



A Document on Little KITEs

**KERALA'S PIONEERING STUDENTS'
ICT NETWORK PROGRAMME**



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LITTLE KITES
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STUDENTS'
ICT NETWORK Programme**

**IT FOR CHANGE
DOCUMENTATION TEAM**

Marzia Ibrahim, Jobin Kanjirakkat,
Anusha Sharma, Harish P,
Chandrasekhar Ramadorai,
Reha Sharma, Intifada P Basheer
and Gurusurthy Kasinathan

KITE

K Anvar Sadath, Dr. P K Jayaraj
A R Muhammed Aslam
Jayakrishnan K S

UNICEF

Akila Radhakrishnan
Sayem Mehmood, Ramnath. KR

DESIGN & LAYOUT

Ratheesh Kumar R
digiCROW

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Contents

1	Introduction.....	7
1.1	Kerala Government's	
1.2	Scope and Methodology.....	11
1.3	Genesis of Little KITEs.....	13
1.4	Formation of Little KITEs units in schools	14
1.5	Curriculum and activities.....	15
1.6	Teacher preparation and support.....	17
2	Observations and Analysis	
2.1	Looking to the future	23
2.2	Views of Teachers	37
2.3	Parents' voices.....	43
3	Benefit Analysis – Stakeholders	
3.1	For Students.....	50
3.2	For Schools and Teachers.....	51
3.3	For the Community.....	52
4	Conclusion	
4.1	Major Highlights	53
4.2	Recommendations.....	57

REFERENCES

Annexure – Tools used in the documentation and other useful links





Abbreviations and Acronyms



ABBREVIATION	EXPANSION
AI	Artificial Intelligence
Digi-Tech	Digital Technology
FGD	Focus Group Discussion
FOSS	Free and Open Source Software
ICT	Information and Communication Technologies
IoT	Internet of Things
KITE	Kerala Infrastructure and Technology for Education
Little KITEs	Little KITEs
MTs	Master Trainers
SCERT	State Council of Educational Research and Training
SSK	Samagra Shiksha, Kerala
STEM	Science, Technology, Engineering and Mathematics

Introduction

In 2017-2018, the Government of Kerala introduced the 'Little KITES' Students' ICT network in government and aided schools to foster digital technology literacy competency among students. These networks not only empower students how to use digital technologies but also encourage them to actively contribute to applying ICT in learning and sharing their knowledge. Aligned with the UNICEF life skills framework, the programme emphasizes critical thinking, creativity, problem-solving, collaboration, and communication skills. Little KITES goes beyond basic skills, exposing students to innovative technologies like IoT, AI, Robotics, 3D Animation, multimedia, language computing, electronics, and mobile app development and preparing them for the evolving digital landscape. The initiative promotes responsible technology usage and enhances overall school productivity through active participation in ICT equipment maintenance, making the learning experience enriching and forward-looking.

Little KITES is an initiative of the 'Kerala Infrastructure and Technology for Education' (KITE), a not-for-profit company, incorporated by, and a part of, the General Education Department, Government of Kerala. Little KITES features over 1.8 lakh active student members and runs in over 2,174 government and aided high schools in the state. So far, the programme has benefited more than 3.80 lakh students in the State. These clubs have become the largest ICT Network of students.

4348 high school teachers, specially trained as Kite teachers, have been guiding Little KITES clubs in schools. Little KITES clubs are established at the school level and comprise high school students (grades 8, 9, and 10). Little KITES aims to enhance students' curiosity and help them explore opportunities brought about by digital technologies, apart from learning about the larger social impact of these technologies. Students are expected to not only learn to use these technologies but also contribute to the development of new software and tools and share their learnings with one another.

An important strength of Little KITES is the sense of community and collaboration that the programme has instilled in students. This educational value of the programme is perhaps as important, as its technological learning aspects. KITE ensures that all the computers in government and aided schools run free software-based operating systems, open digital content, and open educational resources. Besides the fact that free software and educational resources incur no charges, they also help unrestricted sharing and editing/revising of educational content among teachers and students. Thus the expansion of the programme to more schools does not require any expenditure on software or content, and only the hardware and connectivity expenses are required to be incurred as needed. KITE has further facilitated the adoption of Free and Open Source Software (FOSS) in the education

Little KITES is an initiative of the 'Kerala Infrastructure and Technology for Education' (KITE), a not-for-profit company, incorporated by, and a part of, the General Education Department, Government of Kerala.

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The Little KITEs programme has been successful in building student abilities in both learning digital technologies and learning through digital technologies.

sector through several robust initiatives interwoven with ICT, that are running with the active participation of students and teachers.

The objectives of the Little KITEs programme are:

1. To hone students' interest in Information and Communication Technologies (ICTs) and create a culture for the appropriate usage of technology.
2. To help students learn the different

dimensions of ICT tools and use them in their learning activities.

3. To ensure the participation of students in the usage and upkeep of ICT equipment at schools, thereby increasing the ownership and productivity in ICT enabled learning.
4. To introduce students to innovative technologies such as IoT, AI, Robotics, 3D Animation, multimedia, language computing, electronics, mobile app development and the like.



They facilitate the sessions and activities designed as part of the Little KITEs curriculum and guide students in their learning and projects.

Kerala Government's Commitment to FOSS

The Kerala government had taken a well-considered and deliberate decision to use Free and Open Source Software (FOSS) in the public system two decades ago. As it uses FOSS in all government departments, the state saves about INR 3000 crores every year in infrastructural costs, according to the State of FOSS Report, 2021¹. The promotion of FOSS is not driven merely by the goal of saving money, it also nurtures a philosophy of cooperation, and sharing of knowledge and concern for each other. This is best illustrated by the name of the open source operating system, 'Ubuntu,' a word borrowed from the Southern African language Zulu, which conveys the idea that an individual exists only because of a community. An important strength of Little KITEs is the sense of community and collaboration that the programme has instilled in students, this educational value of the programme is perhaps as important, as its technological learning aspects.

5. To enrich students' understanding of safe internet usage and Cybersecurity, and also to inculcate the importance of language computing.
6. Little KITEs clubs are established at the school level and comprise high school students (grades 8, 9, and 10). A school running the Little KITEs programme typically has two teachers, who are appointed as Little KITEs Teachers'.

KITE ensures that all the computers in government schools run free software-based operating systems, open digital content, and open educational resources. Besides the fact that free software and educational resources incur no charges, they also help unrestricted sharing and editing/revising of educational content among teachers and students. Thus the expansion of the programme to more schools does not require any expenditure on software or content, and only the hardware and connectivity expenses are required to be incurred as needed. KITE has further

¹ <https://state-of-foss.in/the-state-of-foss-report.pdf>



facilitated the adoption of FOSS in the education sector through several robust initiatives interwoven with ICT, running with the active participation of students and teachers.

Kerala began its FOSS journey in school education in 2002 and the implementation has become quite mature by now. There used to be a strong belief amongst policy makers that 'open source is not user friendly' and 'not usable' and 'there is no support for

open source'. Partly such apprehension is due to fear, uncertainty and doubt created by proprietary software vendors, who stand to lose if FOSS is chosen.

Not only is FOSS quite usable and user-friendly, there are several philosophical, pedagogical, economic and technological benefits from choosing FOSS over proprietary software. The most important reason is arguably that choosing FOSS allows the implementation of hundreds of useful



educational applications, which creates a resource rich environment in schools. FOSS has been instrumental in reaping the benefits from the Little KITEs programme.

Purpose

1. To document Little KITEs programme and its activities since its inception in 2017-18
2. To identify good practices and areas of

improvement, including for up-scaling and sustaining the programme

3. To provide information that can help to promote adaptation in other states of India / middle income countries

Scope and methodology

'IT for Change' conducted interviews, group discussions, and online surveys with students as well as teachers, master trainers, government officials, and parents. Process documents and other relevant records were also examined at state and district levels.

Exploratory questions

1. How are students benefiting from the programme?
2. What role do teachers play with respect to programme implementation?
3. What were the enabling and disabling factors, if any, associated with the implementation?
4. What are the perspectives of different stakeholders with respect to the programme?
5. What would be some feedback or possible areas of improvement in the implementation process, including for scaling up and sustaining the Little KITEs programme?

Methods

More than 1,000 stakeholders across Kerala were interacted with, through:

Face-to-face interactions - These interactions provided clear insights into the programme and helped us understand the perspectives of the stakeholders. They also provided

IT for Change interacted with more than 1,000 stakeholders across Kerala including students, teachers, master trainers, government officials, and parents through personal interactions, group discussions, and online surveys.



opportunities to explain and clarify any questions or concerns.

Group interactions - These interactions were conducted with students who are members of Little KITEs Clubs. These interactions often consisted of lively discussions.

Survey - A questionnaire was distributed online which enabled a larger number of teachers from different parts of Kerala to participate in this documentation.

Selection of stakeholders for interactions

During field visits, the team focused on interactions with teachers and students in regions covering six districts such that they were representative of the varied educational contexts in Kerala. The districts (regions) are:

- Kozhikode and Malappuram (North Kerala)

- Thrissur and Ernakulam (Central Kerala)
- Trivandrum and Kollam (South Kerala)

The study team visited 20 government and government-aided schools in which the Little KITEs programme is implemented. During the visits, the teams covered schools with large and small student strengths, schools located in rural and urban areas, and schools located in hilly areas near the Western Ghats. The twenty schools that the team visited were selected after consulting the state coordinator and the district coordinators of the Little KITEs programme. The team interacted with around 100 students, around 40 teachers and 10 parents in one-one-one interactions, and about 800 students in group discussions. 140 teachers participated in the online survey, which included an interaction followed by the filling of a questionnaire by teachers from all 14 districts in Kerala.

Amitabh Kant @amitabhk87 · 14.05.2019

Kerala schools to save Rs 3,000 crore by using Linux OS. Envisages largest ICT training for teachers, with training of over 1,50,000 primary teachers. From the next academic year, more than 2,00,000 computers in Kerala schools financialexpress.com/industry/techn... via @FinancialXpress



Kerala schools to save Rs 3,000 crore by using Linux OS

Schools in Kerala are expected to save Rs 3,000 crore as they have chosen the Linux-OpenSource (OS) operating system for computers being made av... financialexpress.com

20 77 261

Tweet by
Amitabh Kant,
Former CEO of
NITI AAYOG



In the 'Hi-School Kuttikootam' programme, students were given intense training in five areas namely Animation, Cyber Safety, Malayalam Computing, Hardware and Electronics.

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The genesis of Little KITEs

In 2001, Kerala Government decided to train and equip school teachers working within the public education system to teach IT in schools.

The government did not want to outsource the task to any external agencies. This is in contrast with other state governments, most of who adopted the BOOT (Build Own Operate and Transfer) model², in which the programme implementation was outsourced to a private company. The adoption of an 'in-house' model of IT education, allowed the system to benefit from capacity building of teachers and the ownership of the infrastructure by the school³.

The 'in-house' design required the schools to appoint a dedicated staff member to

manage the use and maintenance of the new equipment. One subject teacher in each school was assigned the role of the School IT Co-ordinator (SITC), and a group of students (in grades 8 to 10) was given the responsibility of supporting the SITC and each member of this group was called a Student School IT Co-ordinator (SSITC). The SITC and the SSITCs ensured the effective implementation of IT activities in schools. KITE, then known as IT@School, gave detailed hardware and electronics training to SITCs and SSITCs. This training equipped them to solve minor technical glitches in the IT infrastructure. The Central Government funded ICT@School scheme implemented by KITE during 2007-2012 provided ICT equipment to public schools in Kerala.

In 2016, the State Government undertook

² Read a comparison of the Kerala 'in-house' model with the BOOT model adopted in Karnataka, in the policy brief written by IT for Change in 2009.

³ Certain features of the Little KITEs programme which are valuable for adapting in other geographies are highlighted in italicised blue font in this document.

the Public Education Rejuvenation Mission⁴. As part of that, the SSITC network was renamed 'Hi-School Kuttikootam' (which means students' cluster), with the objective of modernization of public education by streamlining ICT-based activities. In the 'Hi-School Kuttikootam' programme, students were given intense training in five areas namely Animation, Cyber Safety, Malayalam Computing, Hardware and Electronics. It was structurally upgraded following Kerala's popular 'Student Police Cadets'⁵ model, in which students formally engage with an area of learning over a few years.' In the two following years, more ambitious plans to implement hi-tech projects in schools led Hi-School Kuttikootam to be restructured as Little KITEs under in January 2018.

Little KITEs units were formed in schools during 2018-19. A few more topics, such as "Development of Mobile Apps, Programming, Robotics, E-Commerce, E-Governance, Video Documentation, and Web TV" were later added to the Little KITEs curriculum.

Formation of Little KITEs units in schools

Selection of Little KITEs Schools

Schools interested in hosting the programme

apply through an online portal provided by KITE. On the portal, the schools supply specific data with respect to the availability of computers and computer labs, internet availability, hi-tech classrooms, and the willingness of Parent Teachers Association (PTA) for setting up a Little KITEs unit. 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 LK, they appreciate the additional time and resources that students spend after-school hours on their experiments and innovations. After receiving an application from a school, KITE verifies the details. If the school's infrastructure availability meets the specifications, KITE would approve the registration of an Little KITEs unit in the school.

While in other state programmes, the provisioning is 'supply-driven', that is, the state government /department good decide which schools will implement the programme, in this case, it is 'demand-driven'. Interested schools can apply and those fulfilling the norms, are selected. Demand-driven model usually leads to higher ownership and commitment on the part of the school and the teachers, as only those

Little KITEs clubs are established at the school level and comprise high school students. A school running the Little KITEs programme typically has two teachers, who are appointed as 'Little KITEs Masters and Little KITEs Teachers' Programme' Standardise.



Screenshot of KITE Ubuntu Operating System

⁴ Information about the 'Public Education Rejuvenation Mission' is available in its evaluation report.

⁵ Information about the Student Police Cadets programme is available on its website.

Collaboration with 36 International Agencies for customizing FOSS applications pre-loaded with Operating System.



The schools conduct classroom activities once every week after regular school hours with all students of the Little KITEs unit, facilitated by the Little KITEs Teachers. The students are given digital and printed copies of the handbooks.

.....

interested in hosting the programme will host it eventually.

KITE has provided financial aid to schools for setting up Little KITEs units amounting to INR 5000 for meeting the initial and recurring expenses including the Little KITEs display board, badges for students, camp expenses etc. This assistance is provided to schools once the Little KITEs unit registration is complete, after satisfying the parameters set by the KITEs. KITE has so far expended a sum of INR 4,43,06,785 for Little KITEs units since 2018.

Selection of Little KITEs members and Little KITEs Teachers

The Head Teacher of a school approved for Little KITEs programme nominates two teachers to coordinate the programme in the school. To select Little KITEs members, an online aptitude test is conducted for eighth standard students. It consists of questions that test the students' knowledge of IT, mathematics and logical reasoning. Between 20 and 40 students who top the aptitude test become Little KITEs members in a school, and each unit has a Unit Leader and a Deputy Leader.

The performance of each club is monitored rigorously on set parameters and grades awarded. Those Clubs who fail to perform well, will be de-recognised. Considering the various clubs in schools, those students who are not part of any other clubs but have a keen interest in IT are given preference to

join Little KITEs. The activities of the Little KITEs units are monitored by the Little KITEs Teachers.

Each school's Little KITEs unit consists of three such batches of students in grades 8, 9, and 10, totalling a maximum of about 120 students. If a school has a greater number of eligible students, the school is permitted to have additional batches to accommodate all the qualifying students. A minimum number of 20 qualifying students (the minimum is 15, if the number of students in grade 8 is less than 30) is necessary for a school to form an Little KITEs unit.

Curriculum and activities

The Little KITEs curriculum implemented by KITE has been prepared by the academic team of KITE and the Resource Persons. It consists of animation, robotics, programming, development of Mobile Apps, AI, Malayalam Computing, Hardware and Electronics, media training, cyber safety, E-Commerce, E Governance, Video Documentation, Web TV etc. The curriculum is spread across three years and includes activities conducted within and outside the school. Kerala Government has authorised KITE to prepare the Little KITEs curriculum incorporating new-age technologies. A total of 32 hrs. is required for teaching the training module. However more time is allotted for Little KITEs classes, without disturbing th normal class hours.

The schools conduct classroom activities once every week after regular school hours



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Face-to-face interactions provided clear insights into the programme and helped understand the perspectives of the stakeholders.

with all students of the Little KITEs unit, facilitated by the Little KITEs Teachers. The students are given digital and printed copies of the handbooks. All students are expected to participate in and complete the specified activities. The activities are guided by the trained teachers in grades 8 and 9, while in grade 10, the students are assigned individual and group projects.

KITE conducts camps at sub-district, district, and state levels, where the students selected from each school get opportunities to explore beyond the activities conducted at the school level and learn to use advanced tools in the areas of their interest. For each higher-level camp, students are selected based on their performance and participation in school-level activities. Students also fill out a self-evaluation form.



Using their training in animation, programming, Malayalam computing, media training, and cybersecurity, students prepare school magazines, organise and document school events, maintain the SchoolWiki page, and engage in additional activities that help fellow students and the local community. Many schools have developed and published digital magazines as a result of their students' training in Malayalam computing.

The widespread practice of using the Little KITEs infrastructure to design, develop and publish school magazines is another indication of the leveraging of ICT infrastructure by the school, to meet its own needs, going beyond the specific aims of the programme which provided the infrastructure.

Teacher preparation and support

Typically, two teachers in a school are nominated by the HM to become Little KITEs Teachers based on their interests and digi-tech skills. The Little KITEs Teachers undergo a mandatory five-day face-to-face and hands-on training, conducted by KITE Master Trainers (MTs) covering all components of the Little KITEs curriculum. Refresher training sessions are conducted when there are curriculum revisions or teacher transfers. The Little KITEs curriculum undergoes periodic revisions based on the requirements of the students and technological developments. For example, recently, new activities were introduced in Robotics, and to carry out these activities new components were provided with their Arduino kit. Each robotic kit consists 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.

The Little KITEs Teachers are responsible for ensuring that students complete the activities specified in the Little KITEs curriculum while supporting them in their individual and group projects. Furthermore, a digital handbook is provided to teachers to facilitate classroom sessions and activities. Teachers update the list of students, attendance, activity logs, etc., on a common portal called Little KITEs Management System (Little KITEsMS). This, along with the regular school visits by MTs, helps KITE track the functioning of the Little KITEs unit and provide any required support to the Little KITEs Teachers.

Students themselves are entrusted with the upkeep of all gadgets and equipment. The use of the same ICT infrastructure for different programmes of the school can be considered an efficient use of resources.

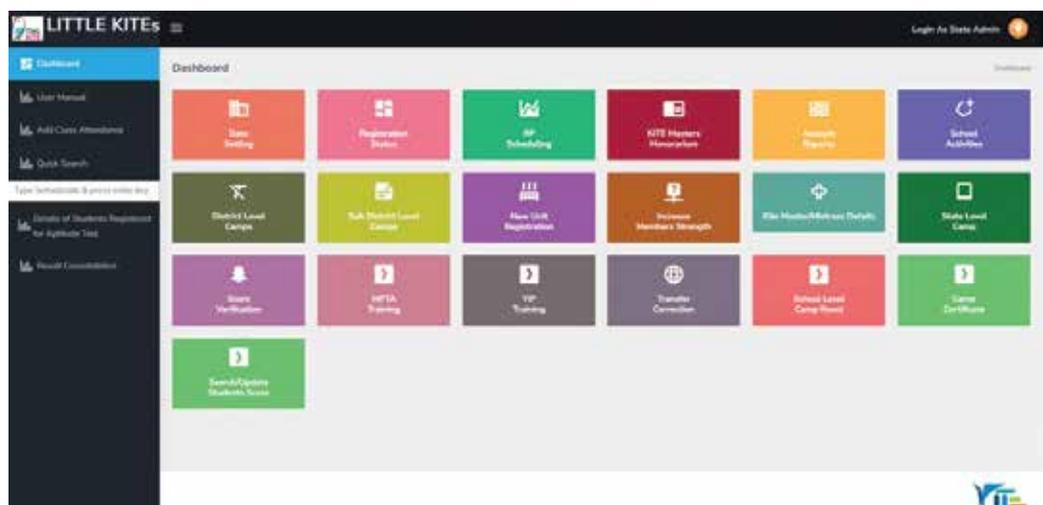
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Little KITEs display board put up in a school



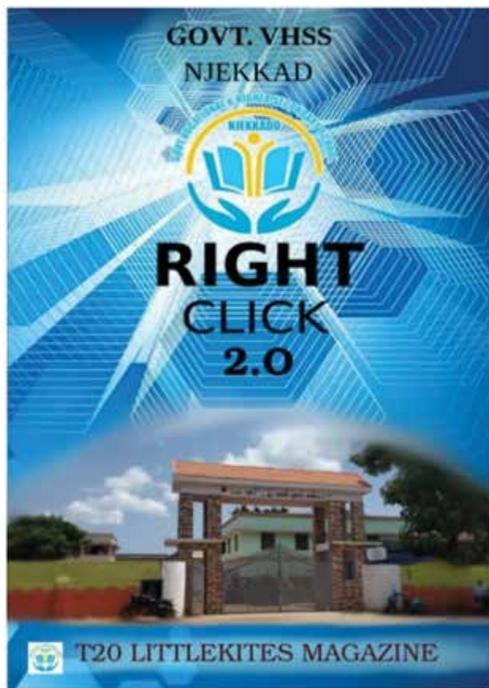
Little KITEs online management system



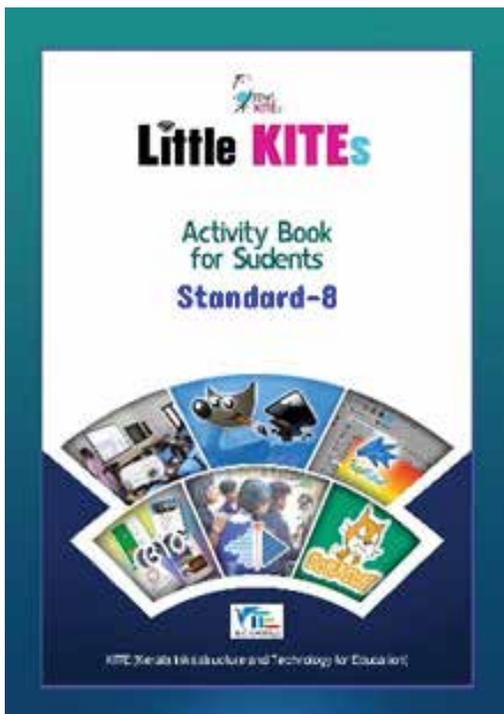
However, Little KITEs clubs at the local levels have the freedom to introduce new activities if they broadly fall within the aims of Little KITEs (See box on Community connect for an illustration).

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While in other state programmes, the provisioning is 'supply-driven', that is, the state government / department decide which schools will implement the programme, in this case, it is 'demand-driven' – interested schools can apply and those fulfilling the norms, are selected.



Digital Magazines of Schools created by Little KITES members



Curriculum & Activity Book

Equipment

All the necessary equipment for the Little KITES activities such as Arduino kits, laptops, and cameras are provided by KITE to each Little KITES unit. The strength of each unit determines the number of the equipment given to the students. The computers used for the students' IT classes are 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. The use of the same ICT infrastructure for different programmes of the school can be considered an efficient use of resources.

In 2023 KITE deployed 9000 Robotic kits



Community connect

Students of Little KITEs unit in Al Farookhia Higher Secondary School, Cheranallur in Ernakulam District set up a 'help desk' on the campus, where anyone could waLittle KITEs in and seek help to pay their electricity/water bills, update details on their Aadhaar and other ID cards, and get assistance for any other IT-related issue. The event was received very well and saw many community members benefitting from the initiative. The students plan to hold more such events and also conduct awareness sessions in the community about Cybersecurity.

The Little KITEs Teachers are responsible for ensuring that students complete the activities specified in the Little KITEs curriculum while supporting them in their individual and group projects.



Arduino Uno Robotic Kit



The 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.

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to Little KITEs units in the ratio of 1:5. This year KITE plans to deploy 20,000 more kits for Little KITEs members, thereby increasing the ratio to 1:2.

ICT infrastructure must be considered 'general purpose infrastructure' and provided to a school for a variety of requirements,

rather than make it as a provision for specific programmes. The same computer can be used to play videos, host educational software applications and support school administration data processing and decision support. However, in many cases, computers have been provided to schools by governments, under specific programmes and generally not much leveraged beyond that purpose.



Observations and Analysis



Voices of Students

High value perception

The Little KITEs programme is a great opportunity for promoting collaboration and self-learning among students. Students have an eagerness to learn, and while they are competitive, they also possess the spirit of teamwork and help one another to complete tasks and projects. The Little KITEs members also help other students in their school with what they learn as part of Little KITEs activities. Students revealed that the programme has helped boost their confidence and skills related to technology. Almost all students believe that what they have learned will benefit them in the future.

Looking to the future



There are students who may not be interested in conventional jobs. Learning these IT skills can give us opportunities in many other fields like animation or robotics.

Disha Tirupati Zadi
9th Std
SSGHSS Puranattukara
Thrissur

Little KITEs clubs are very important because a person who knows IT can gain more opportunities and also help the school in social activities. When students learn IT skills, they can improve the status of the school.

Abhinav
8th Std
GHSS Yeroor, Kollam

We are in the age of the internet. In earlier days, it used to take a whole day for parents to get simple work done like paying bills, etc. Now it's possible in a click. They had to earlier take help in Akshaya centers, but now as we have an IT club in the school, we are ourselves helping the community. Many people benefit from students' support.

Sreedhanya
10th Std
GHSS Yeroor, Kollam

I love making animations but never knew where it was taught and how I could learn it. When I found out that Little KITEs teaches animation, I immediately applied to join. Now my ambition is to become an animator.

Veda
9th Std
ALFHS Cheranelloor, Ernakulam

“

I want to become a journalist and to do that in Kerala, Malayalam is more important than English. Malayalam computing that we have learnt and the media training we have got in Little KITEs will help me in getting into news media.

Theertha

9th Std

GV&HSS Pooyappally, Kollam



”

“

I want to become a successful entrepreneur. In one of the camps, I created an assistive device for visually impaired. It had a sensor to check for obstruction and would alert through Bluetooth. I had chance to present it to the CM when the new robotics kit was launched.

Adish Anthony

10th Std

St. Josephs, Trivandrum



”

“

In some school, all teachers don't know how to use ICT but Little KITEs students there are supporting them. If I have a laptop at home, I can show friends and siblings what I have learnt. We can help others a lot.

Hiba Fathima

9th Std

Karthika Thirunal GV&HSS for Girls
Trivandrum



”

My Experience



Design thinking

Akshay V.V

GHSS, Neyyatinkara, Thiruvananthapuram

Inspired by many ideas from the Little KITEs programme, I embarked on creating my own Operating System. My dream became a reality in 2022 when I released my customized version of Ubuntu, named Limitless OS, in 2023. It was during a state-level Little KITEs camp that I presented Limitless OS to the public, and I also shared its features with my fellow Little KITEs members at school.



Robotic Hand

Pranav Rajesh

St. Joseph HSS, Thiruvananthapuram

Only because of Little KITEs, I was able to develop a Computer Vision based Hand Gesture Control. This can be used as robotic hand in areas where direct human intervention is not possible. This would not have been possible without Robotic kits supplied to schools



Fighting fake news

Athul Bhagyesh

Matha HS Mannahampetta, Thrissur

In today's world, fake news spreads quickly because of technology. I covered topics like the internet and social media's role in our lives, distinguishing truth from falsehoods online, preventing the spread of fake news, and learning how to identify and address misinformation. Little KITEs programmes like this help students and parents understand the difference between truth and lies, which encourages critical thinking.



School Wiki

Nadiya Miya VP

BEM Girls HSS, Kozhikode

My first duty was documentation. Using a camera, I took photos of the winners receiving trophies and documented the prize distribution ceremony. After that, we began our second duty of uploading the products of composition competitions, drawings, paintings, cartoons, etc., on the common page of SchoolWiki. It was a memorable experience in my life as a member of Little KITEs



Life Skills

Hemambari JS

REC GVHSS, Chathamangalam, Kozhikode

My journey through the world of Little KITEs had many ups and downs. Many times I taLittle KITEsed to myself, “I am an average student, can I continue this journey?” But I managed to overcome all the challenges with the help of teachers, my Little KITEs mates, and parents. I learned the values of collaboration, teamwork, and togetherness as part of Little KITEs. Little KITEs gave me inspiration and creative spark to participate in IT Mela and reach the state level in two consecutive years.

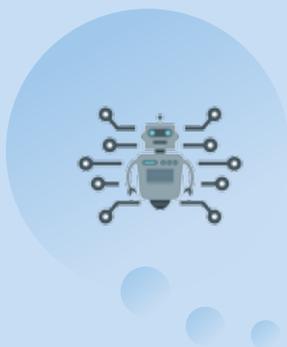


Creating Animation

Aayush Dev

SNDPHSS, Udayamperoor, Ernakulam

I have always thought about making animation films like Disney and Pixar. But after joining Little KITEs club I was able to make my own animations. In 2022 and 2023, I had the opportunity to participate in state level camps in ‘Sasthrolsavam – IT animation’. I have created seven animation movies including my drawing and my own sound. In fact now I am interested to continue my exploration in the field of designing and animation.



Innovative mindset

Malavika S.R

Government Mahatma Gandhi HSS, Chadayamangalam, Kollam

We learned a number of new ideas and concepts such as face recognition, face mood detection, and face lock through classes led by experts at the state-level camp. The class on robotics using a robotic kit was a memorable experience. We learned to make a ship and a sunset using graphic software such as Gimp and Inkscape. The block programming we did using Scratch gave us much confidence.



All students responded positively to the question whether Little KITEs was helpful for them. About 60% of the students said that the topics taught in the programme were important for their future and their careers. About 30% of the students found the programme helpful because they learned about new technologies and gained crucial IT skills. Graphics, animation, and creating games in 'Scratch' emerged as favourite activities among students. Interestingly, one student claimed that IT knowledge could teach them about computer models, which can in turn help them learn advanced physics and chemistry.

When it came to the question of what could be made better, most of the students felt that they needed more hours to work on Little KITEs activities and highlighted the need for additional laptops for them to work on.

Meanwhile, nearly 10% of the students felt that they faced no problems because they had computers at home, which gave them enough time outside school hours to practice.

A few students suggested making Little KITEs lessons available for all students, avoiding making it aptitude test based. They also suggested providing more learning opportunities to students who show greater

Thirst to learn more and do more

Manu

9th Std., GBHSS Manjeri, Malappuram

"So far, I have used OpenToonz to create animation and added audio to it using Audacity. Now, I want to learn how to code in Unity so that I can make better video games and animations. In the future, I plan to build a car racing game using AI that would allow gamers to race against earlier versions of themselves at different skill levels."



Moving from Private school to Public school

Derayadil

10th Std., PPMHSS Kottukkara, Malappuram

"I studied in a private school till 7th Std. In 8th std, I moved to this school and the Little KITEs programme has given me lots of opportunities to pursue my deep interest in animation. I have used the Blender tool to create several creative animations and participated in camps at the district and state levels. The move to this school is something that I am very happy about."



Time - the only challenge

Liyona

10th Std., St.Mary's CGHS Ernakulam

"I feel time is the only challenge. We want to learn more about certain things that we like such as robotics and AI but we need more time to understand it and learn about it."





interest, as well as providing in-depth engagement with topics to make difficult activities easier to understand. Some students expressed the view that the Little KITEs programme should include lower classes as well and begin in 5th grade. They also wanted more opportunities to teach others so that they could learn more. The participation of more students from different classes would expand the scope of the programme, allowing many more students to benefit from it.

One-fourth of the students who participated in interactions suggested that more concepts on robotics and AI should be taught during Little KITEs classes, and close to one-fourth suggested that higher-level programming should be taken up as new activities. Apart from these, students expressed interest in conducting more awareness sessions for parents and primary school students through

Little KITEs on web design, 3D printing, field trips, etc.

These suggestions indicate that students see great value in the Little KITEs programme and hence would like to have 'more of it'.

A primary purpose of school education is to build/strengthen the desire to learn and the ability to learn ('learning to learn') in children, and Little KITEs has strengthened 'self-directed learning' to a large extent. Academic programmes that provide a high level of autonomy and agency to teachers and students, with curricular content seen to be highly relevant and pedagogies that are participatory, collaborative and constructivist are well-placed to support such 'self-directed learning' in students. The focus of the Little KITEs programme is 'learning' and 'learning to learn' and not writing examinations that largely test memory.

Voices of Children of Migrants people

Thanks to Little KITEs

Savarini

a girl from West Bengal

“I like animation very much. I have seen animated movies, and now as part of Little Kites, now I can make short animation movies that my friends like a lot. I am very glad because I am very confident in typing Malayalam and English. I can make video games using Scratch software. I am thrilled to know that I have become the creator of video games. I recently took part in a role play in English and performed before my friends. I think I am more active and confident in mingling with my friends. Thanks to Little Kites for that”

Learning through hands-on experience

Nijitha Titu from Assam

“I really enjoy working in Little Kites IT Club. It's not like the classroom teaching; Little Kites provides a collaborative and innovative experience. One important feature is that it provides a participatory atmosphere, and we learn through exploration and hands-on experience”.

Voices of Children from Tribal Areas in Wayanad District

Thrust for future

Kshethra Babu from Kuruva community

“Animation was really a mystery for me until I became a member of Little Kites. Now I learned that even I can make stories using animation. It really enhanced my confidence. I would like to take my future career in animation and film making. I would like to take forward my interest in digital technology”.

Nurturing innate skills

Renjitha K.R. from Paniya community

“I participated in the district IT mela on behalf of Little Kites. I made a presentation on the different interventions of Little Kites in the Mela. It really enhanced my communication skills and confidence. I was one of the members in making the Digital Magazine of Little Kites. I enjoyed this participatory process. I used to help my people in my neighborhood in writing letters and online services”.



Satyameva Jayate

School and community

Social activities such as 'Satyameva Jayate', and 'Amma Ariyan' (explained below) were appreciated by students. They felt that topics like Cybersecurity and phishing awareness are very important. This shows that the programmes inculcated a sense of social responsibility in addition to building technological capabilities.

Satyameva Jayate

This major digital media literacy programme was organised in 2021-22 for 19.66 lakh students and 2 lakh teachers, who were trained to distinguish between fake and genuine news. The goal was to make the public aware of the spread of fake news using digital media. The training was conducted in three phases. In the first phase, classes were streamed on the KITE Victors YouTube Channel during the Covid-19 pandemic. In the second and third phases, teachers were

trained on specially prepared modules on the internet in daily life, right and wrong practices on social media, filter bubbles, healthy internet usage, etc. Through this project, all Little KITEs members were able to ensure a basic understanding of cybersecurity and educate their parents on the safe use of mobile phones and the internet, as well as the application of cyber technology.

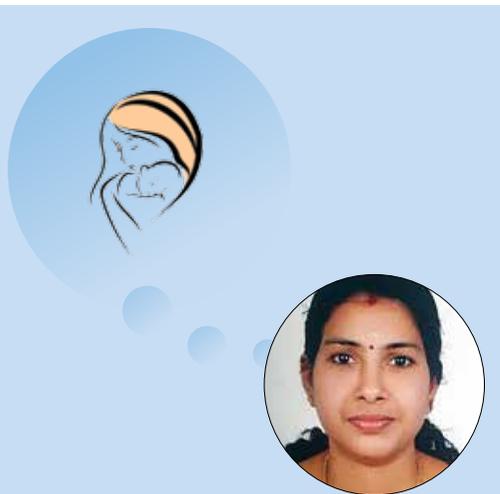
Amma Ariyan

For Mother to learn

The Little KITEs programme initiated a cyber safety awareness campaign in 2019 for parents. The main idea behind the 'Amma Ariyan' project was to raise awareness among parents about Cybersecurity issues through their children. Subsequently the Little KITEs programme has trained 4,01,160 mothers on the safe usage of smartphones and the internet, setting up and using passwords, safe handling of OTPs and PIN, recognizing fake news and guarding themselves against cyber attacks.



**Amma Ariyan -
When Students
became teachers**



**My daughter,
a leader**

Deepa Sudhakaran P
GHSS Kattilangadi, Malappuram

I had the opportunity to participate in the 'Amma Ariyan' (For Mothers to Know) programme, an innovative initiative that brought mothers back to school as students once again. I was really thrilled to see my shy daughter leading the class and speaking clearly. Little KITEs has enhanced the communication skills and confidence of my daughter. The programme enabled me to sit and learn new ideas alongside my good old classmates. My son also joined Little KITEs after seeing his sister's wonderful performance since joining Little KITEs.



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A primary purpose of school education is to build/strengthen the desire to learn and the ability to learn ('learning to learn') in children, and Little KITEs has fulfilled this purpose of strengthening 'self-directed learning' to a large extent.

While the use of the school ICT infrastructure by the local community is a principle that has been discussed in policy documents, this has proven very difficult to implement. More than the use of devices, it is possibly much more valuable to focus on the building of larger literacy of the digital world, to reduce vulnerabilities of the adult population, the Little KITEs programme has been able to demonstrate this.

Though there is a long way to go in the

integration of the school as a community institution of learning, the Little KITEs provides a role model to envisage this.

**Justification behind FOSS
Free and Open Source Software**

While some students felt that they would need to be proficient with the Microsoft Office suite while looking for jobs in the future, so they requested to be trained on it alongside Ubuntu. However, in line with the efforts of



Even if one has to work in an institution that uses proprietary software in the future, the training in the Little KITEs programme would easily equip them to make that transition. This is because, the basic functionality offered by an Office suite remains mostly the same, whether it is Microsoft Office, or Libre Office.....

the Kerala government, the students need to be helped to understand the practical uses as well as philosophical reasons behind the adoption of Free and Open Source Software (FOSS). If they are sufficiently convinced by the arguments in support of FOSS, it is less likely that they would ask for training in proprietary software.

In case they have to work in an institution that uses proprietary software in the future, the training that they receive in the Little

KITEs programme would easily equip them to make that transition. This is because, the basic functionality offered by an Office suite remains mostly the same, whether it is Microsoft Office, or LibreOffice. Just as we learn to drive a car, not a Hyundai Santro or a Maruti Swift and can drive one if we have learnt on the other, anyone who is conversant with LibreOffice can easily work on Microsoft Office. The focus on learning is therefore on the 'process' (such as text editing) and not a product.



Consumers to Creators

Namratha V N

10th std, St. Antony's HSS
Kozhikode

"Until now we were only playing games, now we are making games. This feels really great. The Little KITEs programme has made us feel that we can accomplish tasks that we did not consider taking up previously like AI, Robotics, 3D Animation and mobile app development."



KITE has been able to upgrade the software regularly, creating 'custom distributions' of the FOSS packages regularly and sharing these with the schools.

This is a recurring opinion the team came across while interacting with the students. The world of FOSS is a world of creation, as teachers and students can work on the application and add extensions. Such creativity is not possible with proprietary software, as the vendor does not permit any modification or replication of the application.

At a macro level, FOSS has had many advantages for KITE.

1. The savings from using FOSS has enabled KITE to provide more hardware to the schools. Students have been able

to copy the same software to their home computers.

2. KITE has been able to upgrade the software regularly, creating 'custom distributions' of the FOSS packages regularly and sharing these with the schools. Whereas in the case of programmes where proprietary software was used, the software is usually not upgraded as that has licensing cost implications. In such cases the programme software environment becomes obsolete over time⁶.

⁶ Policy Brief on In-house v/s outsourced models, IT for Change 2009.



3. In the case of 'freeware' (proprietary software that is provided gratis or free of cost), the continued availability of the software cannot be ensured as the vendor may withdraw the software, or may close down.

STEM for Girls

It has been observed that Little KITEs plays an important role in promoting STEM (Science, Technology, Engineering and Mathematics) disciplines among girls. The following table lists the numbers of boys and girls in the last three batches of Little KITEs: (note that programme was introduced in 2017 -18 and was implemented at scale post-covid)

YEAR	STRENGTH	BOYS (% of Total)	GIRLS	GIRLS
2021-24	64,832	31,877	32,955	50.83
2022-25	65,261	32,259	33,001	50.57
2023-26	67,318	33,595	33,723	50.1

Source: KITE

Table shows that girls are equally represented in Little KITEs as boys. Little KITEs has been able to improve girls' participation in STEM, thus breaking prejudice against gender/girls.

It is evident that the programme makes it possible for students from rural backgrounds also to realistically aspire for a future they would have rarely imagined earlier. In a Kollam government high school, one of the girls proudly participated in state-level camp for programming.

A dream for scaling up

Afraah Lathiff

10th std, CBHSS Vallikkunnu
Malappuram

"I have participated in district and state level camps. I made a railway bridge model using sensors and a model for street lights and traffic lights. I like IT a lot and my ambition is to make my own software. I got knowledge and information on robotics and programming in Little KITEs. I want to pursue a degree in computer science from one of the IITs. I think all states in India should have IT clubs because now the world is full of IT and we need to build knowledge about it in schools"

Unique opportunity

Shreya

10th std, GHSS Pooyappally, Kollam

"Teachers have encouraged me a lot. Little KITEs has given me an opportunity to explore many things. I never imagined making it to the sub-district camp, let alone reaching the state-level camp. I was the only girl from Kollam in programming, and in the state-level camp, five students were selected, of which, again, I was the sole girl. It made me feel very good."



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In a Kollam government high school, one of the girls proudly participated in state-level camp for programming.

Figure : Active participation of girls is a happy feature of Little KITEs programme.

Views of Teachers

The Teachers team answered several questions about the Little KITEs programme, such as the objectives and effectiveness of Little KITEs, the training they received, positive changes in students' learning skills and attitudes inculcated by the programme, the students' socioeconomic backgrounds, the Little KITEs curriculum, the functioning of the programme in the school, and ways to improve the programme. Key findings from these interactions are discussed below.

Training and support

Teachers felt that the Little KITEs training helped them learn new skills. They said that training they received helped them overcome computer anxiety, which is experienced when one has little or no computer experience. Nearly two fifths of the teachers who participated in the survey felt that the training helped them overcome computer anxiety. Their comfort bears testimony to the

success of the Little KITEs training, which also included advanced technology topics.

At the same time, more than half of the teachers felt that they needed refresher training for new and advanced topics, to equip themselves to better teach these. Some teachers requested video lectures/resources for difficult topics they had to teach.

Student participation

Teachers noted that students' engagement and enthusiasm in studies improved as a result of their participation in Little KITEs. Perhaps this beneficial impact was due to the curricular content (IT literacy), but partly it could also be due to the participatory and progressive pedagogies used in the programme, where students were encouraged to take initiative, support the learning of peers etc. Many teachers noted that the Little KITEs students took care of the digital equipment in their smart classrooms and documented events in their schools.

Teachers noted that students' engagement and enthusiasm in studies improved as a result of their participation in Little KITEs.

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How Little KITEs helped me as a teacher

Divya K.T

L VHSS, Pothenkode, Thiruvananthapuram

Facilitating collaborative activities as part of Little KITEs has in a way changed my pedagogic approach to teaching my academic subject in my classroom.



Had there not been Little KITEs...

Nalinabai

SSGHSS, Puranattukara, Thrissur

Little KITEs students are in the fore front of the upkeep of Hi-Tech classrooms. They are able to prepare interactive slides for project and seminar presentations. Little KITEs Members are also prompt in preparing school digital magazines and uploading in Schoolwiki. Had there not been Little KITEs, students and teachers would not have been taken to the world of new age technologies such as AI, IoT, Programming and Animation.



Cost - effective learning

Francis Thomas

Matha HS Mannampetta, Thrissur

If one has to study Python programming, the one-month fees in the market amounts to INR 4000. When we get all these for free in schools, teachers and students desire to learn them. Had there been no Little KITEs, students and teachers would not have got hands-on experience free of cost in learning different areas of technology such as hardware and electronics, animation, mobile app development, programming, AI, and Robotics. Little KITEs Members have played the role of teachers in the 'Amma Ariyan' (For Mothers to know) programme.



Soft skills training

Sinitha Pious

HST Ernakulam

As a KITE Teacher I could facilitate critical thinking, creativity, imagination and technological skills among Little KITEs students.



What did I learn along with Little KITEs students?

Sister Rakini Josephine

Vimala Hridaya HSS, Kollam

The parents of the members of Little KITEs have a very congenial relationship with the school. Had there not been Little KITEs cub in my schools, students and teachers would not have acquired digital technology knowledge and skills, creativity, critical thinking and problem solving skills.



Outstanding Performance

Vidyalakshmi

GBHSS, Tirur, Malappuram

Members of Little KITEs find new dimensions of knowledge by applying higher-order thinking skills and imagination. Ashik Ali was a low-scoring student in our school. However, in 2019, he received the Little KITEs award for his outstanding performance as an Little KITEs member. In the 'Ente Keralam' (My Kerala) programme, the students of Little KITEs who made their own computer games using Scratch software won the attention and applause of all.





Curriculum and beyond

Sindu Joy

Little KITEs Teacher, St. Antony's HSS, Kozhikode

Participation in Little KITEs and getting involved with programming, robotics, etc. makes students grasp concepts faster and it improves their mathematical ability. They also become capable of handling all problems and their sense of responsibility is higher after joining Little KITEs because they update the school website, make the school magazine and solve any computer issues in the school.



Bridging the learning challenge

Vishnu

Little KITEs Teacher, CBHSS Vallikunnu, Malappuram

Even to excel in the domain of art, in the present day, one needs to have a basic understanding of digital technologies. Knowledge of IT is not just useful in itself, but also acts as a tool that helps students to learn all subjects.



Career path development

Bindumathi

Little KITEs Teacher, ALFHS Cheranelloor, Ernakulam

Definitely, their point of view has changed. Now many want to become animators and programmers. They are able to imagine doing something in the digital world. Earlier, they wouldn't be able to think of these possibilities.



School-College transition

Nalini Bhai

Little KITEs Teacher, SSGHSS Puranattukara, Thrissur

Former students have said that they found these skills very helpful in doing projects. Some have joined engineering courses and found it very useful for their higher studies. They said that even in their colleges they are the ones who connect devices, take care of IT issues and help their lecturers.



Rural - urban linkage

Anitha

Little KITEs Teacher, KKM GVHSS Orkkatteri, Kozhikode

Our school is in a village area and many students find it difficult to operate a computer. But by the time they reach class 10, Little KITEs helps them a lot to become proficient.

Teachers were asked how they tried to ensure the participation of students who found Little KITEs activities difficult. Many of the teachers felt that peer teaching (students who were comfortable with the activities would teach those who found them hard) was an effective way of dealing with this problem of different levels of understanding. The Little KITEs programme has thus supported desirable practices like peer learning, collaborative learning, and peer-teaching among students.

A few teachers noted that some students face difficulties with topics like robotics and computer programming, which require logical thinking. The teachers made sure that their interest in IT was kept alive by helping them focus on topics of interest to them, such as animation. The broad pattern that the teachers had observed was that there are two groups of students, one interested in programming and the other in animation. Teachers said that they would give extra time to students who had difficulties with robotics and programming and would occasionally let them take the laptops home so that they get enough time to practice⁷. At times, they were also provided with videos that would help them understand the concepts more clearly at their own pace. Some teachers went a step further to lend individual support to such students, addressing their questions and helping them with their projects. Thus, the programme provided the scope for extending and enhancing the pedagogical practices of teachers, beyond the traditional chaLittle KITEs-and-taLittle KITEs method.

In the tenth grade, Little KITEs students do not have classes; they are only required to complete assignments and individual projects. The teachers take special classes for them, if needed, to keep these students engaged with the Little KITEs curriculum.



Some teachers thought that Little KITEs could be made more effective if students were given a textbook⁸. In comparison, the Little KITEs programme provides ample scope for teachers to play the role of a facilitator who enables the student to learn by asking questions and finding solutions on their own.

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A few teachers noted that some students face difficulties with topics like robotics and computer programming, which require logical thinking. The teachers made sure that their interest in IT was kept alive by helping them focus on topics of interest to them, such as animation.

⁷ Since the programme is fully run by the department and school, the entire IT infrastructure belongs to the school system. This enables teachers to take decisions like allowing students to take laptops home. In an 'outsourced' model such as BOOT (Build, Own, Operate, Transfer), where the infrastructure is licensed by an external vendor, this would not be allowed.

⁸ This may have to do with the teachers' preference for a standard and authoritative source to enhance their teaching, though it is not in the spirit of a programme that is essentially digital in nature. The reliance on textbooks is part of the 'textbook culture' discussed by Krishna Kumar in 1986 ("Textbooks and educational culture," *Economic and Political Weekly*. Vol. 21, No. 30. pp. 1309–1310). This culture disciplines teachers and instils a fear or a distrust in applying more participatory methods of teaching.



In general, teachers felt that the Little KITEs clubs in their schools were functioning effectively. According to them, the students participated in Little KITEs activities with great involvement and it led to a deeper understanding of IT-related concepts.

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Teachers' views on the functioning of the Little KITEs clubs

In general, teachers felt that the Little KITEs clubs in their schools were functioning effectively. According to them, the students participated in Little KITEs activities with great involvement and it led to a deeper understanding of IT-related concepts. Even in schools in rural areas, where the students had little access to IT-related resources, the teachers found the Little KITEs students' motivation levels to be high. Little KITEs gave the students the possibility of imagining learning which opened up job possibilities unknown to their parents' generation, such

as the use of AI and virtual reality.

The teachers also noted that the exposure that students received because of Little KITEs positively impacted their personalities and their cognitive abilities. Little KITEs students began to take charge of the documentation of activities in their schools and also became self-motivated learners. While making students self-directed learners is the aim of all teaching, the traditional subjects in the curriculum tend to be approached with the attitude of 'syllabus completion and passing the examination' (this is part of the 'textbook culture'). Meanwhile, Little KITEs allows for, even encourages, self-directed and open learning.



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The Little KITEs programme is seen by KITE as an important instrument to build the capabilities of students in digital technologies, so that Kerala can be well equipped to take advantage of the digital revolution. The state has the ambition of becoming a knowledge economy.

The main challenges pointed out by teachers regarding the functioning of Little KITEs had to do with the shortage of time, given their many teaching and administrative responsibilities. Most teachers felt that they had insufficient teaching time: more than half of the teachers found managing Little KITEs classes along with their subject teaching quite challenging. Some teachers who had various additional responsibilities, such as being School IT Coordinators (SITC) and managing the School Management System, Sampoorana, found it difficult to devote sufficient time to Little KITEs. Some teachers felt that they needed more time with Little KITEs students.

Another suggestion from teachers was to provide further incentives to students to attend the Little KITEs programme through additional marks or 'grace marks'. Currently, additional marks are given to only tenth grade students. However, the programme needs to be seen by teachers and students as an important source of learning, where participation and learning are understood as the inherent reward. The practice of giving grace marks (as an incentive) is considered to be educationally undesirable⁹, when learning itself is a joyous and purposive engagement.

Generally, the teachers are happy with the Head Master's/Mistress' (HM's) involvement

⁹ Eminent Educator and education psychologist, Kamala Mukunda has explained in her book 'What did you ask at school today?' the dangers of introducing extrinsic incentive-punishment in education. The joy of meaningful learning must be the primary and intrinsic incentive for the learner and this has to be developed over time. Extrinsic incentives distort the possibilities of developing intrinsic motivation (learning for its own sake). Incentives can be as harmful as punishments (disincentives). It is often believed that punishment is bad but incentive is good. However extrinsic incentives are also harmful. See Kamala V. Mukunda. 2009. HarperCollins. What Did You Ask At School Today: A Handbook Of Child Learning Book 1 .



The mother of an 8th std student of Matha HS, Thrissur, who attended ‘Amma Ariyan’ shared: “Awareness about the ways in which new technology changes our lives -- from simple things like setting an alarm on a smartphone to paying electricity bills and using bank accounts -- was new and valuable. The presentation on keeping our accounts secure without falling for online scams and phishing messages was extremely useful.”

Interactions with parents of the Little KITEs members showed that they are happy with the learning opportunities that the programme has provided, and added that their children are excited about being a part of it.

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in matters concerning Little KITEs. However, one concern that some teachers had, according to the results of the online survey, was that the HMs do not reduce the other teaching load of the teachers.

Teachers’ views on social initiatives

The teachers had very positive reflections on social initiatives like ‘Amma Ariyan’ and ‘Satyameva Jayate’. The teachers observed that cybersecurity is a matter of great concern and many parents, especially women, wanted more information. They felt that more initiatives of this nature need to be taken up under Little KITEs.

The teachers in a school recollected that their students had undertaken an ‘Ubuntu installation fest’ that displayed their interest in IT as well as their commitment to FOSS.

Regarding social initiatives that can be undertaken by the Little KITEs programme, teachers suggested that the Little KITEs units should help the public by providing some essential services like the ones offered by Akshaya centers in Kerala, but on a smaller scale (services related to Aadhar, bill

payments, etc.). An interesting suggestion was that the students of Little KITEs can help in the management of e-waste, which is becoming a major environmental concern. The other suggestions for social initiatives included conducting IT-related training sessions for students with disabilities, and organizing IT awareness programmes for members of the public, especially women and senior citizens. The teachers also suggested conducting sessions on the addictive and other negative aspects of mobile phones. The teachers recalled that the general public had responded positively to the social initiatives carried out under Little KITEs.

Parents’ Voices

Interactions with parents of the Little KITEs members showed that they are happy with the learning opportunities that the programme has provided, and added that their children are excited about being a part of it. Some parents thought that it would be good to have field visits and interactions with IT professionals so that students can get an understanding of the real world applications of the technologies that they are learning in the Little KITEs clubs.



Interest in studies

Deepa T.K

Thiruvananthapuram

My son participated in school, sub-district, and district-level camps of Little KITEs. Now, he and his Little KITEs friends are in charge of the maintenance and upkeep of computers in the school. I have observed that my son has acquired leadership skills and a renewed interest in studies after being a part of Little KITEs.



Socially useful skills

Manoj P.S

SSGHSS, Puranattukara, Thrissur

I'm delighted to know that my son knows many things which I don't know in the areas of technology. With the help of my son, I am able to submit applications through government websites such as bill payments, revenue certificates etc.



Confidence and Creativity

Sharada M.K

Nochat HSS, Kozhikode

My son was a bit shy and diffident to take part in social activities. But after joining Little KITEs, my son is very confident and active in all the school level and social programmes without any stage fright. He has learned to make equipment such as traffic signals, automatic streetlights based on light-sensor, electronic dice, automatic doors and security alarms using Robotic kits.



Enhanced responsibilities

Vidya Lakshmi

SNDP HSS Udayemperoor, Ernakulam

After participating in Little KITEs activities my son could study deeply all his academic subjects. He is in charge of documenting the videos of school based activities and editing the same before uploading in SchoolWiki. This club enables him to acquire new knowledge and also to improve his proficiency in innovative areas of technology.



Teamwork and communication

Dr Deepa Mary Mathews

Head, Dept of computer applications, FISAT, Angamaly, Kochi

Joining Little KITEs encouraged my daughter to think outside the box and to explore the new age technologies to build a LiFi project for the science exhibition. Successfully presenting her project in the science exhibition has boosted her confidence. Also I have observed positive changes in her ability to work within a team. The collaborative nature of the Little KITEs club activities has contributed to improve teamwork, effective communication and a sense of shared responsibilities.



The teachers had very positive reflections on social initiatives like 'Amma Ariyan' and 'Satyameva Jayate'. The teachers observed that cybersecurity is a matter of great concern and many parents, especially women, wanted more information. They felt that more initiatives of this nature need to be taken up under Little KITEs.



KITE leadership and functionaries

In each district, the district KITE team consisting of Master Trainers (MTs) and the District Coordinators support the functioning of the Little KITEs units in schools across the district. They conduct training for the Little KITEs Teachers, organize student camps at sub-district and district levels and visit the schools to support the implementation. The MTs also give inputs into the curriculum design and draw insights from their experiences. They resolve implementation challenges and try to meet the requirements of students, teachers, and schools.

The Little KITEs programme is seen by KITE as an important mechanism to build the capabilities of students in digital technologies, so that Kerala can be well equipped to take advantage of the digital revolution. The state has the ambition of becoming a knowledge economy¹⁰. The government is devising various schemes to utilise robotics, internet of things and artificial intelligence for supporting advanced learning of students, for the development of relevant applications and platforms for the state, and for providing employment opportunities. Training camps help students in understanding the design, operation and manufacturing of electronic devices¹¹. Improvements are being made in the curriculum by KITE, to address recent developments in technology.

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In each district, the district KITE team consisting of MTs and the District Coordinator work to support the functioning of the Little KITEs units in schools across the district by conducting training for the Little KITEs Teachers, organizing student camps at sub-district and district levels and visiting the schools to support the implementation.



¹⁰ See for instance the article of the Chief Minister - <https://www.thehindu.com/news/national/kerala/towards-a-knowledge-economy-on-the-back-of-social-progress/article67470562.ece>

¹¹ <https://www.eastcoastdaily.com/2023/05/15/students-will-be-introduced-to-robotics-and-artificial-intelligence-education-minister-inaugurates-little-kites-camp.html>

Universal programme v/s islands of excellence

The Atal Tinkering Lab (ATL) is an initiative from the Union Government to encourage technological innovation in high school students. Many of the features of ATL are similar to that of the Little KITEs programme. However, the ATL programme is funded (INR 20 lakhs) and is implemented in a limited number of schools¹², which submit applications and get approval.

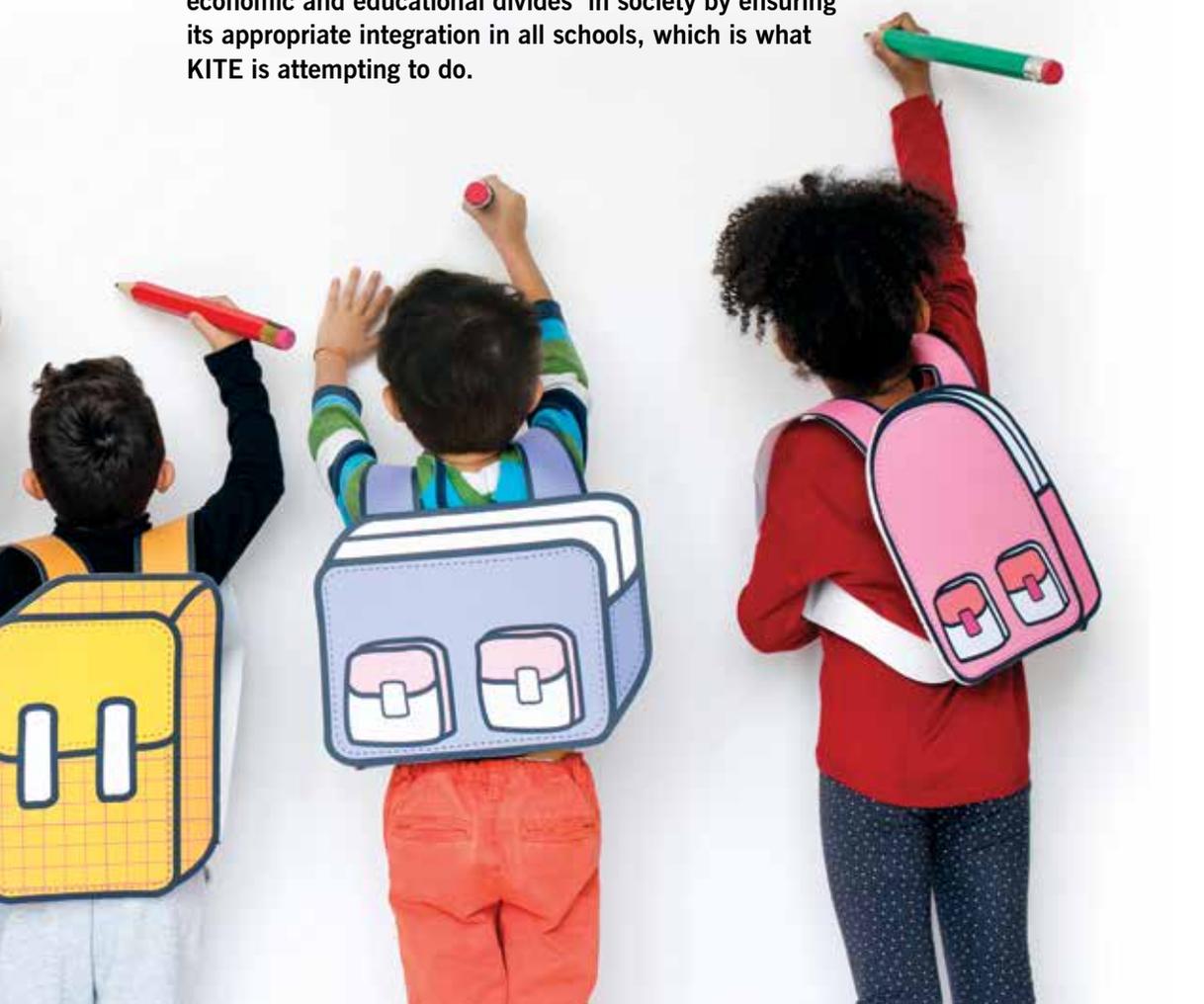
Though the ATL programme may be producing islands of excellence, given the prohibitive costs, the programme is not yet scalable. There is no clear strategy mainstream ATL in the government high schools across the country. Hence it remains an exercise in inequity.

Little KITEs also functions in select 2174 schools only in Kerala, but where the existing ICT infrastructure in each school is used and its maintenance supported on an ongoing basis by KITE. The Robotic kit provided by KITE costs INR 1000 a piece and on average 5 kits are deployed for each Little KITEs unit. It is plan to deployed more Robotic kits in 2024-25 to cover all Little KITEs members. KITE is gradually expanding the Little KITEs programme to cover all government and aided high schools in the state.

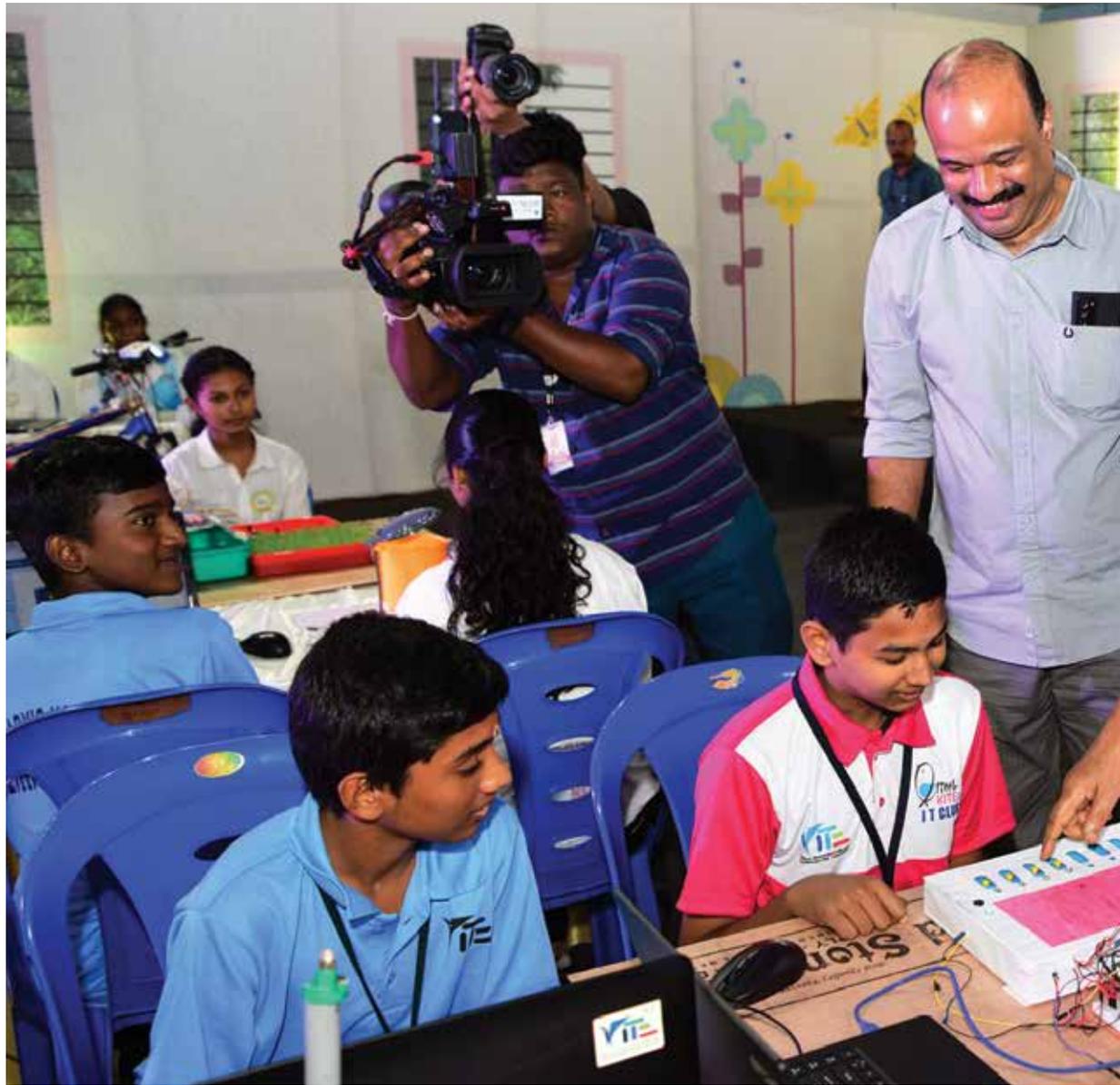
Digital Technologies can be used to bridge existing socio-economic and educational divides in society by ensuring its appropriate integration in all schools, which is what KITE is attempting to do.

The Robotic kit provided by KITE costs INR 1000 a piece and on average 5 kits are deployed for each Little KITEs unit. It is plan to deployed more Robotic kits in 2024-25 to cover all Little KITEs members.

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¹² https://www.aim.gov.in/pdf/Grant-in-Aid_Fund_Utilization_Guideline.pdf



Contributing to a knowledge society

Digital Technologies have impacted every waLittle KITEs of life, unfortunately, not always in a positive manner. Cybercrime is rampant in India, taking advantage of the digital illiteracy of adults. Fake news makes society vulnerable to strife. In Little KITEs, teachers have facilitated students to conduct awareness programmes to help their parents and the wider public become 'informed users' of the internet and social media. The Satyameva Jayate (Truth Alone Triumphs) module in Little KITEs has helped the public identify fake news; teachers and the general public were trained on topics

such as right and wrong practices on social media, healthy internet usage and the role of 'echo chambers' in facilitating the spread of fake news.

Amma Ariyan ('for mother to know') has helped parents to learn safe use of the internet, including while performing financial transactions. Over 4 lakh mothers were trained by their offspring on the safe use of smartphones and the internet, handling passwords, OTPs and PIN, and guarding themselves against cyberattacks. One would recall the 'father' of the 'information society', sociologist Manuel Castells, who suggested over a quarter of a century ago, that every state must launch a mission to have digitally

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 Amma Ariyan ('for mother to know') has helped parents to learn safe use of the internet, including while performing financial transactions.



When Little KITEs reaches all public schools, it would lay a foundation for Kerala to “transition into a knowledge society and an economy based on values of sustainability and inclusivity”, aligning with the state’s ambitions.

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illiterate adults learn digital literacy from their children and grandchildren – the Little KITEs programme builds this in highly relevant areas of media literacy and cyber safety. Amma Ariyan is most relevant for every home in this country.

Parents were impressed by the opportunities provided by Little KITEs to their children. Appreciating the success of the programme in getting their children to be deeply engaged in learning, they hoped that the children could get more chances to directly interact with digital society professionals, and become Kerala’s aware leaders of tomorrow. Little KITEs is enabling students to be active participants in the school’s life, applying

what they learn in the programme – taking pictures, processing them, designing and typing out event reports and newsletters, maintaining the school’s IT labs, supporting school-community linkages etc., important steps in building their confidence to lead lives as constructive and critical citizen leaders of tomorrow.

When Little KITEs reach increases to cover all public schools, it would stand out as one of the pioneering programmes that catapulted Kerala’s “transition into a knowledge society and an economy based on values of sustainability and inclusivity”. Thus Little KITEs equally align with the state’s ambitions and vision.

Benefit Analysis - Stakeholders

For Students

The Little KITES programme has introduced students to the numerous aspects of IT such as hardware, software, electronics, robotics, and animation and strengthens their technology literacy and skills.

1. Little KITES has promoted active learning and has supplemented classroom education with interactive digital experiences by providing wider access to computers, internet, and rich/diverse educational resources.
2. Little KITES has offered students the potential to develop skills such as communication, creativity, problem-solving, perseverance, collaboration, critical thinking, information literacy, technology and digital literacy, media literacy, self-direction, social skills, literacy skills, civic literacy, social responsibility, innovation skills, and thinking skills.
3. Students have received specific training in state-of-the-art technologies such as Artificial Intelligence (AI), Robotics, Internet of Things (IOT) and 3D animation and also opportunities for students to perform hands-on experiments with these technologies.
4. In many cases, the deep and effective participation in the Little KITES programme has build self-esteem and confidence in students and has developed greater aptitude for technology, and a vision for several careers in the digital age.





For Schools and teachers

1. The Little KITEs programme has ensured that schools have the necessary hardware, software, and internet connectivity, usually taking their technological infrastructure and capabilities to a higher level. KITE has also been providing ongoing support to maintain the technology infrastructure.
2. KITE's training programmes for teachers has helped improve their technological skills and to better integrate technology into teaching methods. This is in addition to the support they have got to effectively guide Little KITEs activities.
3. Little KITEs has created a lively, nurturing and stimulating learning context for students, which supports active involvement and reduces absenteeism. Learning for the intrinsic joy of it and learning by doing are valuable processes facilitated by the programme. The portfolio method of assessment of students adopted in Little KITEs has supported constructivist learning.
4. Schools have leveraged the Little KITEs programme to engage with parents and the community through programmes such as Amma Ariyan, but also with the local governments and other stakeholder.
5. By participating in Little KITEs programme, teachers have had an opportunity to integrate their Technological Knowledge, Pedagogical Knowledge and Content Knowledge (TPCK framework) and become better educators. Little KITEs has provided them a space for engaging in teaching-learning without the legacy challenges of syllabus, textbook and written examinations.



As an icing on the cake, the Education Department of Finland is keen to set up student IT clubs, following the Little KITEs model.

For the larger public education system



Supporting the learning of youth on digital technologies, both as technological skills and critical understanding of the role of these technologies in society has aided a transformation of Kerala's schools, thus contributing to a Knowledge Economy. The government is keenly aware of this aspect and the Little KITEs programme was given the "Best Innovative Project in Public Policy" award by the Chief Minister of Kerala in 2022.

For the community



A unique feature is that students of Little KITEs reach out to the immediate and larger local community and train parents in areas such as the role of the internet, distinguishing between the genuine and the fake in social media, and filtering out fake news. By initiating campaigns such as Satyameva Jayate, students have supported community's awareness of Cyber Security and Digital Literacy.

In a sense, Little KITEs reduced digital divide between urban and rural areas by providing equal access to technology and digital resources.

Conclusion

Little KITEs has progressed well from its early start to enhance students' curiosity and help them explore opportunities brought about by digital technologies, besides also learning about the larger social impact of these technologies. Students have to not only learnt to use these technologies but also are contributing to the development of new software and tools and share their learnings with one another. The programme has promoted important life skills such as critical thinking, creativity, problem solving, collaboration, communication and decision making.

In summing up, major highlights are summarised below:

1. Learning through Digital Technologies: The Little KITEs programme has been successful in building student abilities in both learning digital technologies

(e.g., animation, robotics, programming, mobile apps, hardware, electronics, AI) and learning through digital technologies (e.g., Malayalam computing, media training, cyber safety, E-Commerce, E-Governance, video documentation and web TV).

2. Desire to Learn: The programme has strengthened students' desire to learn, with students expressing a desire for more programme hours, activities, and projects. The pedagogies of encouraging self-directed learning, peer support, and collaborative learning have contributed to this desire.

3. Cultivation of Higher-Order Thinking Skills: Little KITEs has proven to be successful in fostering critical thinking, creativity, problem-solving, and collaboration skills in students. Teachers have realised that students have become





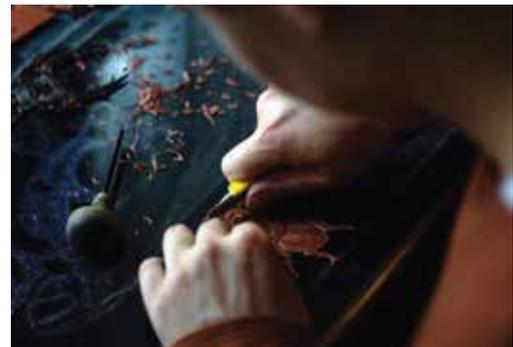
more adept at analyzing, synthesizing information, thinking critically, and working collaboratively on intricate technology projects.

Little KITES programme instils in them a newfound confidence to undertake a variety of creative activities that they may not have considered before.

4. From consumers to creators:

Students engaged in the Little KITES programme have shifted from being consumers of technology to creators, actively participating in the creation of animations, developing games, and creating simple robots, rather than solely participating in technology-related activities. This recurring perspective emerged consistently during interactions with the students, indicating that the

5. Collaborative knowledge construction:



Little KITES students have actively engaged in collaborative knowledge construction through hands-on use of robotic labs, creating traffic signals, light-sensor-based streetlights, electronic dice, automatic doors, and security alarms. This collaborative learning has extended to crafting practical tools like electronic voting machines, sound-regulated



Gender Inclusivity in STEM, Girls are not only equally represented in the programme but also articulate ambitions for higher studies in science and technology, aiming for careers as scientists and technologists.





As part of the Public Education Rejuvenation Mission (Pothu Vidhyabhyasa Samrakshana Yajnjam) in Kerala, academic initiatives like Little KITES have been introduced, restoring parents' faith in the public school system.

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home automation (IoT), and waLittle KITESing sticks for the visually impaired, showcasing tangible community impact. Students have created computer games using Scratch and have developed mobile apps with the MIT App Inventor.

- 6. Students Create School Magazine:** Little KITES students have actively engaged in creatively producing school magazines that document all school activities, including those related to the Little KITES programme. This widespread practice highlights the utilization of Little KITES infrastructure by the students themselves, showcasing their ability to design, develop, and publish school magazines independently. It is remarkable that school magazines are uploaded on each school's Schoolwiki page for public access thus serving as a knowledge repository among schools, purely under students - own responsibility for such knowledge management.



- 7. Gender Inclusivity in STEM:** The programme has addressed the under-representation of girls in STEM

disciplines. Girls are not only equally represented in the programme but also articulate ambitions for higher studies in science and technology, aiming for careers as scientists and technologists. This is much relevant for Kerala and India.

- 8. Active Participation in School Life:** The programme enabled students to be active participants in the school's life, applying what they learn in various activities such as taking pictures, processing them, designing and typing out event reports and newsletters, and maintaining the school's IT labs. These opportunities



have made schooling more meaningful and engaging.

9. Universal Reach for Educational Equity:

The programme has aimed at equitable and universal reach with the vision of expanding beyond the 2174 schools, thus eventually covering all 4752 government and aided schools. The key factors for this include situating the programme on teacher capacity building and choosing the cost effective Free and Open Source Software (FOSS) over proprietary technologies.

10. Increase in student enrolment: As part of the Public Education Rejuvenation Mission (Pothu Vidhyabhyasa Samrakshana Yajnam) in Kerala, academic initiatives like Little KITES

have restored parents' faith in the public school system. There is a shift of students from private to government and aided schools, with Little KITES arguably playing a crucial role, for the shift. Students who have shifted from the private to public schools have expressed satisfaction with the programme's value, after transitioning from private schools.

11. Contribution to Knowledge Society:

The programme has gone beyond technical skills, contributing to a knowledge society. Students are engaged in awareness programmes addressing issues like cybercrime, fake news, and healthy internet usage. The programme has also included modules like Sathyameva Jayathe and Amma Ariyan to promote media literacy and cyber safety. As the programme's reach increases to cover all public schools, Little KITES would certainly stand out as a pioneering programme that has supported Kerala's transition into a knowledge society and an economy based on values of sustainability and inclusivity. It is a case of empowering adolescents with skills that build the future.

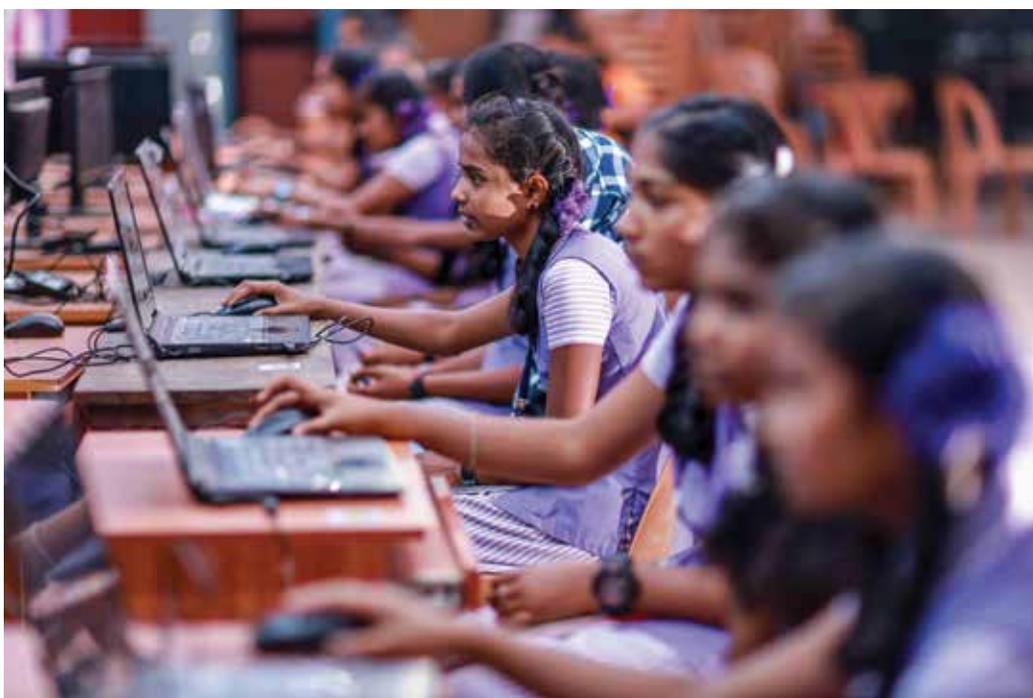
12. Parental Involvement and Training:

Little KITES has involved aspiring parents



The potential for digital technologies to strengthen education should be seen as far more important than building digital skills, in teachers, students, local community as well as the school institutions.





Little KITEs involves parents through modules like Amma Ariyan, where over 4 lakh mothers were trained on safe smartphone and internet usage.

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through modules like Amma Ariyan, where over 4 lakh mothers were trained on safe smartphone and internet usage. Parents appreciate the opportunities provided by the programme to their children and hope for more chances for direct interaction with digital society professionals.

13. Community Connect: Schools implementing 'help desks' run by students, assisting community members with tasks like paying bills, updating Aadhaar and ID card details, and addressing various IT-related issues are successful initiatives. They underscore the positive impact of students actively engaging with and meeting practical community needs. These events not only provide valuable assistance but also strengthen the bond between schools and their communities.

Recommendations

Although it is evident that the Little KITEs programme is providing significant benefits to schools, students and community, there is always scope for improvement, not only for the immediate component of strengthening student digital literacy capabilities but

also for the larger strengthening of the entire education system itself. The second part would need continuous engagement at policy and programme level for meaningfully integrating digital technologies through Little KITEs and other programmes of KITE, achieving the larger educational aims.

Immediate suggestions for the programme

1. Based on the feedback received from teachers and students, there is a need for additional training, including refresher programmes for teachers to make them more comfortable with advanced modules, such as robotics, AI, 3D animation, and higher-level programming.
2. It would make Little KITEs more inclusive if students studying in Malayalam-medium divisions get additional support to enhance their enrolment in the programme. As more and more schools and students get opportunities to participate in the Little KITEs programme, the issue will get mitigated.
3. Connecting education to the needs of the local community through community

projects, including in partnership with local government, will ensure the high investment in public education and can translate into local gains. Drawing from the general enthusiasm among the teachers and the students for socially relevant projects, one or two initiatives can be formally planned in every academic year. Ideas for such initiatives suggested by students and teachers include giving IT lessons for children with disabilities and awareness of cybersecurity, development of 'safe cyberspace' for all sections of society. More ideas could be collected in consultation with the students, teachers, parents, and the public. Theme based challenges could also be mooted.

Larger possibilities for strengthening public education

1. The programme should be extended to 11th and 12th grades, and provide both more advanced digital literacy learning, as well as strengthen life skill and 21st century relevant to the needs of young people and Kerala society. It can combine critical awareness and thinking skills along with latest 21st century technologies, to strengthen Kerala as a knowledge society and knowledge economy. Emerging ideas such as collaborative startups can provide pioneering socio-economic models for the world. They will set an early start to focus on real issues of society such as the environment, employment and social cohesion. There could be greater impact by collaborating with Young Innovators Programme (YIP) of KDISC.
2. The potential for digital technologies to strengthen education should be seen as far more important than building digital skills, in teachers, students, local community as well as the school institutions.
3. Little KITEs has the potential for engaging teachers and bringing in state of the art knowledge to students. Digital technologies to rejuvenate teacher education lies in strengthening the 'Technological-Pedagogical-Content Knowledge' (TPCK) of teachers. Teachers' abilities to integrate digital technologies to strengthen their content and pedagogical practices can be developed through appropriate teacher education programmes. They should be able to create, customise curricular content that is multi-level and multi-modal to meet the diverse learning needs of heterogeneous classrooms. This in line with the National Curricular Framework for Teacher Education, 2009 and the State Curriculum Framework 2023. Little KITEs has laid out an ambitious agenda for teacher education and KITE's programmes should focus on leveraging digital technologies for this purpose.
4. The Little KITEs programme has good scope to improve life skills education for students in a manner that not only enhances their economic potential (employment and entrepreneurial possibilities) but also supports their abilities to negotiate and build societies of caring and compassion, the latter is becoming more and more essential to reduce social strife and build social cohesion.
5. Programmes like *Amma Ariyan and Satyameva Jayate* are critical in today's age of disinformation and misinformation. Adults who are not literate are culpable and the best and efficient way to reach them is through their children. This activity can be formalised through the 'Social Science' labs in schools, so that issues of contemporary nature can be discussed within the broader framework of core constitutional principles. Such formalization will build an important life skill of being able to understand and interpret society and this will be critical to building a cohesive society in the future.

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13 The Kerala Knowledge and Digital Innovation Strategy Council (K-DISC) has initiated a programme for developing digital platforms on a co-operative mode and knowledge start-ups initiated on collaborative models will provide a fillip to this programme.





GOVERNMENT OF KERALA



A Document on Little KITEs

**KERALA'S PIONEERING STUDENTS'
ICT NETWORK PROGRAMME**

