form is used to collect general information of the school students in Radhapuram Assembly Constituency. It includes some personal information about the respondents such as Gender, Standard of Study, Medium of Study, Locality of School, Type of Family, Type of Management, Type of School, Fathers Educational Qualification, and Mothers Educational Qualification

Technology Integration Attitude Scale (TIAS)

The investigators have used a Self-made Questionnaire of Technology Integration Attitude Scale (TIAS) Scale developed by the investigators for collecting data for this study. It is intended to measure the attitude of school students towards technology integration in their teaching learning process. The scale consists of 55 Statements.

3.9.1 SCORING KEY

In the Scoring key, a score is a number assigned to the investigators to provide a quantitative description of respondent's performance on a particular test. Scores are assigned to all the responses. All the statements would be scored for the **TIAS** in the following manner for the positive and negative questions.

RESPONSE	Statements	
	Positive	Negative
YES	1	2
NO	2	1

3.9.2 AREA OF THE STUDY

The investigators had selected Radhapuram Assembly Constituency in Tirunelveli District for their study.

3.9.3 POPULATION

“Population is defined as a group of individuals that have one or more characteristic is common that are of interest to the researchers”.

The researchers have confined the population of the present study only to Primary, Middle, and High School students studying in various Schools of Tirunelveli district in Radhapuram Assembly Constituency.

3.9.4 SAMPLE AND SAMPLING DESIGN

According to John, a sample, as the name implies, is a smaller representation of a larger whole.

W. Best (2008) “A sample is a small proportion of the population that is selected for observation and analysis. By observing the characteristics of the sample, certain inferences can be made about the characteristics of the population from which it drawn”. The investigators have derived the sample of 2072 Primary, Middle, and High School students in Radhapuram Assembly Constituency.

The most basic form of probability sample is the simple Random Sampling technique. With the simple random sample, each unit in the population has an equal probability of inclusion in the sample. Gay (1987) reports: Random sampling is the best single way to obtain a representative sample. The investigators have used the simple random sampling technique to find out the attitude of school students towards technology integration in curricular transaction.

3.9.5 ADMINISTRATION OF THE TOOL

The investigators personally visited the schools with the permission of the concerned Head of the schools. The personal data form along with Technology Integration Attitude Scale (TIAS) was distributed to the students. The students were given enough time to respond to the item of the tools.

3.10 STATISTICAL TECHNIQUES USED

“Statistics is the scientific study of handling quantitative information. It embodies a methodology of collection, classification, description and interpretation of data obtained through the conduct of surveys and experiments”. (Aggarwal Y.P, 2000).The investigators has used the following Statistical techniques for analysing and interpreting the data.

1. *Arithmetic mean*

The mean is a simple arithmetic average. It is a common place knowledge that to take the average of a set of raw score we simply add all the scores up and divide it by the total number of scores”. (Aggarwal, Y.P, 2000) .The investigators has used the following formula to find out the arithmetic mean:

$$\bar{X} = \frac{\sum x}{N}$$

Where,

$$\begin{aligned}\bar{X} &= \text{Arithmetic mean} \\ \sum x &= \text{Sum of scores} \\ N &= \text{Total number of scores}\end{aligned}$$

2. *Standard deviation*

“The square root of average of all deviations of scores from the mean of a given series or frequency distribution is known as standard deviation”. It is also called as “mean square error”. The word standard deviation was coined by Karl Pearson. It is denoted by σ (Sigma) or S.D. Bhandarkar K.M (2007).

The investigators have used the following formula for calculating standard deviation.

$$S.D = \frac{1}{N} \times \sqrt{N\sum x^2 - (\sum x)^2}$$

Where,

$$\begin{aligned}\text{S.D.} &= \text{Standard Deviation} \\ \sum x &= \text{Sum of scores} \\ N &= \text{Total number of items}\end{aligned}$$

3. t-test

Theoretical work on ‘t’ distribution was done by W.S. Gosset in the early 1908. Gosset was employed by the Guinness Brewery in Dublin, Ireland which did not permit employees to publish research findings under their own names. So Gosset adopted the pen name ‘student’ and published his findings under this name and there after the ‘t’ distribution is commonly called students ‘t’ distribution.

(Sharma R.A, 2006)

The investigators have used the following formula for calculating ‘t’ test.

$$t = \frac{M_1 - M_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}$$

Where,

M_1 = Mean of the I group

M_2 = Mean of the II group

S_1 = Standard deviation for the I group

S_2 = Standard deviation for the II group

N_1 = Size of the I group

N_2 = Size of the II group

4. ANOVA (*Analysis of variance*)

The technique of analysis of variance was first devised by sir Ronald Fisher, an English statistician who is also considered to be the father of modern statistics as applied to social and behavioural sciences. The analysis of variance, as the name indicates deals with variance rather than with standard deviations and standard errors (Aggarwal Y.P., 2000).

The investigators has used the following formula for calculating ANOVA :

$$F = \frac{\text{Mean Square Variance between the groups}}{\text{Mean Square Variance within the group}}$$

5. Chi-square

“If the difference between/among the observed and expected frequencies is squared and the same is divided by the expected frequencies and all the quantities obtained independently are added then the same total obtained is called chi-square (χ^2)”, (Ramakrishnan, P., 2003). The investigators have used the following formula for calculating chi-square:

$$\chi^2 = \frac{\sum(O - E)^2}{E}$$

Where,

χ^2 = Chi-square

$\sum$ = Sum of Summation

O = Observed frequency

E = Expected frequency

6. Regression

Simple linear regression is a model that assesses the relationship between a dependent variable and an independent variable. The simple linear model is expressed using the following equation:

$$Y = a + bX + \epsilon$$

Where:

Y – Dependent variable

X – Independent (explanatory) variable

a – Intercept

b – Slope

ϵ – Residual (error)

CHAPTER – IV

ANALYSIS OF DATA

4.1 INTRODUCTION

The analysis of data is the most skilled task in the research process. It calls for the researchers' own judgment and skill. Analysis means a critical examination of the assembled and grouped data for studying the characteristics of the objects under study and for determining the patterns of relationship among the variables relating to it. Statistical analysis of data serves several major purposes. It summarizes large mass of data into understandable and meaningful form. Statistical analysis facilitates identification of the caused factors underlying complex phenomena. It aids the drawing of reliable inferences from observational data. Data are collected and analysed in order to predict or make inference about situations that have not been measured in full. Statistical analysis also helps making estimations or generalizations from the result of sample surveys. It is useful for assessing the significance of specific samples results under assumed population conditions. Analysis of data is the essential factor in its relevance to the solutions of the problems. The analysis and interpretation of data represent the application of deductive and inductive logic to the research process. The data are often classified by division into subgroups and are then analysed and synthesized in such a way that hypotheses may be verified or rejected. The final result may be new principles or generalization. Data are examined in terms of comparison between more homogeneous segments within the group; and by comparison with some outside criticism.

The analysis of data serves the following main functions:

1. To make the raw data meaningful
2. To test null hypotheses
3. To obtain the significant results
4. To draw some inferences or make generalizations
5. To evaluate parameters

4.2. OBJECTIVE TESTING

Null Hypothesis 1

There is no significant difference between the effectiveness of Smart classroom teaching and conventional mode of teaching on academic success of primary school students in Radhapuram Assembly Constituency.

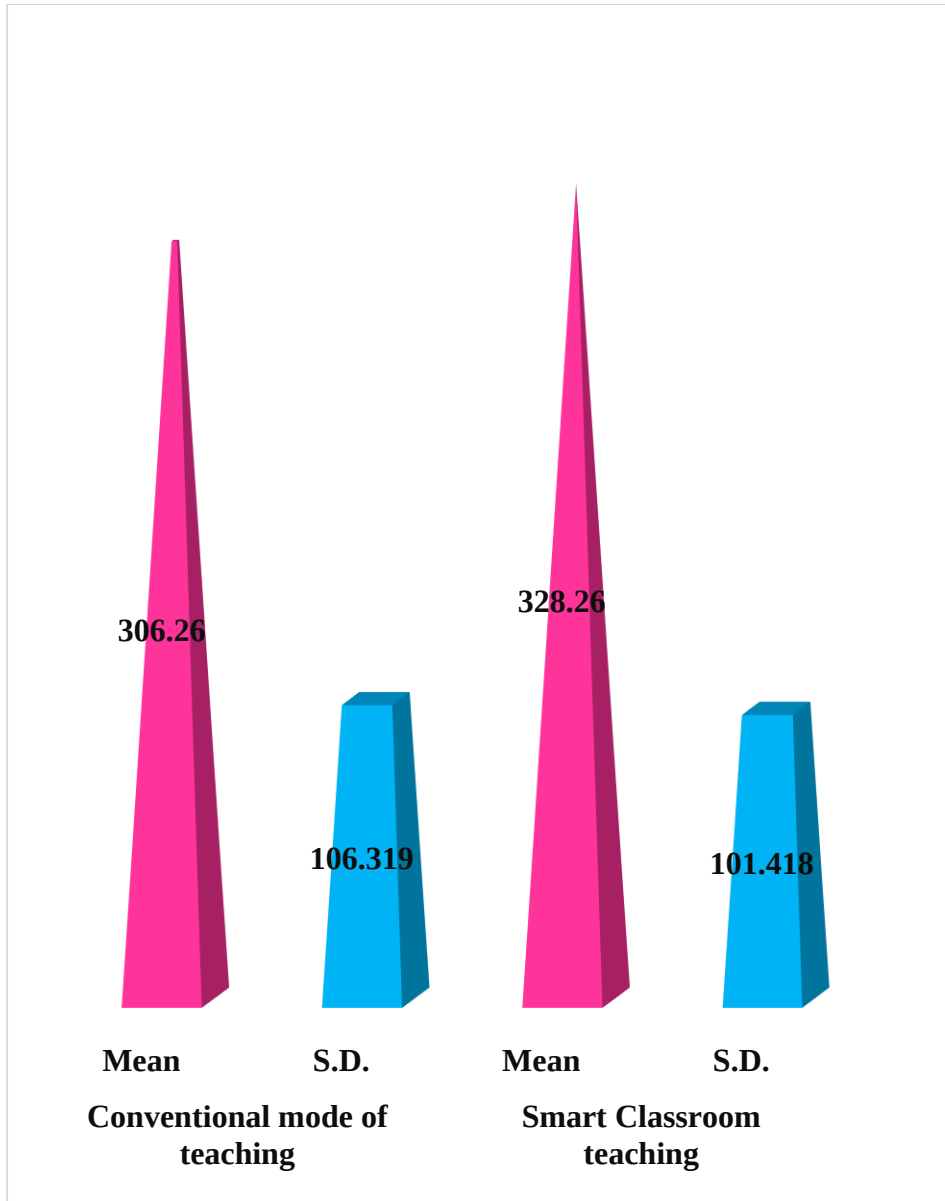
TABLE 4.1

DIFFERENCE BETWEEN THE EFFECTIVENESS OF SMART CLASSROOM TEACHING AND CONVENTIONAL MODE OF TEACHING ON ACADEMIC SUCCESS OF PRIMARY SCHOOL STUDENTS IN RADHAPURAM ASSEMBLY CONSTITUENCY.

Conventional Mode of Teaching N=510		Smart Classroom Teaching N=510		Calculated 't' value	Remarks at 5 % level
Mean	S.D.	Mean	S.D.		
306.26	106.319	328.26	101.418	47.381	Significant

It is inferred from the above table that the mean academic score of conventional mode teaching is 306.26 and standard deviation is 106.319 mean academic score of smart classroom teaching is 328.26 and the standard deviation is 101.418. The calculated t-value 47.381 is greater than the table value 1.96 at 0.05 level of significance. It indicates that the achievement scores of primary school students in Radhapuram Assembly Constituency with respect to conventional mode of teaching scores significantly differ from that of smart class teaching scores. Hence the null hypothesis is rejected.

Fig.4.1. The graphical representation shows the mean score and SD of smart classroom teaching and conventional mode of teaching on academic success of primary school students in Radhapuram Assembly Constituency.



Null Hypothesis 2

There is no significant difference between the effectiveness of smart classroom teaching and conventional mode of teaching on academic success of middle school students in Radhapuram Assembly Constituency.

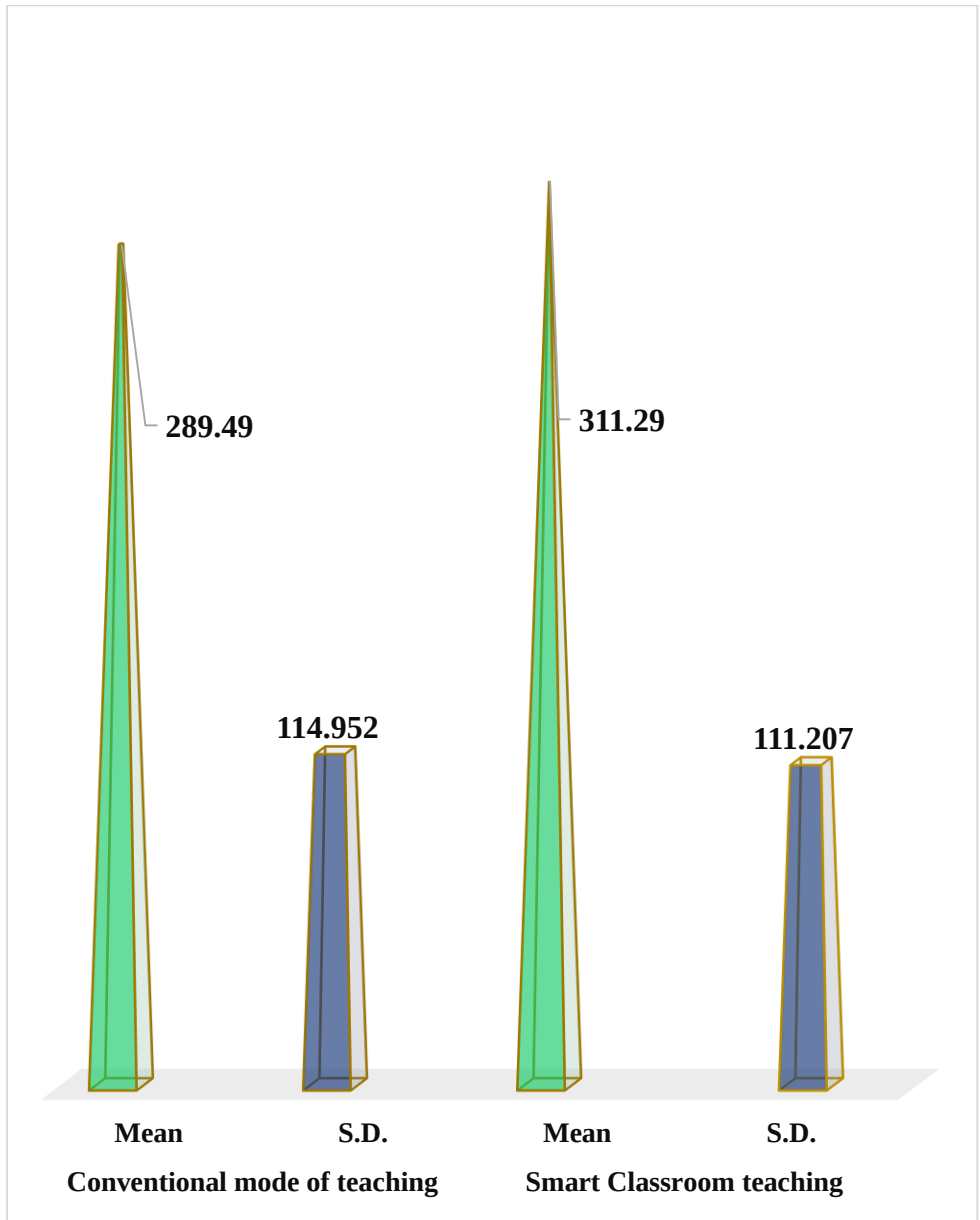
TABLE 4.2

DIFFERENCE BETWEEN THE EFFECTIVENESS OF SMART CLASSROOM TEACHING AND CONVENTIONAL MODE OF TEACHING ON ACADEMIC SUCCESS OF MIDDLE SCHOOL STUDENTS IN RADHAPURAM ASSEMBLY CONSTITUENCY.

Conventional Mode of Teaching N=796		Smart Classroom Teaching N=796		Calculated 't' value	Remarks at 5 % level
Mean	S.D.	Mean	S.D.		
289.49	114.952	311.29	111.207	39.103	Significant

It is inferred from the above table that the mean academic score of conventional mode teaching is 289.49 and standard deviation is 114.952 mean academic score of smart class learning is 311.29 and the standard deviation is 111.207 The calculated t-value 39.103 is greater than the table value 1.96 at 0.05 level of significance. Hence, the academic achievement scores of middle school students in Radhapuram Assembly Constituency with respect to conventional mode teaching differs significantly from that of smart classroom teaching academic achievement scores. Hence the null hypothesis is rejected.

Fig.4.2. The graphical representation shows the mean score and SD of smart classroom teaching and conventional mode of teaching on academic success of middle school in Radhapuram Assembly Constituency.



Null Hypothesis 3

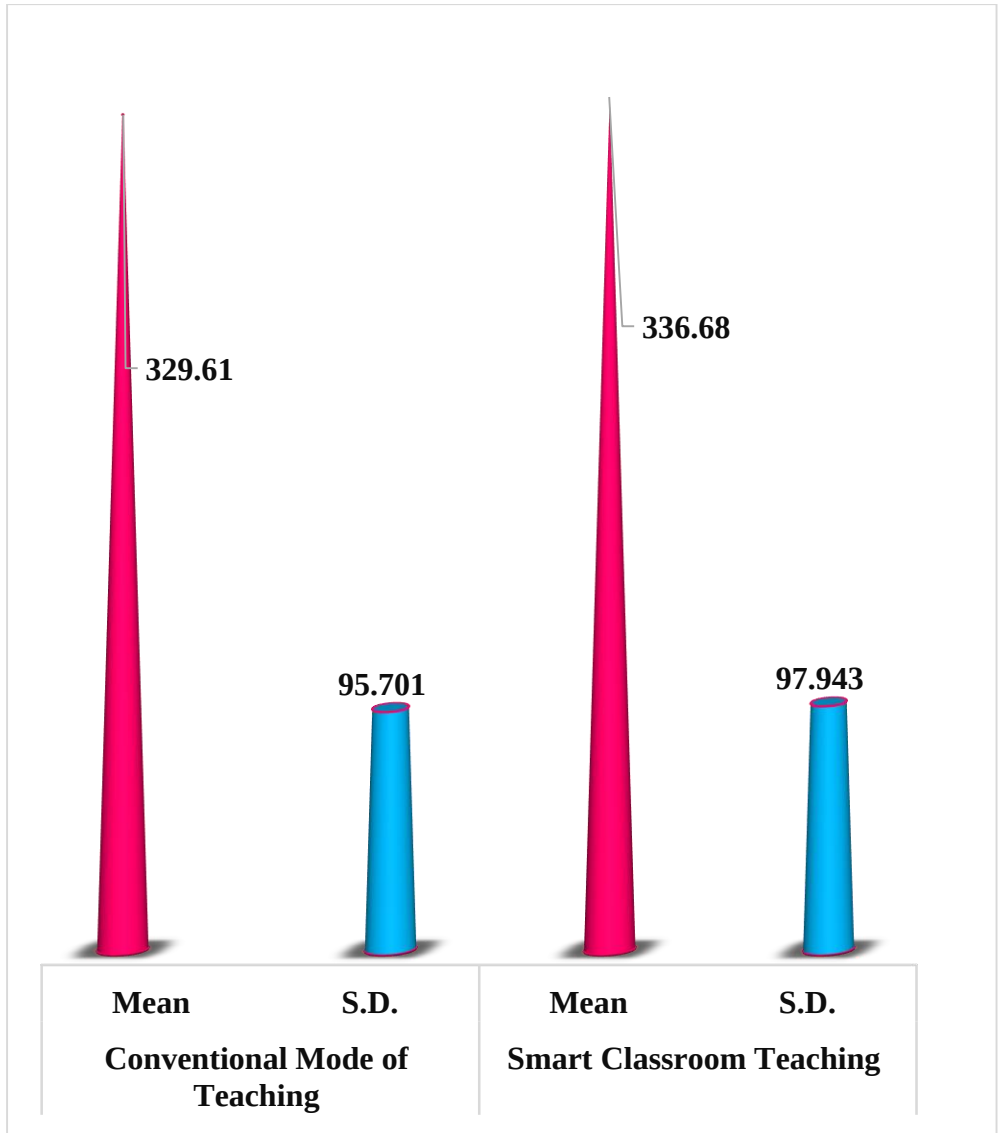
There is no significant difference between the effectiveness of smart classroom teaching and conventional mode of teaching on academic success of high school students in Radhapuram Assembly Constituency.

TABLE 4.3
DIFFERENCE BETWEEN THE EFFECTIVENESS OF SMART CLASSROOM TEACHING AND CONVENTIONAL MODE OF TEACHING ON ACADEMIC SUCCESS OF HIGH SCHOOL STUDENTS IN RADHAPURAM ASSEMBLY CONSTITUENCY.

Conventional Mode of Teaching N=766		Smart Classroom Teaching N=766		Calculated 't' value	Remarks at 5 % level
Mean	S.D.	Mean	S.D.		
329.61	95.701	336.68	97.943	49.938	Significant

It is inferred from the above table that the mean academic score of conventional mode teaching is 329.61 and standard deviation is 95.701 mean academic score of smart classroom teaching is 336.68 and the standard deviation is 97.943. The calculated t-value 47.381 is greater than the table value 1.96 at 0.05 level of significance. Hence, the academic achievement scores of high school students in Radhapuram Assembly Constituency with respect to conventional mode teaching differs significantly from that of smart classroom teaching academic achievement scores. Hence the null hypothesis is rejected.

Fig.4.3.*The graphical representation shows the mean score and SD of smart classroom teaching and conventional mode of teaching on academic success of middle school in Radhapuram Assembly Constituency.*



Null Hypothesis 4

There is no significant difference between male and female primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.4

DIFFERENCE BETWEEN MALE AND FEMALE PRIMARY SCHOOL STUDENTS IN THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Gender	N	Mean	Std. Deviation	t-value	Remarks
Male	246	48.45	3.938	3.077	S
Female	264	47.24	5.259		

(At 5% level of significance the table value of 't' is 1.96)

It is inferred from the above table that the calculated' value 3.077 is greater than the table value 1.96 at 0.05 level of significance. Hence the null hypothesis is rejected. Thus there is significant difference between male and female primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 5

There is no significant difference between rural and semi-urban primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.5

DIFFERENCE BETWEEN RURAL AND SEMI-URBAN PRIMARY SCHOOL STUDENTS IN THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Location of school	N	Mean	Std. Deviation	t-value	Remarks
Rural	379	47.71	4.790	1.080	NS
Semi-urban	131	48.18	4.403		

(At 5% level of significance the table value of 't' is 1.96)

It is inferred from the above table that the calculated 't' value 1.080 is less than the table value 1.96 at 0.05 level of significance. Hence the null hypothesis is accepted. Thus there is no significant difference between rural and semi-urban primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 6

There is no significant difference between Tamil and English medium primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.6

DIFFERENCE BETWEEN TAMIL AND ENGLISH MEDIUM PRIMARY SCHOOL STUDENTS IN THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Medium of study	N	Mean	Std. Deviation	t-value	Remarks
Tamil	399	55.06	2.269	1.339	NS
English	111	55.13	3.164		

(At 5% level of significance the table value of 't' is 1.96)

It is inferred from the above table that the calculated 't' value 1.339 is less than the table value 1.96 at 0.05 level of significance. Hence the null hypothesis is accepted. Thus there is no significant difference between Tamil and English medium primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 7

There is no significant difference between joint and nuclear family primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.7

DIFFERENCE BETWEEN JOINT AND NUCLEAR FAMILY PRIMARY SCHOOL STUDENTS IN THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Family Type	N	Mean	Std. Deviation	t-value	Remarks
Joint	287	45.21	4.612	1.161	NS
Nuclear	223	43.15	4.378		

(At 5% level of significance the table value of 't' is 1.96)

It is inferred from the above table that the calculated 't' value 1.161 is less than the table value 1.96 at 0.05 level of significance. Hence the null hypothesis is accepted. Thus there is no significant difference between joint and nuclear family primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 8

There is no significant difference between Government and Government Aided primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.8

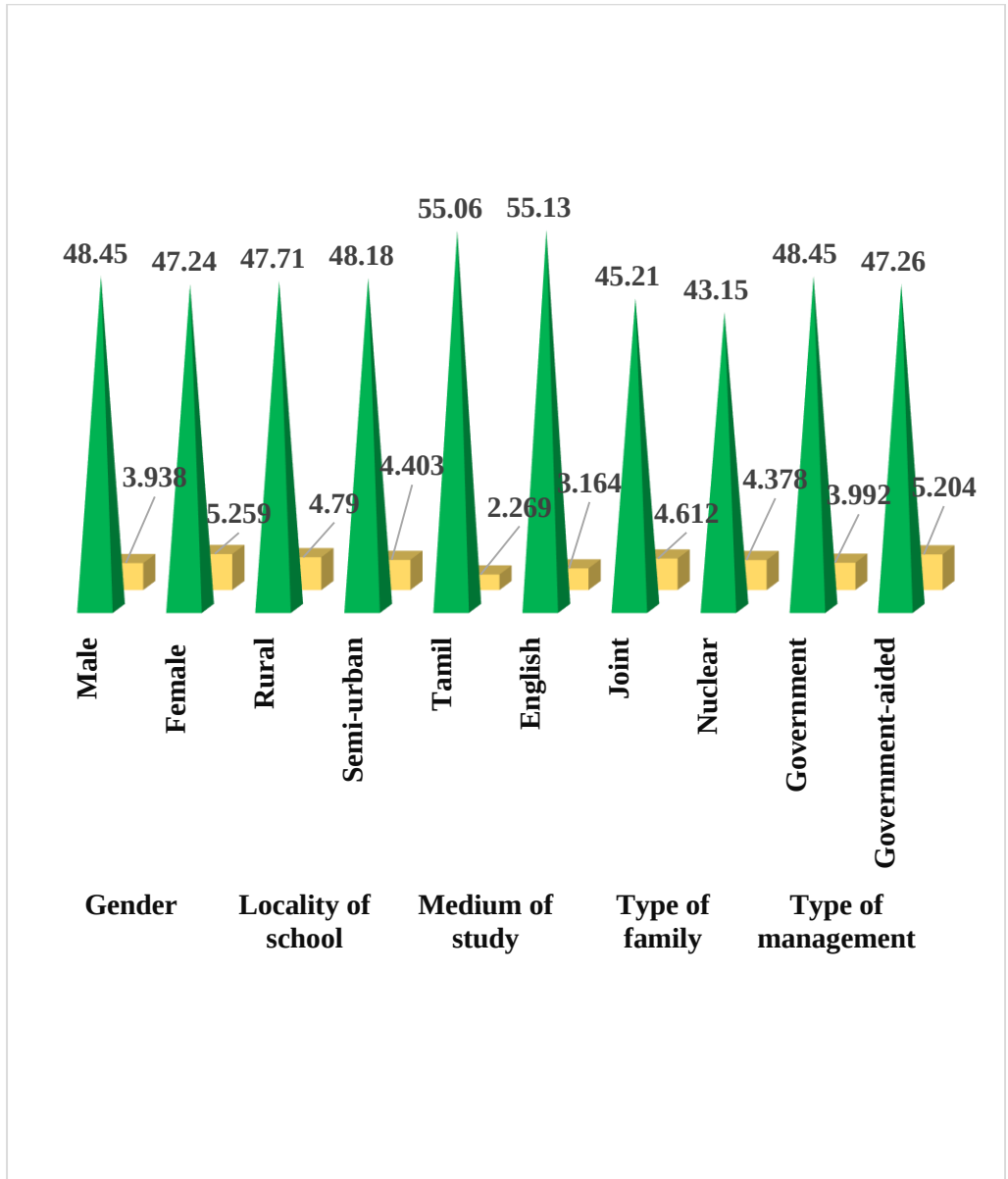
**DIFFERENCE BETWEEN GOVERNMENT AND GOVERNMENT AIDED
PRIMARY SCHOOL STUDENTS IN THEIR ATTITUDE TOWARDS
TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION**

Type of management	N	Mean	Std. Deviation	t-value	Remarks
Government	243	48.45	3.992	3.038	S
Government-aided	267	47.26	5.204		

(At 5% level of significance the table value of 't' is 1.96)

It is inferred from the above table that the calculated 't' value 3.038 is greater than the table value 1.96 at 0.05 level of significance. Hence the null hypothesis is rejected. Thus there is significant difference between Government and Government aided primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Fig 4.4 The graphical representation shows the mean score and standard deviation of primary school students attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.



Null Hypothesis 9

There is no significant association between type of primary school and the student's attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.9

ASSOCIATION BETWEEN TYPE OF PRIMARY SCHOOL AND THE STUDENTS ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Category	Degrees of Freedom	Calculated ' χ^2 ' Value	p-value	Remarks at 5% level
Type of School	2	2.984	0.582	NS

(for 2 df, at 5% level of significance, the table value of ' χ^2 ' is 5.991)

It is inferred from the above table that the calculated ' χ^2 ' value 2.984 is less than the table value 5.991 at 0.05 level of significance. Hence the null hypothesis is accepted. Thus there is no significant association between type of primary school and the student's attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 10

There is no significant association between father's educational qualification of primary school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.10

ASSOCIATION BETWEEN FATHER'S EDUCATIONAL QUALIFICATION OF PRIMARY SCHOOL STUDENTS AND THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Category	Degree of Freedom	Calculated ' χ^2 ' Value	p-value	Remarks at 5% level
Father's Educational Qualification	3	3.295	0.512	NS

(for 3 df, at 5% level of significance, the table value of ' χ^2 ' is 7.815)

It is inferred from the above table that the calculated ' χ^2 ' value 3.295 is less than the table value 7.815 at 0.05 level of significance. Hence the null hypothesis is accepted. Thus there is no significant association between father's educational qualification of primary school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 11

There is no significant association between mother's educational qualification of primary school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.11

ASSOCIATION BETWEEN MOTHER'S EDUCATIONAL QUALIFICATION OF PRIMARY SCHOOL STUDENTS AND THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Category	Degree of Freedom	Calculated ' χ^2 ' Value	p-value	Remarks at 5% level
Mother's Educational Qualification	3	9.982	0.033	S

(for 3 df, at 5% level of significance, the table value of ' χ^2 ' is 7.815)

It is inferred from the above table that the calculated ' χ^2 ' value 9.982 is greater than the table value 7.815 at 0.05 level of significance. Hence the null hypothesis is rejected. Thus there is significant association between mother's educational qualification of primary school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 12

There is no significant difference between male and female middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.12

DIFFERENCE BETWEEN MALE AND FEMALE MIDDLE SCHOOL STUDENTS IN THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Gender	N	Mean	Std. Deviation	t-value	Remarks
Male	446	48.28	4.171	2.090	S
Female	350	48.65	3.964		

(At 5% level of significance the table value of 't' is 1.96)

It is inferred from the above table that the calculated 't' value 2.090 is greater than the table value 1.96 at 0.05 level of significance. Hence the null hypothesis is rejected. Thus there is significant difference between male and female middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 13

There is no significant difference between rural and semi-urban middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.13

DIFFERENCE BETWEEN RURAL AND SEMI-URBAN MIDDLE SCHOOL STUDENTS IN THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Location of school	N	Mean	Std. Deviation	t-value	Remarks
Rural	547	48.22	4.102	1.341	NS
Semi-urban	249	48.80	4.216		

(At 5% level of significance the table value of 't' is 1.96)

It is inferred from the above table that the calculated 't' value 1.341 is less than the table value 1.96 at 0.05 level of significance. Hence the null hypothesis is accepted. Thus there is no significant difference between rural and semi-urban middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 14

There is no significant difference between Tamil and English medium middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.14

DIFFERENCE BETWEEN TAMIL AND ENGLISH MEDIUM MIDDLE SCHOOL STUDENTS IN THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Medium of study	N	Mean	Std. Deviation	t-value	Remarks
Tamil	584	47.34	3.845	1.412	NS
English	212	47.22	3.941		

(At 5% level of significance the table value of 't' is 1.96)

It is inferred from the above table that the calculated 't' value 1.412 is less than the table value 1.96 at 0.05 level of significance. Hence the null hypothesis is accepted. Thus there is no significant difference between Tamil and English medium middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 15

There is no significant difference between joint and nuclear family middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.15

DIFFERENCE BETWEEN JOINT AND NUCLEAR FAMILY MIDDLE SCHOOL STUDENTS IN THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Family Type	N	Mean	Std. Deviation	t-value	Remarks
Joint	198	48.26	4.542	1.087	NS
Nuclear	598	48.15	4.276		

(At 5% level of significance the table value of 't' is 1.96)

It is inferred from the above table that the calculated 't' value 1.087 is less than the table value 1.96 at 0.05 level of significance. Hence the null hypothesis is accepted. Thus there is no significant difference between joint and nuclear family middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 16

There is no significant difference between Government and Government Aided middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.16

**DIFFERENCE BETWEEN GOVERNMENT AND GOVERNMENT AIDED
MIDDLE SCHOOL STUDENTS IN THEIR ATTITUDE TOWARDS
TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION**

Type of management	N	Mean	Std. Deviation	t-value	Remarks
Government	414	48.72	4.127	2.017	S
Government-aided	382	48.68	4.981		

(At 5% level of significance the table value of 't' is 1.96)

It is inferred from the above table that the calculated 't' value 2.017 is greater than the table value 1.96 at 0.05 level of significance. Hence the null hypothesis is rejected. Thus there is significant difference between Government and Government aided middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 17

There is no significant association between type of middle school and the student's attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.17

ASSOCIATION BETWEEN TYPE OF MIDDLE SCHOOL AND THE STUDENT'S ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Category	Degree of Freedom	Calculated ' χ^2 ' Value	p-value	Remarks
Type of School	2	3.109	0.462	NS

(for 2 df, at 5% level of significance, the table value of ' χ^2 ' is 5.991)

It is inferred from the above table that the calculated ' χ^2 ' value 3.109 is less than the table value 5.991 at 0.05 level of significance. Hence the null hypothesis is accepted. Thus there is no significant association between type of middle school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 18

There is no significant association between father's educational qualification of middle school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.18

ASSOCIATION BETWEEN FATHER'S EDUCATIONAL QUALIFICATION OF MIDDLE SCHOOL STUDENTS AND THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Category	Degree of Freedom	Calculated ' χ^2 ' Value	p-value	Remarks
Father's Educational Qualification	3	3.171	0.275	NS

(for 3 df, at 5% level of significance, the table value of ' χ^2 ' is 7.815)

It is inferred from the above table that the calculated ' χ^2 ' value 3.171 is less than the table value 7.815 at 0.05 level of significance. Hence the null hypothesis is accepted. Thus there is no significant association between father's educational qualification of middle school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 19

There is no significant association between mother's educational qualification of middle school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.19

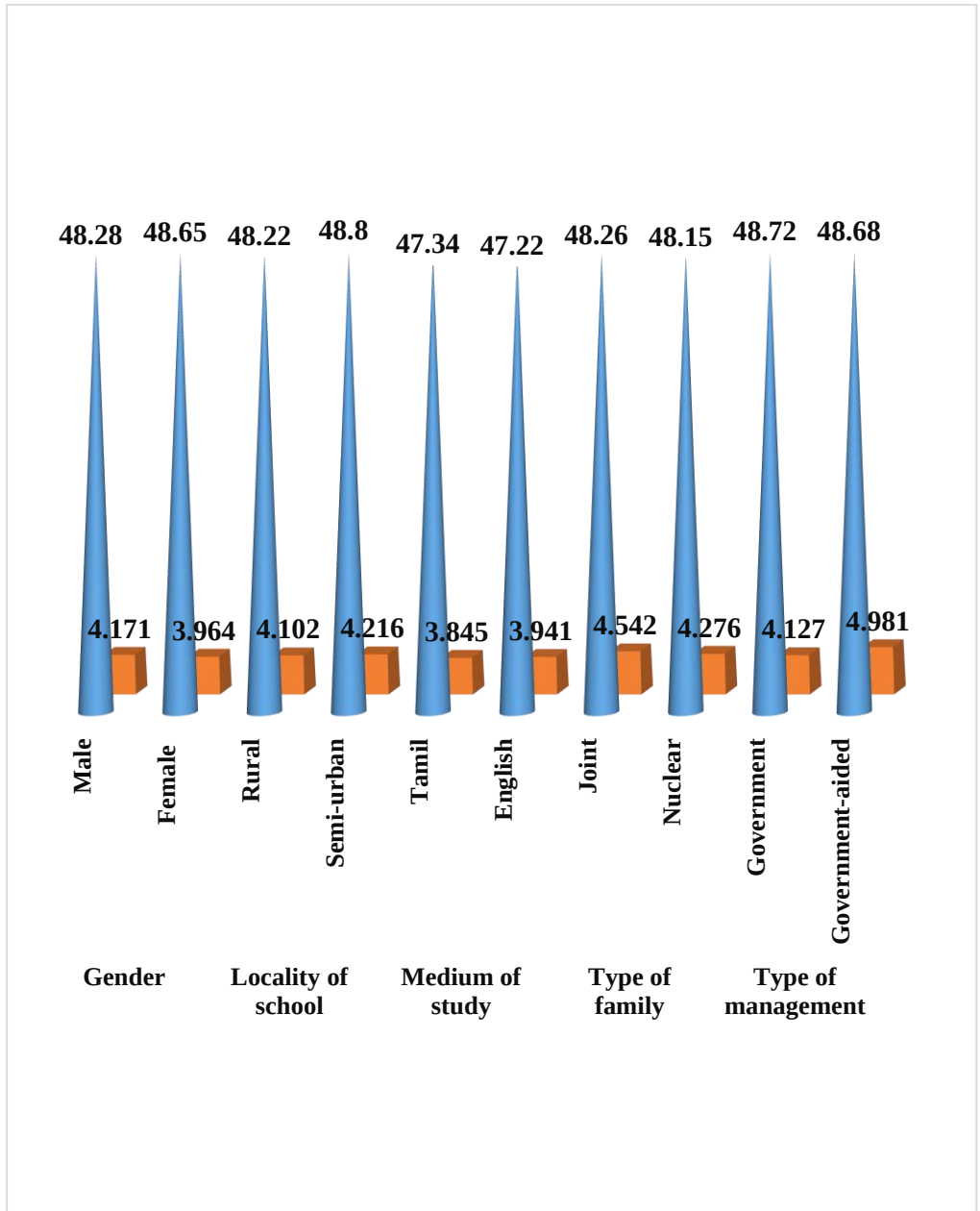
ASSOCIATION BETWEEN MOTHER'S EDUCATIONAL QUALIFICATION OF MIDDLE SCHOOL STUDENTS AND THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Category	Degree of Freedom	Calculated ' χ^2 ' Value	P-value	Remarks
Mother's Educational Qualification	3	10.120	0.043	S

(for 3 df, at 5% level of significance, the table value of ' χ^2 ' is 7.815)

It is inferred from the above table that the calculated ' χ^2 ' value 10.120 is greater than the table value 7.815 at 0.05 level of significance. Hence the null hypothesis is rejected. Thus there is significant association between mother's educational qualification of middle school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Fig 4.5 The graphical representation shows the mean score and Standard deviation of middle School students attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.



Null Hypothesis 20

There is no significant difference between male and female high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.20

DIFFERENCE BETWEEN MALE AND FEMALE HIGH SCHOOL STUDENTS IN THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Gender	N	Mean	Std. Deviation	t-value	Remarks
Male	427	44.91	5.971	2.566	S
Female	339	44.69	5.885		

(At 5% level of significance the table value of 't' is 1.96)

It is inferred from the above table that the calculated 't' value 2.566 is greater than the table value 1.96 at 0.05 level of significance. Hence the null hypothesis is rejected. Thus there is significant difference between male and female high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 21

There is no significant difference between rural and semi-urban high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.21

DIFFERENCE BETWEEN RURAL AND SEMI-URBAN HIGH SCHOOL STUDENTS IN THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Location of school	N	Mean	Std. Deviation	t-value	Remarks
Rural	651	44.82	5.946	0.126	NS
Semi-urban	115	44.74	5.824		

(At 5% level of significance the table value of 't' is 1.96)

It is inferred from the above table that the calculated 't' value 0.126 is less than the table value 1.96 at 0.05 level of significance. Hence the null hypothesis is accepted. Thus there is no significant difference between rural and semi-urban high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 22

There is no significant difference between Tamil and English medium high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.22
DIFFERENCE BETWEEN TAMIL AND ENGLISH MEDIUM HIGH SCHOOL
STUDENTS IN THEIR ATTITUDE TOWARDS TECHNOLOGY
INTEGRATION IN CURRICULAR TRANSACTION

Medium of study	N	Mean	Std. Deviation	t-value	Remarks
Tamil	594	44.67	5.874	1.402	NS
English	172	45.35	6.134		

(At 5% level of significance the table value of 't' is 1.96)

It is inferred from the above table that the calculated 't' value 1.402 is less than the table value 1.96 at 0.05 level of significance. Hence the null hypothesis is accepted. Thus there is no significant difference between Tamil and English medium high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 23

There is no significant difference between joint and nuclear family high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.23

DIFFERENCE BETWEEN JOINT AND NUCLEAR FAMILY HIGH SCHOOL STUDENTS IN THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Family Type	N	Mean	Std. Deviation	t-value	Remarks
Joint	208	46.45	5.614	1.321	NS
Nuclear	558	47.32	5.812		

(At 5% level of significance the table value of 't' is 1.96)

It is inferred from the above table that the calculated 't' value 1.321 is less than the table value 1.96 at 0.05 level of significance. Hence the null hypothesis is accepted. Thus there is no significant difference between joint and nuclear family high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 24

There is no significant difference between Government and Government Aided high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.24

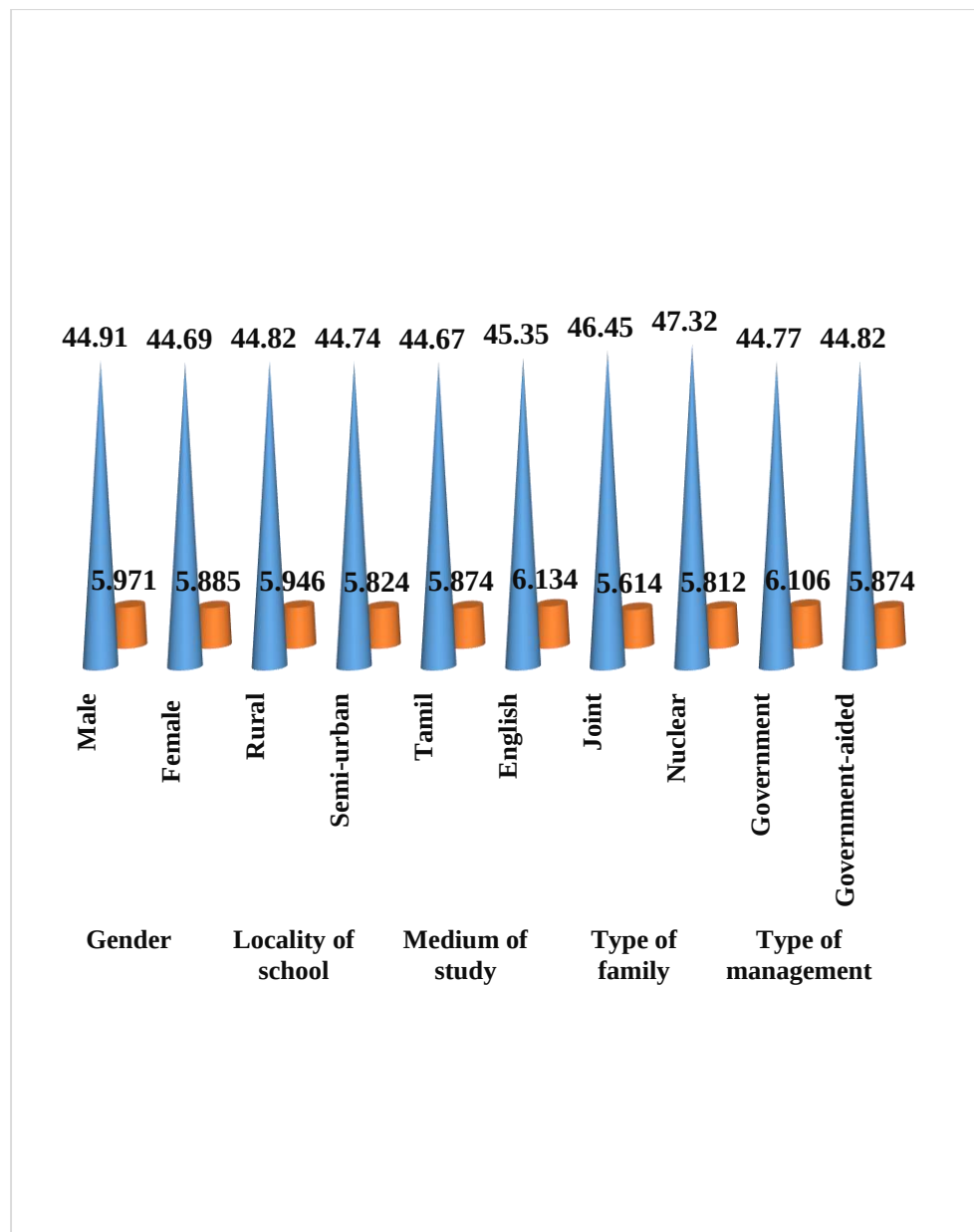
DIFFERENCE BETWEEN GOVERNMENT AND GOVERNMENT AIDED HIGH SCHOOL STUDENTS IN THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Type of management	N	Mean	Std. Deviation	t-value	Remarks
Government	403	44.77	6.106	0.123	NS
Government-aided	363	44.82	5.874		

(At 5% level of significance the table value of 't' is 1.96)

It is inferred from the above table that the calculated 't' value 0.123 is less than the table value 1.96 at 0.05 level of significance. Hence the null hypothesis is accepted. Thus there is no significant difference between Government and Government Aided high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Fig 4.6 The graphical representation shows that the mean score and Standard deviation of high school student's attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency



Null Hypothesis 25

There is no significant association between type of high school and the student's attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.25

ASSOCIATION BETWEEN TYPE OF HIGH SCHOOL AND THE STUDENT'S ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Category	Degree of Freedom	Calculated ' χ^2 ' Value	p-value	Remarks
Type of School	2	1.946	0.522	NS

(for 2 df, at 5% level of significance, the table value of ' χ^2 ' is 5.991)

It is inferred from the above table that the calculated ' χ^2 ' value 1.946 is less than the table value 5.991 at 0.05 level of significance. Hence the null hypothesis is accepted. Thus there is no significant association between type of high school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 26

There is no significant association between father's educational qualification of high school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.26

ASSOCIATION BETWEEN FATHER'S EDUCATIONAL QUALIFICATION OF HIGH SCHOOL STUDENTS AND THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Category	Degree of Freedom	Calculated ' χ^2 ' Value	p-value	Remarks
Father's Educational Qualification	3	0.640	0.832	NS

(for 3 df, at 5% level of significance, the table value of ' χ^2 ' is 7.815)

It is inferred from the above table that the calculated ' χ^2 ' value 0.640 is less than the table value 7.815 at 0.05 level of significance. Hence the null hypothesis is accepted. Thus there is no significant association between father's educational qualification of high school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 27

There is no significant association between mother's educational qualification of high school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

TABLE 4.27

ASSOCIATION BETWEEN MOTHER'S EDUCATIONAL QUALIFICATION OF HIGH SCHOOL STUDENTS AND THEIR ATTITUDE TOWARDS TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION

Category	Degree of Freedom	Calculated ' χ^2 ' Value	p-value	Remarks
Mother's Educational Qualification	3	2.646	0.450	NS

(for 3 df, at 5% level of significance, the table value of ' χ^2 ' is 7.815)

It is inferred from the above table that the calculated ' χ^2 ' value 2.646 is greater than the table value 7.815 at 0.05 level of significance. Hence the null hypothesis is rejected. Thus there is significant association between mother's educational qualification of high school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Null Hypothesis 28

There is no significant influence of technology integration in curricular transaction towards academic success of primary school students in Radhapuram Assembly Constituency.

TABLE 4.28

INFLUENCE OF TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION TOWARDS ACADEMIC SUCCESS OF PRIMARY SCHOOL STUDENTS IN RADHAPURAM ASSEMBLY CONSTITUENCY.

Academic success of primary school students	Model Summary			ANOVA			Coefficient		
	R	R ²	Adj. R ²	F	df	P-value	β	t	P-value
	0.722	0.516	0.541	321.11	1	0.000	0.628	16.013	0.000

Influence of predictors on dependent variable

It is inferred from the above table 4.28 there is significant influence of technology integration in curricular transaction on academic success of primary school students in Radhapuram Assembly Constituency. The R² value (51.6%) indicates how much of the difference in the technology integration in curricular transaction on academic success of primary school students. Hence null hypothesis is rejected.

Null Hypothesis 29

There is no significant influence of technology integration in curricular transaction on academic success of middle school students in Radhapuram Assembly Constituency.

TABLE 4.29

INFLUENCE OF TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION TOWARDS ACADEMIC SUCCESS OF MIDDLE SCHOOL STUDENTS IN RADHAPURAM ASSEMBLY CONSTITUENCY.

Academic success of middle school students	Model Summary			ANOVA			Coefficient		
	R	R ²	Adj. R ²	F	df	P-value	β	t	P-value
	0.621	0.381	0.571	351.15	1	0.000	0.566	19.026	0.000

Influence of predictors on dependent variable

It is inferred from the above table 4.29, there is significant influence of technology integration in curricular transaction on academic success of middle school students in Radhapuram Assembly Constituency. The R² value (38.1%) indicates how much of the difference in the technology integration in curricular transaction on academic success of middle school students. Hence null hypothesis is rejected.

Null Hypothesis 30

There is no significant influence of technology integration in curricular transaction on academic success of high school students in Radhapuram Assembly Constituency.

TABLE 4.30

INFLUENCE OF TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION TOWARDS ACADEMIC SUCCESS OF HIGH SCHOOL STUDENTS IN RADHAPURAM ASSEMBLY CONSTITUENCY.

Academic success of high school students	Model Summary			ANOVA			Coefficient		
	R	R ²	Adj. R ²	F	df	p-value	β	t	p-value
	0.634	0.447	0.578	381.12	1	0.000	0.557	17.014	0.000

Influence of predictors on dependent variable

It is inferred from the above table 4.30 there is significant influence of technology integration in curricular transaction on academic success of high school students in Radhapuram Assembly Constituency. It was inferred from the table, the R² value (44.7%) indicates how much of the difference in the technology integration in curricular transaction on academic success of high school students. Hence null hypothesis is rejected.

4.3.Conclusion

The present chapter describes the statistical analysis and the results obtained from the collected data whether to reject the null hypothesis or to accept it. The next chapter deals with summary, findings and conclusion of the present study.

Chapter-V

5.1. INTRODUCTION

Education elevates one's mind and intellect through a planned process of learning to a higher level of knowledge and a better state of efficiency. It is always aimed at perfection and excellence. Education is conceived as a powerful agency, it is instrumental in bringing out the desired change in the social and cultural life of a nation. It implies that only education can bring social change. The whole process of education is to shape and mould the human personality called the student who plays a vital role in the system of education. To meet the challenging needs of society students should undergo best practices and strategies in the classroom. The concept of Education through Computers is an important milestone. It aims at shaping the individual to imbibe self-confidence and self-reliance in learning. Modern times are termed as an age of technology. Computers have become an integral part of our life. The success in school is determined by three R's READING, WRITING and ARITHMETIC. The success becomes a great success if a fourth R is added, which is COMPUTER. Smart Classroom is highly systematic in approach, unimaginably swift in its operations and astonishingly multifarious in its applications is the most fitting tool in the field of education. The Smart Classroom will change to the maximum extent the nature of the practice of education with respect to the fundamental aspects of What to teach. How to teach? and Why to teach? In Tamil Nadu, probably all Matriculation Schools and some of the Government Aided schools have Smart Classroom. Tamil Nadu Government has planned to establish Smart Classroom in all Schools. The Government and Government-aided schools in Radhapuram Assemble constituency are well-equipped with smart classrooms. At this juncture, it is essential to study the students' attitude towards the use of Smart Classroom. As there is no suitable tool available to study High School Students' Attitude towards the use of Smart Classroom, the investigators have decided to construct and standardise a scale to measure the School Students' Attitude towards the use of Smart

Classroom. One cannot satisfy oneself just by collecting and classifying the research data. For complete satisfaction, he has to study the facts more carefully to find the causes of the occurrence of the phenomenon concerned with the problem. According to Thorndike (1904), “Whatever exists at all, exists in some amount. To know it thoroughly involves, showing it in quantity as well as quality.” According to Polit and Beck (2004), “Data analysis is the systematic organization and synthesis of research data and the testing of research hypothesis using that data”. So, to get a more clear and meaningful picture out of the raw research data collected, analysis and interpretation of the research data is a must. The analysis means the study of tabulated material in order to bring out the inherent facts or meanings. It includes dividing existing complex and complicated factors into simpler factors and placing them together in a new arrangement for the purpose of interpretation. The researcher examines the data critically which leads to acceptance or rejection of the proposed hypotheses, which in turn results in the addition of knowledge in that particular area.

5.2.FINDINGS OF THE STUDY

Using regression analysis, the results of the study proved that the technology integration made a significant impact on academic success of school students in Radhapuram Assembly Constituency. The findings of the study revealed that there exists a significant mean difference in the effect of smart classroom learning environment on academic achievement. The result shows that students taught through smart class have scored better achievement than subject taught through traditional mode. It enhances the student’s cognitive achievement and interest in subjects. The smart classroom programme had an overall positive impact on students, more in terms of generating curiosity, grasping complex concepts rather than capturing attention.

1. There is significant difference between the effectiveness of Smart classroom teaching and conventional mode of teaching on academic success of primary school students.

2. There is significant difference between the effectiveness of smart classroom teaching and conventional mode of teaching on academic success of middle school students.
3. There is significant difference between the effectiveness of smart classroom teaching and conventional mode of teaching on academic success of high school students.
4. There is significant difference between male and female primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
5. There is no significant difference between rural and semi-urban primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
6. There is no significant difference between Tamil and English medium primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
7. There is no significant difference between joint and nuclear family primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
8. There is significant difference between Government and Government Aided primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
9. There is no significant association among boys, girls and coeducation primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
10. There is no significant association between father's educational qualification of primary school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

11. There is significant association between mother's educational qualification of primary school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
12. There is significant difference between male and female middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
13. There is no significant difference rural and semi-urban middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
14. There is no significant difference between Tamil and English medium middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
15. There is no significant difference between joint and nuclear family middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
16. There is no significant difference between Government and Government Aided middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
17. There is no significant association among boys, girls and coeducation middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
18. There is no significant association between father's educational qualification of middle school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
19. There is significant association between mother's educational qualification of middle school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

20. There is no significant difference between male and female high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
21. There is no significant difference between rural and semi-urban high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
22. There is no significant difference between Tamil and English medium high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
23. There is no significant difference between joint and nuclear family high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
24. There is no significant difference between Government and Government Aided high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
25. There is no significant association among boys, girls and coeducation high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
26. There is no significant association between father's educational qualification of high school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
27. There is no significant association between mother's educational qualification of high school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.
28. There is no significant influence of technology integration in curricular transaction on academic success of primary school students in Radhapuram Assembly Constituency.

29. There is no significant influence of technology integration in curricular transaction on academic success of middle school students in Radhapuram Assembly Constituency.
30. There is no significant influence of technology integration in curricular transaction on academic success of high school students in Radhapuram Assembly Constituency.

5.3. INTERPRETATIONS

Interpretation related to finding no-1

There is significant difference between the effectiveness of Smart classroom teaching and conventional mode of teaching on academic success of primary school students of Radhapuram Assembly Constituency.

From table 4.1, it is evident that the calculated t-value 47.381 is greater than the table value 1.96 which is significant at 0.05 level. the mean achievement score (328.26) of Smart classroom teaching which is significantly higher than the mean achievement score (306.26) of the conventional mode of teaching. Hence the null hypothesis is rejected. This may be due to that information and communication technology provides revolutionary opportunities in the education system. A smart classroom is a platform where teachers and students can make an attempt to learn all available techniques and tools for maximum utilization of resources for widening their knowledge. Smart classroom teaching helps enhance the achievement of primary school students compared to conventional classroom teaching. This may be because it creates a more engaging environment than the traditional learning mode.

Further, Student learning becomes more enjoyable and stress-free for primary school students. Their LSRW skills also increased with the continuous learning through this technology-integrated learning. This modern learning technique also enhanced students' scientific attitude, communication skills, problem-solving, critical thinking, and inductive deductive reasoning skills. It enhances the productivity & collaboration of the students and draws students' attention to an interactive learning

methodology. Enhance reading comprehension and vocabulary development by providing students access to word pronunciation, word meaning, contextual information, and comprehension scaffolds to guide an individual's reading. Student eagerness to learn new things also increases and reduces the boredom in learning complex techniques. Creative presentations in the innovative class help to distinguish between trustworthy and dubious sources on the Internet, adhering to proper online etiquette, and many other practical skills. Early exposure to the digital learning environment helps children prepare for future digital demands.

The benefits of using technology in the classrooms are broad and deep. Smart classroom teaching makes students more engaged, motivated, and excited about learning. An interactive smart classroom helps the teachers prepare dynamic multimedia lessons with hands-on components. In smart classroom learning, the student's audio-visual sense is targeted, allowing the students to store information quickly and more effectively. Thus, students who learn through a smart learning environment gain a well-rounded educational experience. Pancholi,A., and Bharwad,A.B (2015) studied the Effectiveness of Smart Classes among Secondary School students of Ankur Vidyalay, Ahmedabad. In their study, they revealed that the two groups differ significantly in their achievement, which means that the smart class teaching method is more effective than the traditional method. Students who received instruction through smart classes achieved higher marks than those who received the education through conventional teaching methods. They also showed the benefits and significant disadvantages of smart classrooms. They agreed that it improves teacher effectiveness, productivity and students' academic performance.

The versatile nature of IWB helps increase students' motivation, engagement and attention span during the teaching-learning process. Learning through Interactive whiteboards provides a multitude of rich learning opportunities for students. IWB helps students to move from one-dimensional thinkers to all-rounded thinkers. Both teachers and students have shown positive attitudes towards smart class and have

equipped their style with interactive whiteboards to provide a better learning environment. It has been said that smart classes will revolutionise the teaching-learning process and are best used in teaching all subjects. Technology integration in classroom teaching inspires and motivates the students in their learning process; they will achieve their goals quickly. The technology will be very effective for the students to promote educational aspirations, and it will create interest to students learn better and increase the students' problem-solving ability in their regular activities.

Bano (2016) also revealed that smart classroom learning positively affects the performance of students in English. Varghese, F (2017) also supported the same in his study “Effect of Smart Class on Academic Achievement.” The study shows a significant effect of Smart Class on academic achievement. Students learn well from using technology and from doing hands-on activities. Interactive whiteboards promote active student engagement in the learning process and have been described as one of the most revolutionary and powerful teaching techniques using technology.

Interpretation related to finding no-2

There is significant difference between the effectiveness of smart classroom teaching and the conventional mode of teaching on the academic success of middle school students in Radhapuram Assembly Constituency.

Table 4.2 shows that the calculated t-value 39.103 is greater than the table value 1.96, which is significant at 0.05 level. The mean achievement score (311.29) of Smart classroom teaching is significantly higher than the mean achievement score (289.49) of the conventional mode of teaching. Hence, the null hypothesis is rejected. The results revealed that a smart classroom is more effective in efficient learning. Smartboard use in curricular transaction allows understanding of subjects more easily and rapidly, avoiding time consumption and increasing student's motivation.

Smart classroom teaching helps to increase conceptual clarity, especially in school subjects that require a practical application and visual understanding and allows the students to learn and memorise quickly. It also provides a lively experience, better content, and in-depth explanation. Students who received the instruction through smart class achieved higher marks than those who received the conventional teaching method. Using multimedia and other ways of presenting content interested the students' learning, and their memory and understanding skills increased. Smart class is bringing digital revolutions into the classrooms. Teaching and learning have become very interesting and compelling. The old chalk and board method is being done by introducing visual aids. Education through new technology like the smart class has made it easier for the teachers to relate the subject to the pupils, who are very receptive to it. The interactive whiteboard provides a large workspace for hands-on work with multimedia resources.

Learning is the most essential thing in the educational system. Reading, asking questions and interacting with others are critical to learning. Current learning theories promote student engagement. It relies on the learner to select and transform information, construct hypotheses to make decisions and synthesize learning through personalizing knowledge.

Students learn well from using technology and from doing hands-on activities. Interactive whiteboards promote active student engagement in the learning process and have been described as being one of the most revolutionary and powerful teaching techniques using technology. Rather than passively absorbing instruction, the students actively learn through a smart classroom environment. It also brings the class together, focuses their attention, and provides structured, teacher-focused group interaction.

Balta Nuri and Duran Muharrem (2015) studied “Attitudes of Students and Teachers towards the Use of Interactive Whiteboards in Elementary and Secondary School Classrooms”. The significant findings are both teachers and students highly rate interactive whiteboards. Students mostly prefer the usage of interactive whiteboards in math courses, and

their attitudes differ across their genders and school levels. Bharathy (2015) found that using Assisted Teaching and Learning methods helps to address the teaching and learning process. Bryant and Bryant (2019) studied that the computer-assisted learning method helped to improve the student's understanding and performance in Mathematics. The study's findings support those of Jena (2013), who discovered that pupils taught using smart classes outperformed those using standard methods in academic attainment. The arrangement of the remedial exercises and the distribution of praise for every improvement is made possible by smart class learning. Sandhya., Singh. D.P., and Saini,S. (2018) conducted a study on the Impact of a Smart classroom learning environment on the academic achievement of the students and interpreted that there exists a significant difference in the effect of teaching through smart classes on the academic achievement of experimental group secondary school students.

Interpretation related to findings no-3

There is significant difference between the effectiveness of smart classroom teaching and conventional mode of teaching on academic success of high school students of Radhapuram Assembly Constituency.

From table 4.3, it is evident that the calculated t-value 47.381 is greater than the table value 1.96 which is significant at 0.05 level. The mean achievement score (336.68) of Smart classroom teaching is significantly higher than the mean achievement score (329.61) of the conventional mode of teaching. Hence the null hypothesis is rejected. This may be due to that a smart classroom is regarded as one of the essential modes of teaching that can transform an old-fashioned education system into a more cutting-edge method. The application of education technology has brought numerous changes in the field of education e-learning and smart classroom motives that improve students' learning ability and achievements.

Smart Classroom teaching and learning helps high school students to understand the subject concepts easily. The Interactive tools,

information on the Internet, and communication tools in the smart class provide opportunities for the students to build their knowledge. Students will work together to solve mathematical problems and explore and learn new concepts easily and quickly. It increases curiosity, explores sense and reduces boredom in learning. Smartboard use increases students' interest, motivation and participation. Audios, animations, videos and images used in a learning environment make classes more entertaining. It serves as a cognitive tool, expands students' minds, and facilitates joint thinking and divergent learning. Their mental load is transferred to the board, and they become accessible to engage in the high-thinking process. It gives a Real-time Interactive dimension to the students. It represents the ability to support the Smart classroom's teaching and human-computer interaction, which involves convenient operation, smooth interaction and interactive tracking. "Smart Classes" provides better education through presentations and videos. A student can learn better through visualization. Not all students may not understand the teaching methodology of a teacher but can understand it through smart classes. This can be seen in the case of movies, i.e. students remember movies better than the lessons taught in the classroom. This type of teaching creates an attention called as interest in them. So, the smart class technique is better. Such education helps to maintain students' interest and focus by engaging them fully for the entire learning experience.

Umit,Y.I and Ferit,K (2016), in their study "High school students' attitudes towards smart board use in Biology classes". They found that smart board use in biology classes allows understanding of subjects more easily and rapidly, avoiding time consumption and increasing students' motivation and interest via visual elements. The students' attitude scores did not differ Statistically concerning "gender" and "smart board use time. The results of the current study are consistent with those of Bachitra & Ahrar (2017), who discovered that smart classes are more effective than traditional ones for teaching students and that their achievement levels are higher. Because an interactive

whiteboard engages all three senses: sight, sound, and touch, students learn most effectively through these senses.

Interpretation related to finding no-4

There is no significant difference between male and female primary school students in their attitude towards technology integration in curricular transactions in Radhapuram Assembly Constituency.

From table 4.4, it is evident that the calculated t-value 3.077 is greater than the table value 1.96 which is significant at 0.05 level. Thus the null hypothesis is rejected. The mean attitude (48.45) of male, which is significantly higher than the mean attitude (47.24) of female. Hence the null hypothesis is rejected.

This may be due to the male students get the opportunities to gain knowledge through smart class learning compared to female students. The frequent usage of electronic gadgets and high involvement in social media usage increase their eagerness for smart board usage. The male students show much interest in coming forward to use S Write available on the smart board this in turn helps the students and increases their curiosity to do the maths subject on the big screen and get reinforcement from the teachers and peer students. Compared to female student's male students enjoy seeing animated videos, rhymes and images this in turn helps to increase their creativity and learning by observing and learning by doing. The male students remember movies better than the lessons taught in the classroom. This type of teaching creates attention and interest in them. Learning in an authentic environment as well as in a virtual world had a positive impact on students' learning, especially in the field of emotion, including learning engagement, learning motivation and learning interaction.

Most of the male students enjoy the visual feast in the form of animations and videos glueing the visual learners to the interactive whiteboard while the class discussions and commentaries of video help the audio learners and touching and marking at the board suits the tactile learners. Hence there is a significant difference in the attitude of male and female primary school students towards technology integration in

curricular transaction in Radhapuram Assembly Constituency The result was contradicted by the study conducted by Moumita Dey (2019). In his study, he revealed that there is no difference between boys and girls in their achievement through learning in a smart classroom.

Interpretation related to finding no -5

There is no significant difference between rural and semi-urban primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.5, it is evident that the calculated t-value 1.080 is less than the table value 1.96 which is not significant at 0.05 level. Thus the null hypothesis is accepted. This may be due to the equal availability of resources found in both the rural and semi-urban areas. Learning through a smart classroom eventually helps to interact students with the images using cutting-edge technology like virtual reality. They also increase teaching and learning flexibility and improve the in-class experience for students. Hence there is no significant difference in the attitude of rural and semi-urban primary school students towards technology integration in curricular transaction in Radhapuram Assembly Constituency. The study supports the findings of Chhaya & Ravindra (2017) who discovered that the use of educational technology improves skills and cognitive traits. With the aid of new technology, learning and receiving new information has never been more explosive, especially on smart classroom devices.

Interpretation related to finding no -6

There is no significant difference between Tamil and English medium primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.6, it is evident that the calculated t-value 1.339 is less than the table value 1.96 which is not significant at 0.05 level. Thus the null hypothesis is accepted. This may be due to the fact that the learning materials are available in both Tamil and English languages. Students can avail the content based on their interests needs and language

requirements. It helps students to think beyond the textbook patterns of learning. Smart class gives importance to the audio-visual aspect and it creates insight in learning. It promotes the habit of self-learning creates curiosity and enhances knowledge of the students. Hence there is no significant difference in the attitude of Tamil and English medium primary school students towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Interpretation related to finding no-7

There is no significant difference between joint and nuclear family primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.7, it is evident that the calculated t-value 1.161 is less than the table value 1.96 which is not significant at 0.05 level. Thus the null hypothesis is accepted. This may be due to the fact that students in nuclear and joint family systems can learn better through visualization. All the students may not understand the teaching methodology of a teacher, but they can easily understand the concept through smart classes. This can be seen in the case of movies, i.e. students remember movies better than the lessons taught in the classroom. This type of teaching creates an attention called as interest in them. So smart class technique is absolutely better. Such teaching helps to maintain the students' interest and focus by engaging them fully for the entire learning experience. Secondly, from the parent's point of view, with the arrival of this digital initiative which is so practical to modern time and friendly to use, teachers can instantly evaluate/assess the learning achieved by their students in his/her class. If a concept taught is not understood then the teacher can repeat it with greater clarity and emphasis. This is supported by the study conducted by Thilagavathy, & Bala Ayyappan (2017). Hence there is no significant difference in the attitude of joint and nuclear family middle school students towards technology integration in curricular transactions in Radhapuram Assembly Constituency. In their study, they showed that there is no

change in the level of attitude towards the use of smart classrooms with respect to the family type of the students.

Interpretation related to finding no -8

There is significant difference between Government and government-aided primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.8, it is evident that the calculated t-value 3.038 is greater than the table value 1.96 which is significant at 0.05 level. Thus the null hypothesis is rejected. The mean attitude (48.45) of Government primary schools, is significantly higher than the mean attitude (47.26) of Government Aided primary schools. Hence the null hypothesis is rejected. This may be due to that the government school students are given ample space to use the technology on their regular basis, they also encourage students to participate in the spoken English classes based on their schedule allotted to them. Hence there is significant difference in the attitude of Government and government-aided primary school students towards technology integration in curricular transaction in Radhapuram Assembly Constituency. This study was supported by the study conducted by Manohari and Thangavel (2017), “A study on Scope of Smart Classrooms in the Government Schools functioning in and around Coimbatore” concluded that the scope of smart classrooms in State board schools. They concluded smart classroom enhance the interest of the student, benefits and is easy to understand.

Interpretation related to finding no -9

There is no significant association among boys, girls and coeducation primary school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.9, it is evident that the calculated ‘c2’ Value 2.984 is less than the table value 9.488 which is significant at 0.05 level. Thus the null hypothesis is accepted. This may be due to the reason that the boys, girls and co-education school students are encouraged to utilize the

resources available in the smart classroom and they gain knowledge on the subject content due to the hands-on learning experience. They are also involved in the game-based learning offered by smart class for each subject content. Hence there is no significant association in the attitude among boys, girls and coeducation primary school students towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Interpretation related to finding no -10

There is no significant association between the father's educational qualification of primary school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.10, it is evident that the calculated 'c2' value 3.295 is less than the table value 9.488 which is significant at 0.05 level. Thus the null hypothesis is accepted. Since the fathers accept the technological advancement in learning and are aware of recent technology compared to the mother, they are also focusing more on their children's futuristic educational growth. Children's academic achievements are observed by the father frequently, and he understands that learning through innovative classes makes education interesting. It creates an excellent platform for students to enhance their performance. Besides this, it helps students to understand the concept faster than verbal or written notes because visual images allow them to understand things more clearly and easily.

Interpretation related to finding no -11

There is no significant association between mother's educational qualification of primary school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency

From table 4.11, it is evident that the calculated 'c2' Value is 9.982 is greater than the table value 9.488 which is significant at 0.05 level. Thus the null hypothesis is rejected. This may be the reason that mothers are

aware of the benefits of technology integration in the student's academic success. Almost every family today have a computer/laptop/smartphone and children have access to those devices. The use of social media platforms has also increased than before. Mothers understand that smart class learning fulfils the needs and interests, space for optimum comfort to create learning and experience for students through activities like reading, writing, debating, watching videos and playing music. Compared to fathers Mothers show more interest in their children's studies and also they are very creative and good at TIAStic. Hence there is significant association between the mother's educational qualification of primary school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Interpretation related to finding no-12

There is no significant difference between male and female middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.12, it is evident that the calculated t-value 2.090 is greater than the table value 1.96 which is significant at 0.05 level. Thus the null hypothesis is rejected. The mean attitude (48.65) of female, which is significantly higher than the mean attitude (48.24) of male. Hence the null hypothesis is rejected.

This may be due to the fact that educational technology gives female students access to an individualized, adaptable, useful, and comfortable learning environment. It supports the teaching and learning process by stimulating interest. Additionally, it provides numerous illustrations, and models to comprehend their subjects. Through interactive and communication technologies, female student has enhanced their learning through technology. Hence there is significant difference in the attitude of male and female middle school students towards technology integration in curricular transaction in Radhapuram Assembly Constituency. This result is supported by the study conducted by Rupali Srivastava & Anuradha Sharma (2020). In their study, they showed that

Male and Female students differ significantly in their attitudes regarding the usage of technology in the classroom. The controlled and experimental group differs significantly in their attitude towards the usage of technology in the classroom.

Interpretation related to finding no -13

There is no significant difference between rural and semi-urban middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.13, it is evident that the calculated t-value 1.341 is less than the table value 1.96 which is not significant at 0.05 level. Hence the null hypothesis is accepted. This may be due to the reason that students feel happy to see technology integration as a part of their learning. They become more attentive to the class and focus on their studies. The distractions while learning are reduced compared to the conventional method of learning. Students use S-write to write their views and concept maps on the interactive boards. They also understand the concepts of science, social science and mathematics. They get excited and engaged during spoken English classes provided through Smart Classroom. This helps to understand the punctuation, grammar, intonation and conversation. English conversations grasp students' attention, spark their imagination and improve learning engagement in the classroom. Hence there is no significant difference in the attitude of rural and semi-urban middle school students towards technology integration in curricular transaction in Radhapuram Assembly Constituency. The result of the study reveals that a smart class learning environment is better for teaching both low achievers and high achievers than traditional classes. This result is supported by the study conducted by Jena, P.C. (2013) on the effect of a smart classroom learning environment on the academic achievement of rural high achievers and low achievers in science.

Interpretation related to finding no -14

There is no significant difference between Tamil and English medium middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.14, it is evident that the calculated t-value 1.412 is less than the table value 1.96 which is not significant at 0.05 level. Thus the null hypothesis is accepted. This may be due to the reason that vocabulary, reading and listening comprehension are enhanced in both the students. Learning activities through interactive digital stories helps them understand the language accents and speak English as a native speaker. Smart class learning helped to develop cognitive dimension, Reinforcement given to all students on every improvement in their tasks, Organization of the corrective activities, Formative tests conducted to find out the progress and Supplementary material provided to students. Intelligent agents to offer a tele-education experience and student modalities or sensory learning are increased due to the integration of technology in education. Hence there is no significant difference in the attitude of Tamil and English medium middle school students towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Interpretation related to finding no-15

There is no significant difference between joint and nuclear family middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.15, it is evident that the calculated t-value 1.087 is less than the table value 1.96 which is not significant at 0.05 level. Thus the null hypothesis is accepted. Smart learning classes help students think ingeniously collaboratively and make iterative adjustments as needed. Smart learning classes create a space that provides emotional support to students. It boosts students' team activities and builds social and emotional skills like cooperation, empathy, etc. Gamification, a vital aspect of intelligent learning, allows students to enhance their potential to interact and play in a virtual space and strengthen the bonds between

their peers. Hence there is no significant difference in the attitude of joint and nuclear family middle school students towards technology integration in curricular transaction in Radhapuram Assembly Constituency. This result is supported by the study conducted by Thilagavathy & Ayyappan B (2017) surveyed Education High School Students' Attitudes towards the Use of Smart Classroom. Their analysis revealed no significant difference between the Students' Attitudes towards using Smart Classroom at the pre-test and post-test concerning their family type.

Interpretation related to finding no -16

There is no significant difference between Government and Government Aided middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.16, it is evident that the calculated t-value 2.017 is greater than the table value 1.96 which is significant at 0.05 level. Thus the null hypothesis is rejected. The mean attitude (48.72) of Government middle school, which is significantly higher than the mean attitude (48.68) of Government Aided middle school. Hence the null hypothesis is rejected. This may be due to the fact that the creation of a diverse learning environment helps to build a smart and multidisciplinary student-centric education system, which is able to create adaptive learning programs for students. Hence there is significant difference in the attitude of Government and Government Aided middle school students towards technology integration in curricular transaction in Radhapuram Assembly Constituency. This result contradicted the study conducted by Pooja Basumatary (2022), who conducted a study on the perception of the stakeholders of secondary schools of Assam on smart classes and their impact on students' learning outcomes in the study they showed that there is a significant difference in the mean scores of CBSE and SEBA students in the perception on smart class.

Interpretation related to finding no -17

There is no significant association among boys, girls and coeducation middle school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.17, it is evident that the calculated 'c2' Value 3.109 is less than the table value 9.488 which is significant at 0.05 level. Thus the null hypothesis is accepted. This may be due to the reason that the boys, girls and co-education students are encouraged to utilize the resources available in the smart classroom and they gain knowledge on the subject content due to the hands-on learning experience. They are also involved in the game-based learning offered by smart class for each subject content. Hence there is no significant association in the attitude among boys, girls and coeducation middle school students towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Interpretation related to finding no -18

There is no significant association between father's educational qualification of middle school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.18, it is evident that the calculated 'c2' value 3.171 is less than the table value 9.488 which is significant at 0.05 level. Thus the null hypothesis is accepted. This may be due to the reason that smart classroom learning improves skills and cognitive traits. With the aid of new technology, learning and receiving new information has never been more explosive, especially on smart classroom devices. Hence there is no significant association between father's educational qualification of middle school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency. This study is supported by the study conducted by Bachitra & Ahrar(2017), who discovered that smart classes are more effective than traditional ones for teaching students and that their achievement levels are higher. Because an interactive whiteboard

engages all three senses sight, sound, and touch students learn most effectively through this sense.

Interpretation related to finding no-19

There is no significant association between mother's educational qualification of middle school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.19, it is evident that the calculated 'c2' Value is 10.120 is greater than the table value 9.488 which is significant at 0.05 level. Thus the null hypothesis is rejected. This may be due to the fact that from the mother's point of view, lessons can be explained much better visually with pictures and figures and have the children repeat them. Compared to fathers, mothers are very interested in their children's learning through smart classes and they can better remember their subject content and also provides benefits in many areas such as its suitability for students with different learning styles, providing education in accordance with individual differences, providing rich content, contributing to learning difficulties, providing education independent of time and space, etc. Hence there is significant association between mother's educational qualification of middle school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Interpretation related to finding no-20

There is no significant difference between male and female high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.20, it is evident that the calculated t-value 2.566 is greater than the table value 1.96 which is significant at 0.05 level. Thus the null hypothesis is rejected. The mean attitude (44.91) of male, which is significantly higher than the mean attitude (44.69) of female. Hence the null hypothesis is rejected. This may be due to the reason that male high school students have sparked an enhancement in students' Academic performance than the female high school students. The language used

in the smart classroom helps to improve the language skills. It enables male students to set their own pace of study, is interactive, encourages them to collaborate, encourages creativity, and male students are able to use the web portal to search for information. Male students can understand and visualize the context more easily, which will subsequently improve their performance. Hence there is significant difference in the attitude of male and female high school students towards technology integration in curricular transaction in Radhapuram Assembly Constituency. In the study conducted by Kocak (2013), he examined the relationship between individuals' demographical backgrounds and their attitudes towards the interactive board, it was found that the participants' attitudes did not cause any significant difference in terms of gender.

Interpretation related to finding no -21

There is no significant difference between rural and semi-urban high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.21, it is evident that the calculated t-value 0.126 is lesser than the table value 1.96 which is significant at 0.05 level. Thus the null hypothesis is accepted. This may be due to the reason that the teaching-learning environment for both rural and semi-urban high school students is richer and more effective. The 2D and 3D digital content in the smart board is accessed by the students right in the classroom and projected on a whiteboard, to elucidate and explain critical concepts, across virtually all subjects. Hence there is no significant difference in the attitude of rural and semi-urban high school students towards technology integration in curricular transaction in Radhapuram Assembly Constituency. This result is supported by the study conducted by Thilagavathy, & Ayyappan (2017) on education high school students' attitude towards the use of smart classrooms. In their study, they revealed that There is no significant difference between the students' attitude towards the use of smart classrooms at the pre-test and post-test with respect to their locality of the school environment.

Interpretation related to finding no-22

There is no significant difference between Tamil and English medium high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.22, it is evident that the calculated t-value 1.402 is lesser than the table value 1.96 which is significant at 0.05 level. Thus the null hypothesis is accepted. This may be due to the reason that availability of the resources in both languages helps the students to gain computer-based skills, and improves retention, critical thinking, recall, reasoning, motivation, better understanding, imagination and adaptation. Learning through this unique technology gives the students more varied, creative and attractive instructional materials, increasing pleasure

and motivation, and facilitating students' participation in class. Hence there is no significant difference in the attitude of Tamil and English medium high school students towards technology integration in curricular transaction in Radhapuram Assembly Constituency. This result supported by the study conducted by Srimathi and Jayanthi (2022) conducted a study on smart classroom knowledge of the higher secondary school teachers in Vellore District. In their study, they showed that there is no significant difference in smart classroom knowledge between the higher secondary school teachers where medium of instruction was in the English medium and in the Tamil medium.

Interpretation related to finding no-23

There is no significant difference between joint and nuclear family high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.23, it is evident that the calculated t-value 1.321 is less than the table value 1.96 which is not significant at 0.05 level. Thus the null hypothesis is accepted. This may be due to the reason that both nuclear and joint family members understand that learning through a smart classroom enhances the skills namely Information Communication skills, critical thinking or higher order thinking skills, software and hardware utilization, and general learning skills. It also

provides the student ample space to use the internet for searching related learning subject content. Audio-visual form of content available in the smart classroom provides a better understanding of the subject content as students learn better when a teacher uses both words and pictures together while explaining. Learning becomes more enjoyable for the students, increases students' interest and motivation for their active participation in the class, improves their retention for a longer period of time and improves their learning outcomes. Hence there is no significant difference in the attitude of joint and nuclear family high school students towards technology integration in curricular transaction in Radhapuram Assembly Constituency. This study is supported by the study conducted by Thilagavathy and Ayyappan (2017) on Education high school students' attitude towards the use of smart classrooms. In their study, they found that there is no significant difference in the student's attitude towards the use of Smart Classroom between the pre-test and post-test level with respect to their family type.

Interpretation related to finding no-24

There is no significant difference between Government and Government Aided high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.24, it is evident that the calculated t-value 0.123 is less than the table value 1.96 which is significant at 0.05 level. Thus the null hypothesis is accepted. The interactive features in the smart classroom allow both the government and government-aided high school students to interact with the screen, make changes to anything seen on the screen and save them. Audios, videos, animations, colours, images and zooming make lessons more visual and entertaining. The capabilities of the smart board help the students recognize mistakes or common misconceptions and undo them to correct them. Hence there is no significant difference in the attitude of Government and government-aided high school students toward technology integration in curricular transaction in Radhapuram Assembly Constituency. This study

contradicted the study conducted by Ilavarasi and Premila (2022) on Attitude towards classroom and online learning at high school level. In their study, they found that there is significant difference among Government, Government-Aided and Private schools with respect to factors of attitude towards classroom learning.

Interpretation related to finding no -25

There is no significant association among boys, girls and coeducation high school students in their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.25, it is evident that the calculated 'c2' Value 1.946 is less than the table value 9.488 which is significant at 0.05 level. Thus the null hypothesis is accepted. This may be due to the reason that students learn difficult and abstract curriculum concepts by watching highly engaging visuals and animations. This makes learning an enjoyable experience for students while improving their overall academic performance. In turn, it provides quality education to students by helping them in better concept formation, concept elaboration, improvement in reading skills and academic achievement. Students benefit by singing the instructional material, 3D animated modules and videos, and activity-based learning. They are thrilled at this concept of innovation and interactive teaching-learning process and their learning becomes more enjoyable. Hence there is no significant association in the attitude among boys, girls and coeducation middle school students towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Interpretation related to finding no-26

There is no significant association between father's educational qualification of high school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.26, it is evident that the calculated 'c2' value 0.640 is less than the table value 9.488 which is significant at 0.05 level. Thus the

null hypothesis is accepted. This may be due to the reason that fathers understand the significance of digital learning environments for the academic success of their children. They found that audio-visual classes transcend the boundaries of location, time and space providing a flexible learning environment. They know that this sort of technology involvement will cater for the needs of every single student and it also helps to grab the attention of students. Hence there is no significant association between the father's educational qualification of high school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

Interpretation related to finding no -27

There is no significant association between mother's educational qualification of high school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

From table 4.27, it is evident that the calculated 'c2' value 2.646 is less than the table value 9.488 which is significant at 0.05 level. Thus the null hypothesis is accepted. This may be due to the fact that the use of technology in education provides opportunities such as providing the opportunity to review information, providing easy access to information, providing visual content by supporting multimedia applications, contributing to lessons and education, helping learning and understanding, while some mothers argued that technology saves time, that it contributes to language development, helps to understand the lesson, and some mothers stated that it also provides benefits in many areas such as its suitability for students with different learning styles, providing education in accordance with individual differences, providing rich content, contributing to learning difficulties, providing education independent of time and space, etc. Hence there is no significant association between mother's educational qualification of high school students and their attitude towards technology integration in curricular transaction in Radhapuram Assembly Constituency.

5.4. EDUCATIONAL IMPLICATIONS

Today is the age of science and technology. The classroom has to have a different shape in times to come. It is to be just like a laboratory where different hardware such as a projector, tape recorder, recorder player, overhead projector, epidiascope, computer etc. is lying. Different type of software is also available to improve the process of teaching and learning. Now the classrooms have totally changed, a shy and inhibited learner in the educational system has become a more active and social student in the modern classroom. This has become possible only through the use of new techniques and innovations in the classroom. Normal classrooms have turned into SMART CLASSROOMS. In the absence of hardware and software, the classrooms will be considered traditional ones. Surely the classroom in the 21st century has to be modern from every angle.

- The smart classroom should be used in the schools to make them aware of the optimum use of technology in their studies.
- The curriculum in the whole academic activities should be connected to the smart class.
- The teacher should make proper use of smart class to clarify the topic.
- The projects, seminars and home assignments, all should be given by taking digital learning into account.
- New concepts and up-to-date information should be given to students through the Smart class.
- All schools must have smart classes and each individual must be given a chance to use the smart class.
- The guidance of teacher must be there with students while using smart class so that they do not get distracted from the right path.
- Training should be organized to provide the teachers with updated knowledge of smart classes in the classroom so that they in turn able to motivate their students for their successful academic achievement.
- Students should be given the proper instruction related to the topic before using smart class and they should be about the benefits of

using the smart class. Smart classroom learning helps to increase the learning abilities.

The techno-visionaries have prophesied that education is the future where the students get a personalised learning environment and instantaneous feedback. The study shows that there is significant effect of Smart Class on academic achievement. Students learn well from using technology and from doing hands-on activities. Interactive whiteboards promote active student engagement in the learning process and have been described as being one of the most revolutionary and powerful teaching techniques using technology.

5.5.RECOMMENDATIONS

Today, we depend on technology for almost everything. And why not, technology makes our life easier, better, and more comfortable in every way. The way forward comes with digital integration. The old concept of a classroom, with books and a blackboard, cannot make sense in this new age of fast development. We need smart classrooms that can meet the needs of a generation of smart students who have grown up playing with a smartphone or a tablet. Generation X has grown up with smart technology, they need their schools to grow at their pace. Smart classrooms support customized education. This is why smart classrooms are the most effective educational tool today. The following recommendations are made on the basis of findings and the empirical knowledge gained by the investigators in the present study.

The installation of smart classrooms for the Government and Government aided schools in Radhapram Assembly Constituency in Tirunelveli District under the firm effort taken by **Tamil Nadu Assembly Speaker Thiru M. Appavu** and inaugurated by the **Honourable Chief Minister Thiru M. K. Stalin**.

The results of this study provide the following recommendations

The findings of the present study reveal that the achievement of the students has improved to a significant level with the support of

technology as well as teachers. Teachers should not rely upon lecture methods and other traditional methods of teaching. They must use Information and Communication Technology for teaching. Teachers should get rid of technophobia and be familiar with the aspects of modern technology. They can prepare their own packages according to the needs of their students. In addition, teachers must have a favourable attitude towards the use of modern technology in the classroom.

The present study reveals that the teacher acts as a catalyst in the smart classroom. The active participation of the teacher in the smart classroom improves the achievement of the students to a significant level. Therefore, the management should encourage teachers to teach through smart classrooms. The teacher is the right person to evaluate the capabilities of his students and can fulfil their needs. In order to improve the quality of education, the suggestions of the teachers must be implemented. For the proper implementation of this technique, the head of the institution and the management must constantly support the teachers.

In addition, good quality in-service training should be given to the teachers for the successful implementation of smart classroom teaching. The training programme should be planned well in such a way as to enhance all the teachers to operate the smart classroom. A special timetable for the smart classroom should be prepared to extend the benefit to all the students. It is essential to inspect the usage of smart classrooms with the help of authorities.

As attitude plays an important role in learning, the attitude of students is very important for the successful implementation of new technology. This study reveals that the students who are the main clients of the educational system had accepted the innovative method of teaching. This study also reveals that students had developed a favourable attitude towards subjects. Students' attitude towards a subject determines their success in that subject. In other words, a favourable attitude results in good achievement. So, students should develop a favourable attitude towards smart classrooms as well as in their subjects.

Results showed that teaching becomes effective using smart class so teachers should be motivated to use smart class approach in their teaching. Emphasis should be placed on making teachers techno-competent. Training should be given to teachers for the pedagogical use of smart classes. Technical assistance should be provided in each school so that they can assist teachers with the technical problems of smart class.

The present investigation shows that this shift from a traditional ‘chalk and talk’ method to a Smartclass teaching method not only enriches teaching-learning of the classroom, it also improves their achievement in their subjects in a significant way. It shows that the Smartclass teaching method proves to be more successful in its effectiveness on achievement compared to the traditional classroom method. It proves more practical and is widely acceptable to learners. It also minimises individual differences and enables all types of learners to perform better. It has many other advantages. Smartclass can be substituted for almost anything in the classroom: blackboard, charts, book, TV, encyclopedias, models, maps, library and many more.

Smartclass can be used as a supplement in a large group classroom teaching. It is easier to control learners in Smartclass than in the traditional classroom. Smartclass can be used individually, in small or large groups by the teachers. Smartclass suggests a new role for the teacher. Earlier the teacher who used to be the only source of information for the passive learners in the classroom has now changed to a facilitator in the teaching-learning process and brings a whole world of knowledge into the classroom.

Smartclass helps students in active learning and draws diagrams easily and accurately. It takes the learners in real-life situations. Smartclass monitor the involvement of learners of all levels; high achievers, average and low level achievers and learners can be motivated for better performance. It can be used to enhance teaching by presenting information in different ways and in different forms. Students can manipulate and make changes to information so that they can develop an understanding of the relationship between different types of

information or through the process of changing that information dynamically. Smart class-used learning sessions in class may act as a source of edutainment (education plus entertainment) as well. The sessions may include games, and recreational activities like solving puzzles and riddles and holding group discussions on some general topics related to current affairs to create more interest among students. So special infrastructure like a separate classroom with an uninterrupted free internet connection will help to enhance the learning experience for the students. Smart class can be considered as a big agent for change in education, and there is a possibility for research in this area of research. Smart class-based teaching can replace the traditional teaching methods and make it more effective. The findings show that Smart classes in the Radhapuram play a very important role in teaching-learning, so, educationists should develop a clear understanding of the conditions, circumstances, means and mechanisms through which Smart class can be closely connected to young students, particularly for teaching and learning.

Smart classrooms can be one of the best mediums to be used for experiential learning. Experiential learning has been emphasized in the recent years; therefore, the school and teachers training institutions should make sure to train the prospective teachers to use the smartboard as a teaching aid for experiential pedagogy.

- Teachers should be motivated to use the smart class approach in their teaching.
- Emphasis should be given on making teachers techno-competent.
- Training should be given to teachers for the pedagogical use of smart classes.
- Technical assistance should be provided in each school so that they can assist teachers with the technical problems of smart class.
- Teachers should have a clear idea of how a traditional classroom is different from a classroom that is equipped with a Smart Board.

- Over-reliance on technology by teachers is also an important issue to be taught in teacher training institutions.
- Teachers should be trained on switching their pedagogy from technology to traditional methods or vice-versa and still sustain the students' motivation and interest.
- To remove the inhibition or fear of using technology in the smart classroom, various workshops, seminars and training programs should be conducted. These programs should be made available to the in-service and pre-service teachers.
- Teacher training institutions should ensure to install the smartboard in their institution and give hands-on experience to the prospective teachers.
- The Smartboard should be installed in the schools and made available to all the students irrespective of their class and subject opted.
- Technological-based classrooms also require well-trained staff. For this purpose, training should be provided to the non-teaching staff also. Backup (in the form of spare media, generator facility and inverter connection) should be ensured in educational institutions.
- Awareness of the e-content development programme may be organized for the teachers.
- Teachers may be allowed to attend orientation or refresher courses so that they will be familiar with the internet and its uses.
- Orientation programmes are conducted for the pupils which should improve the pupil's social interaction.
- Students should be motivated to participate in co-curricular activities.
- The curriculum should be framed according to the needs of pupils and give attention to each and every student.
- Special opportunities should be given to the students to develop their knowledge in the Technology field.

- Special lectures on blogging and web 3.0 technology may be organized for the teachers.
- Digital lesson plans may be made mandatory for the teachers so that they use technology in their classroom.
- Teachers must develop e-modules on their specialised topics which can be shared among the learners through social networks.
- The teachers must be provided with individual desktops with an internet connection.
- Teachers must encourage their students to use social networking sites for their learning purposes.
- Teachers must create groups and post pictures and concepts related to their subjects.
- The curriculum should be framed keeping in view the application of smart classes of teaching.

5.6. SUGGESTIONS FOR FURTHER STUDY

This study could be reproduced to find out how Smart class teaching affects the various abilities of the students in cognitive, emotional, social, personal and motivational aspects.

- There is a need to investigate the Smart class teaching method with other methods of teaching at the higher secondary level.
- The study could be reinvestigated on a larger sample for validation and for a longer duration of time to study the effects on non-cognitive variables like social skills or some personality variables which take more time to bring about a change.
- There is a need to study the combined effects of Smart class used teaching with other private institutions.
- Research is needed to study the effect of Smart class on special groups of learners e.g. gifted, the learning disabled and other special groups' students.

5.7.CONCLUSION

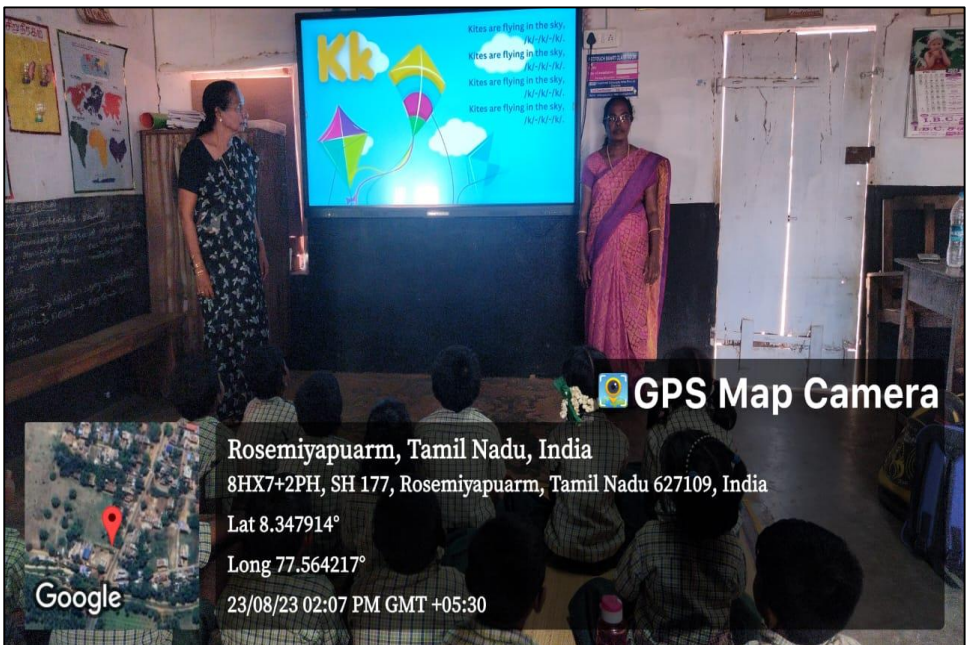
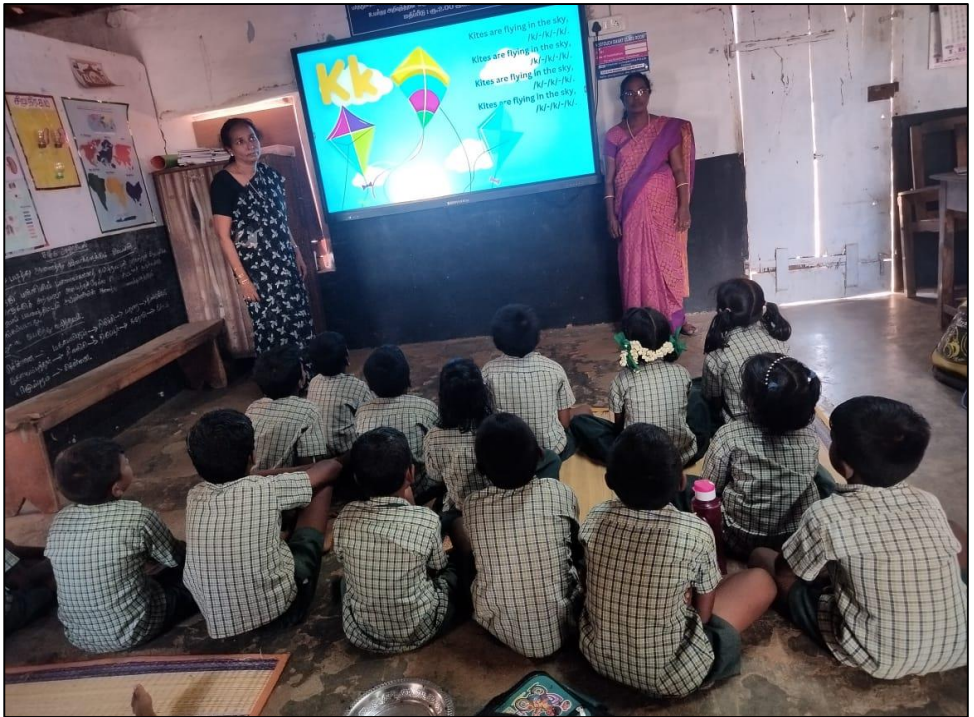
Smart class is bringing digital revolutions in the classrooms. Teaching and learning has indeed become very interesting and effective. Education through new technology like the smart class has made it easier for the teachers to relate the subject to the pupils and the pupils are very receptive to it. The result of this study showed that learning through smart class is more effective in comparison to traditional classrooms as the achievement level of students taught through smart class is higher than the traditional class. It is because interactive whiteboards appeal to all three senses i.e. sight, sound and touch which help the students to learn best through these dominant senses. It was found that the level of achievement is continuously higher in smart class learners than the traditional class learners. This supports that tough or complicated topics of subjects are also effectively taught by using smart classes. In each post-test, the achievement level of the smart class learner is higher than the achievement of the traditional class learner. This may be because the multimedia aspect of smart class is advantageous in increasing the engagement and attention span of learners. The smart classroom and e-learning is a one stop resource for learners to get diverse ideas related to their interest and subject enquiries. Web-based multimedia e-learning environments has added new dimension in designing course content as well as generating new dimensions in the teaching learning processes at school level. Smart classrooms are generally technologically and electronically enhanced classrooms in which teaching learning practices are manifested by the method of e-Learning. Through smart classroom learning potential opportunities are created for active cognitive and social participation for school students.

PHOTO GALLERY





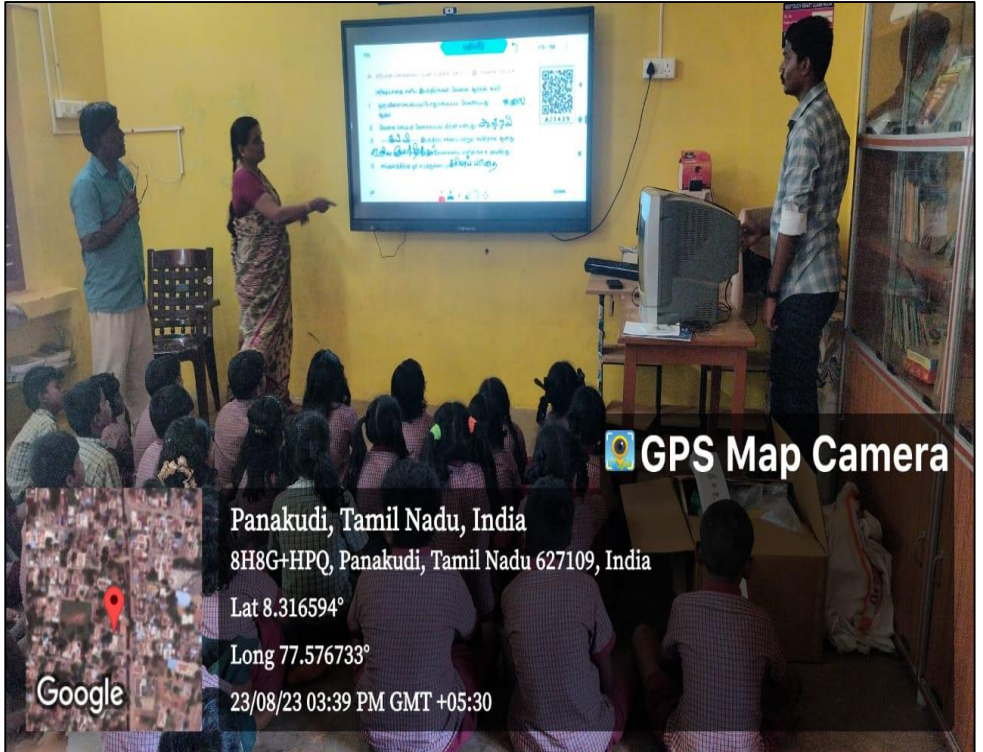
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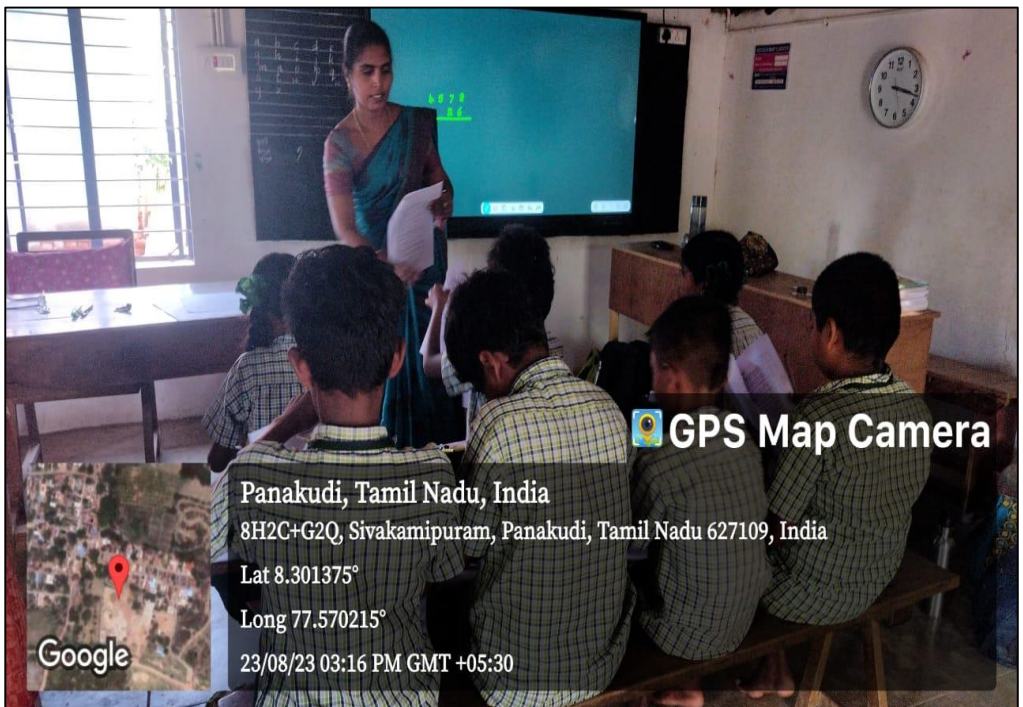
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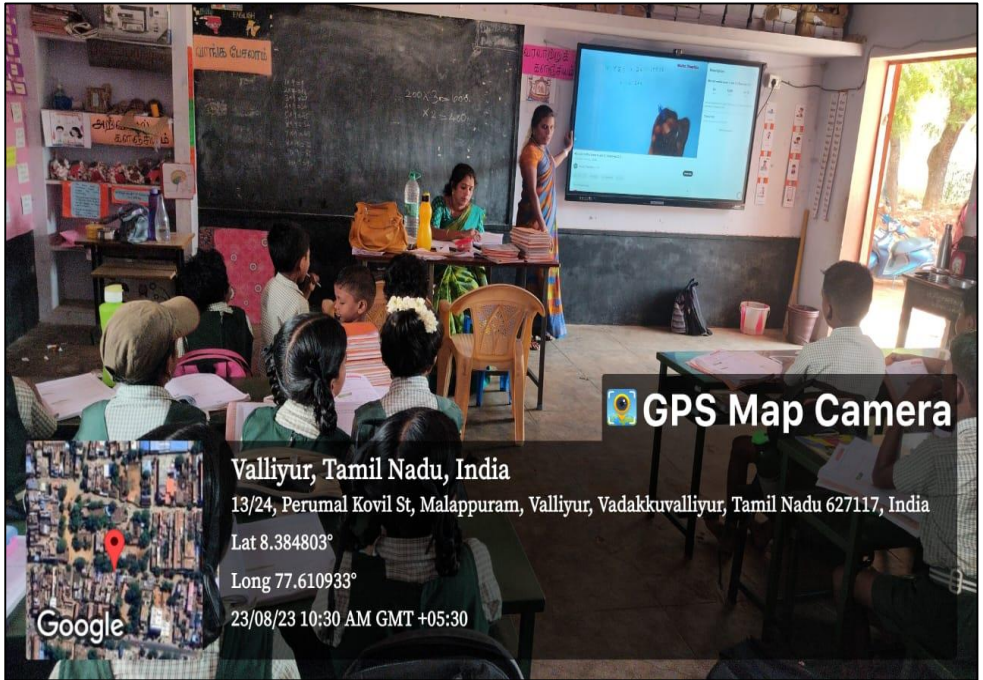
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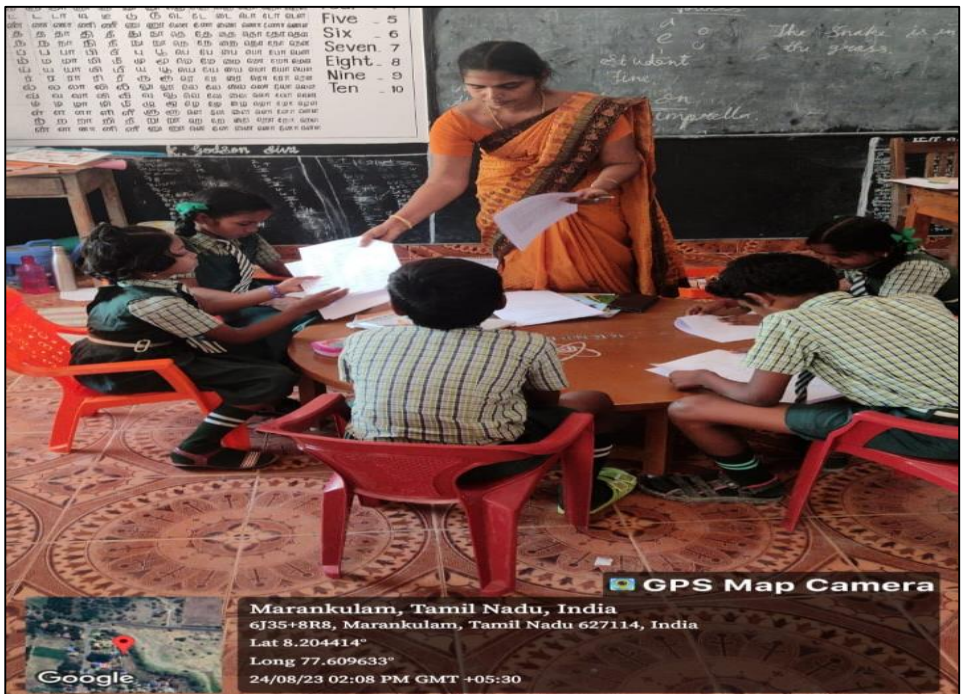
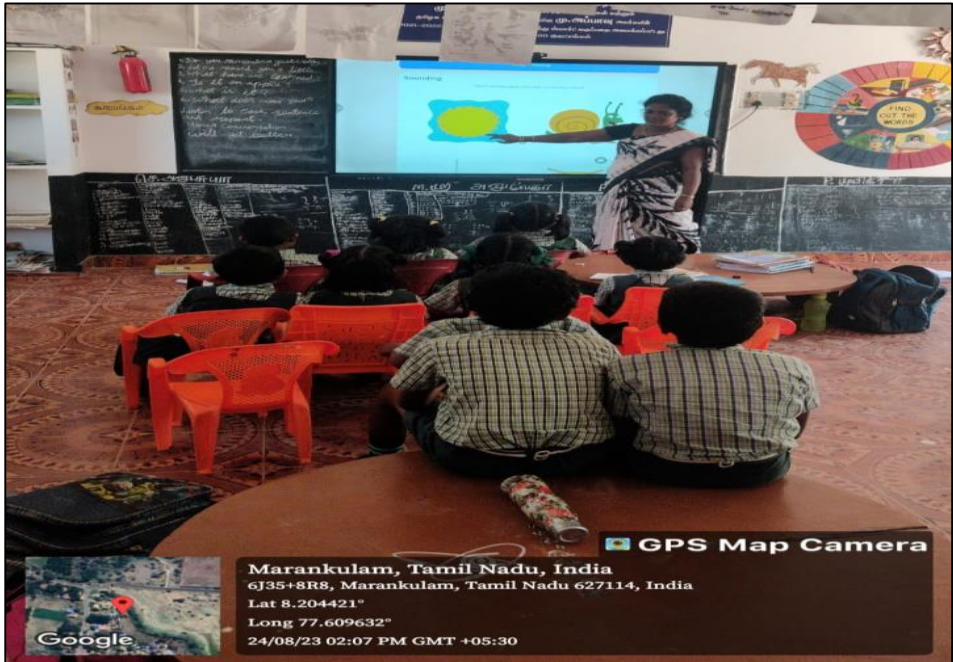
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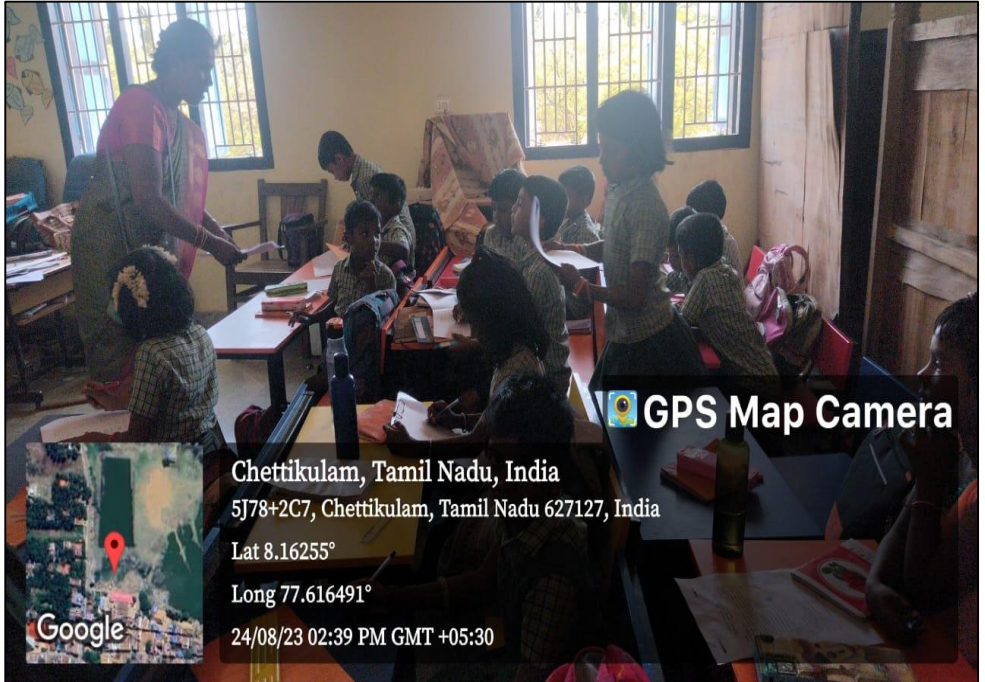
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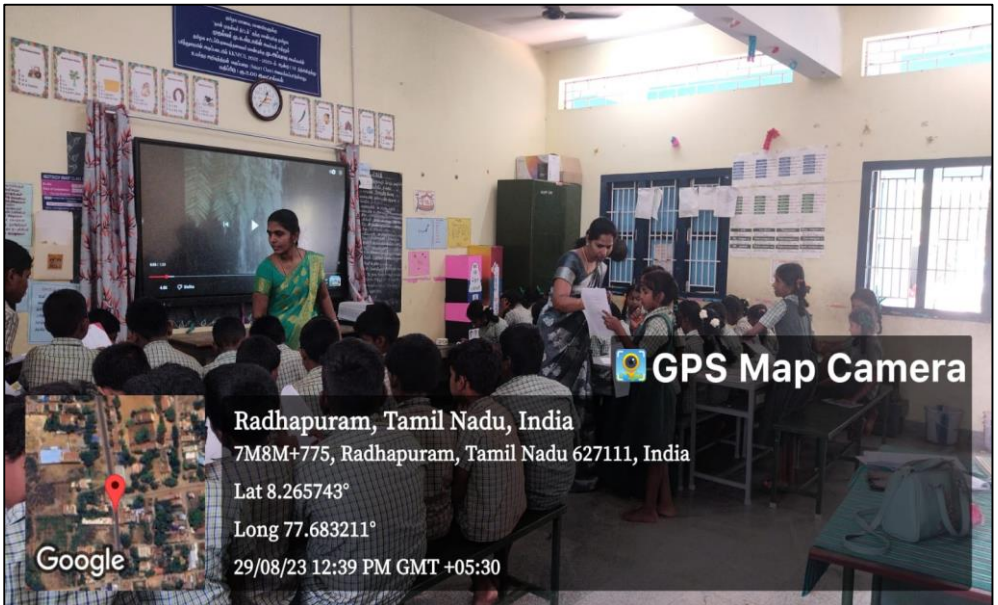
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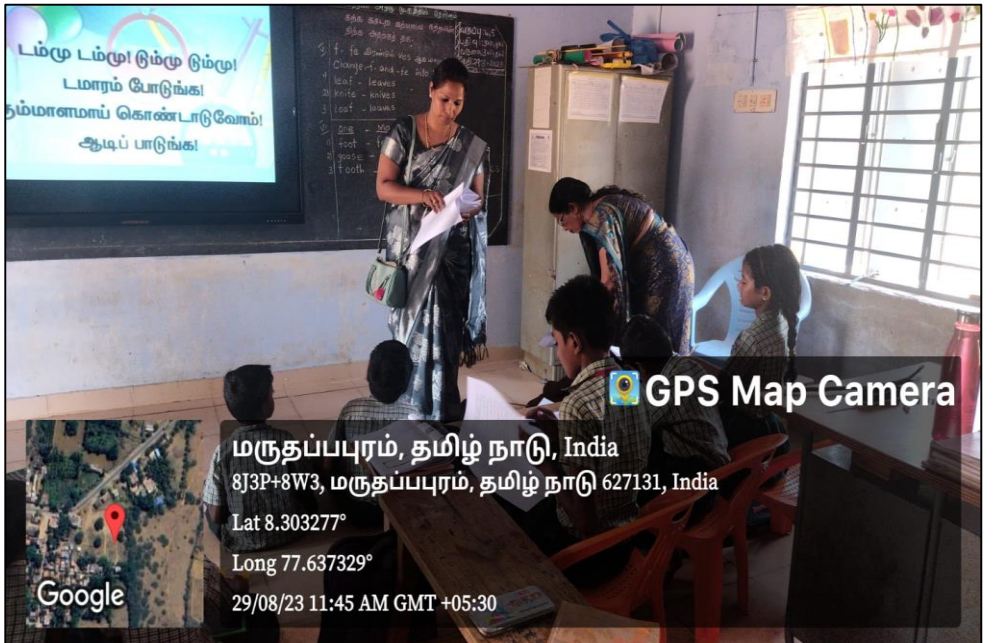
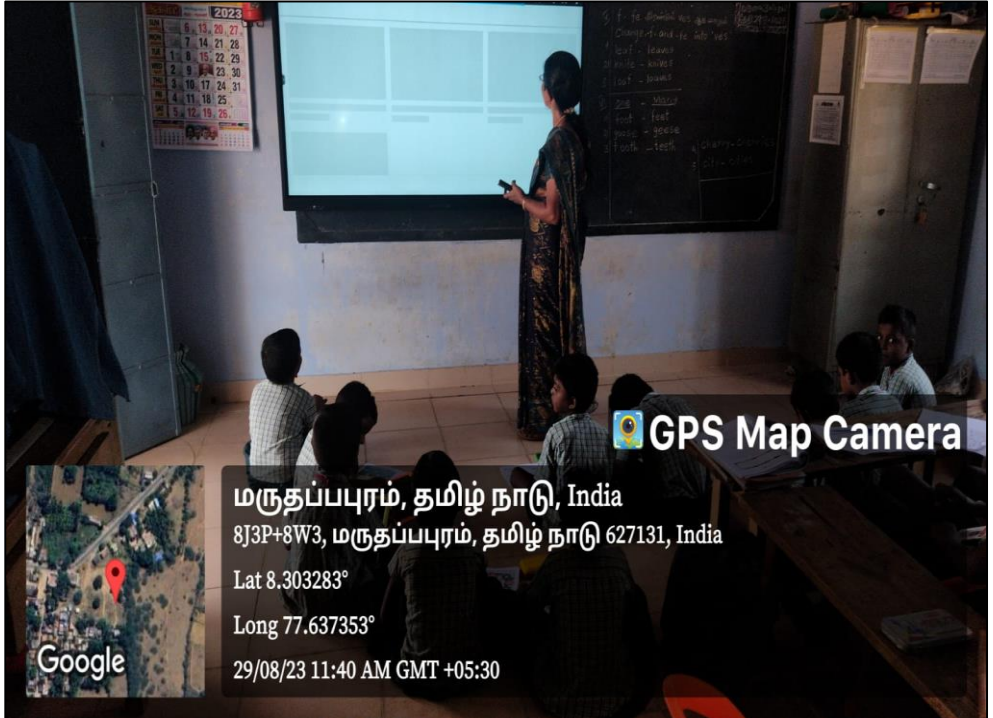
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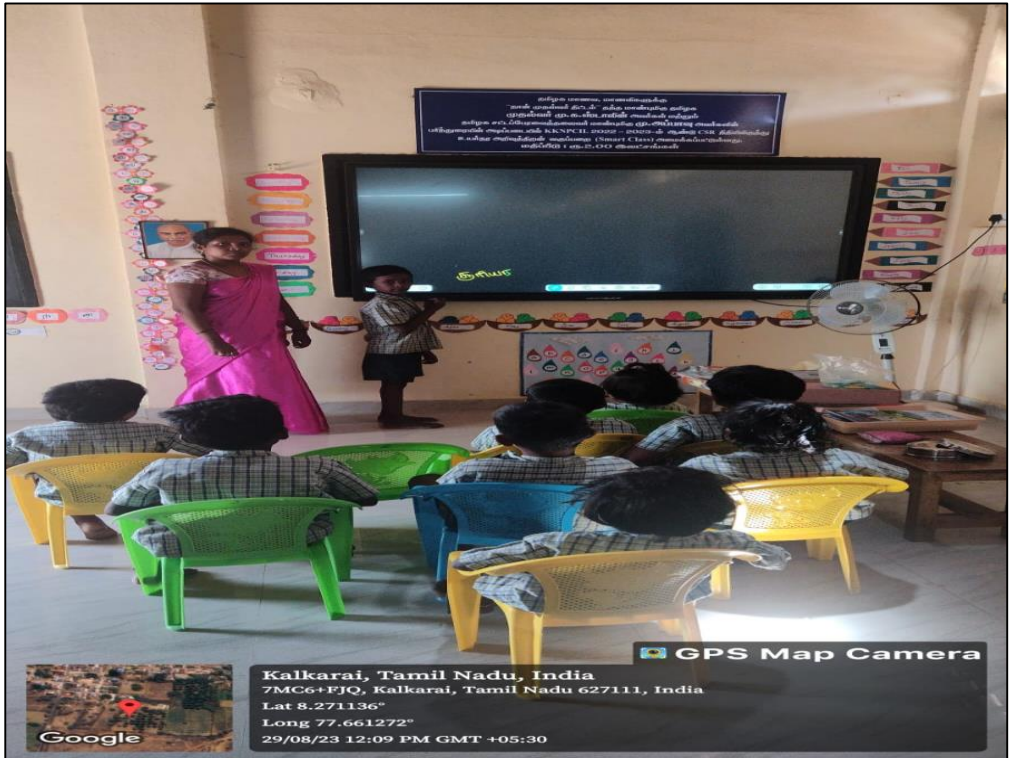
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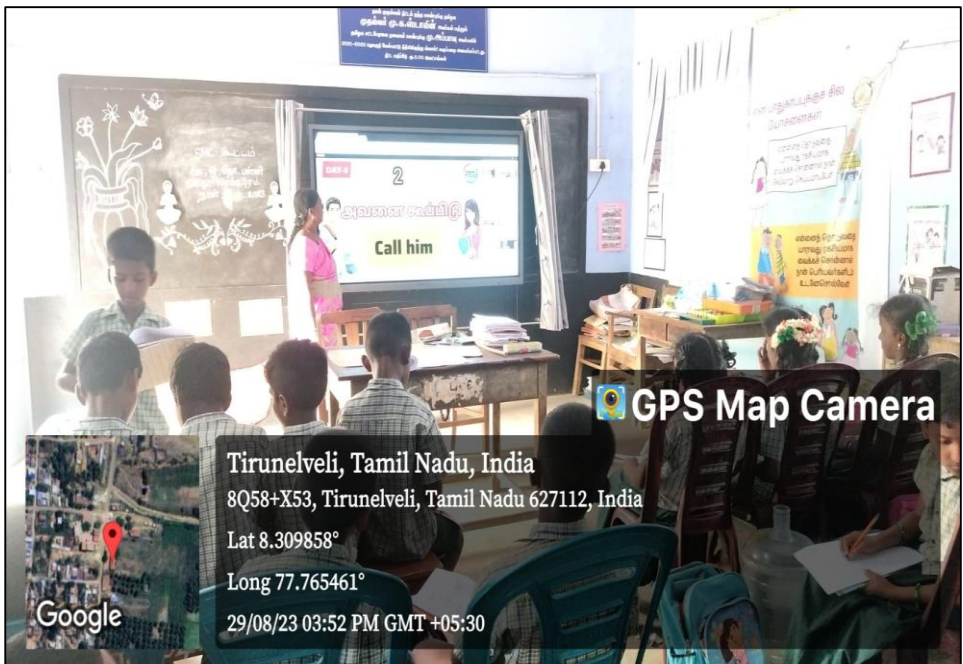
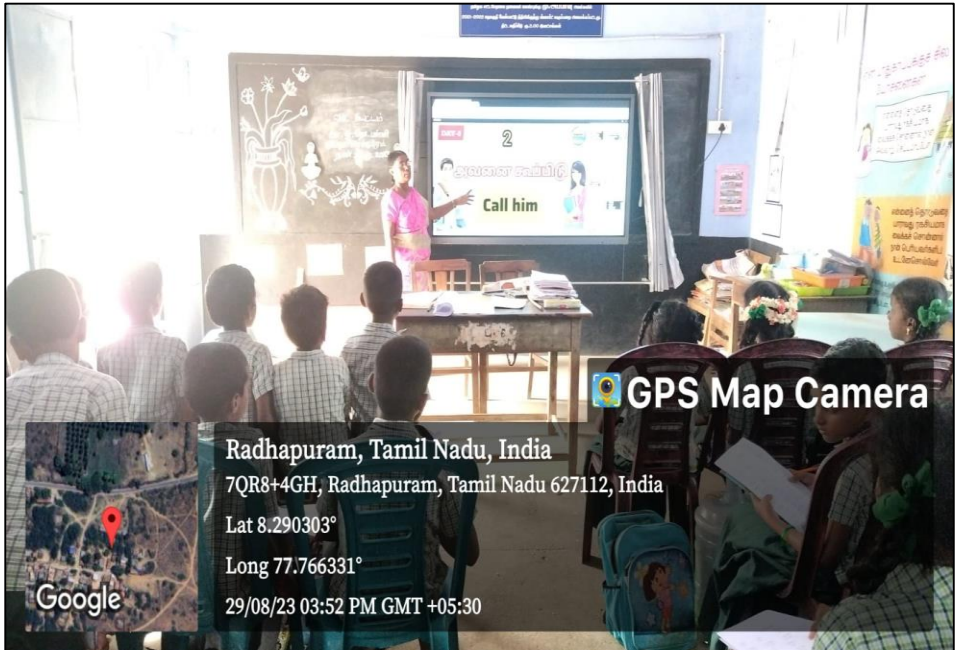
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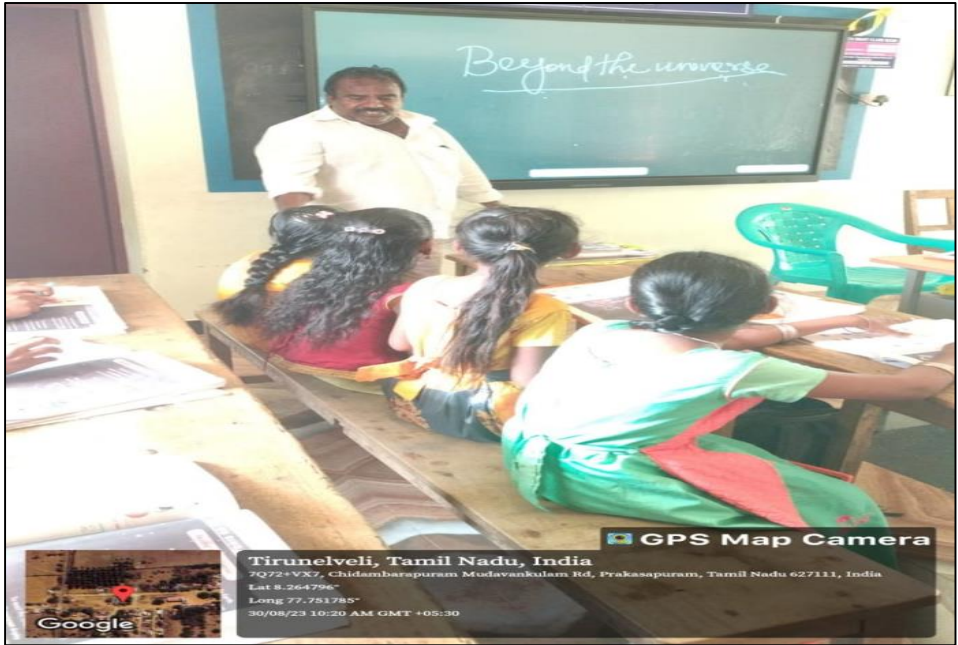
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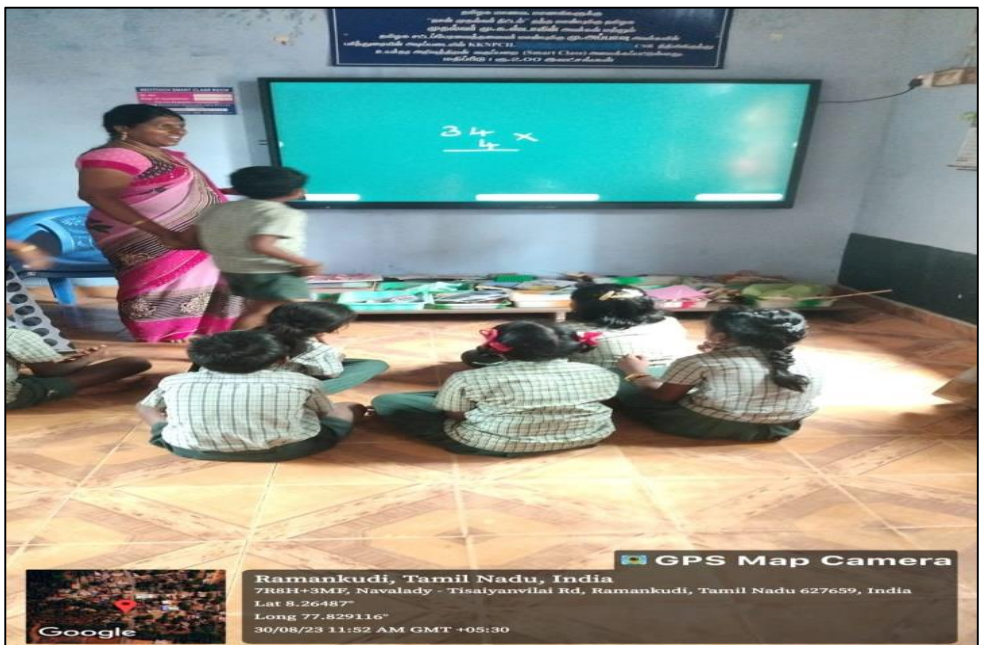
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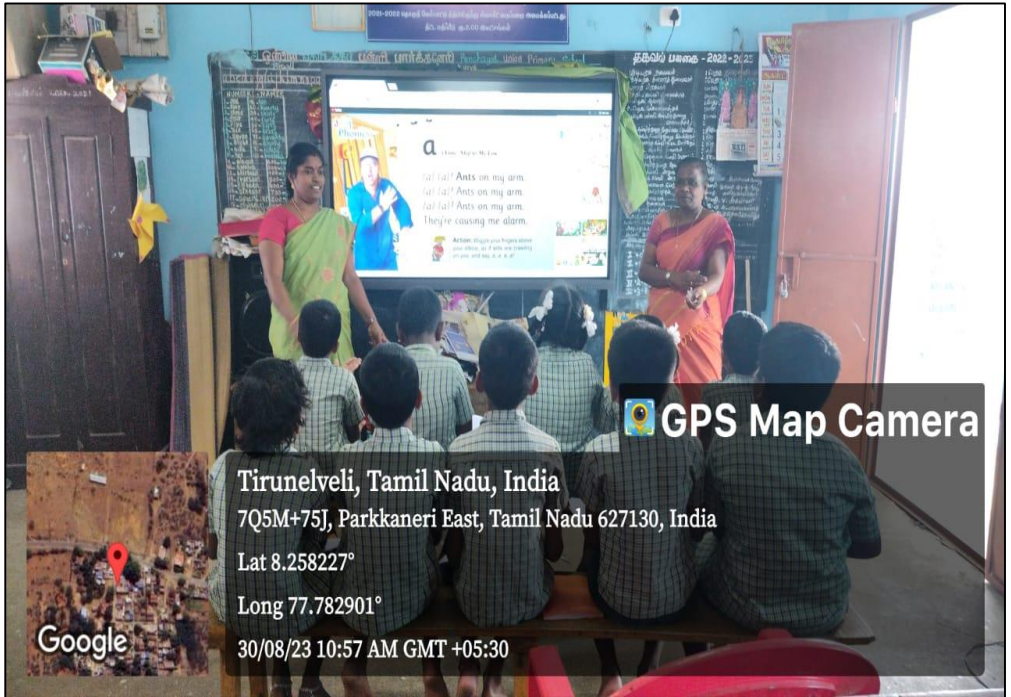
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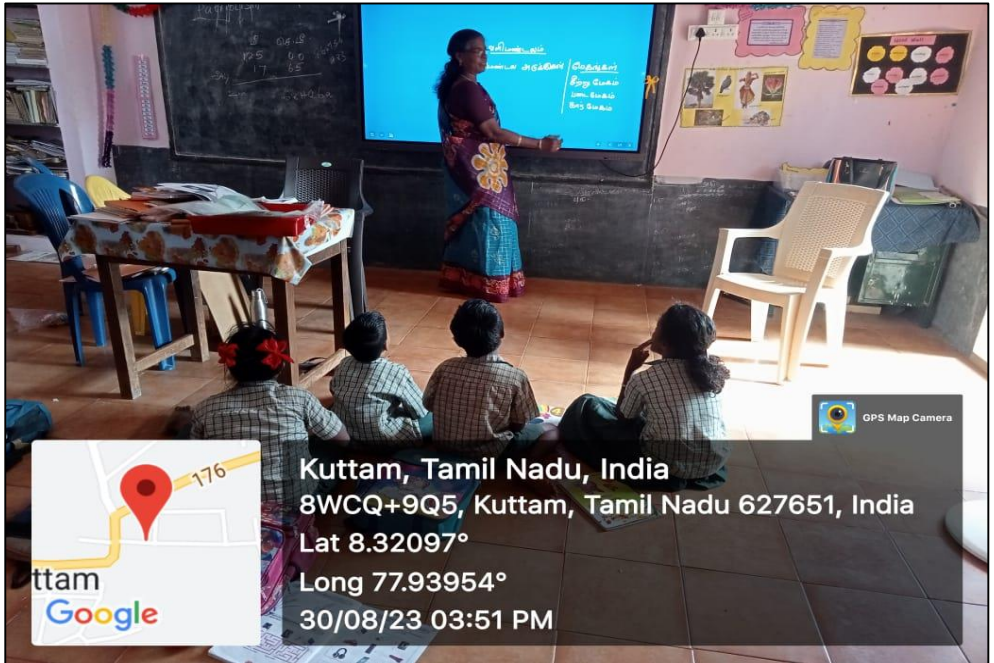
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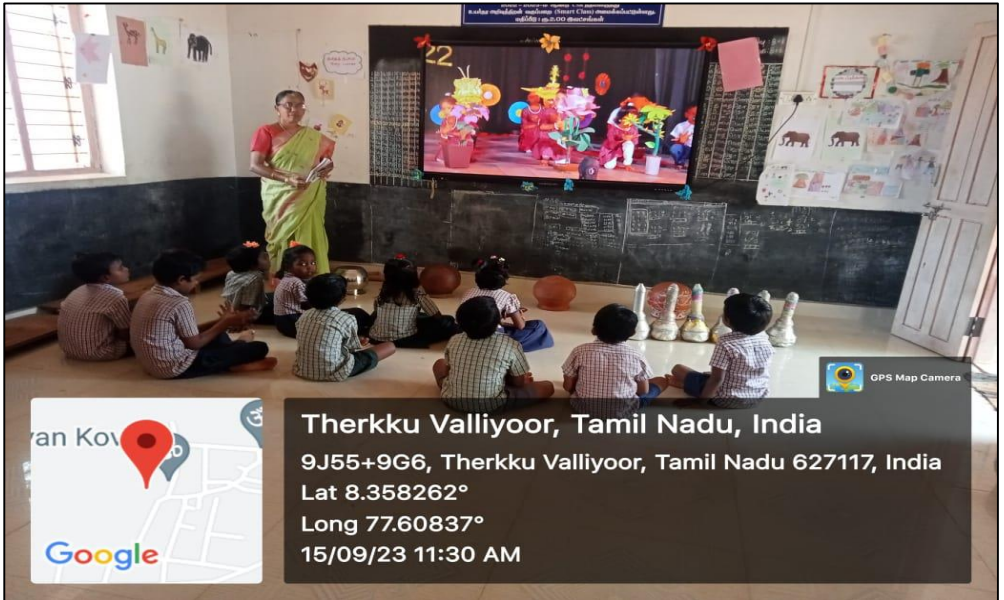
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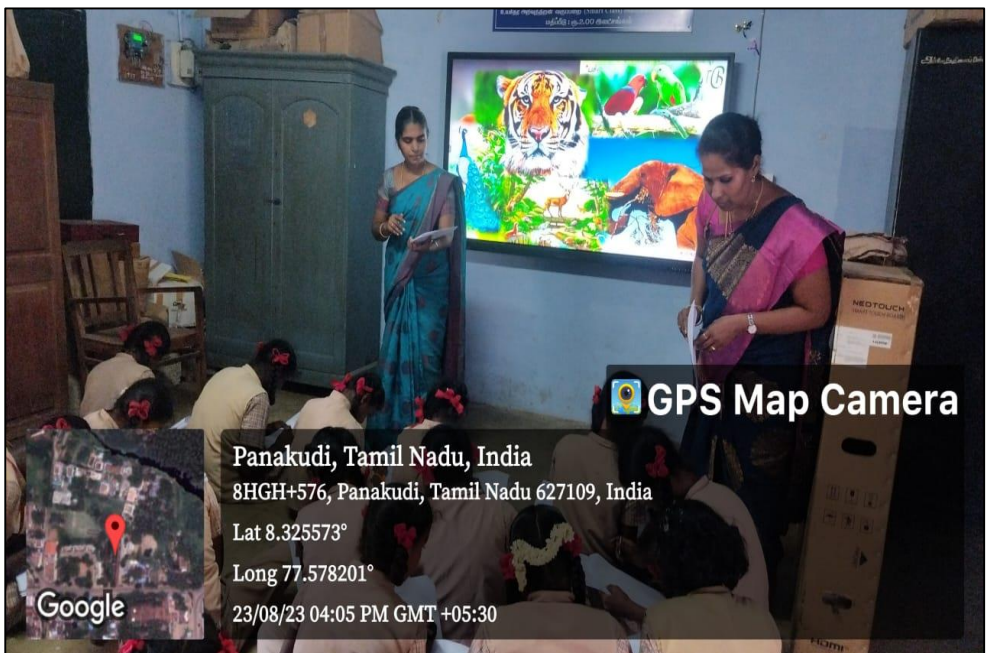
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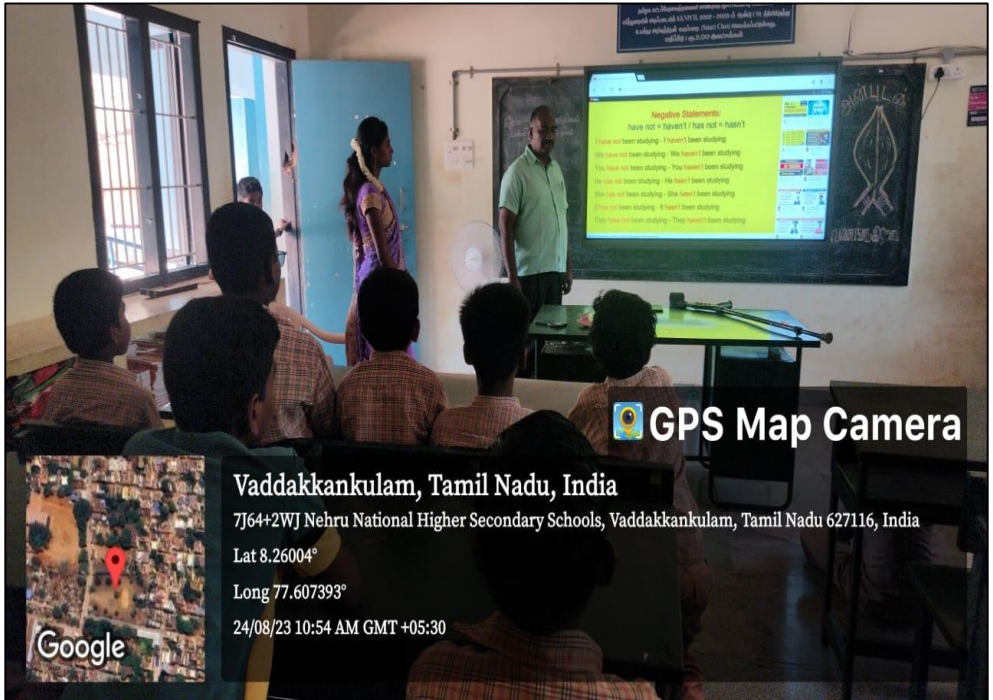
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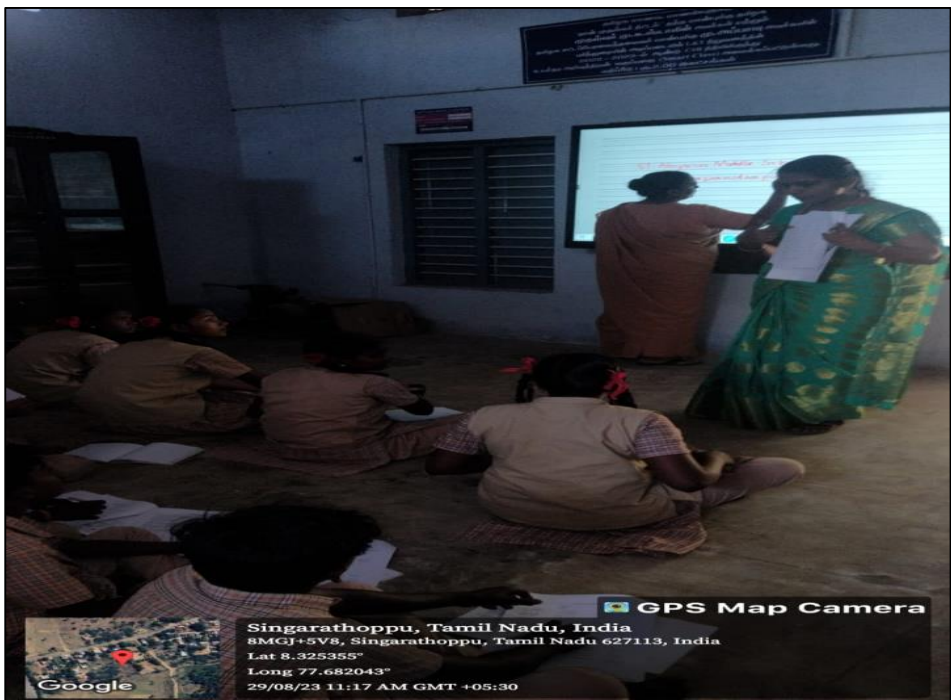
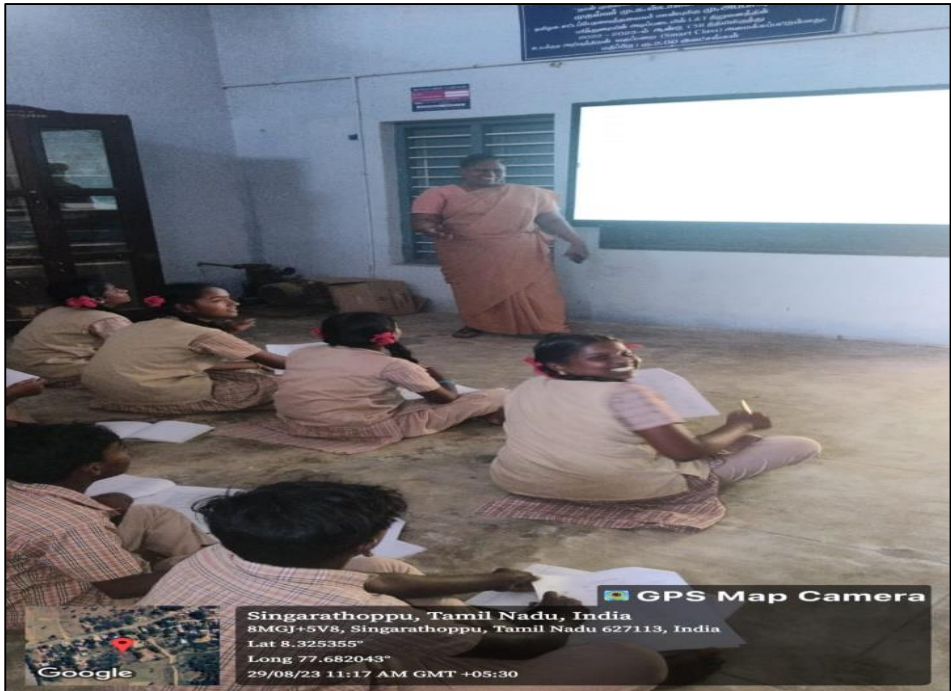
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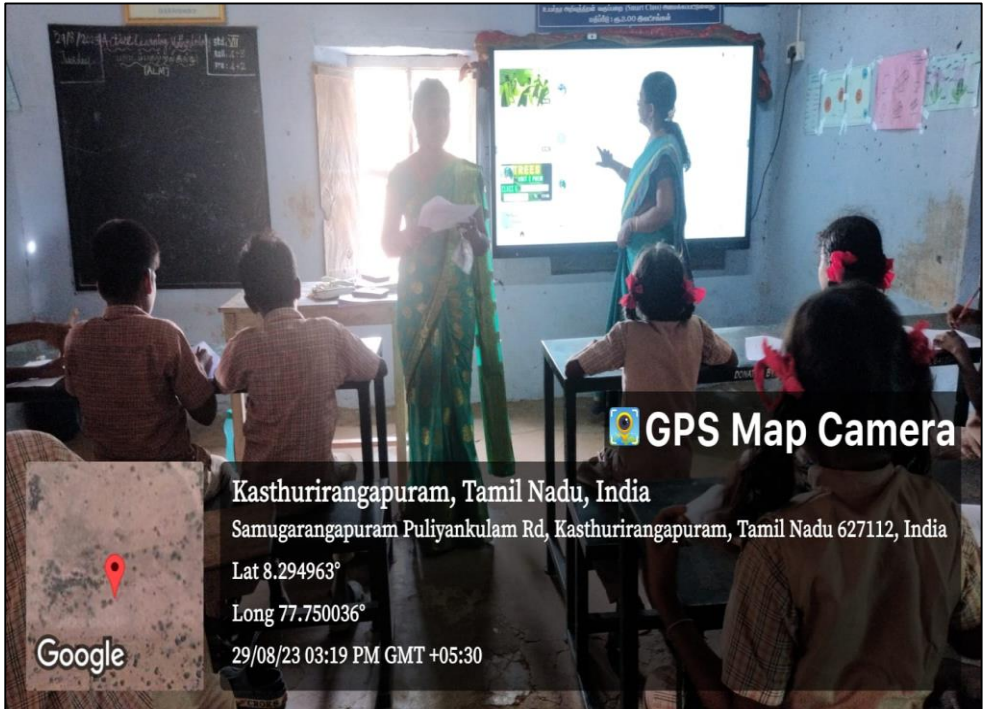
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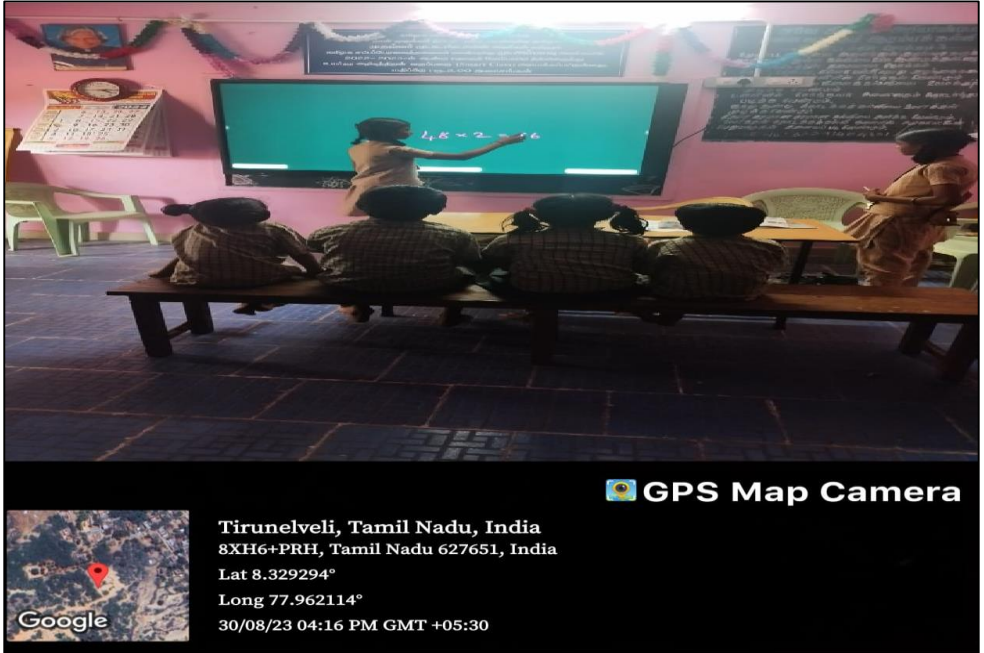
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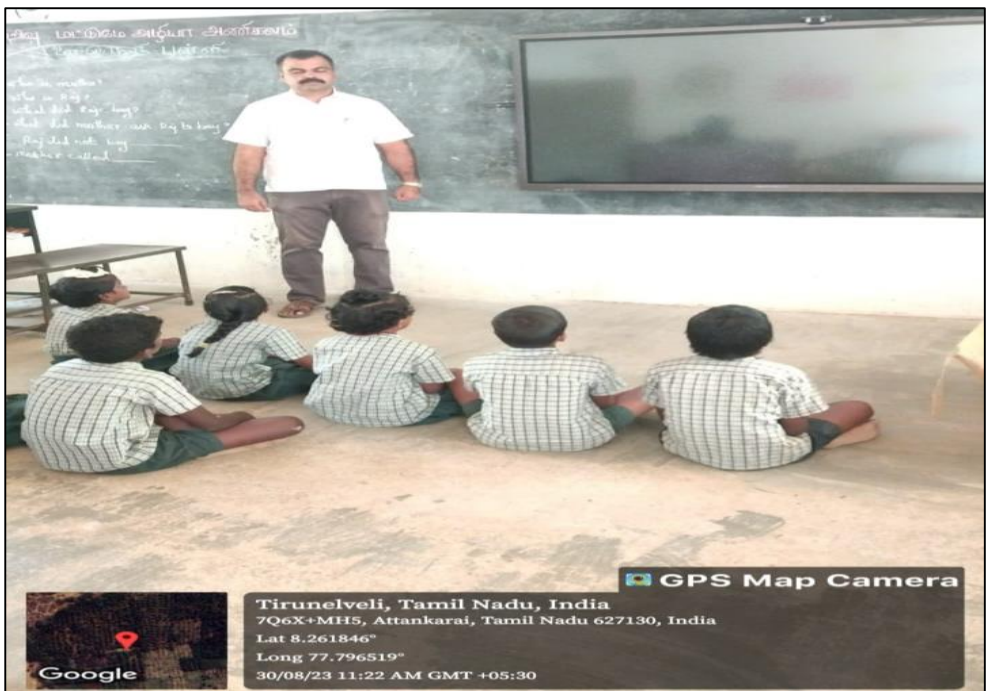
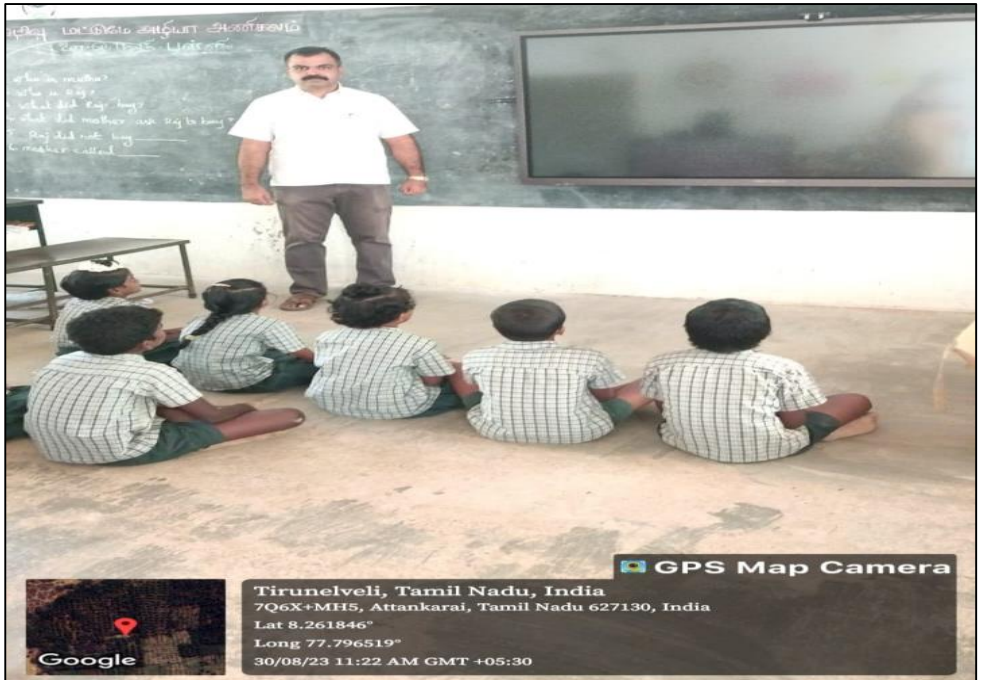
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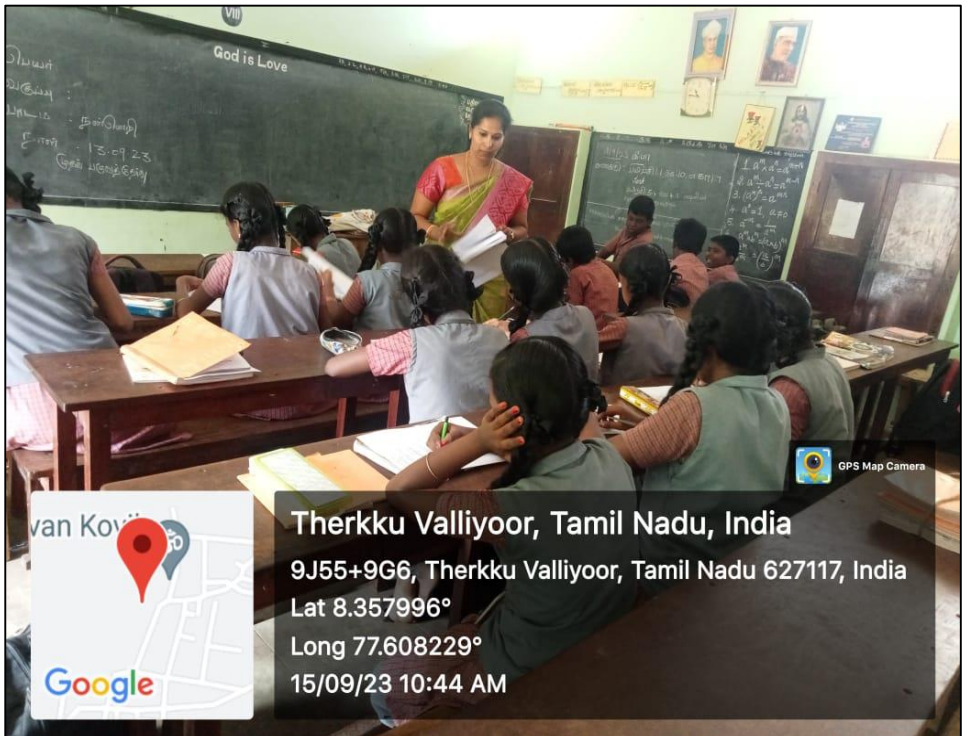
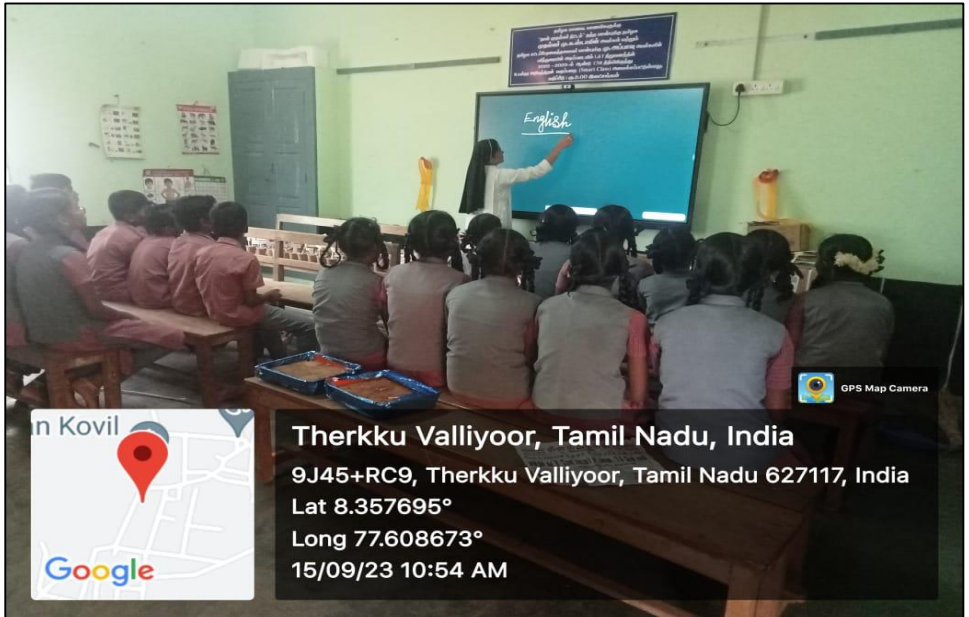
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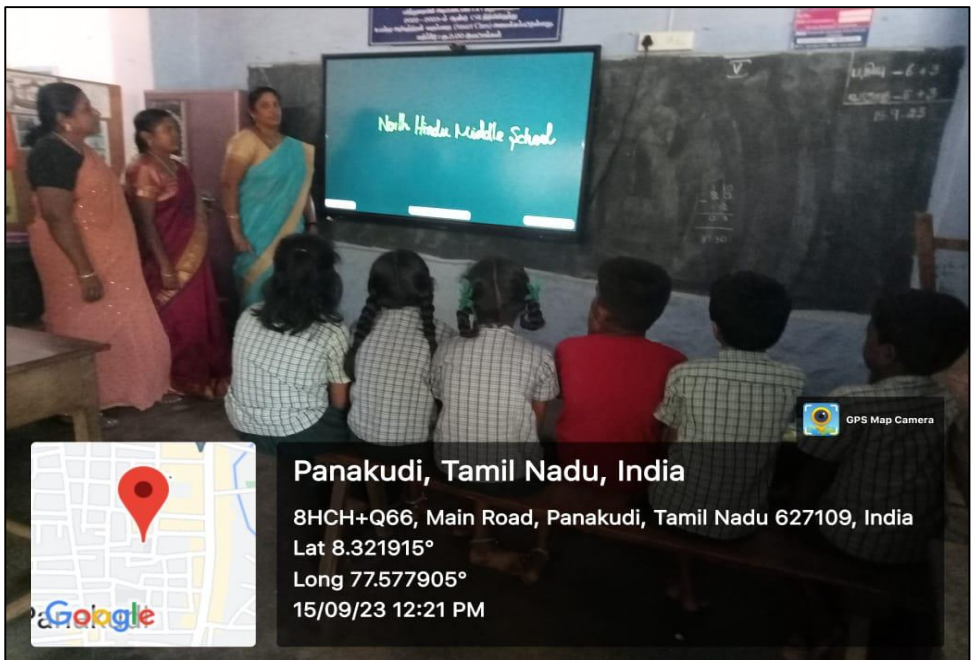
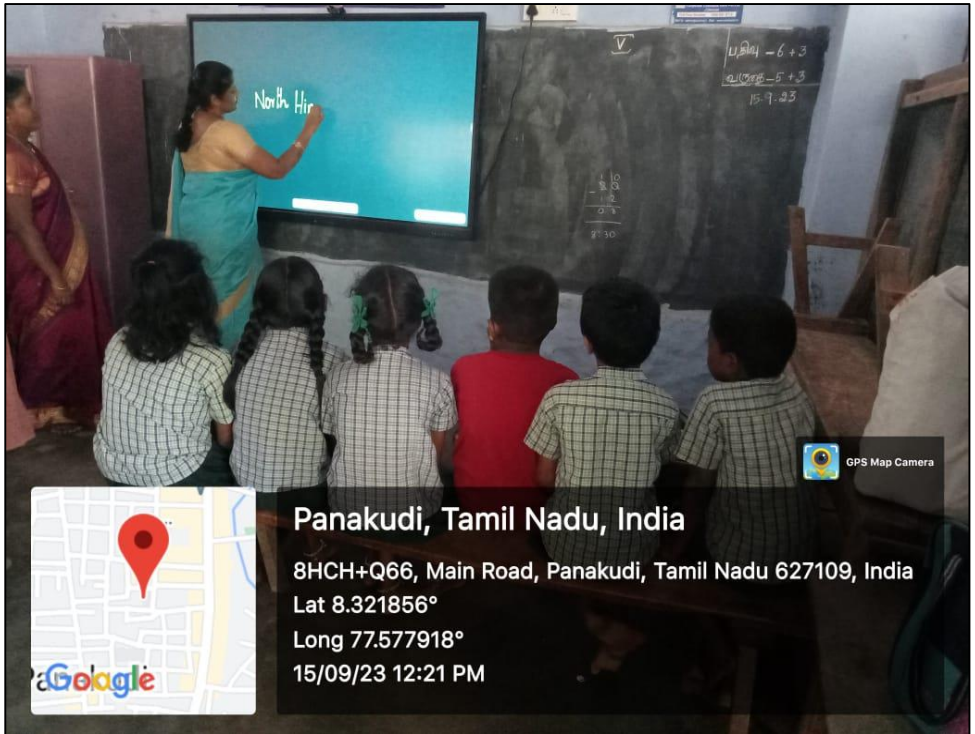
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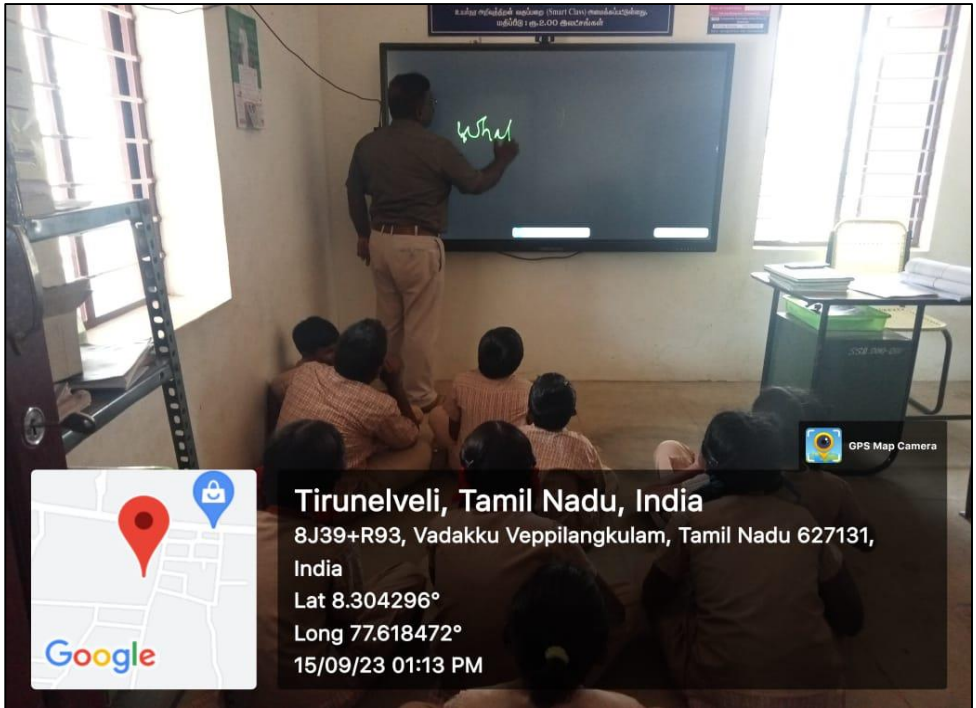
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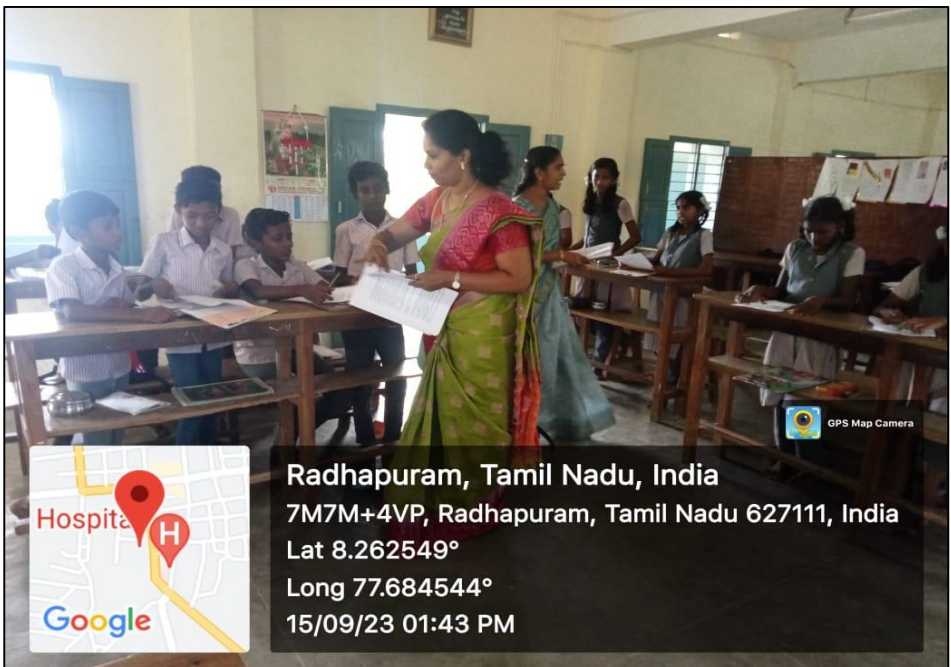
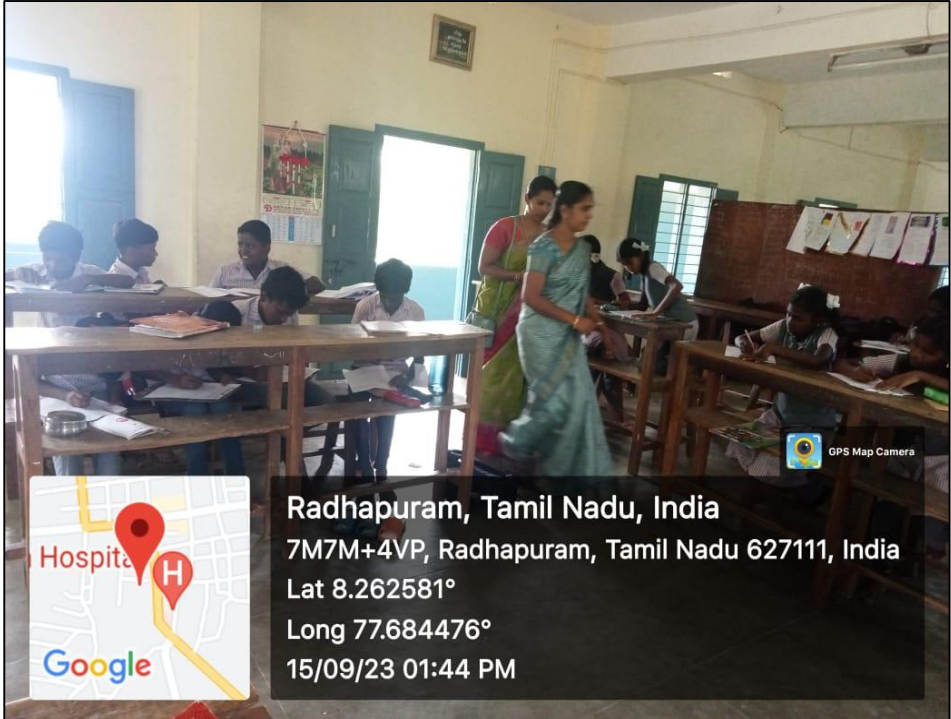
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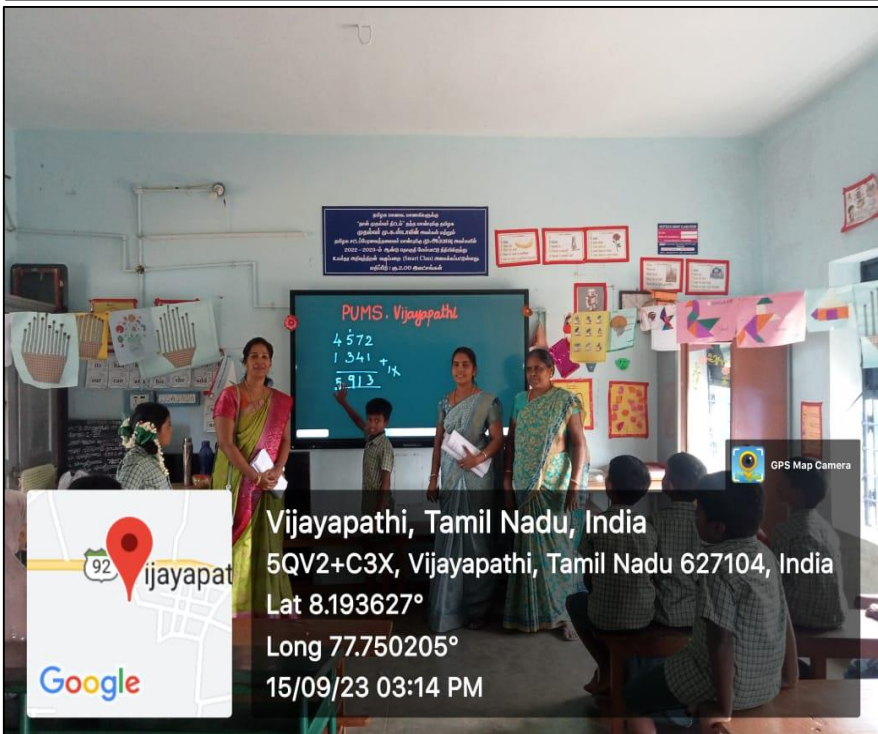
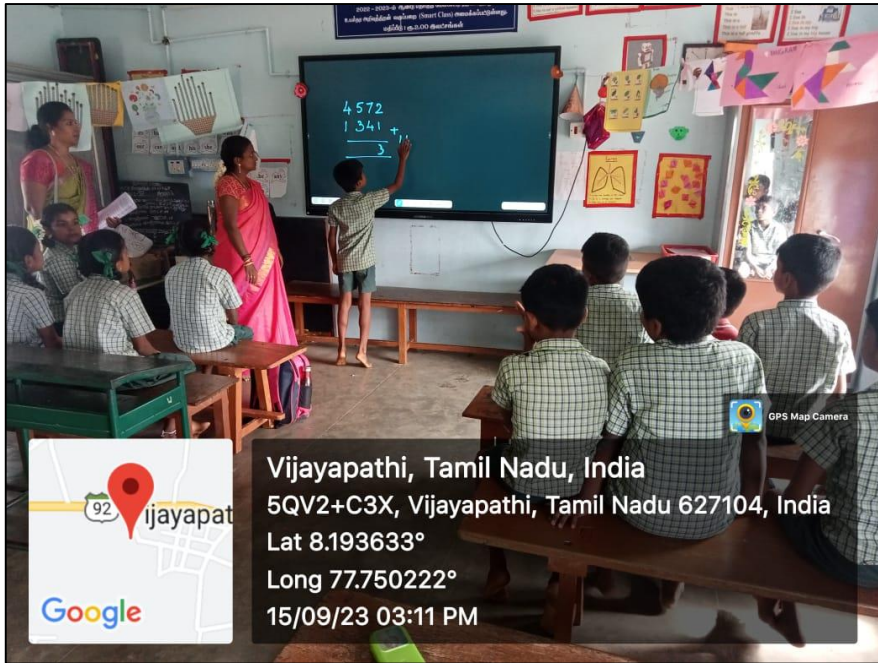
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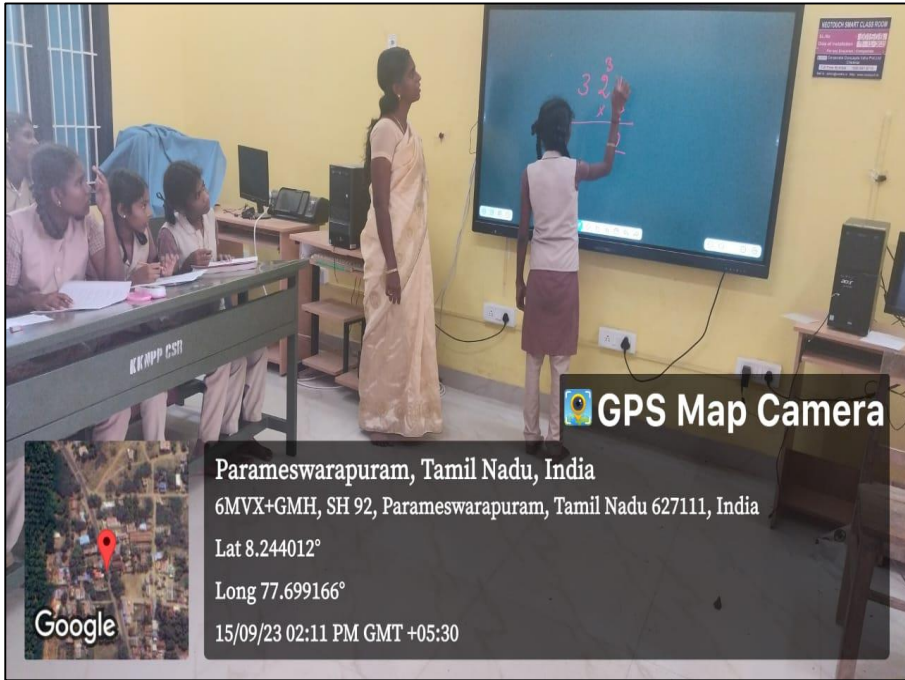
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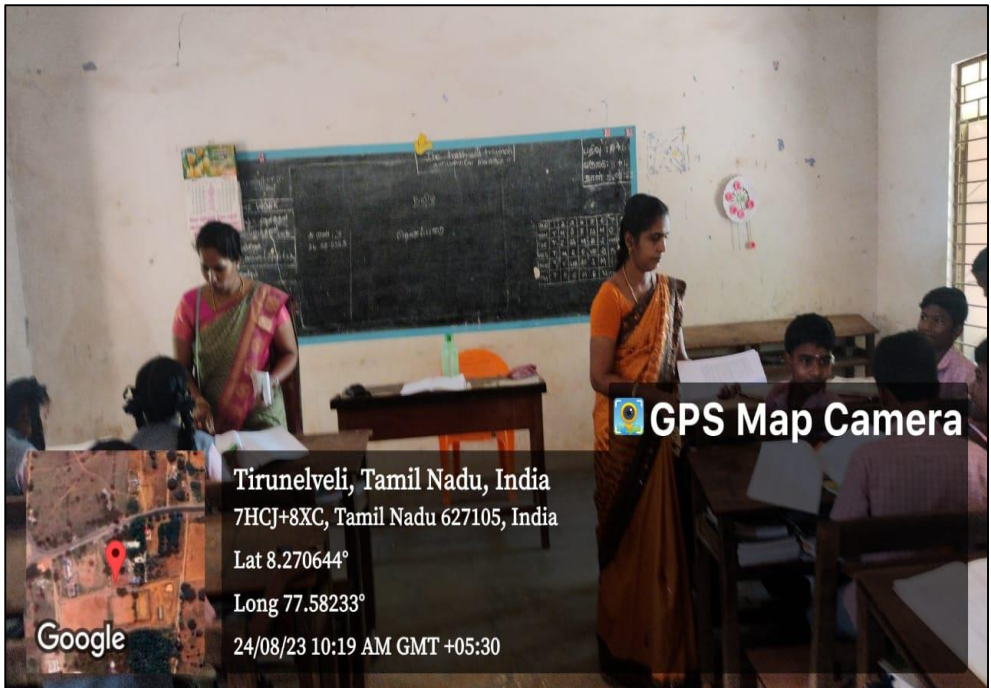
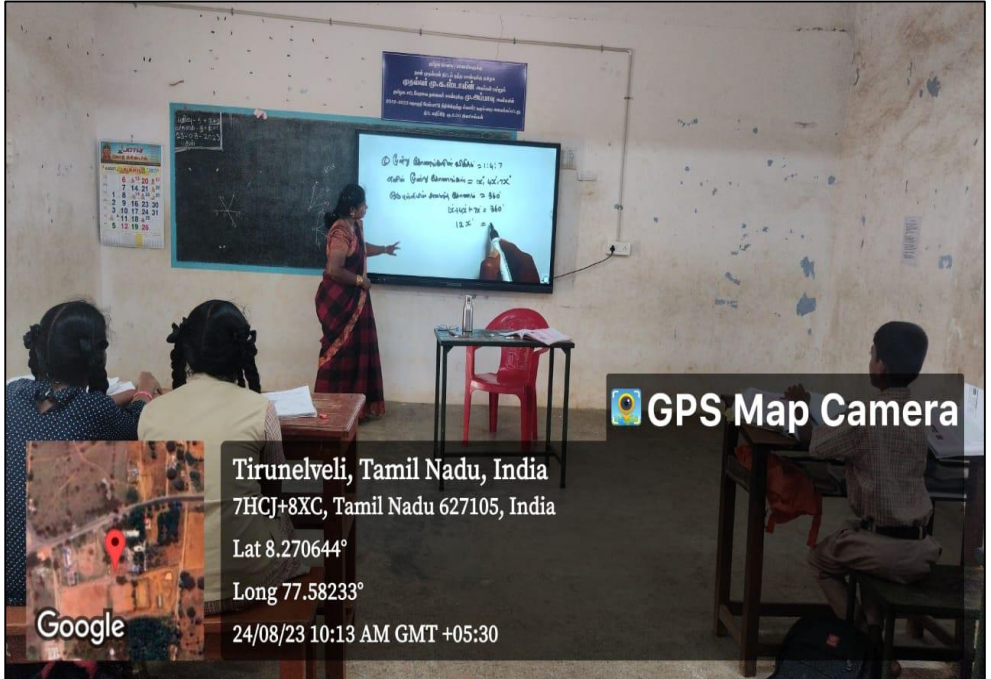
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GOVERNMENT HIGH SCHOOL, KAVALKINNARU



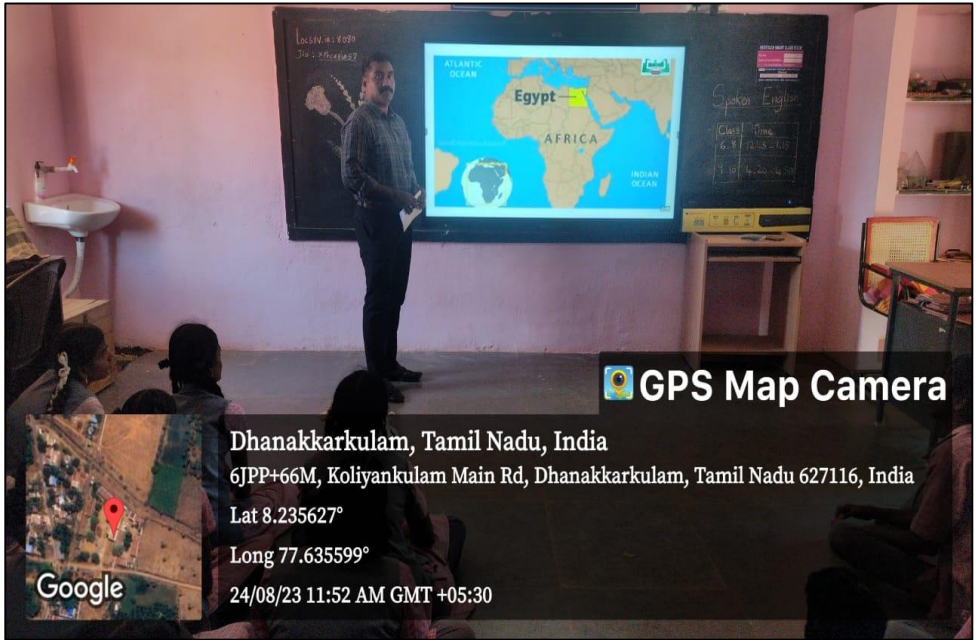
GOVERNMENT HIGH SCHOOL, MADHAGANERI



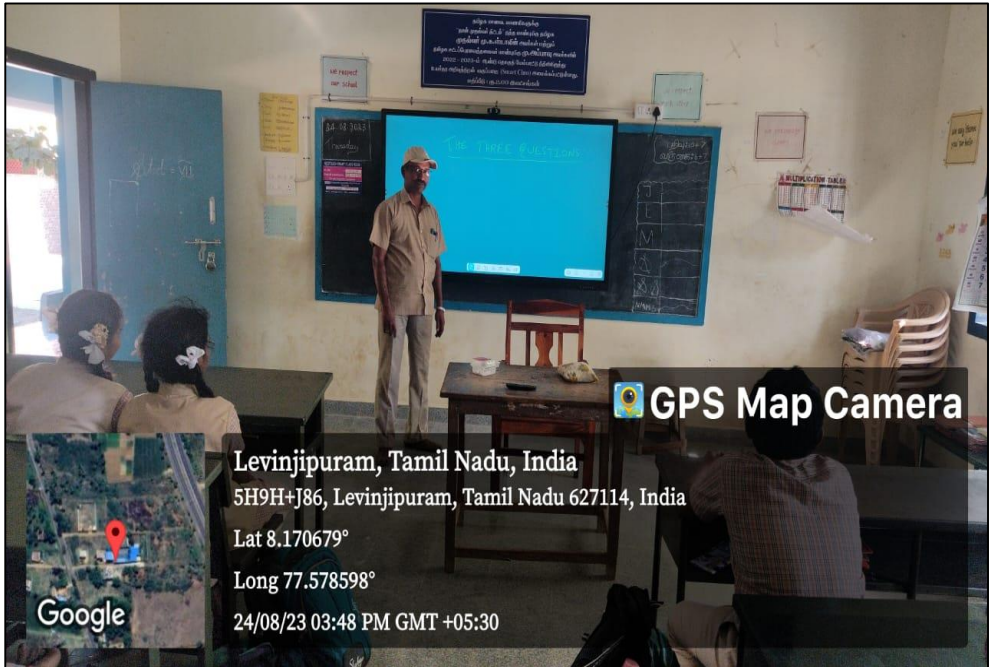
T.D.T.A HIGH SCHOOL, YOKAPURAM



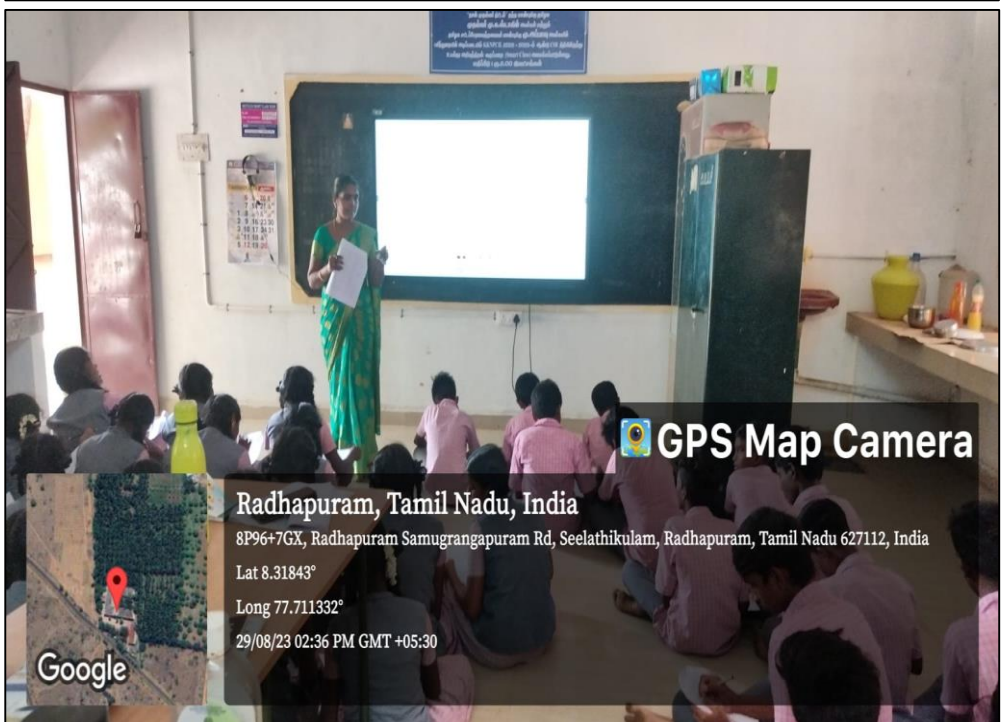
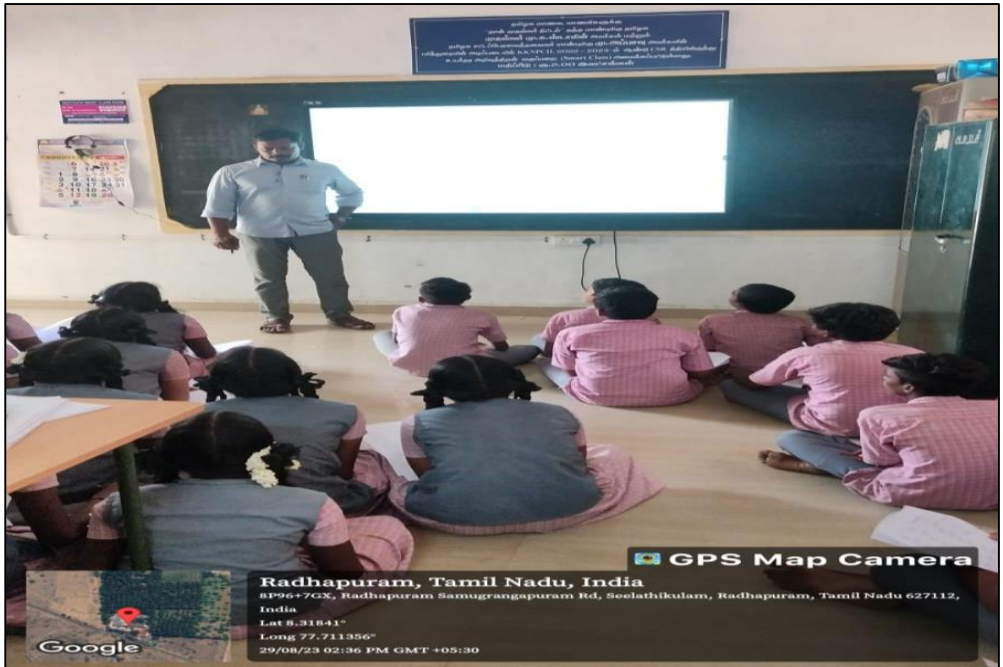
GOVERNEMENT HIGH SCHOOL,KOLIANKULAM



GOVERNMENT HIGH SCHOOL, THERKU KARUNGULAM



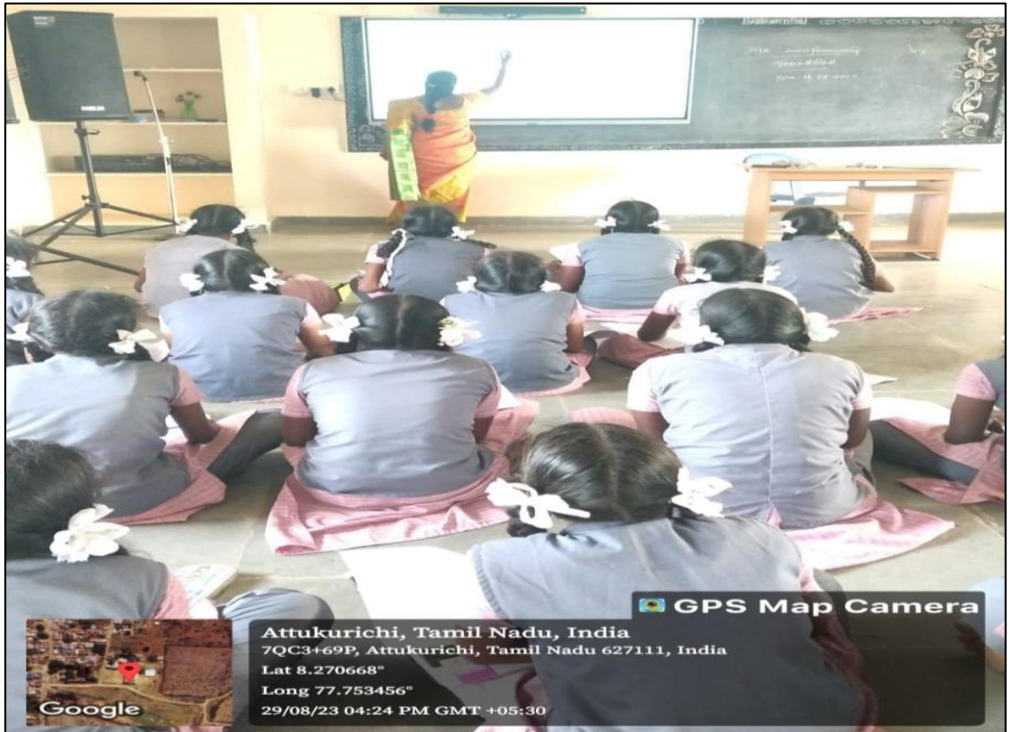
GOVERNMENT HIGH SCHOOL, SILATHIKULAM



GOVERNMENT HIGH SCHOOL, KASTHURIRANGAPURAM



GOVERNMENT HIGH SCHOOL, ATHUKURICHI



APPENDIX

ROUGH TOOL

**TITLE : EFFECTIVENESS OF TECHNOLOGY INTEGRATION IN CURRICULAR
TRANSACTION ON ACADEMIC SUCCESS OF SCHOOL STUDENTS IN
RADHAPURAM ASSEMBLY CONSTITUENCY**

**Name of the Institution: St.Ignatius College of Education (Autonomous)
Palayamkottai, Tirunelveli- 627 002**

அன்பார்ந்த மாணவ, மாணவியரே,

எங்களது ஆராய்ச்சி தொடர்பாக உங்களிடமிருந்து சில விவரங்கள் தேவைப்படுகின்றன. அவற்றை உரிய வகையில் அளித்து உதவும்படி கேட்டுக் கொள்கிறோம். இவை ரகசியமாகப் பாதுகாக்கப்பட்டு எங்களுடைய ஆராய்ச்சிக்கு மட்டும் பயன்படுத்தப்படும் என உறுதி அளிக்கிறோம்.

தங்கள் நன்றியுள்ள,
ஆராச்சியாளர்கள்

Personal Information

பாலினம்	☐ ஆண்	☐ பெண்		
Gender	☐ Male	☐ Female		
படிப்பு தரநிலை	☐ 1-5 ஆம் வகுப்பு	☐ 6-8 ஆம் வகுப்பு	☐ 9-10 ஆம் வகுப்பு	
Standard of Study	☐ 1-5 th Standard	☐ 6-8 th Standard	☐ 9-10 th Standard	
பயிற்று மொழி	☐ தமிழ்	☐ ஆங்கிலம்		
Medium of Study	☐ Tamil	☐ English		
பள்ளி இருப்பிடம்	☐ கிராம	☐ புறநகர் பகுதி		
Location of the School	☐ Rural	☐ Semi-Urban		
பள்ளியின் வகை	☐ ஆண்கள்	☐ பெண்கள்	☐ இருபாலர்	
Type of the School	☐ Boys	☐ Girls	☐ Coeducation	
பள்ளி நிர்வாகத்தின் தன்மை	☐ அரசு	☐ அரசு உதவி		
Type of Management	☐ Govt.	☐ Aided		
மாணவர் இருப்பிடம்	☐ கிராம	☐ புறநகர் பகுதி		
Habitation of Student	☐ Rural	☐ Semi-Urban		
குடும்பத்தின் வகை	☐ கூட்டுக்குடும்பம்	☐ தனிக்குடும்பம்		
Type of Family	☐ Joint	☐ Nuclear		
தந்தையின் கல்வித்தகுதி	☐ படிக்காதவர்	☐ பள்ளி	☐ இளங்கலை	☐ முதுகலை
Father's Education	☐ Uneducated	☐ School	☐ Undergraduate	☐ Postgraduate
தாயின் கல்வித்தகுதி	☐ படிக்காதவர்	☐ பள்ளி	☐ இளங்கலை	☐ முதுகலை
Mother's Education	☐ Uneducated	☐ School	☐ Undergraduate	☐ Postgraduate
ஸ்மார்ட் வகுப்பறையில் செலவழித்த நேரம்	☐ 2 மணிநேரத்திற்கும் குறைவாக	☐ 2-4 மணி நேரம்	☐ 4 மணி நேரத்திற்கு மேல்	
Time spent on the smart classroom	☐ Less than 2 hours	☐ 2-4 hours	☐ Above 4 hours	

S.No	Statement	Yes	No
1.	I enjoy learning through the smart class. ஸ்மார்ட் கிளாஸ் மூலம் கற்றுக் கொள்வதில் மகிழ்ச்சி அடைகிறேன்.		
2.	I feel excited while learning through smart classroom learning environment. ஸ்மார்ட் வகுப்பறை கற்றல் மூலம் கற்கும் போது உற்சாகமாக உணர்கிறேன்.		
3.	The learning content displayed on the smart class screen increases learning curiosity. ஸ்மார்ட் வகுப்பில் திரையில் காட்டப்படும் கற்றல் உள்ளடக்கம் கற்றலில் ஆர்வத்தை அதிகரிக்கிறது.		
4.	The Animation videos shown in the smart classroom about Tamil literature help to understand better. தமிழ் இலக்கியம் பற்றி ஸ்மார்ட் வகுப்பறையில் காட்டப்படும் அனிமேஷன் வீடியோக்கள் நன்கு புரிந்துகொள்ள உதவுகின்றன.		
5.	I can understand the lesson easily through smart classroom learning. ஸ்மார்ட் வகுப்பறை கற்றல் மூலம் பாடத்தை எளிதில் புரிந்து கொள்ள முடிகிறது.		
6.	The smart classroom gives me opportunities to learn new things. ஸ்மார்ட் வகுப்பறை எனக்கு புதிய விஷயங்களைக் கற்றுக்கொள்ள வாய்ப்பளிக்கிறது.		
7.	I can understand Tamil grammar more efficiently through smart classroom learning. ஸ்மார்ட் வகுப்பறை கற்றல் மூலம் தமிழ் இலக்கணத்தை இன்னும் திறமையாக புரிந்து கொள்ள முடிகிறது.		
8.	Smart Classroom Learning Environment enhances my pronunciation skills. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல் எனது உச்சரிப்பு திறனை மேம்படுத்துகிறது.		
9.	The smart classroom gives me various opportunities to get an interest in essay writing. ஸ்மார்ட் வகுப்பறை எனக்கு கட்டுரை எழுதுவதில் ஆர்வம் காட்ட பல்வேறு வாய்ப்புகளை வழங்குகிறது.		
10.	It sharpens my creative imagination power. இது எனது படைப்புக் கற்பனை ஆற்றலைக் கூர்மையாக்குகிறது.		
11.	Smart Classroom Learning Environment develops my letter writing skill. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல் எனது கடிதம் எழுதும் திறனை வளர்க்கிறது.		
12.	It enriches my interaction with teachers and technology. இது ஆசிரியர்களுடனும் தொழில்நுட்பத்துடனும் எனது தொடர்புகளை மேம்படுத்துகிறது.		
13.	The smart classroom enriches my Tamil voice projection. ஸ்மார்ட் வகுப்பறை எனது தமிழ் குரல் வளத்தை வளப்படுத்துகிறது.		
14.	The puzzle games given for the Tamil subject in the smart classroom learning enhance my vocabulary. ஸ்மார்ட் வகுப்பறை கற்றலில் தமிழ் பாடத்திற்காக கொடுக்கப்பட்ட புதிர் விளையாட்டுகள் எனது சொற்களஞ்சியத்தை மேம்படுத்துகின்றன.		
15.	In the smart classroom the matching provided for the lesson helps to understand new words. ஸ்மார்ட் வகுப்பறையில் பாடத்திற்கு வழங்கப்பட்ட பொருத்தம் புதிய சொற்களைப் புரிந்துகொள்ள உதவுகிறது.		

16.	In smart classroom learning, the quiz provided in each lesson helps to check the understanding level of the topics. ஸ்மார்ட் வகுப்பறையில் ஒவ்வொரு பாடத்திலும் வழங்கப்படும் வினாடி வினா, தலைப்புகளின் புரிதல் அளவைச் சரிபார்க்க உதவுகிறது.		
17.	Smart classroom learning helps to create new sentence flawlessly. ஸ்மார்ட் வகுப்பறை கற்றல் புதிய வாக்கியத்தை பிழையின்றி உருவாக்க உதவுகிறது.		
18.	Smart Classroom Learning Environment helps me to learn new vocabulary apart from textbooks. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல் பாடப்புத்தகங்களைத் தவிர புதிய சொற்களஞ்சியத்தைக் கற்றுக்கொள்ள எனக்கு உதவுகிறது.		
19.	Smart classroom learning supports communication easily without fear. ஸ்மார்ட் வகுப்பறை கற்றல் அச்சமின்றி தகவல்தொடர்புகளை வெளிப்படுத்த எளிதாக உதவுகிறது.		
20.	Smart Classroom Learning Environment helps to present ideas very clearly in a logical progression. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல் தர்க்கரீதியான முன்னேற்றத்தில் கருத்துக்களை மிகத் தெளிவாக முன்வைக்க உதவுகிறது.		
21.	Smart Classroom Learning Environment helps me to grasp English content quickly. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல், ஆங்கில உள்ளடக்கத்தை எளிதாகப் புரிந்துகொள்ள எனக்கு உதவுகிறது.		
22.	Assimilating audio-visual in the smart class helps to enhance my Phonetics. ஸ்மார்ட் வகுப்பில் ஆடியோ-விஷுவலை ஒருங்கிணைப்பது எனது ஒலிப்பு அறிவை மேம்படுத்த உதவுகிறது.		
23.	Practice and drilling given in the smart class helps me to learn English Grammar effectively. ஸ்மார்ட் வகுப்பில் கொடுக்கப்பட்ட பயிற்சி ஆங்கில இலக்கணத்தை திறம்பட கற்க உதவுகிறது.		
24.	Smart Classroom Learning Environment helps to learn Glossaries quickly. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல், சொற்களஞ்சியங்களை விரைவாகக் கற்றுக்கொள்ள உதவுகிறது.		
25.	Rhyming words provided in the smart classroom increases my learning curiosity. ஸ்மார்ட் வகுப்பறையில் வழங்கப்படும் ரைமிங் வார்த்தைகள் எனது கற்றல் ஆர்வத்தை அதிகரிக்கிறது.		
26.	Interesting facts at the end of the lesson increase interest in learning. பாடத்தின் முடிவில் உள்ள சுவாரஸ்யமான உண்மைகள் கற்றலில் ஆர்வத்தை அதிகரிக்கும்.		
27.	Smart Classroom Learning Environment helps me to write essays flawlessly. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல், கட்டுரைகள் குறைபாடற்று எழுத எனக்கு உதவுகிறது.		
28.	In smart classroom, I enjoy reading on the big screen. பெரிய திரையில் வாசிப்பதில் மகிழ்ச்சியடைகிறேன்		
29.	Learning of vocabulary through smart class helps me to write poems on my own. ஸ்மார்ட் கிளாஸ் மூலம் சொற்களஞ்சியம் கற்றுக்கொள்வது சொந்தமாக கவிதைகள் எழுத உதவுகிறது.		
30.	English conversation in the smart classroom learning helps to enhance my language skill. ஸ்மார்ட் வகுப்பறை கற்றலில் ஆங்கில உரையாடல் எனது மொழித் திறனை மேம்படுத்த உதவுகிறது.		

31.	Smart Classroom Learning Environment enriches my interaction with others fluently. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல், மற்றவர்களுடனான எனது தொடர்புகளை சரளமாக மேம்படுத்துகிறது.		
32.	Peer learning is boosted through smart classrooms. ஸ்மார்ட் வகுப்பறைகள் மூலம் சக கற்றல் மேம்படுத்தப்படுகிறது.		
33.	Smart Classroom Learning helps to converse in English with others easily. ஸ்மார்ட் வகுப்பறை கற்றல் மற்றவர்களுடன் எளிதாக ஆங்கிலத்தில் உரையாட உதவுகிறது.		
34.	It helps to learn historical events more exciting and easy. இது வரலாற்று நிகழ்வுகளை மிகவும் சுவாரசியமாகவும் எளிதாகவும் அறிய உதவுகிறது.		
35.	Due to smart classroom, I can tell stories quickly with correct notations. ஸ்மார்ட் வகுப்பறை காரணமாக, சரியான குறிப்பீடுகளுடன் என்னால் கதைகளை விரைவாகச் சொல்ல முடியும்.		
36.	Smart Classroom Learning Environment can solve the Jumble words effortlessly. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல், தாலுமாறாகக் குழப்பமான வார்த்தைகளை என்னால் சிரமமின்றி தீர்க்க முடியும்.		
37.	Smart Classroom Learning helps to solve my mathematical problems rapidly. ஸ்மார்ட் வகுப்பறை கற்றல் எனது கணித பிரச்சனைகளை விரைவாக தீர்க்க உதவுகிறது.		
38.	Smart Classroom Learning enhances my problem-solving skill. ஸ்மார்ட் வகுப்பறை கற்றல் எனது சிக்கலைத் தீர்க்கும் திறனை மேம்படுத்துகிறது.		
39.	Smart Classroom Learning helps to solve my mathematical problems quickly. ஸ்மார்ட் வகுப்பறை கற்றல் எனது கணித பிரச்சனைகளை விரைவாக தீர்க்க உதவுகிறது.		
40.	English conversation helps to enhance my language skills. ஆங்கில உரையாடல் எனது மொழித் திறனை மேம்படுத்த உதவுகிறது.		
41.	Smart Classroom Learning helps to learn Number values easily. ஸ்மார்ட் வகுப்பறை கற்றல் எண் மதிப்புகளை எளிதாகக் கற்றுக்கொள்ள உதவுகிறது.		
42.	The 3D images shown in the smart class help to learn the shapes effortlessly. ஸ்மார்ட் வகுப்பில் காட்டப்படும் முப்பரிமாணப் படங்கள், சிரமமின்றி வடிவங்களைக் கற்றுக்கொள்ள உதவுகின்றன.		
43.	Smart Classroom Learning helps to learn mathematical formulas swiftly. ஸ்மார்ட் வகுப்பறை கற்றல் கணித சூத்திரங்களை விரைவாகக் கற்றுக்கொள்ள உதவுகிறது.		
44.	I can draw the 3D models easily because of the pictures shown in the smart class. ஸ்மார்ட் கிளாஸில் காட்டப்பட்டுள்ள படங்கள் காரணமாக என்னால் முப்பரிமாண மாதிரிகளை எளிதாக வரைய முடியும்.		
45.	I can understand science experiments easily due to the live demo of smart class. ஸ்மார்ட் வகுப்பின் நேரடி செயல்விளக்கம் மூலம் அறிவியல் சோதனைகளை என்னால் எளிதாகப் புரிந்து கொள்ள முடிகிறது.		
46.	Smart Classroom Learning helps to understand inventions and discoveries. ஸ்மார்ட் வகுப்பறை கற்றல் புதிய கண்டுபிடிப்புகளைப் புரிந்துகொள்ள உதவுகிறது.		
47.	Interesting facts provided in the smart class for each lesson enhance my learning spirit.		

	ஒவ்வொரு பாடத்திற்கும் ஸ்மார்ட் வகுப்பில் வழங்கப்பட்ட சுவாரஸ்யமான உண்மைகள் எனது கற்றல் உணர்வை மேம்படுத்துகின்றன.		
48.	Smart Class Learning helps to correlate science experiments with real-life examples. ஸ்மார்ட் வகுப்பின் மூலம் அறிவியல் சோதனைகளை என்னால் நிஜ வாழ்க்கை உதாரணங்களுடன் தொடர்புபடுத்த முடியும்.		
49.	It enhances my quick learning skills. இது எனது விரைவான கற்றல் திறனை மேம்படுத்துகிறது.		
50.	I can draw the diagrams / pictures of the science subject quickly through the clear images shown in the smart class. ஸ்மார்ட் வகுப்பில் காட்டப்படும் தெளிவான படங்கள் மூலம் அறிவியல் பாடத்தின் வரைபடங்கள் / படங்களை என்னால் விரைவாக வரைய முடியும்.		
51.	Images provided in the smart class helps to understand the structure of plants and animals. ஸ்மார்ட் வகுப்பில் வழங்கப்படும் படங்கள் தாவரங்கள் மற்றும் விலங்குகளின் அமைப்பைப் புரிந்துகொள்ள உதவுகிறது.		
52.	I can understand the ecosystem better because of the clear content given in the smart class. ஸ்மார்ட் வகுப்பில் தெளிவான உள்ளடக்கம் கொடுக்கப்பட்டுள்ளதால் சுற்றுச்சூழல் அமைப்பை என்னால் நன்றாகப் புரிந்து கொள்ள முடிகிறது.		
53.	Smart Classroom Learning gives me real experiences while learning the science experiments. ஸ்மார்ட் வகுப்பறை கற்றல் அறிவியல் சோதனைகளைக் கற்கும் போது எனக்கு உண்மையான அனுபவத்தைத் தருகிறது.		
54.	I can quickly learn science's complex content given in the smart classroom with suitable examples. ஸ்மார்ட் வகுப்பறையில் கொடுக்கப்பட்டுள்ள அறிவியலின் சிக்கலான உள்ளடக்கத்தை தகுந்த உதாரணங்களுடன் என்னால் விரைவாகக் கற்கக்கொள்ள முடியும்.		
55.	Virtual view of Archaeological sources increases curiosity in the subject. தொல்பொருள் ஆதாரங்களின் மெய்நிகர் பார்வை பாடத்தில் ஆர்வத்தை அதிகரிக்கிறது.		
56.	With Smart Class Colour 3D Maps increases concentration while learning national and world maps ஸ்மார்ட் வகுப்பின் மூலம் தேசிய மற்றும் உலக வரைபடங்களைக் கற்கும் போது வண்ண முப்பரிமாண வரைபடங்கள் செறிவை அதிகரிக்கிறது.		
57.	Virtual videos in the smart class help to learn about historical events interestingly. ஸ்மார்ட் வகுப்பில் உள்ள மெய்நிகர் வீடியோக்கள் வரலாற்று நிகழ்வுகளை சுவாரஸ்யமாக அறிய உதவுகின்றன.		
58.	Smart Classroom Learning helps to learn historical events more exciting and easy. ஸ்மார்ட் வகுப்பறை கற்றல் வரலாற்று நிகழ்வுகளை மிகவும் சுவாரசியமாகவும் எளிதாகவும் அறிய உதவுகிறது.		
59.	Learning through visuals in the smart class helps to learn and memorize the topic for a prolonged period. ஸ்மார்ட் வகுப்பில் காட்சிகள் மூலம் கற்றுக் கொள்வது நீண்ட காலத்திற்கு தலைப்பைக் கற்றுக் கொள்ளவும் மனப்பாடம் செய்யவும் உதவுகிறது.		
60.	Special effects and graphic presentation in the smart class help to learn the content effectively. ஸ்மார்ட் வகுப்பில் சிறப்பு விளைவுகள் மற்றும் கிராஃபிக் விளக்கக்காட்சி ஆகியவை உள்ளடக்கத்தை திறம்பட கற்க உதவுகின்றன.		

61.	The FAQ session in the smart class increases curiosity in learning. ஸ்மார்ட் வகுப்பில் அடிக்கடி கேட்கப்படும் கேள்விகள் அமர்வு கற்றலில் ஆர்வத்தை அதிகரிக்கிறது.		
62.	Special effects and graphic presentation help to learn the content effectively. சிறப்பு விளைவுகள் மற்றும் கிராஃபிக் விளக்கக்காட்சி ஆகியவை உள்ளடக்கத்தை திறம்பட கற்க உதவுகின்றன.		
63.	Smart Classroom Learning Environment helps me to make better use of technology in all the subjects in and out of the classroom. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல், வகுப்பறைக்கு உள்ளேயும் வெளியேயும் அனைத்து பாடங்களிலும் தொழில்நுட்பத்தை சிறப்பாகப் பயன்படுத்த இது எனக்கு உதவுகிறது.		

FINAL TOOL

TITLE : EFFECTIVENESS OF TECHNOLOGY INTEGRATION IN CURRICULAR TRANSACTION ON ACADEMIC SUCCESS OF SCHOOL STUDENTS IN RADHAPURAM ASSEMBLY CONSTITUENCY

**Name of the Institution: St.Ignatius College of Education (Autonomous)
Palayamkottai, Tirunelveli- 627 002**

அன்பார்ந்த மாணவ, மாணவியரே,

எங்களது ஆராய்ச்சி தொடர்பாக உங்களிடமிருந்து சில விவரங்கள் தேவைப்படுகின்றன. அவற்றை உரிய வகையில் அளித்து உதவும்படி கேட்டுக் கொள்கிறோம். இவை ரகசியமாகப் பாதுகாப்பகப்பட்டு எங்களுடைய ஆராய்ச்சிக்கு மட்டும் பயன்படுத்தப்படும் என உறுதி அளிக்கிறோம்.

தங்கள் நன்றியுள்ள,
ஆராய்ச்சியாளர்கள்

Personal Information

பாலினம்	☐ ஆண்	☐ பெண்	
Gender	☐ Male	☐ Female	
படிப்பு தரநிலை	☐ 1-5 ஆம் வகுப்பு	☐ 6-8 ஆம் வகுப்பு	☐ 9-10 ஆம் வகுப்பு
Standard of Study	☐ 1-5 th Standard	☐ 6-8 th Standard	☐ 9-10 th Standard
பயிற்று மொழி	☐ தமிழ்	☐ ஆங்கிலம்	
Medium of Study	☐ Tamil	☐ English	
பள்ளி இருப்பிடம்	☐ கிராம	☐ புறநகர் பகுதி	
Location of the School	☐ Rural	☐ Semi-Urban	
பள்ளியின் வகை	☐ ஆண்கள்	☐ பெண்கள்	☐ இருபாலர்
Type of the School	☐ Boys	☐ Girls	☐ Coeducation
பள்ளி நிர்வாகத்தின் தன்மை	☐ அரசு	☐ அரசு உதவி	
Type of Management	☐ Govt.	☐ Aided	
மாணவர் இருப்பிடம்	☐ கிராம	☐ புறநகர் பகுதி	
Habitation of Student	☐ Rural	☐ Semi-Urban	
குடும்பத்தின் வகை	☐ கூட்டுக்குடும்பம்	☐ தனிக்குடும்பம்	
Type of Family	☐ Joint	☐ Nuclear	
தந்தையின் கல்வித்தகுதி	☐ படிக்காதவர்	☐ பள்ளி	☐ இளங்கலை
Father's Education	☐ Uneducated	☐ School	☐ Undergraduate
			☐ முதுகலை
			☐ Postgraduate
தாயின் கல்வித்தகுதி	☐ படிக்காதவர்	☐ பள்ளி	☐ இளங்கலை
Mother's Education	☐ Uneducated	☐ School	☐ Undergraduate
			☐ முதுகலை
			☐ Postgraduate
ஸ்மார்ட் வகுப்பறையில் செலவழித்த நேரம்	☐ 2 மணிநேரத்திற்கும் குறைவாக	☐ 2-4 மணி நேரம்	☐ 4 மணி நேரத்திற்கு மேல்
Time spent on the smart classroom	☐ Less than 2 hours	☐ 2-4 hours	☐ Above 4 hours

S.No	Statement	Yes	No
1.	I enjoy learning through the smart class. ஸ்மார்ட் கிளாஸ் மூலம் கற்றுக் கொள்வதில் மகிழ்ச்சி அடைகிறேன்.		
2.	I feel excited while learning through smart classroom learning environment. ஸ்மார்ட் வகுப்பறை கற்றல் மூலம் கற்கும் போது உற்சாகமாக உணர்கிறேன்.		
3.	The learning content displayed on the smart class screen increases learning curiosity. ஸ்மார்ட் வகுப்பில் திரையில் காட்டப்படும் கற்றல் உள்ளடக்கம் கற்றலில் ஆர்வத்தை அதிகரிக்கிறது.		
4.	The Animation videos shown in the smart classroom about Tamil literature help to understand better. தமிழ் இலக்கியம் பற்றி ஸ்மார்ட் வகுப்பறையில் காட்டப்படும் அனிமேஷன் வீடியோக்கள் நன்கு புரிந்துகொள்ள உதவுகின்றன.		
5.	I can understand the lesson easily through smart classroom learning. ஸ்மார்ட் வகுப்பறை கற்றல் மூலம் பாடத்தை எளிதில் புரிந்து கொள்ள முடிகிறது.		
6.	The smart classroom gives me opportunities to learn new things. ஸ்மார்ட் வகுப்பறை எனக்கு புதிய விஷயங்களைக் கற்றுக்கொள்ள வாய்ப்பளிக்கிறது.		
7.	I can understand Tamil grammar more efficiently through smart classroom learning. ஸ்மார்ட் வகுப்பறை கற்றல் மூலம் தமிழ் இலக்கணத்தை இன்னும் திறமையாக புரிந்து கொள்ள முடிகிறது.		
8.	Smart Classroom Learning Environment enhances my pronunciation skills. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல் எனது உச்சரிப்பு திறனை மேம்படுத்துகிறது.		
9.	The smart classroom gives me various opportunities to get an interest in essay writing. ஸ்மார்ட் வகுப்பறை எனக்கு கட்டுரை எழுதுவதில் ஆர்வம் காட்ட பல்வேறு வாய்ப்புகளை வழங்குகிறது.		
10.	Smart Classroom Learning Environment develops my letter writing skill. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல் எனது கடிதம் எழுதும் திறனை வளர்க்கிறது.		
11.	The smart classroom enriches my Tamil voice projection. ஸ்மார்ட் வகுப்பறை எனது தமிழ் குரல் வளத்தை வளப்படுத்துகிறது.		
12.	The puzzle games given for the Tamil subject in the smart classroom learning enhance my vocabulary. ஸ்மார்ட் வகுப்பறை கற்றலில் தமிழ் பாடத்திற்காக கொடுக்கப்பட்ட புதிர் விளையாட்டுகள் எனது சொற்களஞ்சியத்தை மேம்படுத்துகின்றன.		
13.	In the smart classroom the matching provided for the lesson helps to understand new words. ஸ்மார்ட் வகுப்பறையில் பாடத்திற்கு வழங்கப்பட்ட பொருத்தம் புதிய சொற்களைப் புரிந்துகொள்ள உதவுகிறது.		
14.	In smart classroom learning, the quiz provided in each lesson helps to check the understanding level of the topics. ஸ்மார்ட் வகுப்பறையில் ஒவ்வொரு பாடத்திலும் வழங்கப்படும் வினாடி வினா, தலைப்புகளின் புரிதல் அளவைச் சரிபார்க்க உதவுகிறது.		
15.	Smart classroom learning helps to create new sentence flawlessly. ஸ்மார்ட் வகுப்பறை கற்றல் புதிய வாக்கியத்தை பிழையின்றி உருவாக்க உதவுகிறது.		

16.	Smart Classroom Learning Environment helps me to learn new vocabulary apart from textbooks. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல் பாடப்புத்தகங்களைத் தவிர புதிய சொற்களஞ்சியத்தைக் கற்றுக்கொள்ள எனக்கு உதவுகிறது.		
17.	Smart classroom learning supports communication easily without fear. ஸ்மார்ட் வகுப்பறை கற்றல் அச்சமின்றி தகவல்தொடர்புகளை வெளிப்படுத்த எளிதாக உதவுகிறது.		
18.	Smart Classroom Learning Environment helps to present ideas very clearly in a logical progression. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல் தர்க்கரீதியான முன்னேற்றத்தில் கருத்துக்களை மிகத் தெளிவாக முன்வைக்க உதவுகிறது.		
19.	Smart Classroom Learning Environment helps me to grasp English content quickly. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல், ஆங்கில உள்ளடக்கத்தை எளிதாகப் புரிந்துகொள்ள எனக்கு உதவுகிறது.		
20.	Assimilating audio-visual in the smart class helps to enhance my Phonetics. ஸ்மார்ட் வகுப்பில் ஆடியோ-விஷுவலை ஒருங்கிணைப்பது எனது ஒலிப்பு அறிவை மேம்படுத்த உதவுகிறது.		
21.	Practice and drilling given in the smart class helps me to learn English Grammar effectively. ஸ்மார்ட் வகுப்பில் கொடுக்கப்பட்ட பயிற்சி ஆங்கில இலக்கணத்தை திறம்பட கற்க உதவுகிறது.		
22.	Smart Classroom Learning Environment helps to learn Glossaries quickly. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல், சொற்களஞ்சியங்களை விரைவாகக் கற்றுக்கொள்ள உதவுகிறது.		
23.	Rhyming words provided in the smart classroom increases my learning curiosity. ஸ்மார்ட் வகுப்பறையில் வழங்கப்படும் ரைமிங் வார்த்தைகள் எனது கற்றல் ஆர்வத்தை அதிகரிக்கிறது.		
24.	Smart Classroom Learning Environment helps me to write essays flawlessly. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல், கட்டுரைகள் குறைபாடற்று எழுத எனக்கு உதவுகிறது.		
25.	In smart classroom, I enjoy reading on the big screen. பெரிய திரையில் வாசிப்பதில் மகிழ்ச்சியடைகிறேன்		
26.	Learning of vocabulary through smart class helps me to write poems on my own. ஸ்மார்ட் கிளாஸ் மூலம் சொற்களஞ்சியம் கற்றுக்கொள்வது சொந்தமாக கவிதைகள் எழுத உதவுகிறது.		
27.	English conversation in the smart classroom learning helps to enhance my language skill. ஸ்மார்ட் வகுப்பறை கற்றலில் ஆங்கில உரையாடல் எனது மொழித் திறனை மேம்படுத்த உதவுகிறது.		
28.	Smart Classroom Learning Environment enriches my interaction with others fluently. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல், மற்றவர்களுடனான எனது தொடர்புகளை சரளமாக மேம்படுத்துகிறது.		
29.	Smart Classroom Learning helps to converse in English with others easily. ஸ்மார்ட் வகுப்பறை கற்றல் மற்றவர்களுடன் எளிதாக ஆங்கிலத்தில் உரையாட உதவுகிறது.		
30.	Due to smart classroom, I can tell stories quickly with correct notations. ஸ்மார்ட் வகுப்பறை காரணமாக, சரியான குறிப்பீடுகளுடன் என்னால் கதைகளை விரைவாகச் சொல்ல முடியும்.		

31.	Smart Classroom Learning Environment can solve the Jumble words effortlessly. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல், தானுமாறாகக் குழப்பமான வார்த்தைகளை என்னால் சிரமமின்றி தீர்க்க முடியும்.		
32.	Smart Classroom Learning helps to solve my mathematical problems rapidly. ஸ்மார்ட் வகுப்பறை கற்றல் எனது கணித பிரச்சனைகளை விரைவாக தீர்க்க உதவுகிறது.		
33.	Smart Classroom Learning enhances my problem-solving skill. ஸ்மார்ட் வகுப்பறை கற்றல் எனது சிக்கலைத் தீர்க்கும் திறனை மேம்படுத்துகிறது.		
34.	Smart Classroom Learning helps to solve my mathematical problems quickly. ஸ்மார்ட் வகுப்பறை கற்றல் எனது கணித பிரச்சனைகளை விரைவாக தீர்க்க உதவுகிறது.		
35.	Smart Classroom Learning helps to learn Number values easily. ஸ்மார்ட் வகுப்பறை கற்றல் எண் மதிப்புகளை எளிதாகக் கற்றுக்கொள்ள உதவுகிறது.		
36.	The 3D images shown in the smart class help to learn the shapes effortlessly. ஸ்மார்ட் வகுப்பில் காட்டப்படும் முப்பரிமாணப் படங்கள், சிரமமின்றி வடிவங்களைக் கற்றுக்கொள்ள உதவுகின்றன.		
37.	Smart Classroom Learning helps to learn mathematical formulas swiftly. ஸ்மார்ட் வகுப்பறை கற்றல் கணித சூத்திரங்களை விரைவாகக் கற்றுக்கொள்ள உதவுகிறது.		
38.	I can draw the 3D models easily because of the pictures shown in the smart class. ஸ்மார்ட் கிளாஸில் காட்டப்பட்டுள்ள படங்கள் காரணமாக என்னால் முப்பரிமாண மாதிரிகளை எளிதாக வரைய முடியும்.		
39.	I can understand science experiments easily due to the live demo of smart class. ஸ்மார்ட் வகுப்பின் நேரடி செயல்விளக்கம் மூலம் அறிவியல் சோதனைகளை என்னால் எளிதாகப் புரிந்து கொள்ள முடிகிறது.		
40.	Smart Classroom Learning helps to understand inventions and discoveries. ஸ்மார்ட் வகுப்பறை கற்றல் புதியகண்டுபிடிப்புகளைப் புரிந்துகொள்ள உதவுகிறது.		
41.	Interesting facts provided in the smart class for each lesson enhance my learning spirit. ஒவ்வொரு பாடத்திற்கும் ஸ்மார்ட் வகுப்பில் வழங்கப்பட்ட சுவாரஸ்யமான உண்மைகள் எனது கற்றல் உணர்வை மேம்படுத்துகின்றன.		
42.	Smart Class Learning helps to correlate science experiments with real-life examples. ஸ்மார்ட் வகுப்பின் மூலம் அறிவியல் சோதனைகளை என்னால் நிஜ வாழ்க்கை உதாரணங்களுடன் தொடர்புபடுத்த முடியும்.		
43.	I can draw the diagrams / pictures of the science subject quickly through the clear images shown in the smart class. ஸ்மார்ட் வகுப்பில் காட்டப்படும் தெளிவான படங்கள் மூலம் அறிவியல் பாடத்தின் வரைபடங்கள் / படங்களை என்னால் விரைவாக வரைய முடியும்.		
44.	Images provided in the smart class helps to understand the structure of plants and animals. ஸ்மார்ட் வகுப்பில் வழங்கப்படும் படங்கள் தாவரங்கள் மற்றும் விலங்குகளின் அமைப்பைப் புரிந்துகொள்ள உதவுகிறது.		
45.	I can understand the ecosystem better because of the clear content given in the smart class. ஸ்மார்ட் வகுப்பில் தெளிவான உள்ளடக்கம் கொடுக்கப்பட்டுள்ளதால் சுற்றுச்சூழல் அமைப்பை என்னால் நன்றாகப் புரிந்து கொள்ள முடிகிறது.		

46.	Smart Classroom Learning gives me real experiences while learning the science experiments. ஸ்மார்ட் வகுப்பறை கற்றல் அறிவியல் சோதனைகளைக் கற்கும் போது எனக்கு உண்மையான அனுபவத்தைத் தருகிறது.		
47.	I can quickly learn science's complex content given in the smart classroom with suitable examples. ஸ்மார்ட் வகுப்பறையில் கொடுக்கப்பட்டுள்ள அறிவியலின் சிக்கலான உள்ளடக்கத்தை தகுந்த உதாரணங்களுடன் என்னால் விரைவாகக் கற்றுக்கொள்ள முடியும்.		
48.	Virtual view of Archaeological sources increases curiosity in the subject. தொல்பொருள் ஆதாரங்களின் மெய்நிகர் பார்வை பாடத்தில் ஆர்வத்தை அதிகரிக்கிறது.		
49.	With Smart Class Colour 3D Maps increases concentration while learning national and world maps ஸ்மார்ட் வகுப்பின் மூலம் தேசிய மற்றும் உலக வரைபடங்களைக் கற்கும் போது வண்ண முப்பரிமாண வரைபடங்கள் செறிவை அதிகரிக்கிறது.		
50.	Virtual videos in the smart class help to learn about historical events interestingly. ஸ்மார்ட் வகுப்பில் உள்ள மெய்நிகர் வீடியோக்கள் வரலாற்று நிகழ்வுகளை சுவாரஸ்யமாக அறிய உதவுகின்றன.		
51.	Smart Classroom Learning helps to learn historical events more exciting and easy. ஸ்மார்ட் வகுப்பறை கற்றல் வரலாற்று நிகழ்வுகளை மிகவும் சுவாரசியமாகவும் எளிதாகவும் அறிய உதவுகிறது.		
52.	Learning through visuals in the smart class helps to learn and memorize the topic for a prolonged period. ஸ்மார்ட் வகுப்பில் காட்சிகள் மூலம் கற்றுக் கொள்வது நீண்ட காலத்திற்கு தலைப்பைக் கற்றுக் கொள்ளவும் மனப்பாடம் செய்யவும் உதவுகிறது.		
53.	Special effects and graphic presentation in the smart class help to learn the content effectively. ஸ்மார்ட் வகுப்பில் சிறப்பு விளைவுகள் மற்றும் கிராஃபிக் விளக்கக்காட்சி ஆகியவை உள்ளடக்கத்தை திறம்பட கற்க உதவுகின்றன.		
54.	The FAQ session in the smart class increases curiosity in learning. ஸ்மார்ட் வகுப்பில் அடிக்கடி கேட்கப்படும் கேள்விகள் அமர்வு கற்றலில் ஆர்வத்தை அதிகரிக்கிறது.		
55.	Smart Classroom Learning Environment helps me to make better use of technology in all the subjects in and out of the classroom. ஸ்மார்ட் வகுப்பறை கற்றல் சூழல், வகுப்பறைக்கு உள்ளேயும் வெளியேயும் அனைத்து பாடங்களிலும் தொழில்நுட்பத்தை சிறப்பாகப் பயன்படுத்த இது எனக்கு உதவுகிறது.		

ACHIEVEMENT TEST QUESTION PAPERS

ST. IGNATIUS COLLEGE OF EDUCATION (AUTONOMOUS)

Accredited by NAAC at Grade A+ with CGPA 3.42 (Third Cycle)
(Affiliated to Tamil Nadu Teachers Education University, Chennai)
Palayamkottai – 627 002



Project on “Effectiveness of Technology Integration in Curricular Transaction on Academic Success of School Students in Radhapuram Assembly Constituency”

STANDARD-VI

I. சரியான விடையைத் தேர்ந்தெடுத்து எழுதுக.

- ஏற்றத் தாழ்வற்ற அமைய வேண்டும்.
அ) சமூகம் ஆ) நாடு இ) வீடு ஈ) தெரு
- நாள் முழுவதும் வேலை செய்து களைத்தவர்க்கு ஆக இருக்கும்.
அ) மகிழ்ச்சி ஆ) கோபம் இ) வருத்தம் ஈ) அசதி
- நிலவு + என்று என்பதனைச் சேர்த்து எழுதக் கிடைக்கும் சொல்
அ) நிலயென்று ஆ) நிலவென்று இ) நிலவன்று ஈ) நிலவுஎன்று
- தமிழ் + எங்கள் என்பதனைச் சேர்த்து எழுதக் கிடைக்கும் சொல்
அ) தமிழங்கள் ஆ) தமிழெங்கள் இ) தமிழுங்கள் ஈ) தமிழ் எங்கள்
- ‘அமுதென்று’ என்னும் சொல்லைப் பிரித்து எழுதக் கிடைப்பது
அ) அமுது + தென்று ஆ) அமுது + என்று இ) அமுது + ஒன்று ஈ) அமு + தென்று

II. Choose the correct answers.

- The is a biological relative of tortoises.
a) sea turtle b) fish c) reptile
- In India’s coastal waters we can see a species of
a) tortoises b) sea turtles c) dolphin
- Sea turtles come to the shore to
a) visit their birthplace b) lay eggs c) go back to sea
- It is a problem for sea turtles to come ashore because of.....
a) they find it difficult to walk on the sand b) they don’t know their way to the shore c) animals and people hunt them
- A turtle’s flippers help it to
a) swim b) dig a nest c) climb
- பட்டியலில் எந்த எண் வரிசை சிறியதிலிருந்து பெரியதாக வரிசைப்படுத்தப்பட்டு உள்ளது?
(அ) 1468, 1486, 1484 (ஆ) 2345, 2435, 2235 (இ) 134205, 134208, 154203 (ஈ) 383553, 383548, 383642

- 12). அரபிக் கடலின் பரப்பளவு 1491000 சதுர மைல்கள். இது எந்த இரு எண்களுக்கு இடையில் அமைந்துள்ளது?
(அ) 1489000 மற்றும் 1492540 (ஆ) 1489000 மற்றும் 1490540 (இ) 1490000 மற்றும் 1490100 (ஈ) 1480000 மற்றும் 1490000
- 13). $3 + 5 - 7 \times 1$ இன் மதிப்பு _____.
(அ) 5 (ஆ) 7 (இ) 8 (ஈ) 1
- 14). $24 \div (8 - (3 \times 2))$ இன் மதிப்பு _____.
(அ) 0 (ஆ) 12 (இ) 3 (ஈ) 4
- 15). BIDMAS ஐப் பயன்படுத்திச், சரியான குறியீட்டைக் கட்டத்தில் நிரப்புக..
 $2 _ 6 - 12 \div (4 + 2) = 10$
(அ) + (ஆ) - (இ) $\times$ (ஈ) $\div$
- 16). ஒரு மரத்தின் சுற்றளவை அளவிடப் பயன்படுவது _____
அ) மீட்டர் அளவு கோல் ஆ) மீட்டர் கம்பி இ) பிளாஸ்டிக் அளவுகோல் ஈ) அளவு நாடா
- 17). 7 மீ என்பதை சென்டி மீட்டரில் மாற்றினால் கிடைப்பது
அ) 70 செ.மீ ஆ) 7 செ.மீ இ) 700 செ.மீ ஈ) 7000 செ.மீ
- 18). வேகத்தின் அலகு _____
அ) மீ ஆ) விநாடி இ) கிலோகிராம் ஈ) மீ/வி
- 19). குளம் _____ வாழிடத்திற்கு ஒரு உதாரணம்.
அ) கடல் ஆ) நன்னீர் இ) பாலைவனம் ஈ) மலைகள்
- 20). இலைத்துளையின் முக்கிய வேலை _____.
அ) நீரைக் கடத்துதல் ஆ) நீராவிப்போக்கு இ) ஒளிச் சேர்க்கை ஈ) உறிஞ்சுதல்
- 21). பழங்கால மனிதன் தனது உணவைச் சேகரிக்க மேற்கொண்ட நடவடிக்கை
அ. வணிகம் ஆ. வேட்டையாடுதல் இ. ஓவியம் வரைதல் ஈ. விலங்குகளை வளர்த்தல்
- 22). புவி தன் அச்சில் சுழல்வதை இவ்வாறு அழைக்கிறோம்.
அ) சுற்றுதல் ஆ) பருவகாலங்கள் இ) சுழல்தல் ஈ) ஓட்டம்
- 23). சூரியக்கும்பம் அடங்கியுள்ள விண்மீன் திரள் மண்டலம்
அ) ஆண்டிரோமெடா ஆ) மெகலனிக் கிளவுட் இ) பால்வெளி ஈ) ஸ்டார்பர்ஸ்ட்
- 24). இந்தியாவில் மாநிலங்களும், _____ யூனியன் பிரதேசங்களும் உள்ளன.
அ) 27, 9 ஆ) 29, 7 இ) 28, 7 ஈ) 28, 8
- 25). இந்தியா ஒரு _____ என்று அழைக்கப்படுகிறது.
அ) கண்டம் ஆ) துணைக்கண்டம் இ) தீவு ஈ) இவற்றில் எதுமில்லை



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STANDARD-VI

I.சரியான விடையைத் தேர்ந்தெடுத்து எழுதுக.

- ஏற்றத் தாழ்வற்ற அமைய வேண்டும்.
அ) சமூகம் ஆ) நாடு இ) வீடு ஈ) தெரு
- நாள் முழுவதும் வேலை செய்து களைத்தவர்க்கு ஆக இருக்கும்.
அ) மகிழ்ச்சி ஆ) கோபம் இ) வருத்தம் ஈ) அசதி
- நிலவு + என்று என்பதனைச் சேர்த்து எழுதக் கிடைக்கும் சொல்
அ) நிலயென்று ஆ) நிலவென்று இ) நிலவன்று ஈ) நிலவுஎன்று
- தமிழ் + எங்கள் என்பதனைச் சேர்த்து எழுதக் கிடைக்கும் சொல்
அ) தமிழங்கள் ஆ) தமிழெங்கள் இ) தமிழங்கள் ஈ) தமிழ் எங்கள்
- 'அமுதென்று' என்னும் சொல்லைப் பிரித்து எழுதக் கிடைப்பது
அ) அமுது + தென்று ஆ) அமுது + என்று இ) அமுது + ஒன்று ஈ) அமு + தென்று

II. Choose the correct answers.

- The is a biological relative of tortoises.
a) sea turtle b) fish c) reptile
- In India's coastal waters we can see a species of
a) tortoises b) sea turtles c) dolphin
- Sea turtles come to the shore to
a) visit their birthplace b) lay eggs c) go back to sea
- It is a problem for sea turtles to come ashore because of
a) they find it difficult to walk on the sand b) they don't know their way to the shore c) animals and people hunt them
- A turtle's flippers help it to
a) swim b) dig a nest c) climb
- Which list of numbers is in order from the smallest to the largest?
(a) 1468, 1486, 1484 (b) 2345, 2435, 2235 (c) 134205, 134208, 154203 (d) 383553, 383548, 383642
- The Arabian sea has an area of 1491000 square miles. This area lies between which numbers?
(a) 1489000 and 1492540 (b) 1489000 and 1490540 (c) 1490000 and 1490100 (d) 1480000 and 1490000

13.The value of $3 + 5 - 7 \times 1$ is

(a) 5 (b) 7 (c) 8 (d) 1

14.The value of $24 \div \{8 - (3 \times 2)\}$ is _____

(a) 0 (b) 12 (c) 3 (d) 4

15.Use BIDMAS and put the correct operator in the box.

$$236 - 12 \div (4 + 2) = 10$$

(a) + (b) - (c) $\times$ (d) $\div$

16.The girth of a tree can be measured by

(a) metre scale (b) metre rod (c) plastic ruler (d) measuring tape

17.The conversion of 7 m into cm gives

(a) 70 cm (b) 7 cm (c) 700 cm (d) 7000 cm

18.Unit of speed is

(a) m (b) s (c) kg (d) m/s

19.Pond is an example of _____ ecosystem.

(a) Marine (b) Freshwater (c) Deserts (d) Mountain

20.Organ of absorption is _____

(a) Root (b) Stem (c) Leaf (d) Flower

21.What was the step taken by the early man to collect his food?

(a) trade (b) hunting (c) painting (d) rearing of animals

22.The movement of the Earth on its axis is called _____

(a) Revolution (b) Seasons (c) Rotation (d) Circulation

23.The galaxy in which our solar system is found is _____

(a) Andromeda (b) Magellanic clouds (c) Milky way (d) Starburst

24.India consists of states and Union territories.

(a) 27,9 (b) 29,7 (c) 28,7 (d) 28,9

25.India is known as a

(a) Continent (b) Subcontinent (c) Island (d) None of these

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STANDARD-VII

I.சரியான விடையைத் தேர்ந்தெடுத்து எழுதுக.

1. 'நெறி' என்னும் சொல்லின் பொருள்
அ) வழி ஆ) குறிக்கோள் இ) கொள்கை ஈ) அறம்
2. 'குரலாகும்' என்னும் சொல்லைப் பிரித்து எழுதக் கிடைப்பது
அ) குரல் + யாகும் ஆ) குரல் + ஆகும் இ) குர + லாகும் ஈ) குர + ஆகும்
3. வான் + ஒலி என்பதனைச் சேர்த்தெழுதக் கிடைக்கும் சொல்
அ) வான்ஒலி ஆ) வானொலி இ) வாவொலி ஈ) வானலி
4. பகைவரை வெற்றி கொண்டவரைப் பாடும் இலக்கியம்
அ) கலம்பகம் ஆ) பரிபாடல் இ) பரணி ஈ) அந்தாதி
5. வானில் கூட்டம் திரண்டால் மழை பொழியும்
அ) அகில் ஆ) முகில் இ) துகில் ஈ) துயில்

II. Choose the correct answers and fill in the blanks.

6. 'Finally the day had come'. Here the day refers to
a. Pongal b. Christmas c. Eid
7. With their treasure, the boys would buy in Eidgah.
a) pens and pencils b) toys and rubber balls c) chocolates and cakes
8. Hamid's friends are
a) Mahmood, Mohsin, Noorey and Sammi. b) Raghul, Preethi, Sam and Mufeed.
c) Rani, Verghese, Sita and Zahir.
9. 'If only her son were there, it would have been a different kind of Eid'. What had happened to her son?
a) Her son had died. b) Her son had gone abroad. c) Her son had gone on a tour.
10. Hamid was like one with wings on his feet. This means
a) He ran fast. b) He ran slowly. c) He was an angel.

III. சரியா, தவறா எனக் கூறுக.

11. (-32) இன் கூட்டல் எதிர்மறை (-32)
12. (-90) + (-30) = 60
13. (-125) + 25 = -100
14. (-30) + (-6) = -6
15. (-64) ÷ (-64) is 0

IV. சரியான விடையைத் தேர்ந்தெடுத்து எழுதுக.

16.. பின்வருவனவற்றுள் எது வழி அளவு?

அ) நிறை ஆ) நேரம் இ) பரப்பு ஈ) நீளம்

17.. அடர்த்தியின் SI அலகு

அ) கிகி / மீ² ஆ) கிகி / மீ³ இ) கிகி / மீ ஈ) கி / மீ³

18.. ஒளி ஆண்டு என்பது எதன் அலகு?

அ) தொலைவு ஆ) நேரம் இ) அடர்த்தி ஈ) நீளம் மற்றும் நேரம்

19.கீழ்க்கண்டவற்றுள் உலோகம் எது?

அ. இரும்பு ஆ. ஆக்சிஜன் இ. ஹீலியம் ஈ. தண்ணீர்

20. ஆக்சிஜன், ஹைட்ரஜன் மற்றும் சல்பர் ஆகியவை கீழ்க்கண்டவற்றுள் எதற்கான உதாரணம்?

அ. உலோகம் ஆ. அலோகம் இ. உலோகப்போலிகள் ஈ. மந்த வாயுக்கள்

21._____என்பவை பாறைகள், கற்கள், கோவில் சுவர்கள், உலோகங்கள் ஆகியவற்றின் கடினமான மேற்பரப்பின் மீது செதுக்கப்படும் வாசகங்களாகும்.

அ) காலவரிசையிலான நிகழ்வுப்பதிவுகள் ஆ) பயணக்குறிப்புகள் இ) நாணயங்கள்

ஈ) பொறிப்புகள்

22. கோவில்களுக்குக் கொடையாக வழங்கப்பட்ட நிலங்கள் ஆகும்.

அ) வேளாண்வகை ஆ) சாலபோகம் இ) பிரம்மதேயம் ஈ) தேவதானம்

23. _____களின் காலம் பக்தி இலக்கியங்களின் காலமென அறியப்படுகிறது.

அ) சோழர் ஆ) பாண்டியர் இ) ராஜபுத்திரர் ஈ) விஜயநகர அரசர்கள்

24. முதல் டெல்லி சுல்தான் பற்றிய தகவல்களைக் கூறும் நூல் ஆகும்.

அ) அயினி அக்பரி ஆ) தாஜ் - உல் - மா - அசிர் இ) தசுக்-இ-ஜாஹாங்கீரி ஈ) தாரிக் - இ - பெரிஷ்டா

25. அரேபியாவில் பிறந்து இந்தியாவிற்கு வந்த மொராக்கோ நாட்டு அறிஞர் ஆவார்.

அ) மார்க்கோபோலோ ஆ) அல்-பரூனி இ) டோமிங்கோ பயஸ் ஈ) இபன் பதூதா



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I.சரியான விடையைத் தேர்ந்தெடுத்து எழுதுக.

1. 'நெறி' என்னும் சொல்லின் பொருள்
அ) வழி ஆ) குறிக்கோள் இ) கொள்கை ஈ) அறம்
2. 'குரலாகும்' என்னும் சொல்லைப் பிரித்து எழுதக் கிடைப்பது
அ) குரல் + யாகும் ஆ) குரல் + ஆகும் இ) குர + லாகும் ஈ) குர + ஆகும்
3. வான் + ஒலி என்பதனைச் சேர்த்தெழுதக் கிடைக்கும் சொல்
அ) வான்ஒலி ஆ) வானொலி இ) வாவொலி ஈ) வானலி
4. பகைவரை வெற்றி கொண்டவரைப் பாடும் இலக்கியம்
அ) கலம்பகம் ஆ) பரிபாடல் இ) பரணி ஈ) அந்தாதி
5. வானில் கூட்டம் திரண்டால் மழை பொழியும்
அ) அகில் ஆ) முகில் இ) துகில் ஈ) துயில்

II. Choose the correct answers and fill in the blanks.

6. 'Finally the day had come'. Here the day refers to
a. Pongal b. Christmas c. Eid
7. With their treasure, the boys would buy in Eidgah.
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9. 'If only her son were there, it would have been a different kind of Eid'! What had happened to her son?
a) Her son had died. b) Her son had gone abroad. c) Her son had gone on a tour.
10. Hamid was like one with wings on his feet. This means
a) He ran fast. b) He ran slowly. c) He was an angel.

III. Say True or False.

11. The additive inverse of (-32) is -32
12. $(-90) + (-30) = 60$
13. $(-125) + 25 = -100$
14. $(-30) \div (-6) = -6$
15. $(-64) \div (-64)$ is 0

IV. Choose the correct answers and fill in the blanks.

16. Which of the following is a derived unit?

- (a) mass (b) time (c) area (d) length

17. SI unit of density is

- (a) kg/m^2 (b) kg/m^3 (c) kg/m (d) g/m^3

18. Light year is the unit of

- (a) Distance (b) time (c) density (d) both length and time

19. Which of the following is an example of a metal?

- (a) Iron (b) Oxygen (c) Helium (d) Water

20. Oxygen, hydrogen, and sulphur are examples of which of the following?

- (a) Metals (b) Non-metals (c) Metalloids (d) Inert gases

21. are the writings engraved on solid surfaces such as rocks, stones, temple walls and metals.

- (a) Chronicles (b) Travelogues (c) Coins (d) Inscriptions

22. was the land gifted to temples.

- (a) Vellanvagai (b) Shalabhoga (c) Brahmadeya (d) Devadana

23. period was known as the period of devotional literature.

- (a) Chola (b) Pandya (c) Rajput (d) Vijayanagar

24. provides information about the first Sultan of Delhi.

- (a) Ain – i – Akbar (b) Taj – ul – Ma'asir (c) Tuzk – i – Jahangiri (d) Tarikh – i – Frishta

25. an Arab-born Morocco scholar, travelled from Morocco to India.

- (a) Marco Polo (b) Al Beruni (c) Domingo Paes (d) Ibn Battuta

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STANDARD-VIII

I.சரியான விடையைத் தேர்ந்தெடுத்து எழுதுக.

1.மக்கள் வாழும் நிலப்பகுதியைக் குறிக்கும் சொல்

அ) வைப்பு ஆ) கடல் இ) பரவை ஈ) ஆழி

2.'என்றென்றும்' என்னும் சொல்லைப் பிரித்து எழுதக் கிடைப்பது

அ) என் + றென்றும் ஆ) என்று + என்றும் இ) என்றும் + என்றும் ஈ) என் + என்றும்

3. 'வானமளந்தது' என்னும் சொல்லைப் பிரித்து எழுதக் கிடைப்பது

அ) வான் + மளந்தது ஆ) வான் + அளந்தது இ) வானம் + அளந்தது ஈ) வான் + மளந்தது

4. அறிந்தது + அனைத்தும் என்பதனைச் சேர்த்தெழுதக் கிடைக்கும் சொல்.....

அ) அறிந்தது அனைத்தும் ஆ) அறிந்தனைத்தும் இ) அறிந்ததனைத்தும் ஈ) அறிந்துனைத்தும்

5. வானம் + அறிந்த என்பதனைச் சேர்த்தெழுதக் கிடைக்கும் சொல்

அ) வானம் அறிந்து ஆ) வான் அறிந்த இ) வானமறிந்த ஈ) வான்மறிந்த

II) Choose the correct synonyms for the italicized words.

6. Nice fun indeed.

a) infact b) doubtedly c) fine

7. The poor woman is in a panic.

a) fear b) grid c) crash

8. The mother consoled her little girl.

a) Pretended b) comforted c) left

9. You are always self-centered.

a) Egoistic b) generous c) heroic

10. What is the secret you are whispering?

a) rumour b) murmur c) louder

11- 15 பின்வருவனவற்றைப் பொருத்துக:

பின்வருவனவற்றைப் பொருத்துக:	
(i) வட்டத்தின் பரப்பளவு	- (அ) $\frac{1}{4} \pi r^2$
(ii) வட்டத்தின் சுற்றளவு	- (ஆ) $(\pi + 2)r$
(iii) வட்டக்கோணப் பகுதியின் பரப்பளவு	- (இ) πr^2
(iv) சுற்றவட்டத்தின் சுற்றளவு	- (ஈ) $2 \pi r$
(v) கால்வட்டத்தின் பரப்பளவு	- (உ) $\frac{\theta^\circ}{360^\circ} \times \pi r^2$

III. சரியான விடையைத் தேர்ந்தெடுத்து எழுதுக.

16. கீழ்க்கண்டவற்றுள் எது ஆங்கிலேய அலகு முறை?

அ) CGS ஆ) MKS இ) FPS ஈ) SI

17.. மின்னோட்டம் என்பது _____ அளவு ஆகும்.

அ) அடிப்படை ஆ) துணைநிலை இ) வழி ஈ) தொழில் சார்ந்த

18.. வெப்பநிலையின் SI அலகு _____.

அ) செல்சியஸ் ஆ) ஃபாரன்ஹீட் இ) கெல்வின் ஈ) ஆம்பியர்

19.. ஒளிச்செறிவு என்பது _____ யின் ஒளிச்செறிவாகும்.

அ) லேசர் ஒளி ஆ) புற ஊதாக் கதிரின் ஒளி இ) கண்ணுறு ஒளி ஈ) அகச் சிவப்புக் கதிரின் ஒளி

20.. இரண்டு அல்லது அதற்கு மேற்பட்ட மதிப்புகள் நெருங்கி

இருப்பது _____.

அ) துல்லியம் ஆ) நுட்பம் இ) பிழை ஈ) தோராயம்

IV. சரியான விடையைத் தேர்ந்தெடுத்து எழுதுக.

21. இந்தியாவில் போர்ச்சுகீசிய ஆதிக்கத்திற்கு அடித்தளம் அமைத்தவர் யார்?

அ) வாஸ்கோடகாமா ஆ) பார்த்தலோமியோ டயஸ் இ) அல்போன்சோ-டி-அல்புகர்க் ஈ) அல்மெய்டா

22. பின்வரும் ஐரோப்பிய நாடுகளுள் இந்தியாவுக்கு கடல்வழியைக் கண்டுபிடிப்பதில் முதன்மையாக இருந்த நாடு எது?

அ) நெதர்லாந்து (டச்சு) ஆ) போர்ச்சுகல் இ) பிரான்ஸ் ஈ) பிரிட்டன்

23.கீழ்க்கண்டவற்றுள் எது பாறைக் கோளம் என அழைக்கப்படுகிறது?

அ) வளிமண்டலம் ஆ) உயிர்க்கோளம் இ) நிலக்கோளம் ஈ) நீர்க்கோளம்

24. உலக மண் நாளாக கடைபிடிக்கப்படும் நாள்

அ) ஆகஸ்ட் 15 ஆ) ஜனவரி 12 இ) அக்டோபர் 15 ஈ) டிசம்பர் 5

25.ஒரு மாநிலத்தின் ஆளுநர் யாரால் நியமிக்கப்படுகிறார்?

அ) குடியரசுத் தலைவர் ஆ) துணைக் குடியரசுத் தலைவர் இ) பிரதம மந்திரி ஈ) முதலமைச்சர்



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Project on “Effectiveness of Technology Integration in Curricular Transaction on Academic Success of School Students in Radhapuram Assembly Constituency”

STANDARD-VIII

1.சரியான விடையைத் தேர்ந்தெடுத்து எழுதுக.

1.மக்கள் வாழும் நிலப்பகுதியைக் குறிக்கும் சொல்

அ) வைப்பு ஆ) கடல் இ) பரவை ஈ) ஆழி

2.‘என்றென்றும்’ என்னும் சொல்லைப் பிரித்து எழுதக் கிடைப்பது

அ) என் + றென்றும் ஆ) என்று + என்றும் இ) என்றும் + என்றும் ஈ) என் + என்றும்

3. ‘வானமளந்தது’ என்னும் சொல்லைப் பிரித்து எழுதக் கிடைப்பது

அ) வான + மளந்தது ஆ) வான் + அளந்தது இ) வானம் + அளந்தது ஈ) வான் + மளந்தது

4. அறிந்தது + அனைத்தும் என்பதனைச் சேர்த்தெழுதக் கிடைக்கும் சொல்

அ) அறிந்தது அனைத்தும் ஆ) அறிந்தனைத்தும் இ) அறிந்ததனைத்தும்

ஈ) அறிந்துனைத்தும்

5. வானம் + அறிந்த என்பதனைச் சேர்த்தெழுதக் கிடைக்கும் சொல்

அ) வானம் அறிந்து ஆ) வான் அறிந்த இ) வானமறிந்த ஈ) வான்மறிந்த

II) Choose the correct synonyms for the italicized words.

6. Nice fun indeed.

a) infact b) doubtedly c) fine

7. The poor woman is in a panic.

a) fear b) grid c) crash

8. The mother consoled her little girl.

a) pretended b) comforted c) left

9. You are always self-centered.

a) egoistic b) generous c) heroic

10. What is the secret you are whispering?

a) rumour b) murmur c) louder

11-15.Match the following

(i)	Area of a circle	a.	$\frac{1}{4} \pi r^2$
(ii)	Circumference of a circle	b.	$(\pi + 2)r$
(iii)	Area of the sector of a circle	c.	πr^2
(iv)	Circumference of a semicircle	d.	$2\pi r$
(v)	Area of a quadrant of a circle	e.	$\frac{\theta^\circ}{360^\circ} \times \pi r^2$

III. Choose the best answer

16. Which one of the following system of units is the British System of unit?

- (a) CGS (b) MKS (c) FPS (d) SI

17. Electric current belongs to quantities

- (a) Base (b) Supplementary (c) Derived (d) professional

18. SI unit of temperature is

- (a) Celsius (b) Fahrenheit (c) Kelvin (d) Ampere

19. Amount of substance is

- (a) Directly proportional to the number of atoms (b) Inversely proportional to the number of atoms
(c) Directly proportional to the square of number of atoms
(d) Inversely proportional to the square of number of atoms

20. Luminous intensity is the intensity of

- (a) Laser light (b) UV light (c) Visible light (d) IR light

21. Who laid the foundation of Portuguese power in India?

- (a) Vasco da Gama (b) Bartholomew Diaz (c) Alfonso de Albuquerque (d) Almeida

22. Which of the following European Nation was the foremost attempt to discover a sea route to India?

- (a) Dutch (b) Portugal (c) France (d) Britain

23. Which of the following is known as sphere of rocks

- (a) Atmosphere (b) Biosphere (c) Lithosphere (d) Hydrosphere

24. World soil day is observed on

- (a) 15th August (b) 12th January (c) 15th October (d) 5th December

25. The Governor of a state is appointed by

- (a) President (b) Vice President (c) Prime Minister (d) Chief Minister

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STANDARD-IX

I.சரியான விடையைத் தேர்ந்தெடுத்து எழுதுக.

1. இந்திய மொழிக் குடும்ப வகைகள்
அ) 8 ஆ) 18 இ) 6 ஈ) 4
2. பொருந்தாததைத் தேர்ந்தெடு.
அ) மூன்று – தமிழ் ஆ) மூன்று – மலையாளம் இ) மூன்று – தெலுங்கு ஈ) மூன்று – துளு
3. தமிழ், தெலுங்கு, கன்னடம், மலையாளம் போன்ற மொழிகளை ஒப்புமைப்படுத்தி ஆய்ந்த முதல் அறிஞர்
அ) மாக்சுமுல்லர் ஆ) எமினோ இ)கால்டுவெல் ஈ) பிரான்சிஸ் எல்லிஸ்
4. இந்தியாவில் பேசப்படும் மொழிகளின் எண்ணிக்கைக்கும் மேற்பட்டது.
அ) 1200 ஆ) 1300 இ) 800 ஈ) 1000
5. ‘தமிழியன்’ என்று தென்னக மொழிகளை பெயரிட்டு அழைத்தவர்
அ) கால்டுவெல் ஆ) மாக்சுமுல்லர் இ) ஸ்டென்கனோ ஈ) ஹோக்கன்

6-10. Match the words in column A with their antonyms in column B.

S.No.	A	B
1.	concentrate	incomplete
2.	inevitable	distract
3.	occasional	wise
4.	complete	continual
5.	insane	preventable

11.பின்வருவனவற்றில் எவை கணங்களாகும்?

- (i) ஒன்று முதல் 100 வரையுள்ள பகா எண்களின் தொகுப்பு.
- (ii) இந்தியாவில் உள்ள செல்வந்தர்களின் தொகுப்பு.
- (iii) இந்தியாவில் உள்ள ஆறுகளின் தொகுப்பு.
- (iv) வளைகோல் பந்தாட்டத்தை நன்றாக விளையாடும் வீரர்களின் தொகுப்பு.

12. பின்வரும் ஆங்கிலச் சொற்களிலுள்ள எழுத்துகளைப் பட்டியல் முறையில் எழுதுக.

(i) INDIA (ii) PARALLELOGRAM

13. $A = \{0, 3, 5, 8\}$, $B = \{2, 4, 6, 10\}$ மற்றும் $C = \{12, 14, 18, 20\}$ என்ற கணங்களைக் கொண்டு.

(அ) சரியா, தவறா எனக் கூறுக:

(i) $18 \in C$ (ii) $6 \notin A$ (iii) $14 \notin C$ (iv) $10 \notin B$

14. கோடிட்ட இடங்களை நிரப்புக:

(i) $3! = \underline{\hspace{1cm}}$ (ii) $14! = \underline{\hspace{1cm}}$

15. பின்வரும் கணங்களைப் பட்டியல் முறையில் எழுதுக.

(i) $A = 20$ - க்கும் குறைவான இரட்டைப்படை இயல் எண்களின் கணம்.

16. அளவுகோல், அளவிடும் நாடா மற்றும் மீட்டர் அளவுகோல் ஆகியவை கீழ்க்கண்ட எந்த அளவை அளவிடப் பயன்படுகின்றன?

அ) நிறை ஆ) எடை இ) காலம் ஈ) நீளம்

17. கீழ்க்கண்டவற்றுள் எது நிறையை அளவிடும் கருவியல்ல?

அ) சுருள் தராசு ஆ) பொதுத் தராசு இ) இயற்பியல் தராசு ஈ) எண்ணியல் தராசு

18. பின்வருவனவற்றுள் _____ ஒரு கலவை

அ) சாதாரண உப்பு ஆ) தூய வெள்ளி இ) கார்பன் டைஆக்ஸைடு ஈ) சாறு

19. நான்கு அறைகளையுடைய இதயம் கொண்ட விலங்கினைக் கண்டறிக.

அ. பல்வி ஆ. பாம்பு இ. முதலை ஈ. ஓணான்

20. மண்டையோடற்ற உயிரிகள் எவ்வாறு அழைக்கப்படுகின்றன?

அ. ஏக்ரேனியா ஆ. ஏசெபாலியா இ. ஏப்டீரியா ஈ. ஏசீலோமேட்டா

21. மனிதர்களுடன் மரபணுவியல் நோக்கில் மிகவும் நெருக்கமாக இருப்பது

அ) கொரில்லா ஆ) சிம்பன்ஸி இ) உராங் உட்டான் ஈ) பெருங்குரங்கு

22. வேளாண்மை மற்றும் விலங்குகளைப் பழக்கப்படுத்துதல் தொடங்கிய காலகட்டம்

அ) பழைய கற்காலம் ஆ) இடைக்கற்காலம் இ) புதிய கற்காலம் ஈ) பெருங்கற்காலம்

23. புவியின் திடமான தன்மைகொண்ட மேல்புற அடுக்கை _____ என்று அழைக்கின்றோம்.

அ) கருவம் ஆ) கவசம் இ) புவி மேலோடு ஈ) உட்கரு

24. புவியினுள் உருகிய இரும்பைக் கொண்ட அடுக்கை _____ என்று அழைக்கின்றோம்.

அ) கருவம் ஆ) வெளிக்கரு இ) கவசம் ஈ) மேலோடு

25. முழு அதிகாரத்துடன் கொண்ட ஒரு அரசாங்க முறை

அ) சிறுகுழு ஆட்சி ஆ) மதகுருமார்களின் ஆட்சி இ) மக்களாட்சி ஈ) தனிநபராட்சி



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STANDARD-IX

I.சரியான விடையைத் தேர்ந்தெடுத்து எழுதுக.

- இந்திய மொழிக் குடும்ப வகைகள்
அ) 8 ஆ) 18 இ) 6 ஈ) 4
- பொருந்தாததைத் தேர்ந்தெடு.
அ) மூன்று - தமிழ் ஆ) மூணு - மலையாளம் இ) மூடு - தெலுங்கு ஈ) மூரு - துளு
- தமிழ், தெலுங்கு, கன்னடம், மலையாளம் போன்ற மொழிகளை ஒப்புமைப்படுத்தி ஆய்ந்த முதல் அறிஞர்
அ) மாக்சுமூல்லர் ஆ) எமினோ இ)கால்டுவெல் ஈ) பிரான்சிஸ் எல்லிஸ்
- இந்தியாவில் பேசப்படும் மொழிகளின் எண்ணிக்கைக்கும் மேற்பட்டது.
அ) 1200 ஆ) 1300 இ) 800 ஈ) 1000
- ‘தமிழியன்’ என்று தென்னக மொழிகளை பெயரிட்டு அழைத்தவர்
அ) கால்டுவெல் ஆ) மாக்சுமூல்லர் இ) ஸ்டென்கனோ ஈ) வேறாக்கன்

6-10. Match the words in column A with their antonyms in column B.

S.No.	A	B
1.	concentrate	incomplete
2.	inevitable	distract
3.	occasional	wise
4.	complete	continual
5.	insane	preventable

11. Which of the following are sets?

- (i) The collection of prime numbers upto 100. (ii) The collection of rich people in India.
 (iii) The collection of all rivers in India. (iv) The collection of good Hockey players.

12. List the set of letters of the following words in Roster form.

- (i) INDIA (ii) PARALLELOGRAM

13. Consider the following sets $A = \{0, 3, 5, 8\}$, $B = \{2, 4, 6, 10\}$ and $C = \{12, 14, 18, 20\}$.

State whether True or False:

- (i) $18 \in C$ (ii) $6 \notin A$ (iii) $14 \notin C$ (iv) $10 \notin B$

14. Fill in the blanks:

- (i) $3 \in$ ____ (ii) $14 \in$ ____

15. Represent the following sets in Roster form.
(i) A = The set of all even natural numbers less than 20.
16. Rulers, measuring tapes and metre scales are used to measure
a. mass b. weight c. time d. length
17. Which among the following is not a device to measure mass?
(a) Spring balance (b) Beam balance (c) Physical balance (d) Digital balance
18. Among the following is a mixture.
(a) Common salt (b) Juice (c) Carbon dioxide (d) Pure silver
19. Identify the animal having a four-chambered heart
(a) Lizard (b) Snake (c) Crocodile (d) Calotes
20. The animal without skull is
(a) Acrania (b) Acephalia (c) Apteris (d) Acoelomate
21. _____ is genetically closest to humans
(a) Gorilla (b) Chimpanzee (c) Orang-utan (d) Great Apes
22. The period called _____ marks the beginning of agriculture and animal domestication.
(a) Paleolithic (b) Mesolithic (c) Neolithic (d) Megalithic
23. _____ is the rigid outer layer of the Earth.
(a) Core (b) Mantle (c) Crust (d) Inner core
24. Layer is made up of liquid iron _____
(a) Inner core (b) Outer core (c) Mantle (d) Crust
25. A system of government with absolute power _____
(a) Aristocracy (b) Theocracy (c) Democracy (d) Autocracy

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