



GOVERNMENT OF KERALA

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EMPOWERING ADOLESCENTS WITH FUTURE-READY SKILLS THE INSPIRING STORY OF LITTLE KITES

A Call to Action





Empowering Adolescents with Future-ready Skills

The inspiring story of 'Little KITEs'



Globally, digital inclusion is recognized as a key enabler in ensuring Education as an essential human right and accelerating the attainment of United Nations Sustainable Development Goal 4 on Universal Access to Education and Learning beyond 2030. Imparting digital skills for students, in combination with life skills, is a unique strategy for empowering adolescents with future-ready skills. It would facilitate not only technological progress, but also has potential for equitable development, provided the interventions are able to promote active participation of students from marginalized

groups, low-income populations, migrants, people with disabilities, linguistic and cultural minority communities, girls and women, while ensuring that no one is left behind. Future-ready skills are those that also develop one's disposition towards inquiry, imagination, support and inclusion. These augur well for Kerala's aspiration to be an equitable knowledge society and economy. As part of interventions under the Public Education Rejuvenation Mission in Kerala, the state has pioneered an innovative programme called 'Little KITEs'.¹

¹ EdTech initiatives such as the Teacher Professional Development programme on digital mastery for teachers, Samagra content portal, Sampoorna school management software, and SchoolWiki which connects schools with content exchange by students, are some of the earlier initiatives that have provided a successful foundation for the successful implementation of Little KITEs

Digital Literacy

The New Hope for Young People

Digital learning has served as the main tool promoting learning among children in times of crisis and conflict. This was evident during the COVID-19 pandemic when countries with poor education systems (both regular and digital) suffered the greatest disruption to learning. The unforeseen situation left one-third of students globally with no access to learning when schools shut for more than a year.

It is estimated that there are 1.8 billion young people worldwide, 90% of whom live in low—and middle-income countries. In a survey of over 80,000 young people across nine countries, more than a quarter of respondents felt they have little to no control over how technology will impact their lives over the next decade. Despite this, young people even in connectivity-deprived and underfunded geographies, are creating breakthrough, innovative technological solutions addressing critical challenges. This is not to say that tech funding can be ignored. A good EdTech programme can only be built over a robust education system.²

In a survey of over 80,000 young people across nine countries, more than 25% felt they have little to no control over how technology will impact their lives over the next decade. However, young people, even in connectivity-deprived and underfunded geographies, are creating breakthrough, innovative technological solutions addressing critical challenges.



² <https://unesdoc.unesco.org/ark:/48223/pf0000386701>

Context in India

In India, the National Education Policy 2020 has emphasized the need to include digital literacy and computational thinking in the syllabus. In several states, concerted efforts are being made to reduce the digital divide in education, especially in rural and lower-income urban schools. As part of these initiatives, students in Grades 9-12 are being reached with access to the Internet, Internet-connected devices, and digital literacy training that could fuel learning.

Initiatives like the Atal Tinkering Labs have been set up in select schools across the country to 'foster curiosity, creativity, and imagination in young minds; and inculcate skills such as design mindset, computational thinking, adaptive learning, physical computing, etc.'³ India's Central Board of Secondary Education has worked on a comprehensive syllabus for Grades 7 to 12, and some states like Tamil Nadu have taken life skills into the digital curriculum, with the emotional well-being of adolescents as the goal.

There has also been a push to include design thinking and innovation courses in schools. UNICEF's UPSHIFT is a curriculum-based social innovator accelerator, piloted in schools in a few states in India, besides 50 other countries,



to equip students with transferable skills, innovation mindsets, design thinking and transformative learning journeys.⁴

Imparting an engaging curriculum that skills adolescents to lead the 21st century with creativity and confidence could be a game-changer for leveraging the potential of adolescents in India, for education, economy and society. The secondary school curriculum and pedagogy must evolve to make younger generations future-ready. Further, innovative school-based e-initiatives would work well when they involve the government at all levels with the local leaders and stakeholders for adolescents and young people. India has the largest adolescent population in the world (253 million), and must empower them with future-ready skills and dispositions without leaving anyone behind.⁵ In context, Kerala's digital reach of school students has been noteworthy.

³ Atal Tinkering Labs | ATL / AIM <https://aim.gov.in/atl.php>

⁴ <https://www.unicef.org/innovation/upshift>

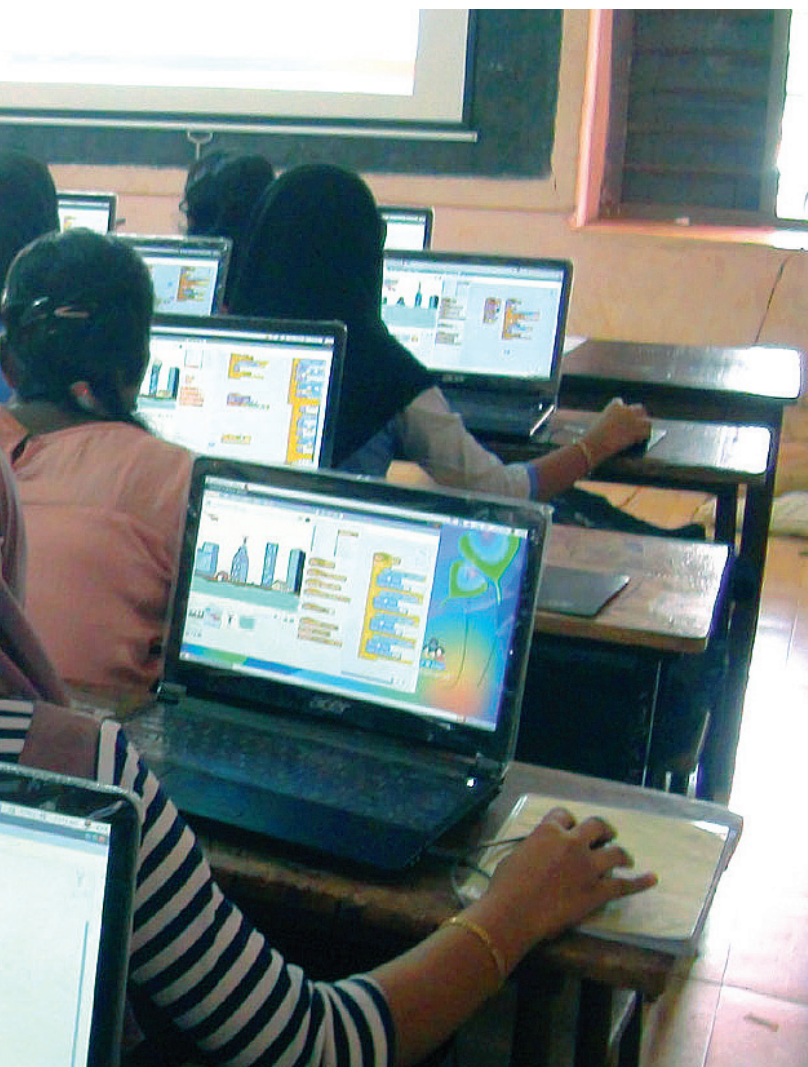
⁵ <https://www.unicef.org/india/what-we-do/adolescent-development-participation>



Technology for Growth

Little KITEs is believed to be the largest ICT student network in the country. Over 1,80,000 high school students (Grades 8, 9, and 10) are currently members of Little KITEs clubs formed in over 2,174 government and aided high schools in the state (roughly covering 50% of the state's schools). Since its inception in the year 2018 (and with an understandable gap during the COVID years), more than 12,00,000 students have benefited from the programme

The programme is aligned with UNICEF's Life Skills Framework and emphasizes critical thinking, creativity, problem-solving, collaboration, and communication skills. Further, in alignment with UNICEF's Global framework on Transferable skills⁶ Little KITEs has a focus on students' life skills, social skills, 21st-century skills, and socio-emotional skills. It has built the capacity of about 4500 teachers to guide the Little KITEs students with hands-on exposure



learning in the evolving digital landscape. Little KITEs also promotes the responsible use of technology and encourages active participation in EdTech infrastructure maintenance, thus creating an enriching learning experience with a view to the future. The Little KITEs initiative is an attempt to help students think about the larger social impact that technologies can have.

The students are encouraged to develop new software and tools and share what they have learned with each other, which fosters a sense of community and collaboration. This is in keeping with UNICEF's belief that digital literacy goes beyond technical know-

The Little KITEs initiative received the 'Best Innovation Project' award for 2022 from the state's Chief Minister. On September 6, 2022, a collaboration between Kerala's KITE and Finland's Education department was officially announced to adapt the Little KITEs model in Finland's schools.

to innovative technologies like IoT, AI, Robotics, 3D Animation, Multimedia, Language Computing, Electronics, and Mobile App Development.

These are futuristic in approach and prepare students for entrepreneurship, employment and life-long

how.⁷ Little KITEs promotes the knowledge, skills, and attitudes that allow children to feel both safe and empowered in an increasingly digital world. It encompasses play, participation, socializing, searching, and learning through digital technologies within the context of the child's age, local culture, and environment.

⁶ <https://www.unicef.org/media/64751/file/Global-framework-on-transferable-skills-2019.pdf>

⁷ <https://www.unicef.org/innocenti/documents/digital-literacy-children-10-things-you-need-know>



Soaring high with KITE

Kerala Infrastructure and Technology for Education (KITE), formerly IT@School until August 2017 is a Government of Kerala enterprise, under General Education Department, that has the mandate to foster, promote and modernise Kerala's educational institutions through

sustainable, inclusive, technology-assisted interventions. Particularly during the COVID-19 lockdown, KITE ensured the broadcast of specially curated e-curricula to over 4.6 million students in the state.⁸ It included the transmission of digital texts through KITE VICTERS⁹

⁸ First Bell - <https://kite.kerala.gov.in/KITE/uploads/3.pdf>

⁹ KITE VICTERS is an Indian state-owned free-to-air children's Educational entertainment television channel owned and operated by KITE under the Department of General Education and is wholly owned by the Government of Kerala. The channel is headquartered in Thiruvananthapuram, Kerala

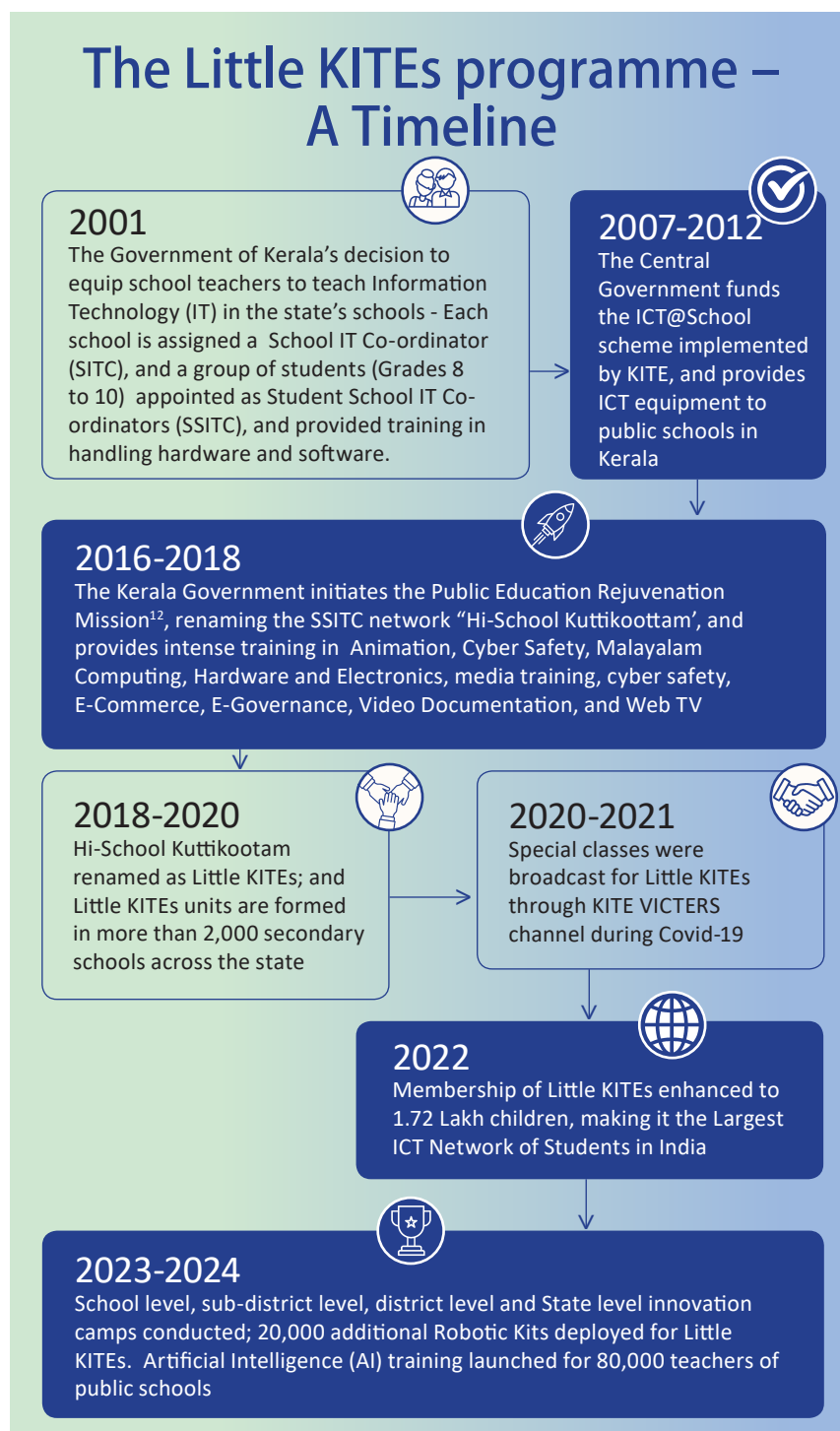
web and social media, including YouTube; the creation of video versions of textbooks; and the animation, shooting, and editing of the sessions. A rapid assessment by UNICEF showed that Kerala had achieved the highest access to digital learning among teachers and students in a short time, compared to any other state in the country.¹⁰

During 2018, KITE rolled out the 'Little KITEs' Students' ICT network in government and aided schools across the state. While the primary aim of Little KITEs was to foster meaningful digital technology literacy-competency among students, the programme has developed both the digital and social skills of school students to explore solutions for real-life challenges using technology. The Little KITEs initiative received the 'Best Innovation Project' award for 2022 from the state's Chief Minister. On September 6, 2022, a collaboration between Kerala's KITE and Finland's Education department was officially announced to adapt the Little KITEs model in Finland's schools.¹¹

¹⁰ <https://www.unicef.org/india/reports/rapid-assessment-learning-during-school-closures-context-covid-19>

¹¹ Finland, recognised as the leader in Education globally, ties up with Kerala govt to replicate Little KITEs model – ThePrint – PTIFeed

¹² <https://spb.kerala.gov.in/sites/default/files/inline-files/EvallImpactEduRejun.pdf>



Little KITEs school selection process

Schools interested in setting up a Little KITEs unit apply via KITE's online portal, declaring how many computers they have, the school's internet connectivity, and if there are any hi-tech classrooms. In the school selection process for Little KITEs, KITE engages and empowers parents and the community to also play an active role. When a PTA debates and agrees on the decision to set up Little KITEs, they appreciate the additional time and resources that students spend after school hours on their experiments and innovations. Little KITEs members/students are selected after an online aptitude test assessing their IT, mathematics, and logical reasoning knowledge. Between 20 and 40 students who top the test are selected as Little KITEs members, with a Unit Leader and a Deputy Leader.

Each school's Little KITEs club comprises three batches of students in Grades 8, 9, and 10, totalling a maximum of about 120 students. If a school has more eligible students, additional batches are created to accommodate all the qualifying students. To facilitate the learning, the Head Teacher nominates two teachers to coordinate the programme in each school.

Future-ready toolkit

- 9,000 Arduino Robotic Kits deployed to 2174 schools
- Each Robotic Kit comprises of Arduino Uno Rev3, LEDs, SG90 Mini Servo Motor, LDR Light Sensor Module, IR Sensor Module, Active Buzzer Module, Push Button, Bread Button, Jumper wires and Resistors.
- 4,000 Little KITEs Teachers and 60,000 students trained on the use of equipment.



Little KITEs implementation

The Little KITEs curriculum, which comprises Animation, Robotics, Programming, Development Of Mobile Apps, AI, Malayalam Computing, Hardware And Electronics, Media Training, Cyber Safety, E-Commerce, E-Governance, Video Documentation, and Web TV, has been curated by the academic team at KITE and resource persons hired from across the country. Little KITEs club activities are typically conducted after school hours. While students in Grades 8 and 9 are supervised by a teacher, students in Grade 10 are assigned individual and group projects.

All the necessary equipment for the Little KITEs activities, such as Arduino kits, laptops, and cameras, are provided by KITE. Computers used for the students' IT classes are also used for Little KITEs such that the student-computer ratio is maintained at 2:1. Students themselves are entrusted with the upkeep of all gadgets and equipment.



'FOSS-tering' change

To ensure the easy implementation of the Little KITEs programme, KITE has facilitated the adoption of Free and **Open Source Software (FOSS)** through several ICT-based initiatives in which students and teachers actively participate. In addition to being cost-effective, it allows the unrestricted sharing and editing/revising of educational content among teachers and students. The expansion of the programme does not incur any additional expenditure on software or content. Hardware and connectivity expenses are incurred as needed. The state government's decision to use FOSS in General Education Department since 2008 itself gave Kerala an early start and has helped **save about INR 3000 Crore annually** in infrastructural costs, according to the State of FOSS Report, 2021¹³.

KITE has further facilitated the adoption of FOSS in Education through robust initiatives interwoven with ICT, that are running with the active participation of students and teachers.

Choosing FOSS over proprietary software has technological, economic, social, and pedagogical benefits. Technologically, the most important is that FOSS allows the implementation of hundreds of useful educational applications for the Little KITEs programme. Educationally, FOSS has offered a wide variety of new opportunities for learning and exploring beyond the teacher-led curriculum and syllabi. Accelerating accessibility to creative learning opportunities, along with cost reduction in reach for underprivileged students, has made FOSS a game-changer for KITE, and promises to steer Kerala towards the knowledge economy for all that the state has envisioned. The key pedagogical value of FOSS is that it supports teacher agency – teachers can use the applications they want to install/upgrade these without any constraints. FOSS apps 'belong' to the school and the teachers and not any company. So their use, upgrade, replace decisions are made by the school and the school system, without any vendor dependency.

Name of Software	Category
Libre Office packages	Office Packages
GIMP, Krita	Raster image editing and drawing
Inkscape	Vector image editing
Synfig Studio, Draw SW	Animation
OpenShot video editor, Kden Live	Video editing

¹³ <https://state-of-foss.in/the-state-of-foss-report.pdf>



Name of Software	Category
Odacity	Audio editing
GNUKhatana	Financial accounting
Kaizium, PhEt, RasMol, Gchemical, KStars	Science
Quantum GIS, GPlates	GIS
Geogebra	Mathematics
Sunclock, Marble, KGeography	Earth studies
Stellarium	Desktop Planetarium
GCompris, pySio game	Edutainment software
Blender	3D Graphics
Scribus	Desktop publishing
QT 5	Interface designer
Geany, IDLE	Programming IDEs
Scratch	Visual programming
GCC	Combiner
Firefox, Chromium, Web	Web browsers
FileZilla	FTP, SFTP & FTPS client
Orka Gimage reader	Tools for visually challenged
Transmission	Bit Torrent client
YouTube DL	Video downloader
PDF Shuffler, PDF Viewer, Xplayer	PDF utilities
VLC, Totem, SM player, Xplayer	Media players
Audacious	Audio players
WinFF, Handbrake	Media format converters
Kasm, GTK recording, MyDestop, Simple Screen recorder	Screen capturing software
K3b, Brasero	CD / DVD Burner
GParted, Gnome Disk	Partition tools
testdisk	Data recovery
Sigil	E-Pub file editor
Lyx	Latec editor
FET	Timetable generator

Impact of innovation



To understand the programme's impact and identify gaps in its implementation, Bengaluru-based non-profit IT for Change conducted an exploratory exercise¹⁴ with support from UNICEF office for Kerala and Tamil Nadu. The report¹⁵ discusses the findings and presents analyses and recommendations to further strengthen the programme.

Overall, 800 students participated in the group discussions, and 140 teachers from 14 districts participated in an online survey, followed by an interaction and the filling of a questionnaire.

¹⁴ This exercise included processing secondary data as well as interacting with more than 1,000 stakeholders across Kerala, representing about 20 schools across six districts. The data was gathered through field visits, personal interactions, group discussions, and online surveys

¹⁵ Little KITEs: Kerala's Pioneering Students' ICT Network Programme Released for KITE by the Chief Minister of Kerala on July 6, 2024

Key questions from the questionnaire

- How are students benefiting from the programme?
- How are teachers helping with programme implementation?
- What were the enabling and disabling factors associated with the implementation?
- How did different stakeholders perceive the programme?
- How can the Little KITEs programme be improved, scaled up and sustained?

Voices from the field

As part of Little KITEs, I am making short animated movies that my friends like a lot. I am also more active and confident when mingling with my friends. Thanks to Little KITEs for that”

Girl from an inter-state migrant family in Ernakulam district.

Preparing a presentation on the different interventions of Little KITEs really enhanced my communication skills and confidence. I also help people in my neighbourhood write letters and with online services”.

Girl student from a tribal community in Wayanad district

I have observed that my son has acquired leadership skills and a renewed interest in studies after being a part of Little KITEs.

Mother of Little KITEs student in Thiruvananthapuram district

I had the opportunity to learn about fake news and cybercrime from my daughter, when she conducted classes for parents in Little KITEs’s Amma Ariyan initiative.¹⁶

Mother of Little KITEs student in Malappuram district

Without Little KITEs, students and teachers would not have been taken to the world of new-age technologies such as AI, IoT, Programing and Animation.

Teacher of a school in Thrissur district

Had there not been Little KITEs club in my school, students and teachers would not have acquired digital technology knowledge and skills, creativity, critical thinking and problem-solving skills.

Head Teacher in Kollam district

¹⁶ In a unique, strategy, the Amma Ariyan programme is about students training parents on the safe usage of smartphones and the internet. More than 400000 mothers have participated in this programme.

Evidence and discussion

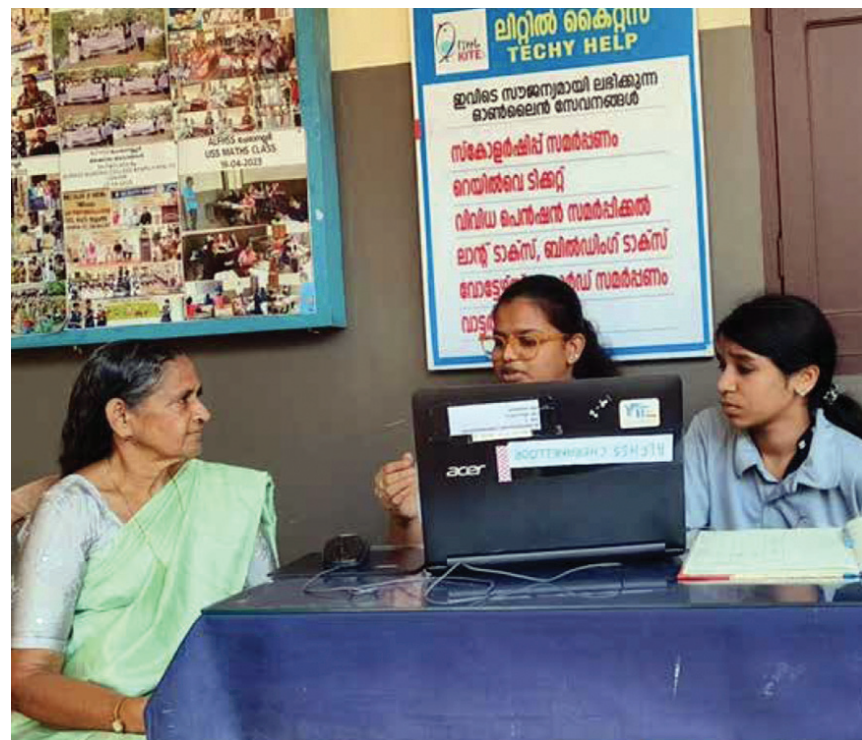


1. The Little KITEs programme could successfully build student abilities in both learning digital technologies and learning through digital technologies. Students have requested longer hours, activities and projects.
2. The Little KITEs programme could foster multiple skills and dispositions, and teachers noted that students were becoming more adept at analyzing data, synthesizing information, thinking critically, and working collaboratively on intricate technology projects.
3. Students engaged in the Little KITEs programme evolved from being consumers of technology to creators and designers of technology. This has instilled newfound confidence for school-based innovations among adolescent students.
4. The Little KITEs programme has addressed the under-representation of girls in STEM disciplines. Girls from marginalized communities have developed ambitions for higher studies in science and technology, and aiming for careers as scientists and technologists.

5. The Little KITEs programme aims at equitable and universal reach expanding beyond 2,174 schools, with the vision of eventually covering all government and aided schools. The expansion depends on teacher capacity building and choosing FOSS over proprietary technologies, besides adequate tech-funding for innovative engagement in schools.
6. As part of the Public Education Rejuvenation Mission of Government of Kerala, initiatives like the Little KITEs programme have restored parents' faith in the public school system. There is evidence of the increasing numbers of students shifting from private to government and aided schools, with Little KITEs arguably playing a crucial role for the shift.
7. The programme has gone far beyond technical skills, and is contributing to a knowledge society. Students are engaged in awareness programmes around cybercrime, fake news, and healthy internet usage.
8. Little KITEs has potential for engaging teaching digital technologies in bringing state-of-the-art knowledge to students, and this must be strongly tapped further. AI training launched for 80,000 teachers by the Government of Kerala is a promising beginning in this path. This programme also includes critical perspectives on the role of AI in education.
9. The Little KITEs programme should be extended to 11th and 12th grades, and provide advanced digital literacy learning, as well as strengthen life skills and 21st

century skills that are relevant to the needs of young people and Kerala society. Making the programme more accessible to students in Malayalam medium would increase further innovative engagement.

10. Connecting the innovations to the needs of the local community through community projects, in partnership with local governments, will facilitate higher investment in public education. This can address local challenges and issues, including those of conservation, pollution, climate change etc, which resonate with the state and its students.



Conclusion

Students and young people, the future generations, must be empowered to be architects of an inclusive digital future – because it is their digital future. With this conviction, over the last 22 years, Kerala has managed to achieve a himalayan feat - namely developing and maturing an EdTech model within its decentralized public education system. This model is in effect helping Kerala to develop into an advanced knowledge society, and a knowledge economy for the world.

The progress of Kerala's EdTech achievements lies in sustained efforts, starting with teacher capacity building on a large scale, enabling teachers to master digital technologies, as well as hand-holding student-learning with digital tools. The model has matured to support creation of a variety of platforms - be it for publishing open education resources repositories, for school administration, for school websites, for student mentoring by teachers, and for an exclusive 24x7 educational TV channel called KITE VICTERS besides some specialised programmes such as E-cube Language Labs.

The cherry on the cake is the Little KITEs programme, which has been acknowledged by visiting educationists, administrators and tech-specialists as an advanced student digital literacy programme. It goes far beyond teaching

students to use a limited set of apps, and has actually enabled students to freely work on Robotics and AI. Students are now designers and creators, and not merely users of technology.

Another unique feature not to miss, is that Little Kites is completely designed and run in-house by KITE without any dependence on for-profit corporations, which generally rule the roost for digital programmes in most parts of the country. This strategic positioning was possible only because all the previous EdTech programmes were also designed and implemented in-house by the robust public education system.

The Kerala “Public EdTech” model is one that has survived and is thriving. It has simple and profound lessons and is an example for education systems in India and the world. It is a potential model that can offer lessons not only for other states in India, and similarly placed middle-income countries, but is equally important for the Global North.

In closing, it is evident that Little KITEs is a well-sown seed in the fertile ground of EdTech in Kerala. It has grown rapidly and has promoted a wide range of students across the public school system to explore creativity and problem-solving, to connect school to life in innovative ways, and to architect safe digital futures.

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