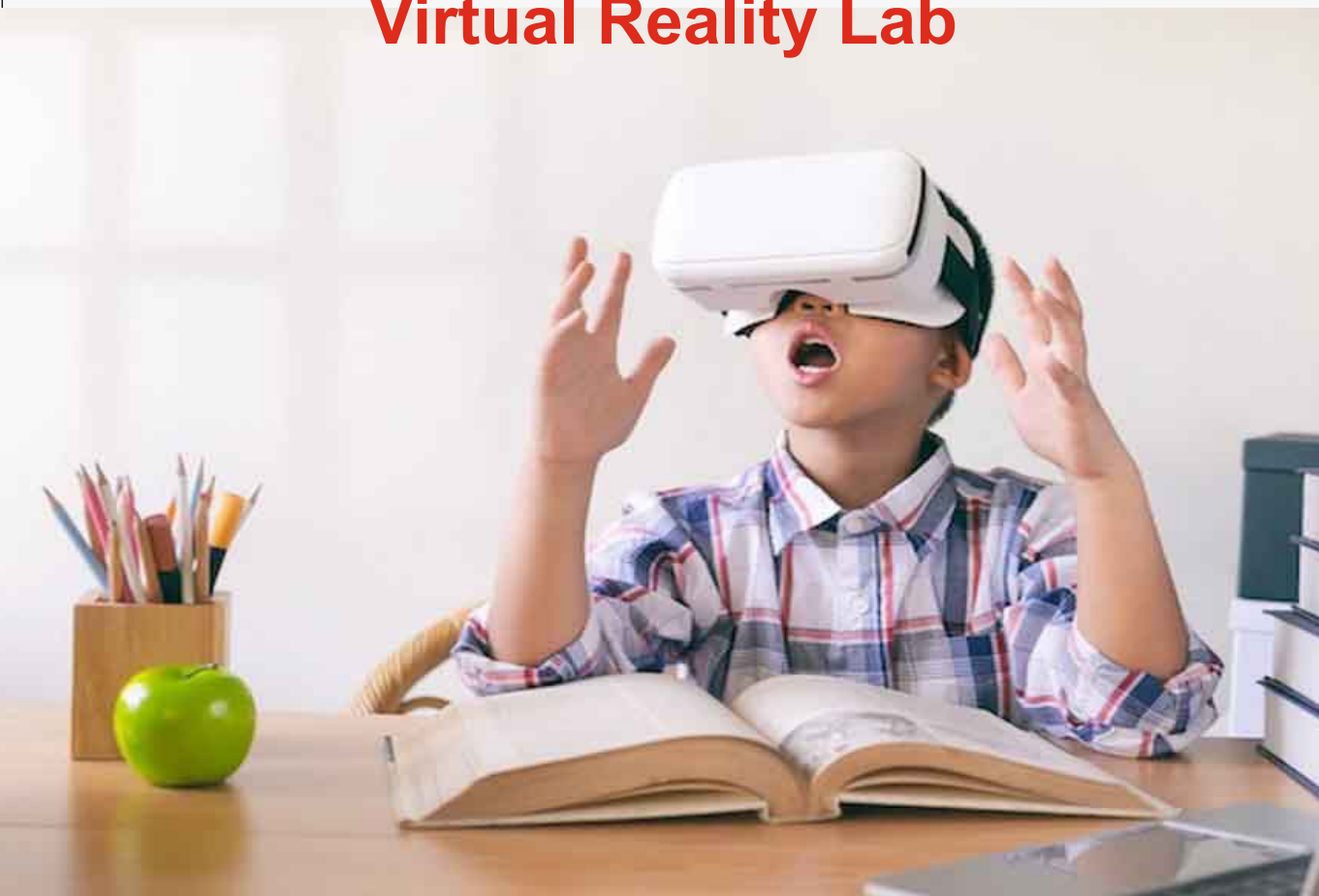


VR LAB

Virtual Reality Lab





Thiruvananthapuram
Date: 17/07/2025

V. Sivankutty
Minister for General Education
and Labour
Government of Kerala

Kerala has always been a role model among all states in the field of education. Performance excellence and quality are the hallmarks of General education in Kerala. The Kerala society's emphasis on education has contributed greatly to this achievement. The General Education Department and Samagra Shiksha Kerala, hand in hand, are implementing numerous quality interventions, paving the way for the empowerment of public education and thereby creating a new Kerala.

Kerala is among the states that have shown the best performance in the National Quality Index. This achievement has earned Kerala a place in the 'STARS' project. The goal of the 'STARS' project is to implement necessary reforms to enhance the quality and credibility of public education, design and implement innovative and flexible activities to improve educational quality, and ensure better outcomes.

This is a brief document about the major activities implemented by Samagra Shiksha Kerala under the STARS project in Kerala. I extend all my best wishes for the continuation and quality implementation of excellent activities.

With affection,

- V. Sivankutty

Dr. K. VASUKI IAS
SECRETARY



General Education Department
Government Secretariat
Thiruvananthapuram-695 001

Phone-Office : 0471-2517395

Date



Message from Secretary, General Education

Samagra Shiksha represents an integrated and inclusive approach to school education, and this document reflects the innovative practices, collaborative initiatives, and community engagement that have enriched our educational landscape. I am delighted to note the commendable effort taken to present a document showcasing the academic activities carried out under Samagra Shiksha in Kerala under the STARS Project. This initiative is a significant step forward. Creating a comprehensive record of our academic endeavours is crucial for several reasons: it allows us to effectively showcase the depth and breadth of the programme, serves as an invaluable resource for future planning and implementation, and enables us to identify best practices and areas for further improvement. This document not only reflects the dedication and hard work of our educators, administrators, and stakeholders but also serves as a valuable record of the innovative and inclusive practices being implemented across the state.

The holistic development of learners is always the focus of the Samagra Shiksha, Kerala. This documentation highlights our collective strides towards that goal. From strengthening foundational learning to fostering equity and excellence in education, the initiatives captured in this document reflect the spirit of collaboration and commitment that defines Kerala's education system.

The hard work demonstrated in creating this document is truly appreciated. Such thorough documentation will undoubtedly contribute to the continued success and evolution of educational initiatives across the State, ultimately benefiting our students and the entire academic community.

I congratulate the entire team behind this initiative for their dedication and vision. May this report serve not only as a record of achievements but also as a source of inspiration for future educational endeavours.

Dr. K Vasuki IAS
Secretary
Department of General Education
Government of Kerala

Department of General Education
Samagra Shiksha Keralam

STARS Project Document 2025
VIRTUAL REALITY LAB

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Kerala envisions an education system that effectively integrates technology with pedagogy to create meaningful, engaging, and future-ready learning experiences. Recognising the transformative potential of digital innovation, the State seeks to enhance classroom learning by making complex and abstract concepts more accessible, especially in subjects that require visualisation and experiential understanding.

In this context, the Virtual Reality (VR) Lab initiative reflects Kerala's commitment to leveraging advanced technology to ensure quality and equity in education. The programme is designed to provide immersive and interactive learning experiences for students at the secondary and higher secondary levels, particularly in subjects such as Physics, Chemistry, Biology, Mathematics, and Geography, where direct or real-life exposure may be limited.

The initiative also underscores the State's emphasis on academic collaboration and quality content development. Curriculum-aligned VR content is developed through the combined efforts of school teachers, SCERT researchers, and higher education faculty, and is technologically enabled by C-DAC to create engaging virtual modules.

By introducing VR-enabled classrooms, the State aims to bridge gaps in experiential learning, stimulate curiosity, and deepen conceptual understanding among learners. The gradual expansion of VR labs across schools demonstrates Kerala's forward-looking approach to modernising education while ensuring that students across regions benefit from innovative learning tools.



OBJECTIVES

Through such initiatives, Kerala reaffirms its vision of creating a technologically empowered, inclusive, and dynamic education system that equips learners with the skills and competencies required for the future.

The programme aims to enhance learners' understanding of complex and abstract concepts in Science and Mathematics through the integration of immersive Virtual Reality (VR) technology with curriculum-aligned instructional modules. Recognising that many scientific and mathematical ideas are difficult to comprehend through conventional classroom methods alone, the initiative seeks to provide experiential and visual learning opportunities that make such concepts more concrete and accessible.

By deploying VR-enabled modules in classrooms, the programme facilitates interactive and engaging learning experiences that allow students to explore, visualise, and internalise key concepts in a simulated environment. This approach not only strengthens conceptual clarity but also promotes curiosity, inquiry, and deeper cognitive engagement among learners.

The alignment of VR content with the prescribed curriculum ensures that these digital interventions directly support classroom teaching and learning outcomes. Furthermore, the use of technology-enhanced pedagogy helps cater to diverse learning styles, enabling students to grasp difficult topics more effectively and retain knowledge for longer durations.

Through this initiative, the programme aspires to transform traditional learning into an immersive educational experience, thereby improving academic performance, fostering scientific temper, and equipping learners with the skills required for a technology-driven world.

Virtual reality is one of the major innovations that has significantly influenced modern education through technology. This new technological tool has given contemporary educational practices a fresh shape and direction. Although VR is already being used in higher education, especially in science education, this is the first time it is being applied in the school education sector. Kerala is at the forefront in using this technological facility.

It helps teachers convey numerous natural phenomena that lack direct visual possibilities and are otherwise difficult to explain easily and without any loss of information during communication. From the child's perspective, the greatest advantage of VR is that it ensures the learner receives exactly what the curriculum intends.



**VIRTUAL
REALITY**

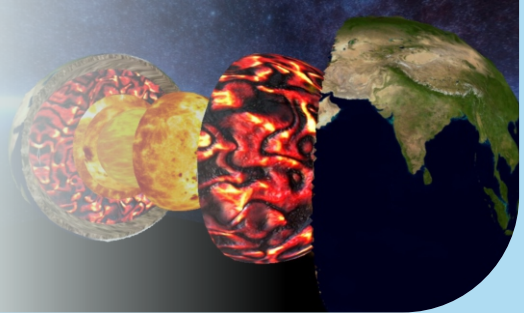
A Virtual Experience of the Earth

Learning about the mysteries inside the Earth always sparks wonder and curiosity among children. We generally understand the Earth's interior by analysing facts from direct and indirect sources. Offering children a direct visual experience of the Earth's interior can undoubtedly elevate the learning process to a higher level. It is in such contexts that virtual reality becomes a blessing. The VR experience of the Earth's internal structure is truly astonishing. This content has been developed as a digital module that helps each learner clearly understand the characteristics of the Earth's inner layers. Students can also independently explore and separate the layers as needed.

By incorporating opportunities for creative assessment, this VR-enabled learning process becomes an excellent digital learning tool. Indeed, virtual reality has opened up a world of remarkable clarity and new possibilities in geography learning.

Shanlal A.B.

HSST Geography,
Government THSS Chalai,
Thiruvananthapuram



OBJECTIVES

- To easily understand complex concepts in textbooks
- To enable deep learning
- To approach subjects in an enjoyable manner
- To provide diverse learning environments
- To enhance creativity and problem-solving skills
- To improve critical thinking

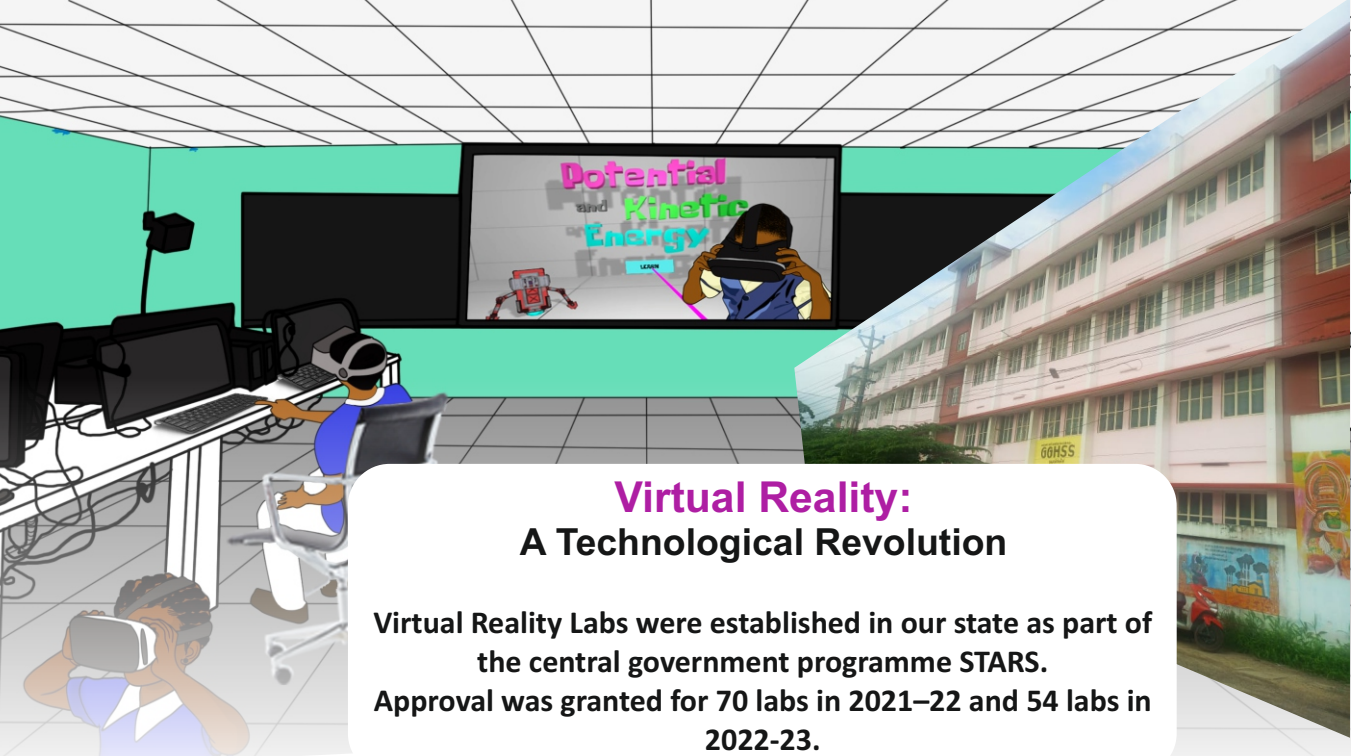


An Experience of Immersion in the Impossible

Imagine taking a walk through the streets of ancient Rome or travelling through the royal courts of the Mauryan Empire. Being able to immerse oneself in such experiences, possible only in imagination, and to grasp an entire era! What an incredible possibility that is.

Virtual reality offers this rare opportunity, not only for recreating historical experiences but also for providing direct exposure to scientific phenomena and cosmic movements. Though the experience is virtual, VR helps learners overcome the limitations of words and static visuals, allowing them to understand concepts more completely.





Virtual Reality: A Technological Revolution

Virtual Reality Labs were established in our state as part of the central government programme STARS. Approval was granted for 70 labs in 2021–22 and 54 labs in 2022-23.



In the first phase, VR labs were set up in:

- GG HSS Malayinkeezhu, Thiruvananthapuram
- GHSS Puthoor, Kollam
- VHSS Kumarakom, Kottayam

In the second phase, VR labs were established in:

- GVHSS Desamangalam, Thrissur
- GHSS Kamballoor, Kasaragod

Depending on the availability of funds, these VR labs will be expanded to more schools.



Kerala's Own Digital Content

Preparing digital content using VR technology is a highly complex and expensive process. It is noteworthy that Kerala has developed interactive learning materials aligned with its curriculum. Another special feature is the availability of explanations in both English and Malayalam. Students can choose the language medium they prefer.

These content modules were developed through the combined efforts of C-DAC (a central electronics research institution) and Kerala's education experts. The digital content can be used in the upcoming VR labs as well.



Stages of VR Content Development



Stage 1

Preparing the User Story Needed for Digital Content Sections in the textbook where a direct experience is impossible were selected. User stories were prepared under the leadership of competent teachers from government schools, research officers from the research institution SCERT, college teachers from the higher education sector, and officials from Samagra Shiksha Kerala.

Stage 2

Digital Content Development

The prepared user stories were converted into digital content by the engineers at the central research institution C-DAC. Selected areas from physics, chemistry, biology, mathematics, and geography for classes 8 to 12 were developed into digital content.





Stage 3

Improvement

The digital content created is first reviewed and improved by an expert committee consisting of the Project Manager and Project Leader at C-DAC. After that, the expert committee of teachers who have prepared the user stories re-examine the content and refine it further.

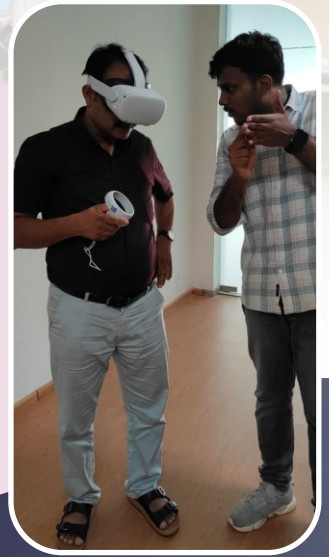


Stage 4

VR Content Installation

The completed content was provided to five schools in the state. To familiarise teachers and students in these schools with the content, extensive training was conducted in multiple phases under the leadership of C-DAC and Samagra Shiksha Kerala.

As part of the training, the necessary technical knowledge required to effectively use virtual devices for learning was also provided.



VR for the Public

The virtual reality technology used in classroom learning attracted considerable public attention at the 'Ente Keralam' exhibition-cum-fair held at district centres in connection with the Kerala Government's fourth anniversary celebrations.

People of all ages watched and enjoyed the VR experience.

Long queues formed as people eagerly waited to personally experience this digital revolution in the field of education.



LEARNING ADVANTAGES OFFERED BY VIRTUAL REALITY IMMERSIVE LEARNING



- The greatest strength of VR is that it enables experiences that are impossible through the five senses.
- **Ensuring Deep Understanding**
VR helps students gain a clear and precise understanding of subtle scientific phenomena.
- **A Platform for Safe Experimentation**
VR allows students to conduct experiments that may be impossible in classroom or laboratory settings, including those with potential risks, and observe the resulting changes safely.
- **Increased Learning Motivation**
Students show greater interest and enthusiasm towards learning because VR enables vivid and emotionally engaging learning.
- **Learning that Supports Multiple Intelligences**
Since VR content integrates a variety of sensory experiences, differences in cognitive abilities do not hinder learning in any way.

VR in the News (The Page contains newspaper coverage)

Govt schools take VR route to make learning funfilled

SOVI VIDYADHARAN @TPuram

HOW about peeling and examining various layers of the earth such as its core, mantle and crust with the ease of peeling an orange? That's how interesting a geography chapter has turned into for students of Government Girls' HSS, Malayinkeezh, in the state capital. Thanks to the newly set-up virtual reality (VR) lab in the school, learning has become a totally immersive affair, giving students hands-on experiences that are difficult to explain or replicate in real life.

Besides geography, students from Classes VIII to XII in the school can now experience as many as 65 concepts in VR mode for subjects such as physics, chemistry, biology and mathematics. Though intended for students from the secondary level, children in lower classes also make a bee-line to the school's VR lab to experience the varied learning environment.

The Girls' HSS at Malayinkeezh is among the five schools in the state to boast a VR lab that was set up under the



Students of Government Girls' HSS, Malayinkeezh, experiencing various learning concepts through virtual reality | EXPRESS

Strengthening Teaching-Learning and Results for States (STARS) project implemented by Samagra Shiksha Kerala (SSK). The setting up of VR labs in government schools comes at a time when even leading private schools are yet to introduce the facility as part of classroom learn-

ing. "We are now planning to introduce 120 VR labs in select schools across the state in the second phase," a senior SSK official told *TNIE*.

While helping this correspondent wear the VR glasses and wield the controller, Saina N F, a Class X student of the school, narrates how her

It's a different world altogether where each concept in the textbook unfolds in front of our eyes with the corresponding sights and sounds

Saina N F, a Class X student, Govt Girls HSS, Malayinkeezh

learning experience has been totally transformed. "It's a different world altogether where each concept in the textbook unfolds in front of our eyes with the corresponding sights and sounds. The feature to touch and move the objects that we see around us adds to the fun," she says.

School headmistress Leena CH said the VR lab is also a major draw for students in schools located nearby. "There has been a steady stream of visitors to our VR lab from neighbouring schools," she says with pride.

Nikhila Nair R S, the teacher in-charge of the VR lab, explains that attentiveness and retention of children have improved drastically with the setting up of the facility.

"Though we have only 16 devices, the VR experience of

each student can be cast on an external screen using an app, facilitating its viewing by more students. Currently we are using Meta Quest devices and more learning modules are being added," Nikhila said.

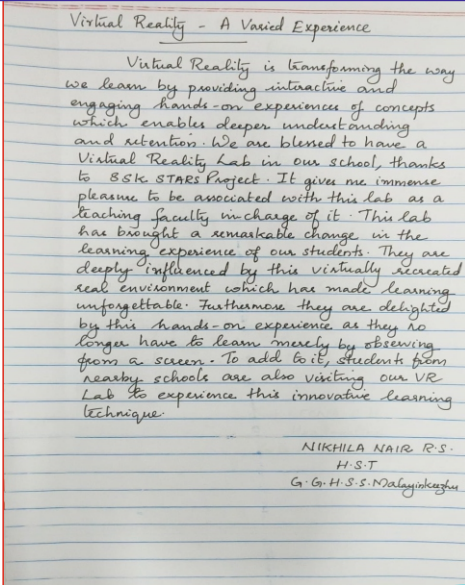
She was given training by the Centre for Development of Advanced Computing (C-DAC), that is providing the technical support for the project.

VR project (box/sub head)
The 'user stories' for students were prepared by a team of school and college teachers and research officers of the State Council for Educational Research and Training (SCERT), under the overall supervision of state-level officials of SSK.

These user stories were turned into virtual experiences and set into the VR devices by a team of 12 engineers of C-DAC. The content is periodically examined by an expert committee that suggests various improvements.

Orientation classes are provided by C-DAC to teachers and students on using the VR devices.

നേർസാക്ഷ്യങ്ങൾ



Virtual Reality A Varied Experience

Virtual Reality is transforming the way we learn by providing interactive and engaging hands-on experience of concepts which enables deeper understanding and retention. We are blessed to have a Virtual Reality Lab in our school, thanks to SSK STARS Project. It gives me immerse pleasure to be associated with this lab as a teaching faculty in charge of it. This lab has brought a remarkable change in the learning experience of our students. They are deeply influenced by this virtually recreated real environment which has made learning unforgettable. Furthermore they are delighted by this hands-on experience as they no longer have to learn merely by observing from a screen. To add to it, students from nearby schools are also visiting our VR Lab to experience this innovative learning technique.

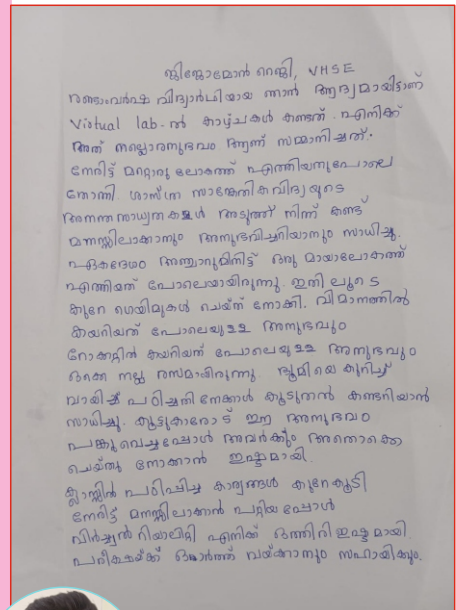
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ജി ജി എച്ച് എസ് എസ് മലയൻകീഴ്



NIKHILA NAIR R S
H.S.T
G.H.S.S Malayinkeezhu

Jijo Mon Reji, VHSE

As a second-year student, this was my first time watching visuals in a virtual lab. It gave me a wonderful experience. It felt as though I had stepped directly into another world. I was able to closely see, understand, and experience the endless possibilities of science and technology. For about six or seven minutes, it felt like entering a magical world. I tried a few games too. The feeling was like flying in an aeroplane or being launched in a rocket—very exciting. I learned much more about Earth than what I had studied in books. When I shared this experience with my friends, they too wanted to try it. Since I was able to understand classroom concepts more directly, I liked virtual reality a lot. It will also help me remember things for the exam."



Jijo Mon Reji, VHSE

TESTIMONIALS

My VR Experience

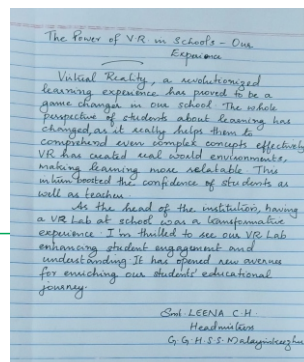
I was selected in VR Lab's Charge in 8th standard. I have seen this VR Show in many places but I didn't see what's inside VR lab. I was so curious when a VR lab came to my school. And I am very happy that my school has fulfilled my dream to see through VR. My charge was not only to see through it also to show other excited children My school and from other schools. When I entered to the charge. I thought that this was a thing to play but then I realize not only for playing but also for learning. This will help students to analyse the topic deeply and remember in exams because of this visual experience. When students and other people say about VR that it is very useful thing and this was a nice experience that is a proud moment to us, In our VR there is four subjects and so many topics in each. Each topics has audio instruction so a student who don't know to do can easily do it. In vacation VR was so fun. A group of people come from SSK and teach us more about VR and we go to kanakakunnu to show VR in the exhibition. So many tourists, children and other people come to see VR and a crowd of people formed in front of VR. There reviews were great. Totally VR give me so many sweet experience and teach me to interact with other people. I'm so glad and proud to say that I am in charge of VR and this is a great experience to me.

Thank you to those who gave this Golden experience.

Sreenandhana
Class 9 D
GGHSS
Malayinkeezh



TESTIMONIALS



The Power of VR in schools -our Experience

Virtual Reality, a revolutionized learning experience has proved to be a game changer in our school. The whole perceptiveness of students about learning has changed, as it really helps them to comprehend even complex concepts effectively. VR has created real world environments making learning more relatable. This in fact boosted the confidence of students as well as teachers.

As the head of the institution, having a VR lab at school was a transformative experience. I am thrilled to see our VR Lab enhancing student engagement and understanding. It has opened new awareness for enriching our students' educational journey.

Smt. LEENA C.H.
Headmistress
GGHSS Malayinkeezhu

Revolutionizing Education: CDAC and SSK's VR Learning Project Transforms Classrooms in Kerala

In an inspiring collaboration, CDAC and SSK have joined hands to revolutionize traditional education through the power of Virtual Reality (VR). Designed specifically for school students, this innovative project focuses on creating interactive 3D learning experiences that help learners better understand complex science and academic concepts—topics that are often difficult to grasp through conventional textbook methods.

Developed by CDAC with inputs from SSK subject experts, the VR applications cover key subjects like Physics, Chemistry, Biology, Geography, and Mathematics. The applications support both English and Malayalam languages, ensuring accessibility for students from different educational backgrounds. Whether from English or Malayalam medium schools, students can engage with lessons in their preferred language, making learning more inclusive and effective.

More than just a technological marvel, this project is centered on hands-on, immersive learning. Teachers and students across five schools in Kerala have already benefited from this initiative, receiving specialized training to navigate and utilize VR tools effectively in their classrooms. Feedback from these schools has been overwhelmingly positive, with both students and educators expressing excitement about the new way of learning. Students showed increased interest in subjects they once found challenging, highlighting VR's potential to transform education.

The success of this project also extended beyond schools. The applications were proudly showcased at the Global Science Festival of Kerala in 2024, where they received widespread appreciation from the public and educational professionals alike. Visitors to the festival lauded the effort as a forward-thinking approach that could redefine the future of education in India.

With technology becoming a core component of modern education, the CDAC-SSK VR project stands as a shining example of how innovation, collaboration, and commitment can open doors to new learning possibilities. The journey has just begun—but its impact on students' minds is already visible.

Vinu Kumar A R
Senior Director
C-DAC, Thiruvananthapuram





About STARS

STARS (Strengthening Teaching-learning and Results for States) is an education project designed and implemented by the Central Government with World Bank assistance to improve education standards. Among the states of Himachal Pradesh, Odisha, Rajasthan, Madhya Pradesh, and Kerala implementing this project, Kerala was included considering its excellent education quality index. Kerala has been receiving the benefits of the STARS project since 2021. Numerous suitable and commendable education programmes for Kerala have been implemented as part of the STARS project.

This booklet presents one of the most important activities among them.

