NITI Aayog | ATAL INNOVATION MISSION

BEYOND TINKERING

ATL Student Innovator Program Handbook



NITI Aayog

ATAL INNOVATION MISSION

BEYOND TINKERING

ATL Student Innovator Program Handbook

We will explore the mysteries of science and harness the power of technology and innovation. We will realize the opportunities of the digital world. Our youth will learn more from - and with - each other

— Shri Narendra Modi



अमिताभ कांत
Amitabh Kant
मुख्य कार्यकारी अधिकारी
Chief Executive Officer

सत्यमेव जयते

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Message

India has always shown tremendous entrepreneurial spirit, and the last ten years have set the stage for the future. Bringing the Indian Youth to the 21st century through in-demand skills such as design thinking, Artificial Intelligence, IoT, Frontier Technologies, and Entrepreneurial acumen would go a long way towards a resurgent 'Aatmanirbhar Bharat'.

The Atal Tinkering Labs Program established by Atal Innovation Mission is the Government of India's flagship initiative to inculcate the spirit of tinkering and innovation within Indian Youth. Today, almost 10,000 ATLs in schools and students are solving pressing problems in their community, through ingenious and impactful approaches to solve these issues. We believe that investing early on in research and new technologies, along with having a bias for action is the new way to lead. AIM is doing a pathbreaking job by identifying and enabling these prodigies and establishing a network of students, teachers, mentors, and experts.

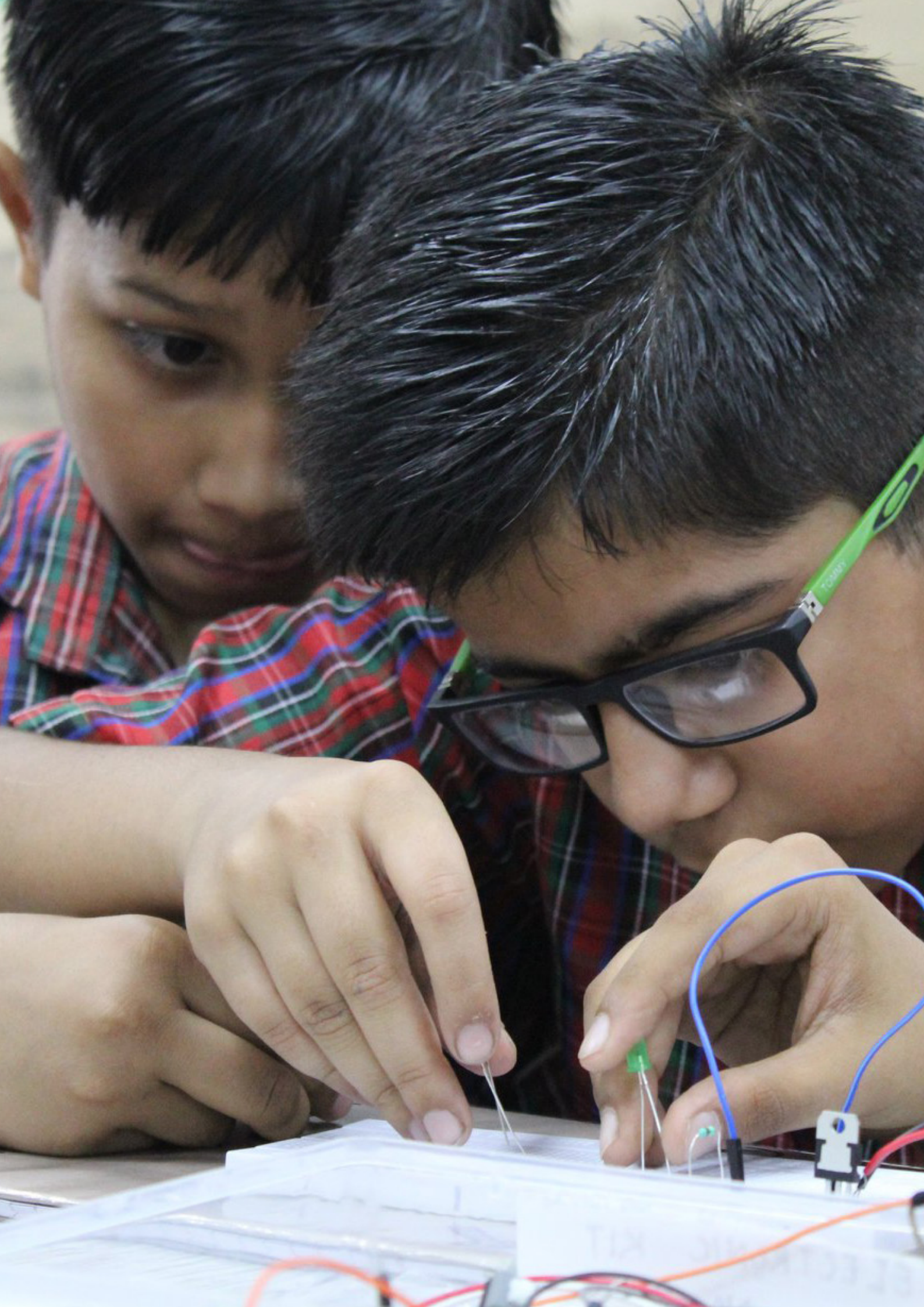
ATL Student Innovator Program (SIP) is an intervention where student-innovators develop their nascent ideas with accredited business mentors from the state-of-the-art and world-class Atal Incubation Centres. They get a chance to test their creative ideas, make a product, register it, and present the business to industry leaders. Connecting ATL and AIC programs has fostered self-learning and confidence in young minds and pronounced to the world that India is ready for the digital economy.

The foundations of SIP are a pragmatic approach, to disrupt norms, identify challenges, product-market fit, and entrepreneurship - to experience the startup world. Entrepreneurs are known for solving problems, taking nations ahead, and making communities around them happier & efficient. This book is an attempt to institutionalize memory and a call to action for startup-ecosystem enablers.

I call upon the young student entrepreneurs to mesmerize us as we celebrate the Azadi Ka Amrit Mahotsav. The SIP program is one of the many steps by AIM, making entrepreneurs the lead drivers in our nation-building journey.

(Amitabh Kant)

Place- New Delhi
Dated- 01/12/2021



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सत्यमेव जयते

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संसद मार्ग, नई दिल्ली
Mission Director, Atal Innovation Mission
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Message

Children are naturally creative. It is our job to give them the freedom and space to let their creativity blossom to its full potential. Creativity is now as important in education as literacy.

Atal Innovation Mission (AIM), NITI Aayog at the school level, is setting up state of the art Atal Tinkering Labs (ATL) at schools in all districts across the country. These ATLs empower the students with the 'skills of the future', which include Computational thinking, Internet of things (IoT), Artificial Intelligence, Design thinking, Advanced robotics.

Since the birth of ATL, and over the years, AIM has witnessed an exemplary display of creativity and problem-solving skills from the young minds of our country. We are currently in the fourth Industrial Revolution where there is a blurring of boundaries between the physical, digital, and biological worlds. We have to keep up with the world and revive and update our education practices to keep up with the technological advances.

We at AIM believe that in order to learn something, we must apply it and only then can we understand its intricacies and retain it. Thus, the ATL helps in applying the concepts taught through real time applications, hands-on activities and experiments. These are makerspaces exquisitely designed and presented to involve young students across the country from both rural and urban areas, promoting inclusive learning in all genders.

It is imperative to not just introduce the youth to the latest technologies, but also support and guide them in their journey of being the 'Future Entrepreneurs', to offer them the needed professional guidance and opportunities. AIM places a special emphasis on empowering the students with programs like the Student Innovator and Internship Programs (SIP). As the growth of technology and innovation are at an all-time high, the SIP helps in facilitating the spirit of research and development in upcoming disciplines and working on relevant projects upskills them for their future endeavors.

The 'Beyond Tinkering' handbook will not only consolidate the first-hand learnings of the SIP program but also help Corporates, Incubators and other potential Mentor Organizations in applying and implementing the teachings in other such forthcoming programs.

I express my gratitude to all AIM Corporate Partners and Atal Incubators (AICs) for their continued support and enthusiasm in making the SIP program successful and contributing towards nurturing the future innovators of our country.

(Dr. Chintan Vaishnav)

स्वच्छ भारत
एक कदम स्वच्छता की ओर



Preface

Every child possesses the innate ability to be a contributing asset to their country's development as a future entrepreneur, innovator or change maker; provided they are exposed to the right guidance and motivation from a young age itself. If students are aware about the plethora of opportunities existing in the world, they can reach their best potential which not just benefits them and their families, but also the community at large.

The Atal Innovation Mission (AIM) was born with this vision for India. Promoting a culture where young students are not alien to the concepts of innovation and entrepreneurship is what AIM, NITI Aayog aspires for and is working towards since its inception.

With the establishment of Atal Tinkering Labs (ATL) in schools all over India, AIM has been successful in funding over 9300 ATLs and million students have benefitted from the resources and guidance provided. The ATL modules and resources have helped foster critical thinking and analytical skills in kids from a young age where they can learn and explore new and upcoming niches and hone themselves according to their area of interest.

Keeping up with these objectives, the need of proper mentoring and support for these young change makers has been identified, leading to the introduction of the ATL Student Innovator Program (SIP). Having mentors that can help their mentees realize strengths, improvement opportunities and provide appropriate guidance can be a huge catalyst in bringing out their best. These experiences not only make learning more interactive, but also help the students gain better exposure in the areas they are curious about.

The 'Beyond Tinkering' handbook will serve as a concrete framework to conduct similar programs and trainings for the students. We hope that the document will also bring on board additional stakeholders towards creating a sustainable approach for the innovator/ internship program, and shed light on the roles of Incubators and Corporates in building a 'New India'.

I would like to thank all our Corporate Partners and Atal Incubation Centers (AICs) for their time and effort in helping the students get the most value from the ATL Student Innovator Program (SIP), a one-of-a-kind program envisaged as a bridge to connect the journey from a student-innovator to a student-entrepreneur. It is because of their dedication and support that the students are empowered to explore and innovate beyond their ATLs.

I take this opportunity to thank NITI Aayog Vice-Chairman Dr. Rajiv Kumar, CEO Mr. Amitabh Kant, and AIM Mission Director Dr. Chintan Vaishnav for their leadership and continuous support towards making ATL a national movement.

Mr. Manglesh Yadav and the entire AIC team have supported the Student Innovator Program throughout. I would also like to thank the core ATL team members Ms. Swati Rao, Ms. Vishnu Priya Bijapur, Mr. Prateek Deshmukh, Mr. Shubham Gupta and Ms. Tanvi Mishra for supporting the entire program. Ms. Naba Suroor and Mr. Ronak Jogeshwar have provided invaluable support in leading the Student Innovator Program and in framing and scribing this book.

This book is an effort towards capturing and showcasing how the overall mentoring and collaborating experiences of students with peers while working on projects helps in providing a comprehensive learning process to them, and help them transform into innovators and develop an entrepreneurial mindset, which will pave the way forward for developing an 'AatmaNirbhar Bharat'.

Happy Tinkering!

Ms. Deepali Upadhyay
Program Director
Atal Innovation Mission
NITI Aayog

EXECUTIVE SUMMARY

The 21st century needs a radical and disruptive change to a student's learning processes. With each passing day, new technology interventions by the industry are challenging the education system to create Future-ready Makers. 'Tinkering' and 'Making' are natural human skills that now need to be embraced with technology.

The Atal Tinkering Lab (ATL) program has become a national movement that is revolutionizing the Education Ecosystem of India. The goals and vision of the ATL movement tie in beautifully with the National Education Policy (NEP) and will play a pivotal role to implement the 'Experiential and Project-Based Learning' model in India.

After 4 successful years of iterative design with the support of expert ecosystem enablers from the Industry and Academia, AIM has created a journey of a pathway for India's youth - from Tinkering and Making to Innovation and Entrepreneurship.

The idea is to expand the vision of the ATL movement to '**Democratize Tinkering**'. This document aims to weave the experiences of ATLs, Atal Incubation Centres, and AIM Partners and share the philosophy and the working framework of AIM's Student Innovator Program.

Educationists, Industry experts, Start-up evangelists and Institutions may use this document to familiarize themselves with the Student Innovator Program (SIP) and give them building blocks on how to create their own unique SIP experience. The onset of the book introduces AIM and NITI Aayog to the reader. In the following chapter, we take a deep dive in understanding the tenets of the ATL program. The ATL Marathon, the flagship precursor contest of the SIP is captured. The essence of our 4 years experience of designing and implementing the various engagement vehicles of the ATL program is captured in the origination of the Learning Pyramid framework.

Effective engagement and learning outcomes are some of the key success indicators and are captured in the third chapter. We aim to only define them and not dictate how they are to be measured. We trust that the institutes will create their own mechanisms to introduce additional indicators and methods to gauge them. Every TBI has its own unique method of mentoring and training startups, and this will help students to create their novel start-up pitches.

The next chapter deep dives into the implementation and engagement piece. Aspects of selection, timeline and an indicative and non-exhaustive weekly calendar

is placed. AIM believes that it is important for students to live a week of 'start-up life' and recommends a residential program on-site at the Incubation Center or Corporate office. Mentor roles are placed to help institutes handpick experts who add value to the SIP experience in line with the program's intended outcomes. The chapter concludes with possible opportunities, awards and recognition beyond SIP.

The next two chapters briefly touch in the celebration and recognition aspect of the SIP. Top teams of the SIP are offered the Student Entrepreneurship Program supported by AIM's corporate partners. Additionally, AIM has captured some of the inspiring media stories and feedback from the student, mentor and incubator communities. The final chapter concludes with reflecting upon how the SIP is embarking entrepreneurial journeys of young innovators and weaves a vision of the future.

We hope that the energy and zeal with which this book has been written is communicated to the reader and is contagious enough to nudge the readers onboard in this innovation journey with us.

Ronak Jogeshwar
Innovation Lead,
Atal Innovation Mission,
NITI Aayog

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INTRODUCTION TO NITI AAYOG AND AIM

1

1.1 ABOUT NITI AAYOG

The National Institution for Transforming India, also called NITI Aayog, was formed via a resolution of the Union Cabinet on January 1, 2015. NITI Aayog is the premier policy 'Think Tank' of the Government of India, providing both directional and policy inputs. While designing strategic and long-term policies and programs for the Government of India, NITI Aayog also provides relevant technical advice to the Centre and States.

An important evolutionary change from the past, NITI Aayog acts as the quintessential platform of the Government of India to bring States to act together in the national interest, and thereby fosters cooperative federalism. NITI Aayog is continuously developing itself as a State-of-the-Art Resource Centre, with the necessary resources, knowledge, and skills, that will enable it to act with speed to promote research and innovation, provide strategic policy vision, and deal with contingent issues.

NITI Aayog is nominated as the nodal agency by the United Nations to monitor, coordinate and effectively implement the 17 Sustainable Development Goals across the country to bring about the desired transformation.

NITI Aayog's entire gamut of activities can be divided into four main heads:



Some of the prime responsibilities of the NITI Aayog are:

- To evolve a shared vision of national development in priority sectors and develop strategies with the active involvement of states, in light of the nation's objectives.
- To develop mechanisms to formulate credible plans at the grassroots level and aggregate these progressively at higher levels of government.
- To design strategic and long-term policy and program frameworks.
- To create a knowledge, innovation, and entrepreneurial support system through a collaborative community of national and international experts, practitioners, and other partners.
- To focus on technology up-gradation and capacity building for the implementation of programs and initiatives.

1.2 ATAL INNOVATION MISSION

The Atal Innovation Mission (AIM) is a flagship initiative of the Honorable Prime Minister's Office (PMO), housed at the NITI Aayog, to promote innovation and entrepreneurship across the length and breadth of the country. AIM, NITI Aayog is envisaged as an umbrella innovation organization that would play an instrumental role in the alignment of innovation policies between central, state, and sectoral ministries, by incentivizing the promotion of an ecosystem of innovation and entrepreneurship at various levels – higher secondary schools, higher education and research institutions, ME/MSME industry, corporate, and government ministerial level, by a public-private partnership. The initial focus has been towards creating an institutional framework, to nurture innovation and entrepreneurial mindset.

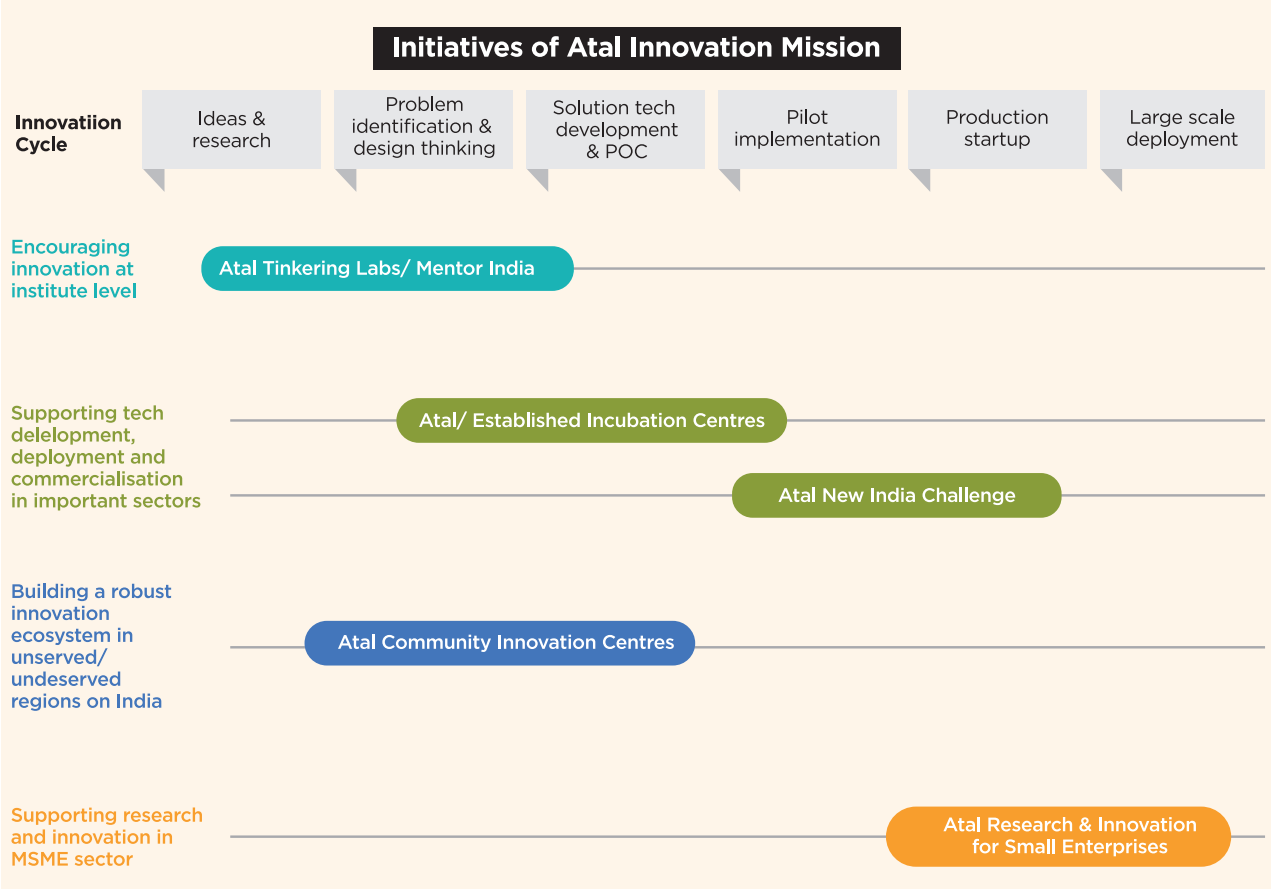


Fig 1.2.1: *Initiatives of AIM*

Through the Atal Tinkering Labs (ATL) program, AIM, NITI Aayog is fostering the spirit of creativity and innovation at the school level, wherein students get an opportunity to experience 21st-century,nation-building skills such as ideation, design thinking, IoT, rapid prototyping, etc. and widen their intellectual horizons in pursuit of solutions to day-to-day problems and showcase their innovations at prestigious national and global platforms.

To further nurture these school students, the Mentor of Change (MoC) program, which is a

citizen-led national movement was launched in 2017 and is being led by AIM, NITI Aayog, wherein skilled professionals provide pro-bono mentoring to young ATL innovators, with a strong sentiment towards nation building.

AIM, NITI Aayog's Atal Incubation Centres (AICs) are creating a world-class ecosystem for start-ups to flourish, with the required handholding, including access to mentoring and investor networks. Atal Community Innovation Centres (ACICs), through PPP-driven model are encouraging the spirit of innovation with a focus on underserved/unserved regions of the country, such as rural, tribal, aspirational districts, hilly and/or coastal areas which at present lack a vibrant startup and innovation ecosystem.

AIM, NITI Aayog realized the importance of making innovation a national movement, wherein citizens felt the responsibility to create impact and contributed towards the same. Launched by AIM, NITI Aayog in collaboration with five Ministries of the Govt. of India, the Atal New India Challenges (ANIC) provides innovators an opportunity to propose technological solutions in 24 different areas of national importance. The selected innovations shall receive grant-in-aid along with support for swift productization and commercialization. And finally, the Atal Research and Innovation in Small Enterprises (ARISE) program encourages the Ministries of Government of India to invest in research and innovation, and explore to leverage relevant innovations into the public system.

1.3 AIM PROGRAMS

1.3.1 Atal Tinkering Labs

With the conception of AIM, NITI Aayog, innovation and entrepreneurship have become an integral part of our national mission, and children as young as 12 years of age are being introduced to the world of technology innovation, with ATL in schools. ATL is the flagship initiative of AIM, NITI Aayog, Government of India, to nurture an innovative mindset amongst high school students across the length and breadth of India. Within an ATL, students are free to think and explore, try and fail, even come up with something out of the box. The program is designed to equip students with 21st century skills such as design thinking, critical thinking, computational thinking, digital fabrication, collaboration and so on. It will enable India to create a dent in the Global Maker's movement (Dougherty, 2012) and become a global platform for world class innovation. ATLs encourage students and teachers to experiment, explore and follow a self-learning path, thereby empowering them to think differently about problems and develop innovative solutions. ATL is also providing other sections of the community, including parents, mentors and other individuals interested in innovation to give life to their ideas. Under the ATL scheme, grant-in-aid of up to ₹ 20 lakh is provided to schools selected for setting up the ATL.

As of November 2021, 14916 schools have been selected for establishment of ATLs and more than 9300 ATL schools have been sanctioned, covering more than 90% of all the districts and 110 Aspirational Districts of India. These labs, established in both government and private schools and majority in co-educational and girls' schools, are serving as community hubs of innovation, while transforming the way India learns, thinks, ideates

and innovates. As per the Strategy for New India published by NITI Aayog, over 10,000 ATLs will be established by FY 2020-21.

1.3.2 Atal Incubation Centres

Under its core objectives, AIM supports the establishment of new incubation centres called Atal Incubation Centres (AICs) that nurture innovative start-up businesses in their pursuit to become scalable and sustainable enterprises. Along with AICs, AIM provides scale-up support to a few distinguished incubation centres of the country. These incubation centres, referred to as Established Incubation Centers (EICs) have already been in existence, but AIM intends to further catalyze their performance by providing them scale-up support.

AIM supports these AICs in creating world-class incubation facilities across the country with state of the art physical infrastructure, in terms of capital equipment and operating facilities available to their incubatee start-ups, coupled with the availability of sectoral experts for mentoring. Apart from this, business planning support, access to seed capital, industry partnerships, training and other relevant components required for supporting innovative start-ups is provided. Moreover, most of the AICs established are sector-specific in areas such as manufacturing, transport, energy, health, education, agriculture, water, sanitation, Internet of Things, Cyber Security, etc. to promote unprecedented technological innovation in these sectors.

Under AIC, AIM provides a grant-in-aid of up to ₹ 10 crores for a maximum period of five years to cover the capital and operational expenditures required to establish the AIC. As of July 2021, AIM has shortlisted 102 incubators covering 23 states of the country out of which 68 are already funded. 620+ start-ups have been incubated in AICs/ EICs out of which 100+ are women led start-ups. In addition to this, AIM has provided ₹ 6+ crore of seed fund based on which the EICs have leveraged ₹ 60+ crore of funding.

1.3.3 Atal Community Innovation Centres

Atal Community Innovation Centers (ACIC) are envisaged to serve the unserved/ underserved areas of the country with respect to the start-up and innovation ecosystem. AIM saw it to be crucial to reach the innovators at the bottom of the pyramid and give them equitable opportunities, especially by reducing the lab to land distance and creating a space for pre-incubation of ideas/ solutions. Celebrating the idea of 'frugal' which is predominant in Indian communities, ACIC aims to create a formal approach to identify and scale up these innovations; using solution driven design thinking and supported by Public Private Partnerships (PPP) model.

The program offers an opportunity to explore unique and incentivized solutions to encourage students, researchers or any individual/ group of individuals to ideate and design novel solutions. Every ACIC established would get a grant of upto ₹ 2.5 crores from AIM with a matching or greater contribution from the applicant. The ACIC are encouraged to form value-adding partnerships with the private sector, NGOs and local MSME industries.

ACIC aims to create more design-aware societies, enabling them to leverage design principles to be able to build more human-centric, meaningful innovations.

1.3.4 Aatmanirbhar Bharat ARISE-ANIC

The Aatmanirbhar Bharat ARISE-ANIC program is a national initiative to promote research & innovation and increase competitiveness of Indian startups and MSMEs.

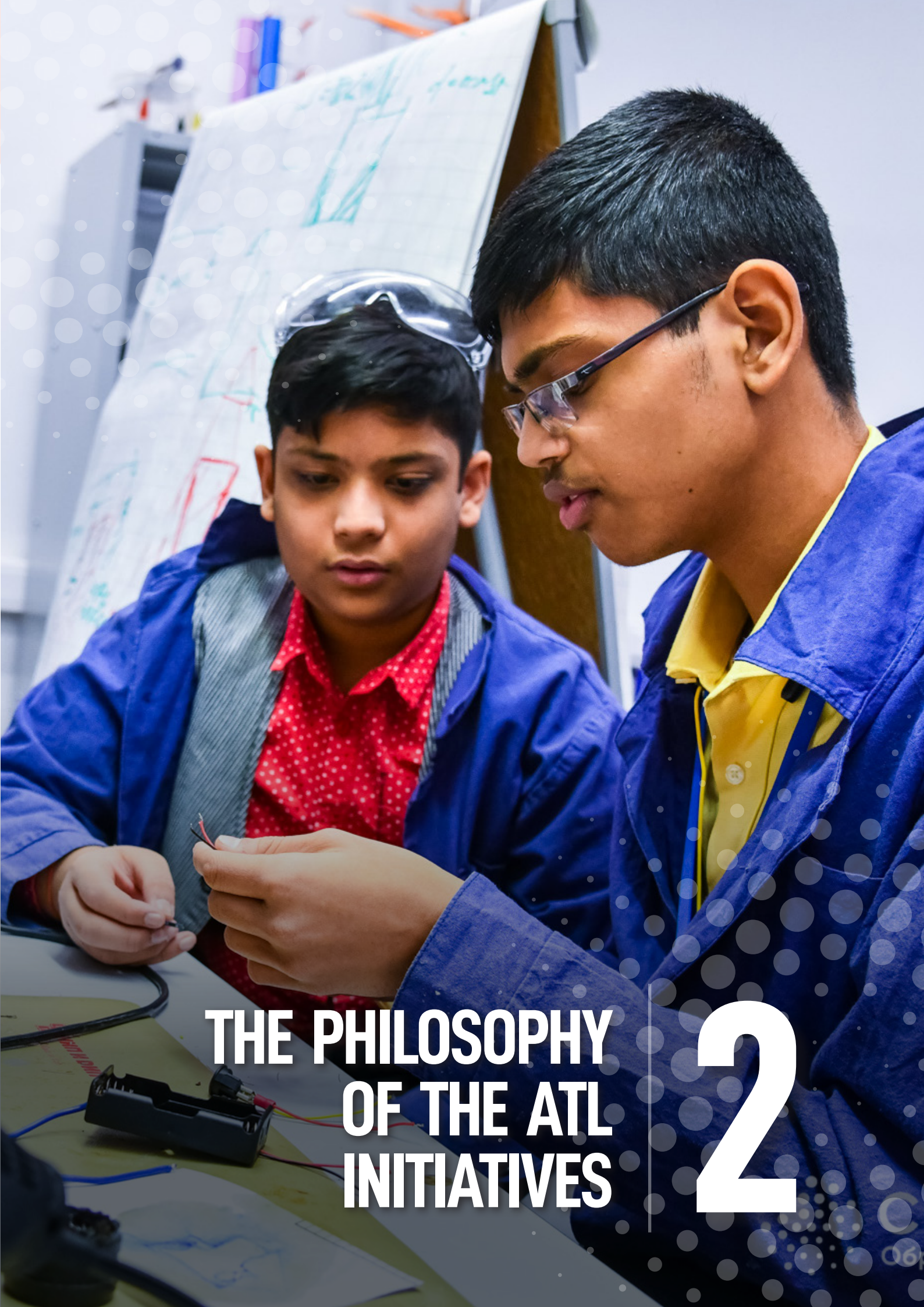
The objective of Aatmanirbhar Bharat Applied Research and Innovation for small Enterprises (ARISE) and Atal New India Challenges (ANIC) program is to proactively collaborate with esteemed Ministries and the associated industries to catalyse research, innovation and facilitate innovative solutions to sectoral problems. The objective is also to provide a steady stream of innovative products & solutions where the Central Government Ministries / Departments will become the potential first buyers.

The Aatmanirbhar Bharat ARISE-ANIC program is in line with the Honourable Prime Minister's mandate of "Make in India", "Startup India", "Aatmanirbhar Bharat" to fast track the growth of the Indian MSME sector.

1.4 AIM ECOSYSTEM: CORPORATE AND ACADEMIC PARTNERS

AIM has worked on forging robust partnerships with the industry and academia in order to leverage their expertise towards guiding students on various innovation related skills. Sustainable institutional frameworks that draw upon the capacity, resources, technical know-how of these partners are key to ensure the success of the program.Partners help in expanding the technical horizon of the students by providing internship and mentoring opportunities, provide guidance with their innovations and work with AIM to create student friendly technology modules. Corporate organizations include start-ups, Micro, Small and Medium Enterprises (MSMEs) and large corporations that provide ATL students with exposure to advanced technologies.

AIM works closely with all its partners to ensure they work in cohesion such that the essence of the ATL movement is preserved, while maintaining homogeneity in the outcomes desired to be achieved.



THE PHILOSOPHY OF THE ATL INITIATIVES

2

2.1 EVOLUTION OF THE ATAL TINKERING LAB'S INITIATIVE

Combining the traditional teaching methodologies with today's experiential learning will be the key towards creating a unique blended education system in India. Keeping in mind the demands of the growing economy and global growth in innovation development, the Government of India, embarked on a noble mission to create an ecosystem that nurtures futuristic skills like complex problem solving, critical thinking, adaptive learning, computational skills in children, with a vision to create 1 million neoteric innovators, with the ATL initiative.

The ATL initiative, across India today, is tapping on the intrinsic imaginative and problem-solving knack of children and equipping them with the required skills of the future. Access to multiple ATL resources is helping them to ideate and create feasible solutions to substantial problems facing the community. Further, the support of students, teachers, principals and parents is considered crucial in successfully achieving the objectives of ATL. The overall goal is to leapfrog the Indian education system, and create a generation of young innovators ready to take on the further challenges, in their constant pursuit to build the New India.

The ATL introduces Indian students to a very different microenvironment, that allows freedom to explore new ideas, test them, and follow a 'learning by doing' approach. Students are introduced to new technologies and concepts wherein they begin working in teams, towards solving real world problems, leveraging their learning. Such a gradual approach, allows the students to acclimatize themselves to this new and innovative experience, learn new technologies, and appreciate the transformation within.

The ATL not only provides the students with an opportunity to tinker and showcase their innovations, but also help to create awareness in the community, while engaging with parents and other students from non-ATL schools. The conducive environment created by the intra school tinkering and innovation activities prepares the students to go out and advocate their innovations on external platforms, which also provides them the recognition they deserve for their work.

Depending upon their inclinations, the ATL movement seems to kinder two set of key desires within the students :

- To learn something new (learn ATL technology and resources)
- To become innovators/entrepreneurs (solve challenges by leveraging ATL technology and resources)

The ATL movement has been successfully able to connect the desires of the students to an objective/outcome. The movement has further been able to provide a pathway or direction to these students through various ATL initiatives–engaging events, activities, competitions and programs specially curated for anyone who wants to explore the world of Tinkering and Innovation.

The AIM team imagines that with the scale and reach, the ATL movement today has matured into an 'Operating System', upon which the ATL initiatives are being run to cater to the key aspirations of our beneficiaries. The figure below illustrates the concept:

Atal Tinkering Laboratories (Learn, Think, Make, Break, Create and Collaborate)					
Aspiration	**Skill** (To learn something new)			**Entrepreneurship** (To become innovators/entrepreneurs)	
Resources	Coding	AR/VR	CAD	Industry Internship	Startup via AIC/ACIC
	3D Printing	Robotics	Artficial Intelligence	Student Innovator Program	
	Game Design	Intellectual Property Rights	...and many more	Student Entrepreneurship Program	
Outcome	Learn 21st century STEM skills with ATLs			Create indigenous products and solve challenges	

Fig 2.1.1: *ATL Operating System*

One of the key ideas that AIM believes in is collaboration. All the resources and skills mentioned above are being designed, curated and taught to children through esteemed organisations. For example, the AI Base and Step-Up modules are designed by NASSCOM in collaboration with various industry partners; the Intellectual Property Rights module has been designed in collaboration with CIPAM, DIPP under the Ministry of Commerce. Further, the learning material created is freely available on the AIM website[1].

Students, through the above learning experiences, are able to create entrepreneurial agency within them. Catering to their hunger to learn, AIM has designed the Student Innovator Program in collaboration with AICs and Technology Business Incubators (TBIs), the Student Internship Program and the Student Entrepreneurship Program in collaboration with the Industry.

2.2 ATL PROGRAM FRAMEWORK

The ATL Program Framework is backed by years of ideation, experimentation and implementation at a national scale. The philosophy and the framework of the ATL Program are captured in the ATL Handbook 1.0[2] and 2.0[3]. The four key pillars of the framework are–Select, Establish, Enable and Celebrate.

The Select pillar begins with identifying how many Tinkering Labs does India need. Through data and analytics, it is estimated that one out of every three eligible schools must have an ATL. A digital application and selection process is laid out for schools to express their interest in establishing an ATL. The schools are evaluated based on various

1 ATL Curriculum : https://aim.gov.in/atl-curriculum.php

2 ATL Handbook 1.0: https://aim.gov.in/The_ATL_Handbook.pdf

3 ATL Handbook 2.0: https://aim.gov.in/pdf/ATL_Handbook_2021.pdf

parameters such as past performance, number of students and teachers, geographical location, accessibility, and availability of utility services. A due-diligence process is initiated and compliant schools are sanctioned ATL grant-in-aid.

The second pillar is Establish. It begins when the school receives the ATL grant-in-aid. The school is expected to procure the necessary tools and resources and inaugurate the ATL. Capacity Building workshops for Teachers are conducted by AIM and its affiliates regularly, helping ATL teachers to learn STEM skills. The school is also expected to establish collaborations within its neighbourhood and encourage community engagement.

The third pillar is Enable. As the name suggests, the central idea is to enable the schools and students to on-board themselves on the innovation bandwagon. The ATL curriculum, modules, activities and initiatives such as the Mentor of Change, The ATL Marathon, Community Day, Tinkerfest, etc. fall under this pillar. Through Enable, AIM is in constant attempt to design and organize various events for the ATL community and keep a high level of motivation and participation across all stakeholders. The level of participation for any ATL initiative is crucial for measuring the success of the ATL.

The fourth pillar, Celebrate, prioritizes how ATL stakeholders can be recognized and celebrated by the ATL and larger innovation community. Inspired by the spirit of students, AIM organizes numerous national and global showcase opportunities for the best teams. The SIP and SEP programs, alongwith AIM ATL publications such as ATL Handbooks, Mentor India Handbook, Exemplary Teachers and Mentor decks, Top innovation coffee table book and this publication are part of this pillar. AIM also celebrates the spirit of innovation through its mainstream and social media channels.

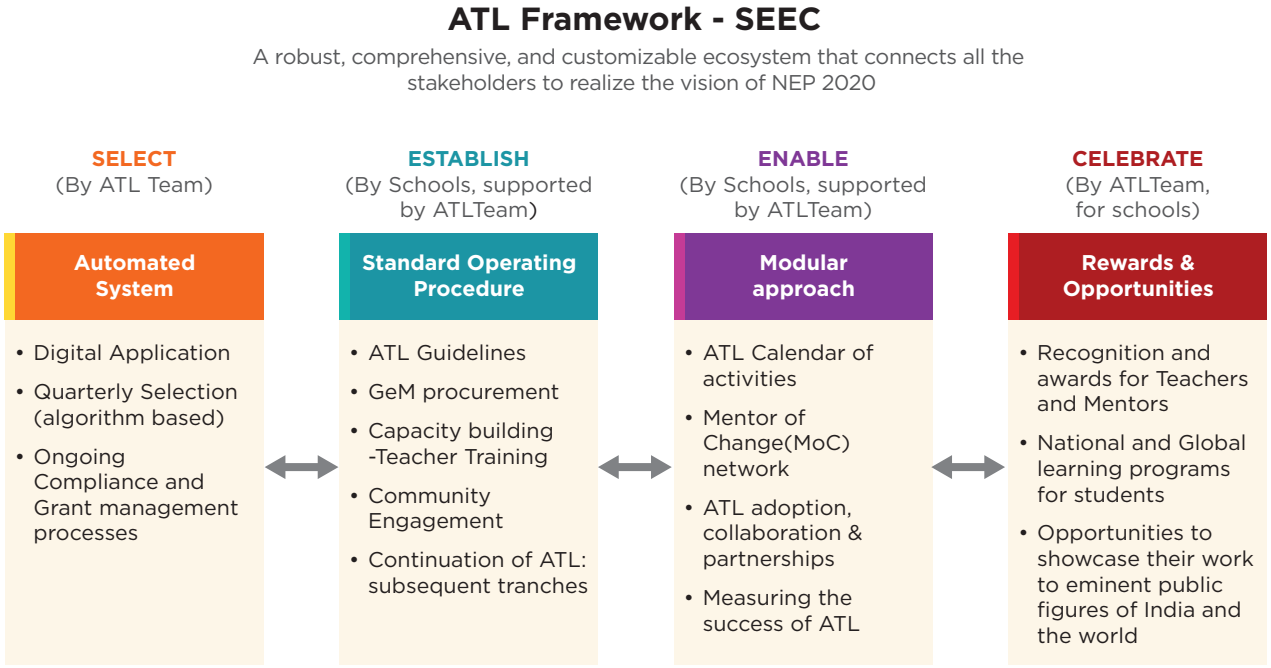


***Fig 2.2.1** : ATL Framework–SEEC*

2.3 INTRODUCTION TO ATL MARATHON

"The youth should have the courage to think differently, courage to invent, to travel the unexplored path, courage to discover the impossible and to conquer the problems and succeed"

— Dr. A.P.J. Abdul Kalam

The ATLs in schools across the country are dedicated HackerSpaces or MakerSpaces where latest technologies such as 3D printers, Robotics, Internet of Things (IoT), discrete electronics, and rapid prototyping tools are available to students from the age of 10 to 18. More than grants and resources, AIM is organising on-ground activities and engaging with the stakeholders through its various initiatives and programs, one of which is the ATL Marathon.

The ATL Marathon is the flagship challenge by AIM, to enable young student innovators solve community problems by creating ingenious prototypes and products. The students and teachers who are recognized as top teams of ATL Marathon, get a chance to further refine their work through various immersion programs such as the Student Innovator Program, Corporate Internship Programs, and Entrepreneurship Programs.

The inaugural season of ATL Marathon commenced in 2017-18, focussing on 6 focus areas that align with India's national priority areas–Clean Energy, Waste Management, Healthcare, Smart Mobility, Water Resources and Agriculture Technologies. The Top 30 teams of ATL Marathon 1.0[4] were identified from 20 different states/UTs of India. The second season of ATL Marathon added two more focus areas–Architecture & Design, and Sustainable Development Goals.

The first two seasons of the ATL Marathon helped participants to hone all the necessary STEM skills. The ATL community collectively gained the confidence to effectively use Makerspace tools within their schools.

The theme of ATL Marathon 3.0 was to create 'Mindful Innovations for a Greater Good'[5]. The ATL student community was given the opportunity to vote for their preferred problem statements under 4 key themes–Quality Education, Inclusivity and Equality for all, Sustainable Environment and Justice, Health and Hygiene. The 4 milestones of ATL Marathon 3.0 are illustrated as under:

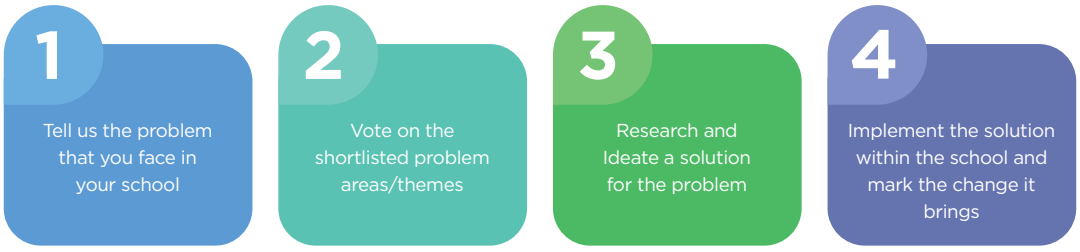


***Fig 2.3.1** : Student's Milestones for ATL Marathon*

4 Top 30 innovations of ATL Marathon–https://aim.gov.in/pdf/top30final-low.pdf

5 ATL Marathon 3.0–https://innovate.mygov.in/atl-marathon-2019/

The ATL Marathon 4.0 continued on the 4 milestone approach of its predecessor. Embracing the global COVID-19 pandemic challenge, the ATL Marathon 3.0 was inspired by PM's clarion call of 'Aatmanirbhar Bharat' and its five pillars Economy, Infrastructure, System, Demography, Demand.

Till date, more than 10,000 created innovations in their ATL and submitted to AIM for consideration. The steady growth of participation in the ATL Marathon is illustrated below:

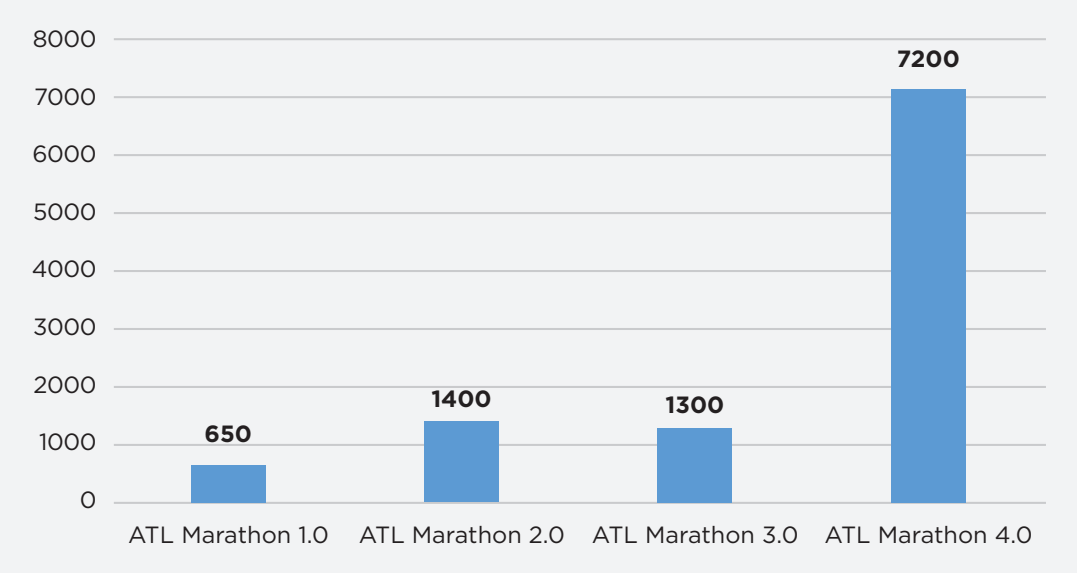


***Fig 2.3.2** : ATL Marathon participation history*

The ATL Marathon contest has now formalized into a structured flagship competition for ATL beneficiaries, with a strong evaluation matrix capturing the 5 key aspect of one's innovation and a robust timeline, illustrated below:



***Fig 2.3.3** : Key aspects of ATL Marathon*

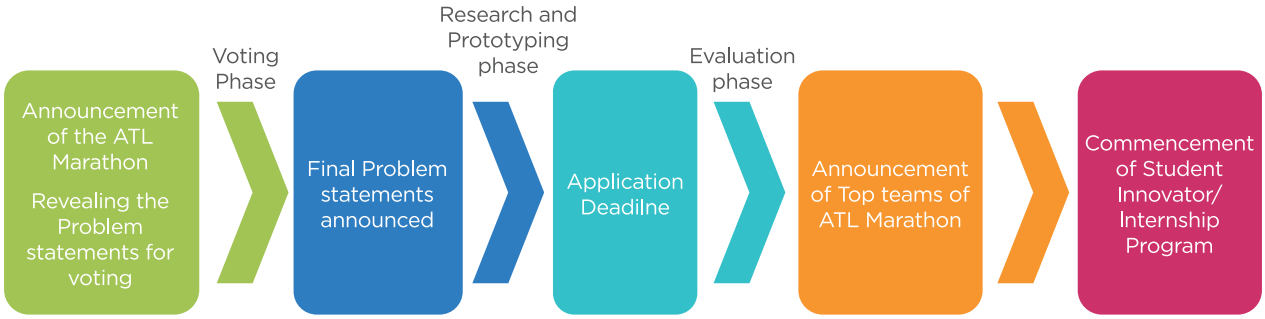


***Fig 2.3.4** :Timeline of ATL Marathon*

Through the ATL Marathon, participants express their creative spirit and propose novel, innovative solutions to India's community and social problems. Every year, AIM formalizes a jury of eminent experts and professionals from industry, academia, research and start-up institutions who review and select the best solutions based on their novelty and prototype functionality. The ATL Marathon is aligned with the 17 goals of the "2030 Agenda for Sustainable Development" (SDGs) adopted by all United Nations Member States.

The ATL Marathon ignited the curiosity of its beneficiaries which resulted in meaningful creations, with the potential of scale-up, if mentored in the right direction. This need created an opportunity for AIM to connect the ATLs to the AICs and AIM's industry partners, through the Student Innovator and Internship Programs.

2.4 INTRODUCTION TO STUDENT INNOVATOR/INTERNSHIP PROGRAM (SIP)

The two core objectives of AIM are–Innovation Promotion and Entrepreneurship Promotion. ATLs promote innovation within school students and AICs promote entrepreneurship within the energetic youth of India. The ATL Student Innovator Program is envisaged as a bridge to connect the journey from a student-innovator to a student-entrepreneur. To institutionalize a mechanism, AIM SIP is where the students with the most ingenious idea(s) are trained on business and entrepreneurial skills. AIM's AICs and industry partners provide mentorship and resources to the best ATL Marathon teams, through the following two programs:

- **ATL Student Innovator Program with AICs:** Support the student teams towards developing a complete product package with business/ product pitch and test their innovation on-ground. Journey of a student from a Student-innovator to a Student-entrepreneur. Top innovations identified across various innovation areas from the ATL Marathon are awarded the ATL SIP in collaboration with AIM Incubators.
- **ATL Student Internship Program with AIM corporate partners:** The students are trained in emerging technologies and are also coached in essential workplace skills. The program is designed so students can experience the corporate environment, gain exposure to new technologies and prepare themselves for future workforce

and job creation. Mentors to guide the student interns on the usage of digital tools to enhance their innovation and to look at business aspects of the project as an implementation plan for start-ups.

AIM works closely with all its AICs and corporate partners to enable strategic support for its various programs. The AICs and AIM's Corporate Partners together support AIM in conducting the Student Innovator/Internship Program (SIP). These organisations are herein referred to as "Mentor Organisation". Over the course of this document, executives from Mentor Organisations shall engage with insights and experiences from the past 4 years of SIP to create a holistic and rewarding learning program for ATL beneficiaries.

2.4.1 SIP objectives and deliverables

AIM conducts the ATL Marathon, every year where the ATL students across the country work together to research, ideate, innovate and implement solutions across various categories. After multiple rounds of evaluation, the top teams are selected to collaborate with the Mentor Organisation via the various Student Innovator and Internship Programs. The students selected as top teams are identified after a rigorous screening and selection process, and are ready to become the next generation of student-preneurs.

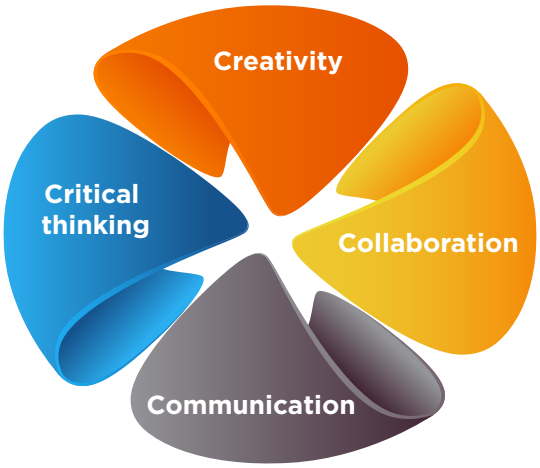
Towards achieving the same, the following support from Mentor Organisation is sought:

1. To provide support and mentorship to the student teams adopted by the Mentor Organisation via a 6-8 week Student Innovator Program (SIP).
2. To connect students with relevant industry/ academia networks of the Mentor Organisation.
3. To assist with prototyping support required for enhancing the Technology Readiness Level (TRL) of the student teams' innovation by 2 stages (e.g from TRL 2 to 4).
4. To support the student teams towards developing a complete product package with pitch decks.
5. To host SIP bootcamps/ Internship program/ Industry visits where the student teams further refine their innovation and undergo training on various sessions such as product development, IPR, market research, business design, etc.
6. To guide the student teams to test their innovation as a proof of concept.
7. To support, train and guide the student teams to protect their intellectual property at all times.

2.5 THE LEARNING PYRAMID PHILOSOPHY OF THE SIP

India as a country, has always promoted and supported great innovations–be it the digit '0' by Aryabhatta or the contribution towards technology or astronomy. India's demographic and cultural diversity naturally encourages knowledge sharing between different individuals and communities.

Today, the ATL initiative has become one of the first experiences for curious students. ATL houses the latest tools and resources such as IoT, discrete electronics, sensors and actuators, rapid prototyping tools, 3D printers, etc. ATL becomes a 'Four-C-Able'[6] space, based on four Cs of 21st century learning.



To channelize the above 4 Cs towards solving a real-world community issue, the student participates in the ATL Marathon. After completing the ATL Marathon journey, students were puzzled on the future prospects of their innovation. A potential of introducing a program to address this uncertainty was identified by AIM, and a need for a learning experience was sought for.

The SIP was introduced with the aim to refine the ideas of students, and support them in the structured growth of their ideas and thus try to commercialize their ideas and help them generate revenue. Each team is connected to the AIM Incubator or Corporate Partner based on the innovation, focus area, accessibility, etc. Student innovators undergo training, mentorship and support which helps in evolving and scaling up their current prototype into functional products. The central idea of the SIP is to create a unique 'Learning Experience' for children, capturing elements like prototyping and product design, Technology Readiness Level (TRL), Intellectual Property Rights (IPR), business design, funding and finance.

The above topics are usually not taught in a school environment. Educators of the 21st century have encouraged that industry concepts should be introduced within schools. In this chapter, we are attempting to capture and connect the elements of learning through our Learning Pyramid. The model is created by reflecting upon the experiences of the initial design, implementation and eventual expansion of the SIP.

6 Laura Fleming, Worlds of Making–Best practices for establishing a Makerspace in your school

The most basic form of learning is Lecturing, where students mostly learn by listening and seeing. Educators have reflected that the transition of knowledge in this mode is not the most efficient.To offer a more hands-on experience, we have Workshops to complement our lectures, e.g. a physics experiment on refraction of light. Both Workshop and Lecturing are examples of Facilitator Based Learning and are teacher driven.

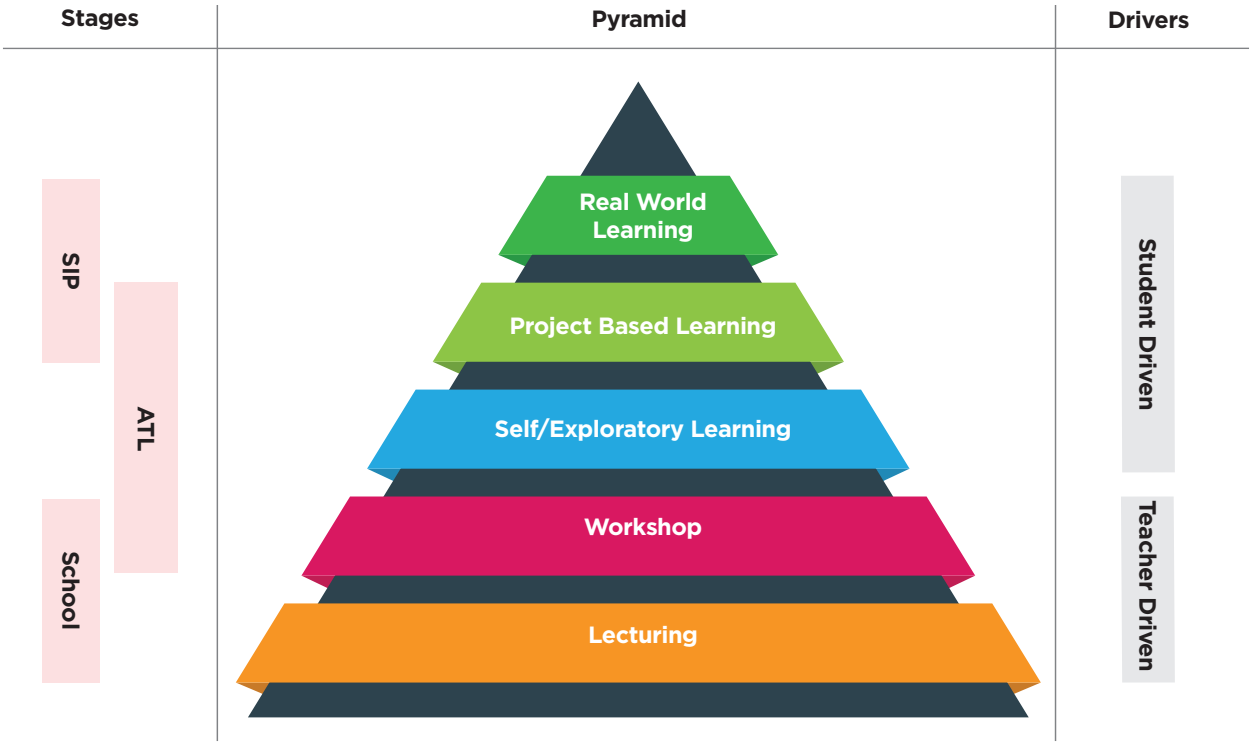


Fig 2.2.1.1 *: The Learning Pyramid model for SIP*

It is very important for the students to learn through their own experiences. Constructivism[7] is a well-established theory of learning indicating that people actively construct new knowledge by combining their experiences with what they already know. This theory suggests that knowledge is not delivered to the learner, but constructed inside the learner's head.

Seymour Papert, the father of the Maker Movement and one of the forces behind the MIT Media Lab, created the theory of Constructionism[8] as a way of learning, where he actively describes learning as 'building knowledge structures'.

The SIP Learning Pyramid model philosophy's core is to embrace student-driven learning. The ATL has proven to be a space where students can practice Constructionism freely. Through experimentation, efforts have been made to create a knowledge structure for SIP, further explained through the next 3 forms of learning.

7 Constructivism–Jean Piaget's theory of cognitive development

8 Situating Constructionism, Seymour Papert (1991)–http://www.papert.org/articles/SituatingConstructionism.html

The third layer is Self/Exploratory learning, which does not essentially require a facilitator or an institution. It relies on one's observation of their surroundings and how different elements of an environment interact with each other. Building up this learning experience, educators introduced the Project-Based Learning (PBL) model. The PBL approach prepares us for the real world, where we combine all of our learning experiences and expand our knowledge on the job, leading to the creation of real-world output and evolving one's perspective.

The SIP taps into the PBL experiences of students and introduces the element of Real-World Learning. During SIP, the students are continuously refining their challenge statement, collaborating with experts from the industry and academia, and developing a product. Students are able to engage in deep conversations and ask critical questions to each other.

The SIP is a critical piece in the big picture of the creation of one's innovation journey, bringing real-world learning into an Atal Tinkering Lab, and evolving a student-innovator into a student-preneur. This legion of student-preneurs is the likely future generation of enterprising leaders who will leverage the Startup-Incubation ecosystem of the Atal Incubators.

2.6 INTRODUCTION TO THE STUDENT ENTREPRENEURSHIP PROGRAM (SEP)

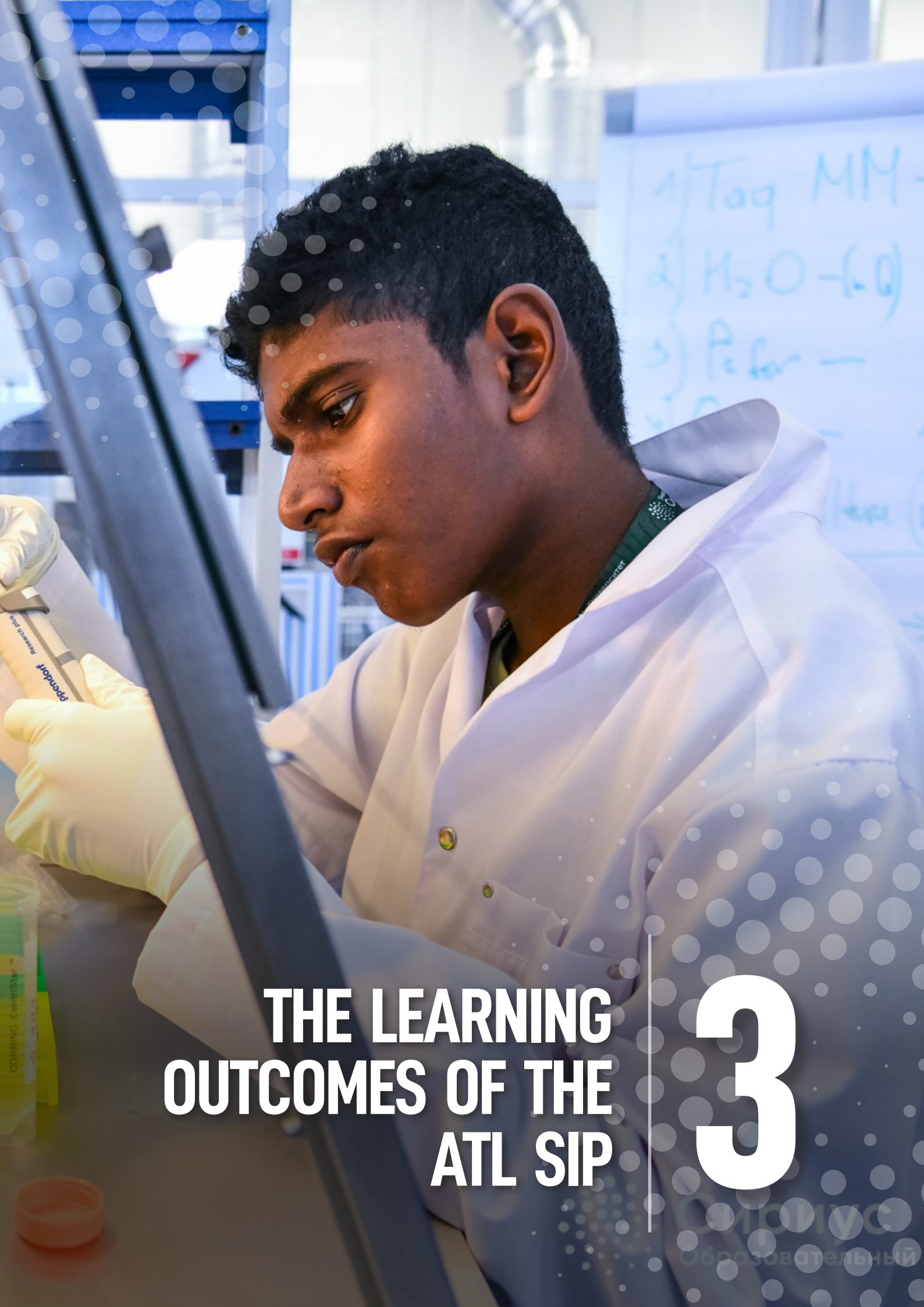
> *"Real Growth of a country is in the heart, minds, bodies and souls of young minds of the country"*
>
> — Sir C.V. Raman

As the fourth industrial revolution continues at full steam, the country prepares to embark on a massive innovative transformation. Innovation is the key indicator of a country's growth and development. Original ideas and ingenious implementation, often with frugal means is where our country's strength lies. India is well positioned to enhance its global leadership in a post fourth industrial revolution era. It is imperative to focus on preparing the youth, giving opportunities to express their creativity, to expand their horizons and helping them turn their ideas into reality to become the next biggest creators and innovators.

Innovative education can help to foster a creative mindset from an early age and play a vital role in transforming society. Often innovation is not an expensive or larger-than-life initiative and instead is the process of creating a sustainable solution with minimal available resources. The AIM community has thousands of schools spread across the country where students become part of an ecosystem of free thinking, creating and innovating.

AIM has designed the Student Entrepreneurship Program (SEP), an effort to institutionalize a mechanism where top teams of the SIP (one from each focus area) can work with the corporate and industrial partners and receive further mentorship, funding for IPR, product design, and product deployment in market in collaboration with AIM's Corporate Partners. Further information about the SEP is available in chapter 5.


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THE LEARNING OUTCOMES OF THE ATL SIP

3

While being an Innovator is an individualistic quality, creating a culture of Innovation leads to improvement in economic growth and overall well being of the Country. India, being a young country is well positioned to infuse the culture of Innovation into its academic and social structure.

Knowing the process of Innovation in a systematic manner will stimulate generation of IPRs by young students, and that might also result in creating products/solutions which solve practical challenges of society. While promoting the creation of IPR is expected to infuse constructive competition amongst young minds, it is advised to be wary of quantitative mindset only, resulting in a rush for IPRs not necessarily useful.





Some questions that one can ask themselves to understand the different aspects of a good ATL Marathon Project which is ready for the Student Innovator Program are mentioned below:

Purpose and Relevance
Is my innovation meaningful to me, and to others around me? Does this idea intrigue me to solve a noticeable problem and should I invest my energy in the development of this project?

Novelty
Is my idea and prototype novel enough to be explored further?

Impact and scalability
Beyond my immediate neighborhood or community, where else does this problem exist, and what did those communities do to address this problem?

Access
What should be my steps to make my innovation accessible and easy to use?

Adoption
What should I do to enable people to accept and adopt my innovation?

Sustenance and Entrepreneurial goal
How can my innovation sustain itself by generating revenue and how can I profit with my idea.

3.1 ENGAGING STUDENTS: INTEGRATING TINKERING WITHIN SCHOOL LIFE

"The Best Way to predict the future is to invent it"

—Alan Kay

While there are many options for manifesting one's creativity in a classroom environment, innovation may originate from both the industry and academia. The fourth industrial revolution has enabled individuals to become passionate changemakers. And, the Maker Education offers the tools to create ingenious prototypes like fabrication, coding and physical computing.

An important component that could democratize the tinkering mindset in schools is creation of incentive systems that reward exemplary students and teachers. For the most part, creation of such spaces is driven by energetic and visionary teachers who take initiative to do things differently.

If you are an educator or a teacher in a school with a Tinkering Lab or Makerspace, you will need help to incorporate making, engineering and design thinking within the fabric of the school system. Convincing your fellow teachers, school Principal, and parents is a valid concern. Every school has a different set of challenges and a one size fits all approach may not work everywhere.

This has much to do with the very nature of activities within a tinkering lab. Before adopting a top-down engagement plan, AIM organizes various initiatives as experiments and weighs their outcomes. AIM has created a blend of initiatives which make it easier for schools and their students to tinker and innovate. The activities such as ATL Community Day, Tinkerfest, ATL Marathon, Student Innovator Program, Corporate Internships and Student Entrepreneurship Programs enable students to fulfil their academic and entrepreneurial pursuits. This learning is now standardized through the annual ATL Academic Calendar[9].

It is observed that the journey of a Student-Tinkerer to Student-Innovator to Student-Entrepreneur is a 2- academic year metamorphosis, in 2 phases as illustrated below:

Academic Year 1	Activities
Vacation time	Unbox Tinkering' Capacity building Workshops for Teachers, ATL Community Day
Commencement of the Academic Year 1	ATL Tinkerfest, ATL learning through Modules
1st Term of Academic Year 1	ATL Marathon Problem Statements are introduced
End of 1st Term of Academic Year 1	ATL Marathon Launch
2nd Term of Academic Year 1	Student-Tinkerers work on their ideas and submit their innovation for ATL Marathon
End of Academic Year 1	ATL Marathon Results

9 ATL Calendar for Academic Year 2021-22: https://aim.gov.in/ATL_Calendar_2021_to_2022.pdf

Academic Year 2	Activities
Commencement of the Academic Year 2	Top Student-Innovator Teams are allocated Mentor Organizations
1st Term of Academic Year 2	Top Teams undergo the Student Innovator Program
End of 1st Term of Academic Year 2	Selection of Student-Entrepreneurs for the Student Entrepreneurship Program
End of Academic Year 2	Student's Entrepreneurial Journey begins with SEP

After the set-up and inauguration of the ATL, the ATL-incharge and other faculty members are trained on ATL and STEM based tools and technologies through the 'Unbox Tinkering' Capacity Building Workshops[10]. The training programs include a series of discussion and simulation sessions which allow interactive and open learning and exchange of new ideas. Each training session may include 50 teachers, and is facilitated by 3-4 STEM experts for AIM's corporate partners. The training programs are organized through virtual sessions along with self-learning modules to enable familiarization of the ATL facility to the teachers.

The above training gives the ATL-incharge the confidence to conduct workshops and sessions for their students within an ATL. Engagement activities and workshops through corporate partners and events like ATL Tinkerfest and ATL Community Day are organized to further strengthen a student's understanding on concepts like 3D printing, IoT, microelectronics, robotics, drones and 21st century skills of collaboration, critical thinking, design thinking, ethical leadership, etc.

Tinkering is a new concept in India, and it requires continuous handholding facilitated by a sustained engagement with subject experts. Every year, during ATL Tinkerfest, AIM has offered a unique learning experience for students. During the first 2 years of the program ATL Tinkerfest was celebrated in schools as an exhibition of innovation that the students have created. In 2020, hosting physical exhibitions became a challenge, however learning did not stop. AIM introduced ATL 'Tinker-from-Home' series where numerous workshops were organized in collaboration with industry, academia and start-ups. In 2021, AIM introduced the ATL Tinkerpreneur Bootcamp series. Over 9 weeks, students were trained virtually on every aspect of innovation and entrepreneurship.

Through the above engagements, students are equipped with necessary know-how and graduate to a Student-Tinkerer. The stage is set to introduce ATL's flagship contest–ATL Marathon, which helps a student to leverage their knowledge towards creating solutions to some of the most pressing issues and problem statements. The ATL Marathon is a six-month long unique competition where pressing problems faced by the youth within their schools and community are highlighted, and participant students come up with interesting and exhaustive investigations to find innovative solutions.

Students undergo 4 phases consisting of Research, Ideation, Innovation and Implementation to create relevant and ingenious prototypes. The students are able to connect their theoretical knowledge gained by the school curriculum to a real-life project. The structure

10 https://aim.gov.in/atl-teacher-training.php

of the ATL Marathon helps students to learn scientific and analytical concepts easily. For e.g, using analog inputs from sensors to create a physical action through coding.

After the completion of ATL Marathon, the teams are evaluated by industry experts as per the criteria mentioned in section 4.1. The Top teams who graduate to the next phase are the Student-Innovators who are awarded the prestigious Student Innovator Program in collaboration with Atal Incubation Centres and Student Internship Program in collaboration with Corporate Partners. Some of the key Learning Opportunities are illustrated below:

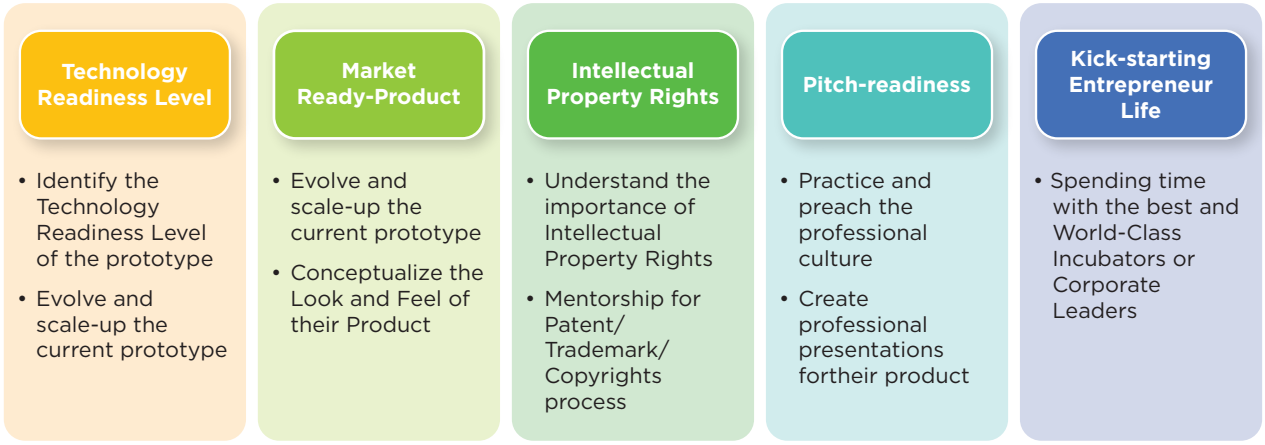


Fig 3.1.3 *: Learning Opportunities*

3.2 TECHNOLOGY READINESS LEVEL

Technology Readiness Levels (TRL) are a type of measurement system used to assess the maturity level of a particular technology. Each technology project is evaluated against the parameters for each technology level and is then assigned a TRL rating based on the project's progress. There are nine technology readiness levels. TRL 1 is the lowest and TRL 9 is the highest.

When a technology is at TRL 1, scientific research is beginning and those results are being translated into future research and development. TRL 2 occurs once the basic principles have been studied and practical applications can be applied to those initial findings. TRL 2 technology is very speculative, as there is little to no experimental proof of concept for the technology.

When active research and design begin, a technology is elevated to TRL 3. Generally both analytical and laboratory studies are required at this level to see if a technology is viable and ready to proceed further through the development process. Often during TRL 3, a proof-of-concept model is constructed.

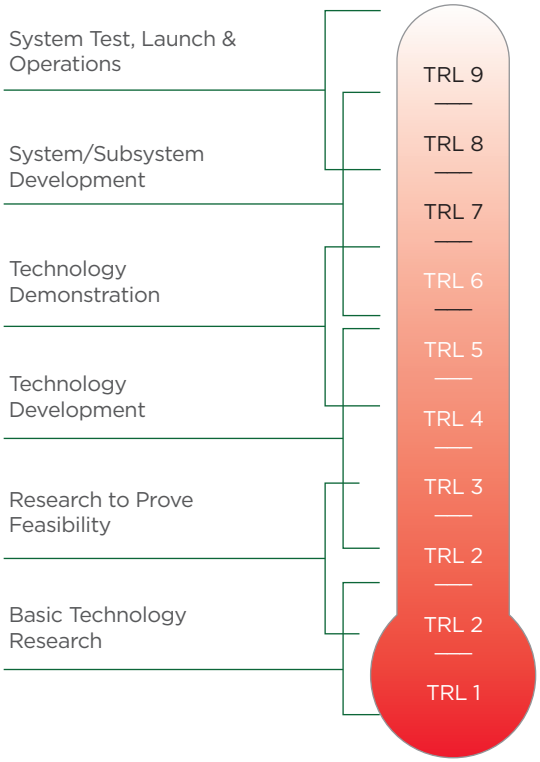


***Fig 3.2.1** : NASA Technology Readiness Level (TRL)*

Once the proof-of-concept technology is ready, the technology advances to TRL 4. During TRL 4, multiple component pieces are tested with one another. TRL 5 is a continuation of TRL 4, however, a technology that is at 5 is identified as a breadboard technology and must undergo more rigorous testing than technology that is only at TRL 4. Simulations should be run in environments that are as close to realistic as possible. Once the testing of TRL 5 is complete, a technology may advance to TRL 6. A TRL 6 technology has a fully functional prototype or representational model.

TRL 7 technology requires that the working model or prototype be demonstrated in a space environment. TRL 8 technology has been tested and "flight qualified" and it's ready for implementation into an already existing technology or technology system. Once a technology has been "flight proven" during a successful mission, it can be called TRL 9.

3.3 PROTOTYPE TO MARKET-READY PRODUCT

The process of moving from a Prototype to a Minimum Viable Product is an important journey for young entrepreneurs. As the inexperience of creating real life products/solutions might result in a confusing state for Innovators,

Hence guidance and support at this stage is very critical for solutions to see the light of the day.

A MVP is a prototype at heart but further along in the product development process. A MVP will be created once you have tested out any hypotheses through prototyping and

got proof of concept. Ideally, you'll create the minimum version (which you'll improve) of your product and share it with the biggest number of people.

3.4 INTELLECTUAL PROPERTY RIGHTS

All parties understand that it is important to protect each other's intellectual property:

- The Intellectual Property of the Idea/prototype/product will belong solely to the students.
- The school, ATL In charge, AIM NITI Aayog, the AIC or any of their partners shall not claim any Intellectual Property Rights for the innovations and shall not breach any Intellectual Property law with respect to the same.
- Any future developments with the original idea of the students' innovation by any party shall be by extension owned by the student.
- No license is granted under this SOI to either Party under any of the other Party's intellectual property rights, either expressly, by implication, inducement, estoppel or otherwise. Both Parties understand and acknowledge that grant of any such license shall always be expressed and in writing.
- NITI Aayog will not be responsible for any breach of Intellectual Property of the AIC. Similarly, The AIC will not be responsible for any breach of Intellectual Property of NITI Aayog.

3.5 PROFESSIONAL PRESENTATIONS AND PITCH-READINESS

Right from the beginning of the program, the emphasis must be given to Learn and Apply the concept on the project. All the pitches from the students to be collected at the Day-0 before the beginning of the program, and the final pitches to be collected at the final day of the program.

It is advised that every week the students are put to work on one slide. This is to ensure that the Pitch deck is revised every week resulting in evolution of the overall deck where each slide must focus on the work done and how it will relate to the Market.

Mentors and Super-Mentor sessions must be conducted with the aim of resolving the doubts and refining the pitch deck. Since the teams belong to various states, the pitch deck should not restrict creativity due to language constraints.

The motivation should be to convey the story behind the work being done beyond the numbers. All the teams should work with a mindset to build a pitch deck which will eventually be presented before a panel of experts during the Final Demo Day.

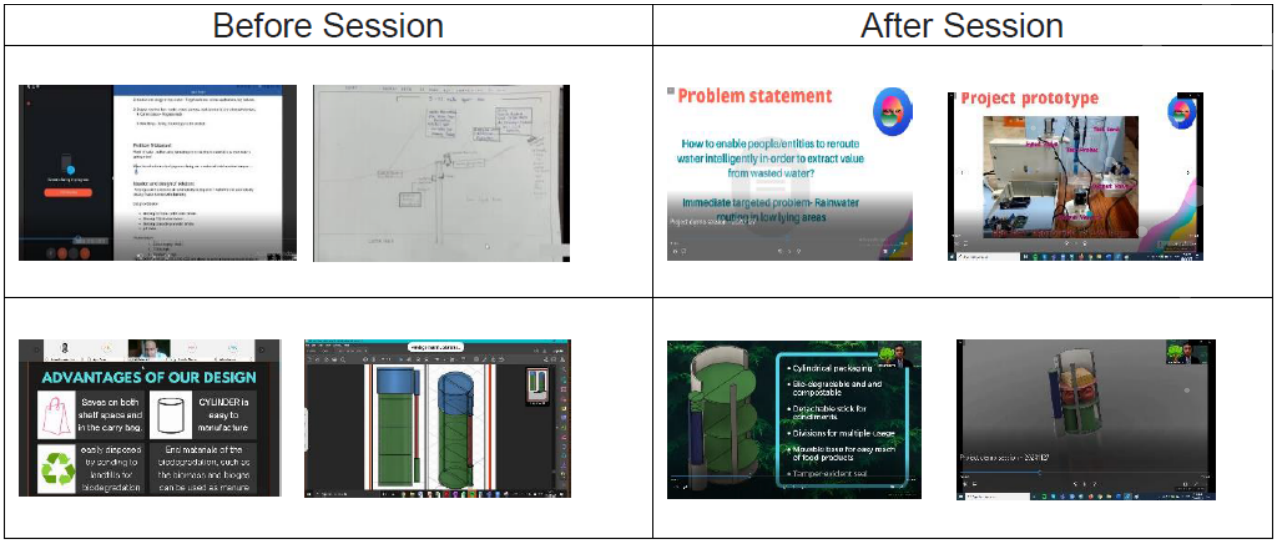


Fig 3.5.1 *: Comparison of presentations before and after sessions*



THE IMPLEMENTATION OF THE ATL STUDENT INNOVATOR PROGRAM

4

4.1 TEAM SELECTION PROCESS AND ONBOARDING

The parameters used for evaluations and selection of teams are:

S.N.	Phase	Parameter	Evaluation Pointer
1	Research	Extensiveness of research	Level of research conducted to understand the problem statement
2	Ideation	Presentation of Idea	Level of detailing done to present the idea
		Community Outreach	Inclusiveness of community with the idea
		Team Dynamics	Commitment of the team towards one another and their project
3	Innovation	Innovativeness of idea	How innovative or novel is the idea suggested by the team
		Video	Content of the video presentation (Capturing the entire innovation solution journey in the video)
4	Implementation	Implementation (if implemented) + Feasibility of Implementation	How successfully was the innovation implemented/ can be implemented in a controlled environment.

4.2 ATL SIP–TIMELINE AND CALENDAR

In order to ensure proper support and guidance is received by the teams, the Mentor Organisations are advised to create a timeline for the entire program. A timeline spreading over nearly 6-8 weeks is to be prepared to carry out the necessary activities in order to make sure the shortlisted teams understand the nuances of entrepreneurship.

During the first two weeks of the program, the organisation should be engaged in understanding the innovations and mapping their requirements and critical areas where the teams might need support. A pool of mentors from diversified backgrounds may be identified to engage with these teams.

During the next four weeks, the teams are to be mentored by industry experts, professionals and technology specialists. In addition to the technological improvements to the teams' products, the mentors must also imbibe an understanding of customer behaviour, market needs, and the position of a product. Topics like intellectual property rights, importance of investments and various ways to raise funds should be covered.

During the last four weeks of the program, the teams with their mentors shall consolidate their learnings and finalize their innovation/ prototype/ product. The teams are also expected to create a detailed product presentation with financial outlay and an investor pitch.

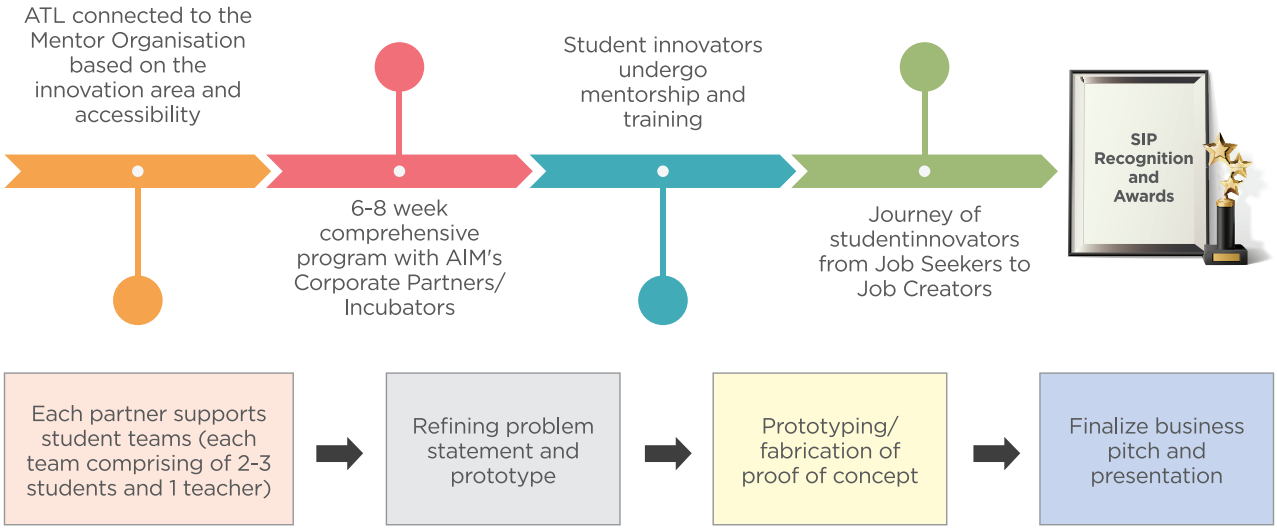


***Fig 4.2.1** : Program Flow*

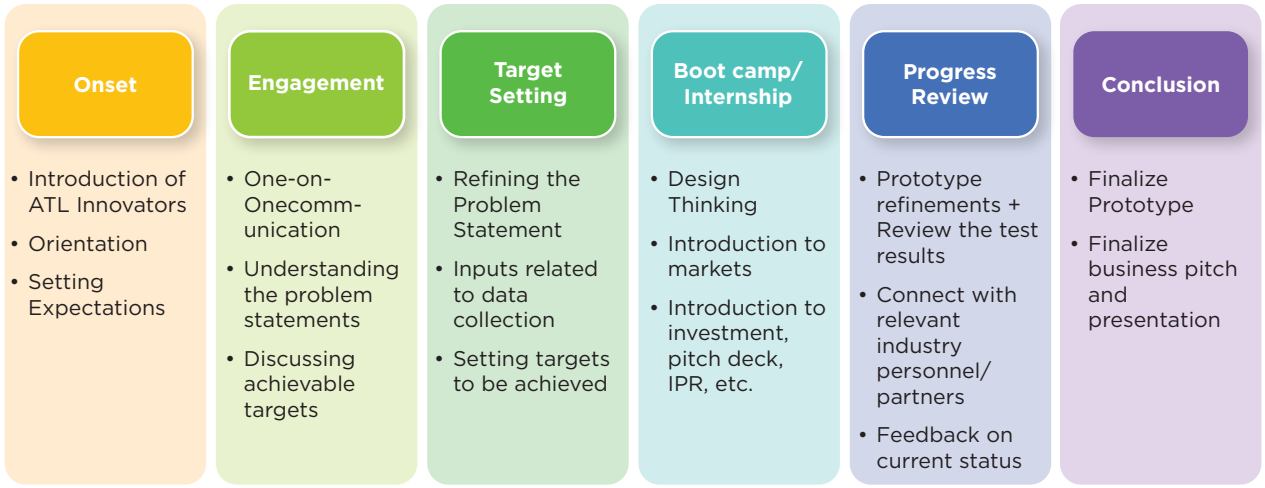


***Fig 4.2.2** : Program Activities*

AIM Student Innovator Program - Suggestive Calendar

Weeks	Activity	Description
1-2	Student Innovation Program Begins Introductory Call Creating roadmap for the SIP	◆ Introducing ATI Innovators - AIM Partner Organization Orientation ◆ Setting Expectations
	Engagement - Discussion Engagement - Data analytics	◆ One-to-One Communication - Students present their innovation and journey till now Need-Gap Analysis. Revisit Design Thinking Process and refine problem statement Discuss and set achievable targets. ◆ Revisit last week, set expectations for the week - collecting on ground insights ◆ Partners/ AICs to guide teams on how to collect data and insights from the target audience ◆ Refining Problem statement and prototype ◆ Discussing insights
3	Refining Prototype	◆ Elements of IP - Protect your idea with the help of IP rights. ◆ Discussions on understanding of IP and its relevance to the innovation ◆ Refining Prototype
4	Pre planning for the Bootcamp Refining Prototype	◆ Procurement of resources ◆ Refining Prototype
	SIP Bootcamp/ Internship	◆ Prototyping/ fabrication of Proof of Concept ◆ Sessions as required (IPR, Prototyping, Financials. Target Market understanding. Business plan/pitch, etc)
5	Testing and Refinement	◆ Test prototype in the community Refine as per feedback
6	Business Plan	◆ Business Plan - Creation and How to Pitch Students create Plan and present Plan Refinement
7	Preparing for the Finals	◆ Prototype refinement ◆ Content creation • Video. Business pitch and presentation
8	Finalization	◆ Finalise Prototype ◆ Finalise Business pitch and presentation

***Fig 4.2.3** : Suggestive Calendar*

4.3 ROLE OF MENTOR ORGANISATIONS

This part is intended to spark a thought process within the reader from the mentor organization in context to encourage invention, tinkering and making within a young student. We have observed that it is usually unconventional for an Industry, Startup or Business Incubator professional to mentor school children.

One simple way to do this is to make 'Less Us, More Them' (LUMT)[11] our Mentoring Mantra. The Coach or Mentor plays a critical role and is responsible to break the ice, break barriers,

11 Dr. Gary Stager, Invent to Learn

and break popular notions. The Mentor must be well versed with latest technologies, app development, coding languages, UI and design, and should be able to work and research closely with the students. It is not necessary for the Mentor to have any on-the-ground experience on mentoring school students. Good communication skills and command over English, Hindi and other Indian languages helps the mentor to effectively communicate with the students. Some of the key attributes of a mentor are illustrated below:



***Fig 4.3.1** : Key attributes of a mentor*

A fundamental difference between the startup industry and education institution is the way to approach mistakes. The startup industry may celebrate the value of mistakes and failure towards innovative thinking. It may be noted that the term failure actually refers to 'iteration'. The mentors may use this to ensure the students do not get comfortable during SIP and always are trying to improve their current prototype.

Some key objectives and responsibilities of Mentor Organisation are mentioned below:

- To enable all the students to become expert product innovators
- Motivate and empower them with leadership traits & nurturing innovators to enhance 21st century skills & entrepreneurial mindset.
- Each team is connected to one of the Mentor Organisation (AIM Partner/ Incubators) based on the innovation area, accessibility, etc.
- Student innovators undergo training, mentorship and support which helps in evolving and scaling up their current prototype into functional products.

4.3.1 Feedback Report

After the completion of the program, each Mentor Organisation has to submit a comprehensive ***Program Feedback Report*** to the AIM team. The report should broadly cover the following:

- Program Objective
- Program Timeline/ Calendar

- Bootcamp Details: Details and learnings of the onsite/ virtual sessions conducted by the Mentor Organisation for each particular day of the program
- Value Addition: The deliverables achieved and how the each particular allocated team benefitted from the program
- Feedback from Panel: The feedback and the input of the panel for the teams and the program
- Feedback from Students: Program feedback from the student teams
- Pitch Deck: Share the pitch deck of all the allocated teams with the AIM team
- Event Pictures: Pictures of the event/ sessions (including online sessions) conducted with the AIM team
- Final Results: The top teams scored by the Mentor Organisation as per their performance/ progress during the program

4.4 ATL SIP–STUDENT AND PROTOTYPE JOURNEYS

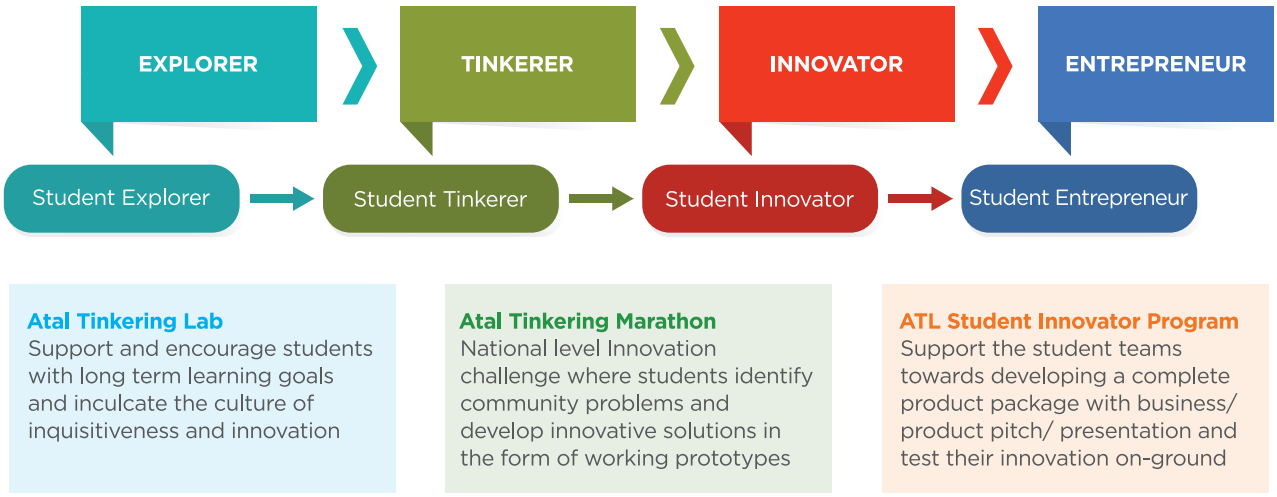
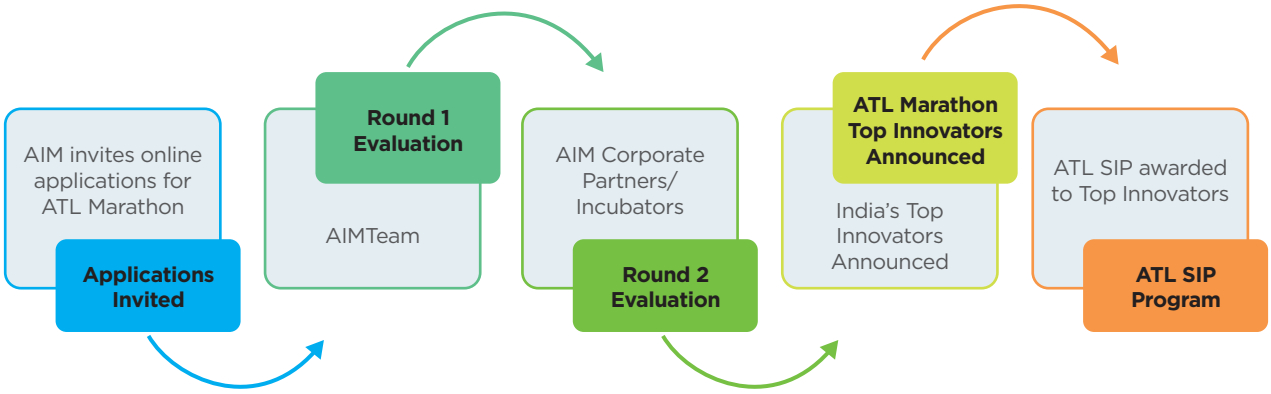


Fig 4.4.1 *: ATL SIP–Student Journey*



Top innovations identified across various focus areas from the ATL Marathon are awarded the ATL Student Innovator Program (SIP) in collaboration with AIM's Corporate Partners and Incubators

***Fig 4.4.2** : ATL SIP–Prototype Journey*

4.5 MAPPING PROGRAM OUTPUTS

4.5.1 The Boot Camp

The ATL SIP Bootcamp is a five-day onsite/ virtual bootcamp hosted by the Mentor Organisation at their facility as a part of the Student Innovator Program. The objective is to develop a minimum viable product (MVP), based on the feedback given by the end-user community, via the prototyping and machinery support provided by the Mentor Organisation.

The main deliverables of the ATL SIP Bootcamp are:

- Connecting the teams with relevant industry and academic people for further support.
- Supporting the teams in refining their prototypes and improving the TRL (Technology Readiness Levels).
- Supporting the teams to formulate a business plan and a pitch deck for their product
- Testing the prototype/MVP created on-the-ground and acquiring end-user and customer feedback.
- Providing the teams with inputs related to intellectual property and connecting them with relevant personnel for further support in this area.





4.5.2 Mentoring Sessions

Volunteers from the Mentor Organisation lend their expertise and conduct sessions on Design Thinking, Digital TechnoThese sessions are designed to share corporate learning and experience amongst the selected teams. logy, Communication Skills, etc. These sessions are intended to achieve the following aims:

- To be a source of knowledge for students
- Help students to find, use and explore different technologies/ tools
- Understand the stages of product development through design-based thinking
- Understand the role of communication in personal and professional life
- Create awareness of appropriate communication strategies and ways to analyze a variety of communication acts.









4.5.3 Internship Program

Following the successful selection of the top teams, the leading teams are offered a 10-15 day internship with the industrial experts from one of the Mentor Organisation's:

- The students are exposed to a variety of functional topics concerning entrepreneurial management
- Topics such as product development, sales, pricing, organizational culture, understanding workplace dynamics, branding, patenting, to building successful teams are comprehensively covered
- The internship intends to enable them to learn about the finer nuances of running an entrepreneurial venture and the traits required to be a successful entrepreneur.



4.6 SIP AWARDS & RECOGNITION

During SIP, the young innovators are mentored in various aspects of the innovation journey such as product design, IPR, business and entrepreneurship and so on. The end goal of the SIP is to create a minimum viable product with a robust business plan through a series of mentoring sessions and bootcamps.

The process leads to the selection and announcement of the final top teams/ innovations of ATL. The teams further get the opportunity to take part in the national/ international level showcase events, and advance their innovations on the journey of product launch.

In the year 2019, on the occasion of Children's Day, the top teams of the SIP presented their innovations to the Hon'ble President of India. The Top 8 teams showcased their innovations to the Hon'ble President of India. *Link: https://youtu.be/kgsSaWeYM-k*



In an attempt to celebrate and boost the students who come up with exemplary ideas for problems put forth to them in the ATL Marathon and their overall tinkering journey, AIM in the form of a booklet presents a wonderful compilation of the top grass root innovations by the students and their mentors. It captures the stories that showcase the growth and mindset of the young generation collated in the shape of – The ATL CoffeeTable Booklet.

- The stories of the 50 SIP teams of the year 2019 are captured at:
- The stories of the 30 SIP teams of the year 2018 are captured at:





AIM-SIRIUS Innovation Festival Series

Towards inculcating a spirit of innovation and collaboration between young minds of Russia and India, Atal Innovation Mission (AIM) in India and Fund "Talent and Success" (Sirius) in Russia are collaborating to conduct exchange programmes to nurture the bilateral relations in the field of education.

The AIM-SIRIUS Innovation Festival[12] series is a unique opportunity offered to all students and teachers who qualified as the Top Teams of ATL Marathon.

12 AIM-Sirius Program: https://aim.gov.in/aim-sirius.php

AIM and Sirius Centre annually organize a physical/virtual educational learning, innovation program and hackathon focused on Developing Technological Solutions for the Grassroot Problems of both the nations. These educational programs and hackathons are designed to develop students' competencies on understanding 21st century technologies and developing innovative engineering and technological projects to meet the crusting challenges of the Sustainable Development Goals.





Indian and Russian students and teachers are evaluated individually based on their course preference, a personal essay along with a 2 minute video, as per the following parameters:

1. Fundamental understanding and knowledge of the student in the selected course.
2. Must have worked towards creating a project/innovation to address a community problem in the area of the selected course.
3. Prior experience in open source electronics, coding, IoT, soldering, 3D printing, prototyping skills, etc is desirable.
4. Basic/elementary understanding of English language.

Some of the Key focus areas from the last 3 editions are:

- Embracing Culture
- Education
- Applied Cognitive Science.
- Biological and Genetic Research
- Promoting Sports, Fitness, and Games
- Chemistry
- Data analytics & Frontier Technologies
- Digital Financial Assets of the 21st Century
- Drones & Robotics

Each focus area team may consist of 10 members, as follows:

- Two Lead Mentors from Industry and Academia, one each from India and Russia.

- One Indian Teacher from ATL and one Russian Educator from Sirius Centre.
- Three ATL students from India and three Russian students from Sirius Centre.

Over the past 3 years, more than 100 individuals have participated in this program as students, teachers or mentors.The cohorts nurtured by the SIP have proven to be the most innovative students of India, and are able to work confidently with Russian young-innovators, resulting in them becoming global-citizens and future makers.

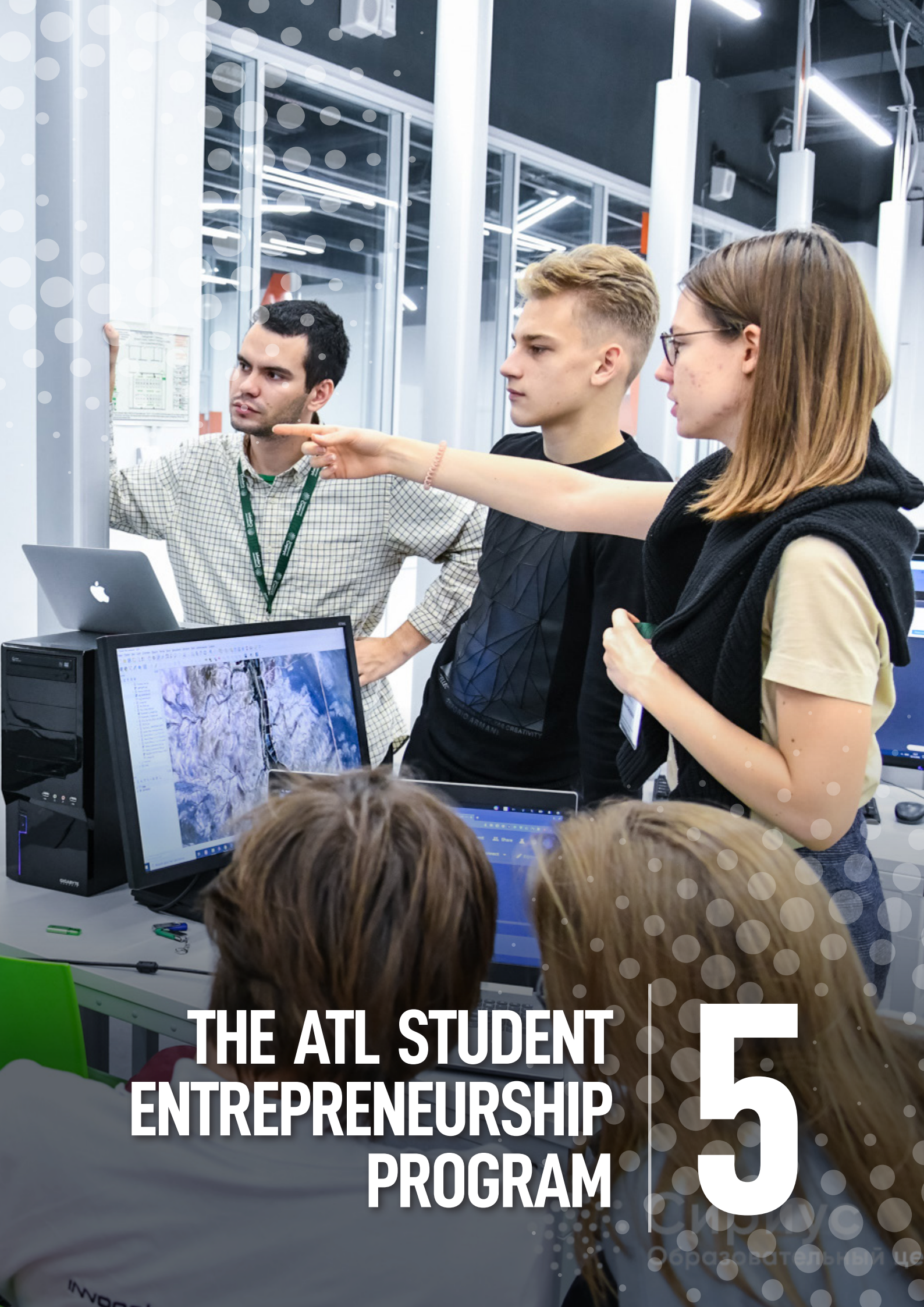


ATL Student Entrepreneurship Program (SEP)

The ATL Student Entrepreneurship Program (SEP) serves as a catalyst and helps accelerate the entrepreneurial journey of the young innovators. The students make their products market-ready and are given a showcase opportunity to the investor network.

ATL SEP is a 10-month extensive program in collaboration with the industry for young innovators to pursue their innovative and entrepreneurial ideas along with their education with an objective of developing a market ready product via the mentoring and training support provided by the AIM Corporate Partners. Additional information is available in chapter 5.


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5 THE ATL STUDENT ENTREPRENEURSHIP PROGRAM

The Student Entrepreneurship Program aims to transform students from being innovators to entrepreneurs. The Top teams from the SIPs are nurtured throughout a 10 month comprehensive program. SEP hinges on supporting the development of innovative prototypes into functioning and market ready products.

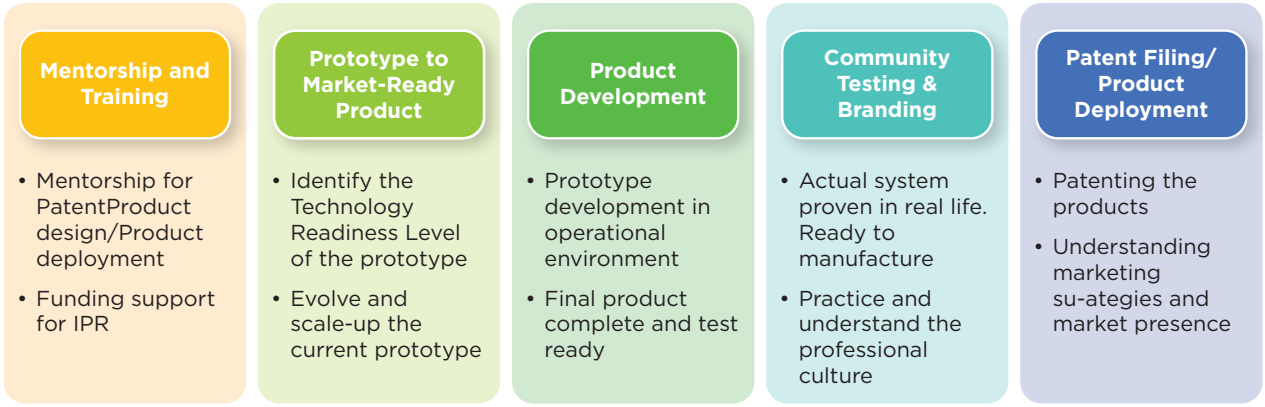


***Fig 5.1** : ATL SEP learnings*

5.1 PROGRAM FLOW AND STUDENT JOURNEY

The phases of the SEP include–User research, internship, product development, testing, patent filing and product launch–striving to offer a complete entrepreneurial experience to the students. An indicative timeline is illustrated below:

Month # Activities	1	2	3	4	5	6	7	8	9	10
Refining problem statement and User Research										
Virtual Training & Mentoring										
Internship										
Product Development										
Community Testing & Product finalisation										
Patent Filing										
Product Promotion & Seeking funds										
Soft Launch and Graduation Event with AIM										

***Fig 5.1.1** : ATL SEP indicative timeline*

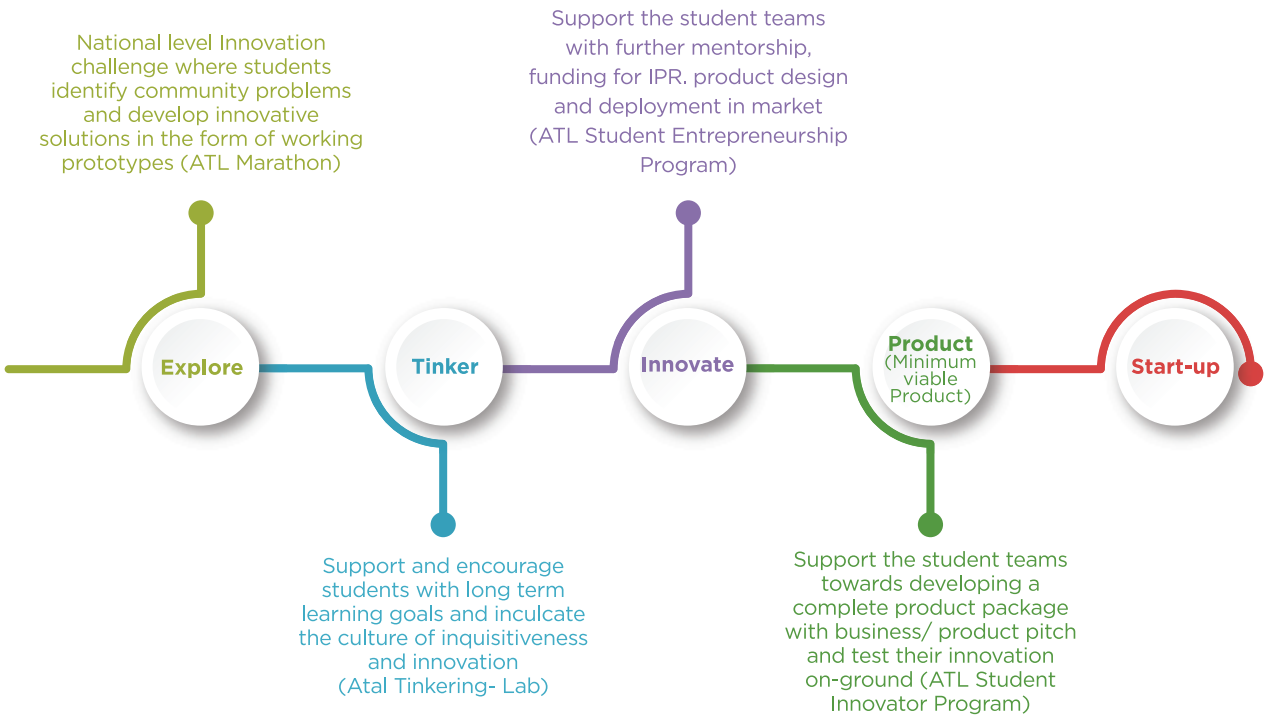


***Fig 5.1.2** : ATL SEP–Student Journey*

5.2 ATL SEP–HIGHLIGHTS

"We wanted the students to have an immersive experience. It was indeed a proud moment for us when the teams successfully filed their provisional patent applications and received their application numbers"

— Ms. Usha Bhaskar, Program Manager (Learning Links Foundation)





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NYSE:DELL(NYSE:DELL)

Dell Technologies in Partnership With NITI Aayog Launches Student Internship Program to Nurture Young Minds

Wednesday, August 21, 2019 3:50PM IST (10:20AM GMT)

Dell Technologies Inc.

DELL Technologies

News Summary

Dell Technologies initiated a Student Internship Program in partnership with NITI Aayog's AIM, as part of the ATL – Student Entrepreneurship

National Youth Day: Niti Aayog and Dell EMC launch student entrepreneurship programme under Atal Innovation Mission



HOME MARKETS COMPANIES OPINION TECH SPECIALS PF PORTFOLIO MULTIMEDIA CORONAVIRUS TOKYO OLYMPICS

Beyond Business GO

Atal Innovation unveils 2nd edition of student entrepreneurship programme

Niti Aayog's Atal Innovation Mission (AIM) in collaboration with Dell Technologies on Tuesday launched the second edition of its student entrepreneurship programme

Topics
Atal Innovation Mission

Press Trust of India | New Delhi
Last Updated at August 11, 2020 23:17 IST

Fig 5.2.1 *: ATL SEP in the news*

"It was an overwhelming experience when we sold around 60 units of our products to the visitors at a fair. We are also developing a website for our product"

— Students from Jnana Prabodhini
(Pune, Maharashtra)



CELEBRATING THE ATL STUDENT INNOVATOR PROGRAM

6

6.1 STUDENT EXPERIENCES

Program: Adobe Student Mentorship Program (2020)

Innovation Title: Sign Language Translator

Team Name: ByteX

School Name: Bal Bharat Public School, Delhi

Our Innovation solves the problem by providing speech-impaired people an interface through which they are able to express themselves and voice their opinions to the world. Although, they usually have assistance at hand, this app enables them to be more independent and explore the world like never before.

I am very grateful for the laudatory workshops and our commendable mentor. I learnt a lot of new things about various crucial topics like cyber security, Artificial Intelligence, Intellectual Property, and so on. Using Adobe applications like Premiere Rush, Illustrator, After Effects, Photoshop, ... we were able to make such amazing videos, which took the presentation of our innovation on a new level. The workshop on Artificial Intelligence and Machine Learning also had a major role, as our innovation is based on Machine Learning. It was an amazing experience. I thank AIM, NITI Aayog for providing us such a great platform and opportunity.

—Nabh Garg

Program: SheCodes Innovation Program (2020)

Innovation Title: Algorithmic Medical Card

Team Name: Algorithmic Team

School Name: Carmel Convent School, Chandigarh

To monitor the health parameters of the girl students, the system is developed using the on-chip processor and camera to read the students monthly health card and provide access to doctors/ parents for analyzing the students' condition with the normal parameters and suggest the suitable measures.

The plethora of courses that were spread over a span four days of the boot camp were insightful and didactic yet fun. They contained all the necessary courses (from identifying a problem, making a prototype to patenting) and information needed at all stages of developing and marketing our product. It was also very amazing to interact with so many teams from all over India and listen to the problems they had selected and developed solutions for. The speakers and volunteers of the program were very enthusiastic and motivated our team.

—Algorithmic Team

6.2 INCUBATOR AND PARTNER EXPERIENCES

ATL Student Innovator Program with AIC MIT ADT Incubator Forum

When the teams started their Journey, most of them wanted to solve many facets of a problem at one time. However as they spent time with their mentors week after week, they could understand the importance of breaking down the problem into modules. Right from Defining the problem statement, they enjoyed their journey of Designing a solution, Prototyping it, testing the same and iterating it to make a better version of prototype. All the nuances of converting a prototype to MVP and then taking it to the market (GTM) was a new learning for most of them. They appreciated the focus on protecting their Innovations through IPR session followed by importance of funding the venture. Overall it was a very enriching experience as they could learn from the Mentors who have built their own startups, corporates who could bring the Market wisdom to them coupled with Academic flavor to their learning experience. One of the student termed it an 'Eye-opener' journey while the ATL- Incharge was excited about learning from the Best Mentors. For AIC-MITADT it was truly a very satisfying experience to see the journey of students from **'School–to–Society'** where each of them started with a school project and culminated into a product/ service that's relevant to the society.

Valedictory Video of the SIP 2020 conducted by AIC MIT ADT:

https://www.youtube.corn/watch?v=ZSAfuSxzicY

—AIC MIT ADT Incubator Forum, SIP 2020

IBM Student Internship Program

The mentorship for the finalists of the ATL Marathon was designed by IBM in collaboration with AIM, NIT' Aayog. In 2018, IBM pioneered the roll-out of this program that provides opportunities to students to gain hands-on experience by working on diverse real-world projects using advanced technologies. The program has been running consecutively for 3 years. While keeping its structure intact, the program has transformed and upgraded the approach in keeping with emerging trends, themes, and technologies in the STEM fields. It has successfully championed the intent to transform the young into innovators who are passionate, self-driven and capable of setting the sail to usher an era of a new and brighter India. The IBM Student Internship is a learning platform that empowers students to apply acquired knowledge and skills to solve real-world problems. It is a complete hands-on, experiential training that provides a wide range of opportunities for students to engage with new-age technologies as they participate in real-life innovation projects. Such events build motivation and self-confidence among the students and also offer a sense of accomplishment.

—IBM, Student Internship Program 2018-20

SheCodes Innovation Program

The **SheCodes Innovation Program**, a collaborative initiative by AIM, NITI Aayog and **Dell Technologies** implemented by **Learning Links Foundation**, was launched in August 2020, with an aim to inspire girls to **tinker**, **create** and **innovate**. The program through its various stages encouraged girl students to participate in STEM fields, and help them transform from young innovators to entrepreneurs and contribute towards an innovative India. As a part of this program, 112 girl participants from different parts of India were given an opportunity to serve as agents of change, creating a paradigm shift in the minds of peers, educators, societies and individuals alike. During the course of phase 1, the girl students participated in boot-camps, mentoring sessions and also went through a 10-day internship program in the presence of industrial experts. This helped them to enhance their technical and communication skills, ideate and develop their innovations and learn about the world of entrepreneurship.

—Dell Technologies, ATL SheCodes Program 2020

6.3 ATL STUDENTS IN MEDIA





Atal Innovation Mission

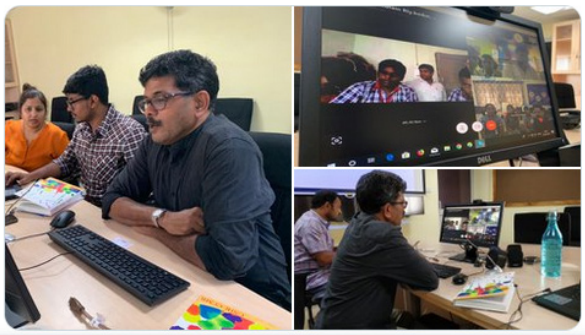
The Student Innovator Programme at Amrita TBI gives young innovators the opportunity to get guidance from mentors, revisit and refine ideas and hone their skills at an incubation centre.

#AIMtoInnovate



AIC-CCMB
@AIC_CCMB

Orientation meeting with #ATLInnovators & @AIC_CCMB for setting expectations & creating roadmap to transform student-innovators to studentpreneurs under the @NITIAayog_ATL @AIMtoInnovate #StudentInnovatorProgram @NITIAayog @ccmb_csir @CSIR_IND @rpallela @nalamrao57



"We learnt about the product development plan and a business development plan by setting up a startup for producing our idea on a commercial scale"

— Students from Andhra Pradesh
Social Welfare School (Tallapalem, Visakhapatnam)

Young innovators test high-tech ideas at boot camp

Week-long event at Sri Krishnadevaraya University's Atal Incubation Centre ends on a promising note

SPECIAL CORRESPONDENT
ANANTAPUR

Fifty students from four schools in Andhra Pradesh converged at the Atal Incubation Centre at Sri Krishnadevaraya University for a week to convert their innovative ideas into implementable product design proposals.

The boot camp concluded on the university campus last week and the students were encouraged to continue working on these ideas in order to make them production-ready in the days to come.

The four schools were selected at the national level by the Atal Innovation Mission from among the schools that were enrolled under Atal Tinkering Labs (ATLs). As part of honing their skills under the Student Innovator Programme 2.0, the students underwent a 10-week training schedule (nine weeks online and one week at a physical laboratory).



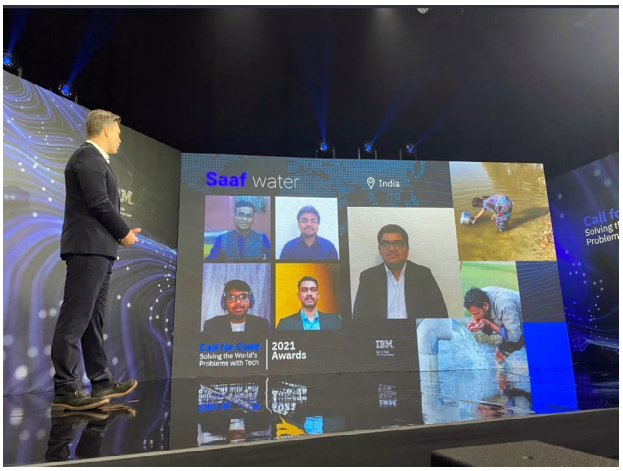
Students participating in the boot camp organised at Atal Incubation Centre at Sri Krishnadevaraya University in Anantapur. • R.V.S. PRASAD

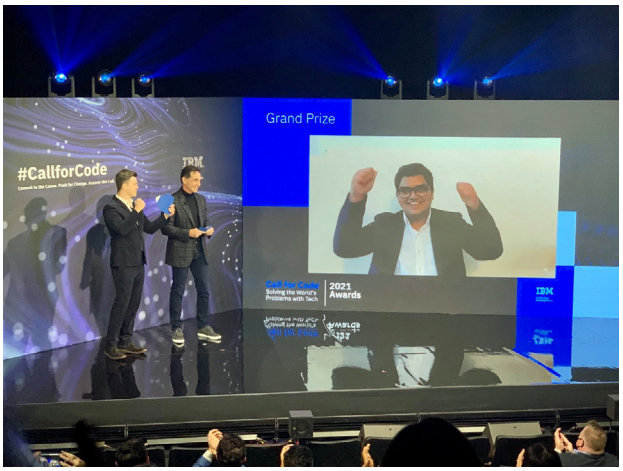
With the help of the ATLs, girls from Andhra Pradesh Social Welfare School-Tallapalem in Visakhapatnam district came up with the idea of a chip that would assist their friends and classmates to hear by sending sound-waves directly to the bone. Mentors explained to them the process of registering their idea for Intellectual Property Rights. They also explained about the product development plan and a business development plan by setting up a startup for producing these chips on a commercial scale, said AIC director K. Nagabhushan Raju.

The teams from APSWRS Peddapavani (Prakasam district) and Kovvur (West Godavari) came up with solutions for an alerting system for damage caused to crops by cattle and a 'smart dustbin' for public garbage collection points with a GPS-enabled gadget. The fourth team from A.P. Model School at Dechavaram in Guntur district experimented with low-cost Radio-Frequency Identification (RFID)-fitted toll points either on highways or at parking lots.

6.4 SAAFWATER: ATL ALUMNI TEAM AND WINNERS OF IBM CALL FOR CODE AWARD OF $200K[13]







The Atal Tinkering Lab (ATL) initiative is bringing a perceptible and pronounced change to India's STEM, innovation and entrepreneurship landscape at school level.

The ATL movement has been successfully able to connect the desires of the students to an objective/outcome. The movement has further been able to provide a pathway or direction to these students through various ATL initiatives–engaging events, activities, competitions and programs specially curated for anyone who wants to explore the world of Tinkering and Innovation. The ATL Marathon is the flagship challenge by AIM, to enable young student innovators solve community problems by creating ingenious prototypes and products. The students and teachers who are recognized as top teams of ATL Marathon, get a chance to further refine their work through various immersion programs such as the Student Innovator Program, Corporate Internship Programs, and Entrepreneurship

13 *https://developer.ibm.com/blogs/saaf-water-provides-insights-for-safe-water-consumption/*

Programs. The above learning framework of the ATL program allows student-tinkerers to become student innovators and eventually lead a mindset change towards becoming a student-entrepreneur.

The impact of this intervention is proven by the journey of Team TechXcl's SaafWater. TechXcl is a start-up of 5 ATL alumni, whose project SaafWater is the Global Winner of the prestigious IBM Call for Code Global Challenge 2021. The team comprises students spread over Goa, Maharashtra, Telangana & Delhi. Individuals in the team have proven experience for innovations in areas of smart mobility, agri-tech, water, and healthcare.

These students leveraged all the opportunities provided by AIM to learn and proved their mettle nationally and globally through opportunities such as AIM-Sirius Innovation Summit (2019), InSpreneur – India Singapore Innovation Summit (2019), Indo-Russia Research and Innovation Program at Sirius Centre (2020).

As ATL Community Enablers, Team TechXcl is involved with training Dr. K.B. Hedgewar ATL Students in IoT, Design Thinking, Robotics and more. As local ecosystem enablers, they regularly engage and mentor students from ATLs and nearby communities. For e.g they recently mentored 17 school teams for the AIM-ISRO Space Challenge earlier this year.

The team members of TechXcl come from different parts of the country and were connected during recognition ceremony of the inaugural ATL Marathon under the presence of Vice Chairman NITI Aayog, Dr. Rajiv Kumar, in January 2019. The team comprises of Hrishikesh Bhandari and Sanket Marathe from Goa, Jay Aherkar from Pune, Manikanta Chavvakula from Hyderabad and Satyam Prakash from Delhi, mentored by Mr. Chintamani Shirodkar.

The ideation of SaafWater began when Hrishikesh's mother fell severely ill after unknowingly consuming contaminated water from their village's public groundwater source. Post her medical treatment, the team took up the task to solve this problem. 50% of the world's population is still dependent on groundwater. As per UNICEF and WHO reports, in 2019, 1 out of 3 people globally do not have access to safe drinking water due to physical, chemical, and biological contamination of groundwater. Consumption of contaminated water leads to numerous health complications from dysentery to severe kidney damage. A need for a system to monitor, communicate and warn about anomalies/degradations in groundwater to local communities and relevant authorities was identified. Team TechXcl leveraged their experience of ATL and technical expertise to help people consume 'Saaf' Water, by creating an AI-IoT-Sensor based harware+software product 'SaafWater', powered by IBM Cloud and IBM Watson services.

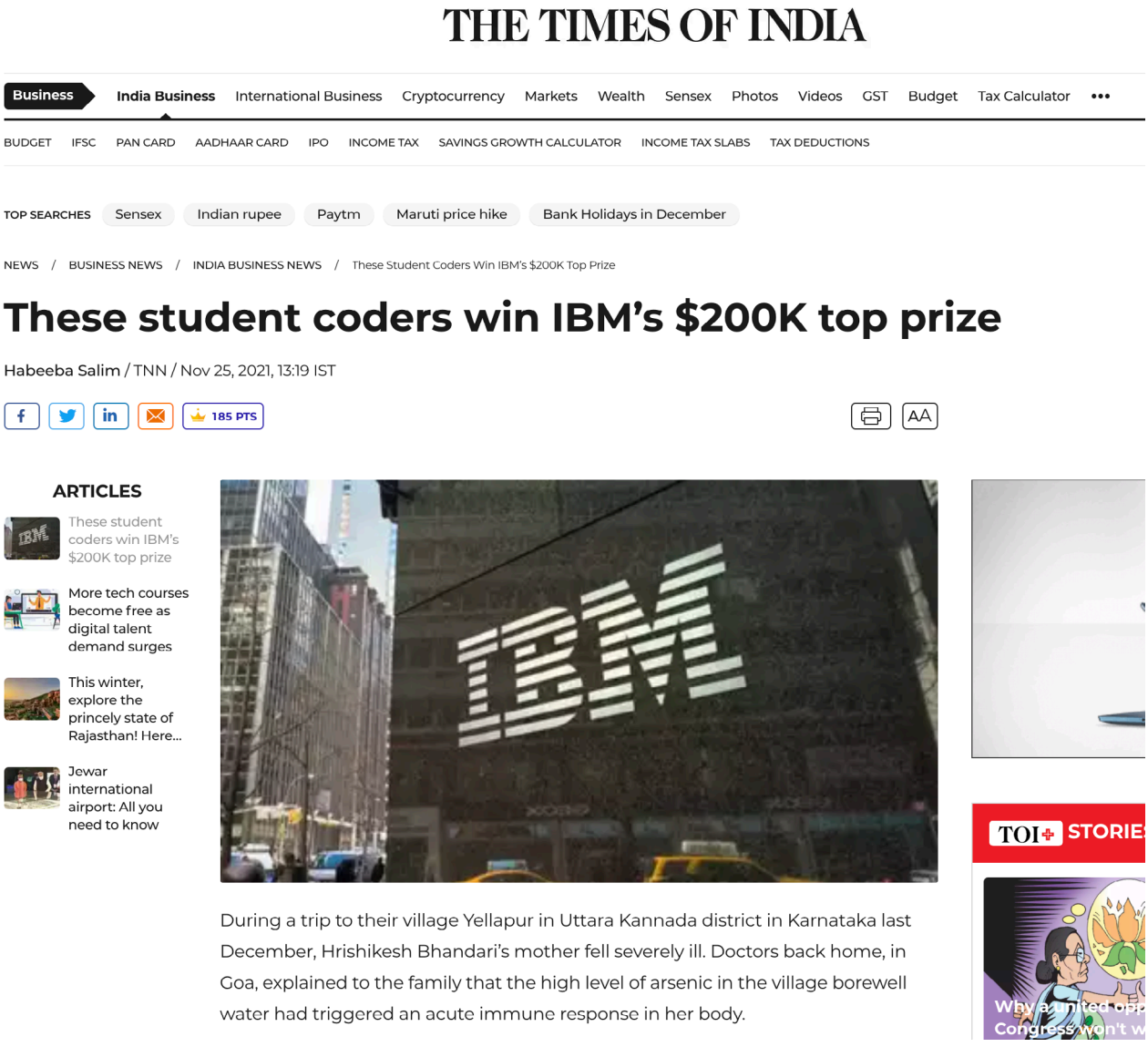
SaafWater helps one decide whether a specific quantity of water is safe for consumption. The device is to be installed near the source of groundwater and is compatible with community standards. This low-powered and cellular-enabled device monitors Total Dissolved Solids (TDS), pH Value, and more. This information is relayed back to an on-site visual indicator, broadcasted via SMS and displayed at SaafWater Dashboard. The visual indicators are easy to absorb and uses simple yet effective infographics in multiple languages. SaafWater's machine learning model displays interactive map for people to monitor water quality over a large region and recommends purification methods to its stakeholders.

This ingenious solution led to SaafWater becoming the first Indian team to win the IBM Call for Code Global Challenge 2021. The innovation is in the process of deployment in collaboration and support from David Clark Cause (DCC), IBM, United Nations, The Linux Foundation and other IBM Call For Code Partners[14].

With the prize money of $200K, Team TechXcl plans to refine their innovation and deploy them at different geographies. Ideas on improving seasonal anomaly predictions, detection of biological contamination without lab testing, weather data integration, and multi-lingual user interface are planned.

Team TechXcl and SaafWater story is an example of ATL program's impact.

Link: www.saafwater.com



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These student coders win IBM's $200K top prize

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During a trip to their village Yellapur in Uttara Kannada district in Karnataka last December, Hrishikesh Bhandari's mother fell severely ill. Doctors back home, in Goa, explained to the family that the high level of arsenic in the village borewell water had triggered an acute immune response in her body.

TOI+ STORIES

14 https://newsroom.ibm.com/2021-11-16-IBM-and-David-Clark-Cause-Crown-Saaf-Water-Winner-of-4th-Annual-Call-for-Code-Global-Challenge

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IBM and David Clark Cause Crown Saaf Water Winner of 4th Annual Call for Code Global Challenge

November 16, 2021

PRINT TEXT

Created to combat water quality-related deaths, the Saaf Water sensor and analytics platform for rural localities wins 2021 Call for Code Global Challenge

Technology using AI, Blockchain, and Cloud to verify, track, and reward waste removal in outdoor areas wins Call for Code University Edition prize

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IBM Japan

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・Saaf Water's sensor and analytics platform for rural areas, developed to prevent death from water quality, won the highest award in the 4th Call for Code Global Challenge
・AI, blockchain, cloud Call for Code University Edition's Best Solution for Outdoor Waste Removal Verification, Tracking, and Rewarding Technology

[Armonk, NY, USA-November 16, 2021 (local time)]

Today, IBM, the founding partner of Call for Code (https://callforcode.org/), and David Clark Cause, t he founding body, said, "No. Announced the best solution for the 4th Call for Code Global Challenge. A t this year's Global Challenge, we called on innovators around the world to respond to climate change with open source technology. Call for Code is the largest and most ambitious endeavor for software d evelopers around the world to address urgent social issues. This effort leverages the latest advanced t

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Your Market View

NAME	PRICE	+/-	%	DATE
TSLA	1,014.97	-69.63	-6.42	Official Close 12/3/2021
AAPL	161.84	-1.92	-1.17	Official Close 12/3/2021
MSFT	323.01	-6.48	-1.97	Official Close 12/3/2021



CONCLUSION 7

7.1 SIP OR SEP–THE RIGHT PROGRAM FOR MENTOR ORGANISATION

The Atal Tinkering Lab is based on the philosophy that incentives are a great beginning to create an exponential wave of innovation and entrepreneurship amongst school children. Young children are keen to receive mentoring support to take their innovations to the next level and test them with potential users. The effort has been to build an inclusive model for innovation by providing an equal opportunity to all regions and to all children irrespective of the rural-urban divide and government-private divide, by public- private partnership.

As a Mentor Organisation, one may factor in their organisation's strength, expertise and synergies with AIM whilst choosing SIP or SEP. The general thoughts or motivations for AIM's partners while making this choice is illustrated as follows:

Student Innovator Program : During this, the Mentor Organisation supports the select teams of ATL Marathon to further their innovation/prototype with the goal to learn about prototyping, IPR, start-up funding and product design. The student teams are incubated with the possible goal of creation of an MVP and a start-up.

Student Internship Program : During this, the Mentor Organisation onboards the select teams of ATL Marathon as interns within their organisation. These interns are trained on various tools and technologies used by the organisation on a daily basis, participate in product ideation and design discussions with experts, understand organisational behaviour and are provided mentoring support for the students' prototypes.

Student Entrepreneurship Program : SEP is offered after the completion of the SIPs. The students of SEP have completed 2 years of their innovation journey (ATL Marathon and SIP), and usually have a refined prototype possibly ready to be scaled up. SEP demands the Mentor Organisation to very closely work with the student teams in all aspects of start-up creation. Key responsibilities include complete funding and mentorship support for product development, patent filing, startup registration and initial manufacturing.

It may be noted that the above expectations are indicative and not exhaustive. AIM expects every organisation to offer unique avenues to the students. Mentor organisations as per their discretion may choose to support AIM in any or all of the above opportunities.

7.2 EMBARKING ON THE ENTREPRENEURSHIP JOURNEY

The ATL Student Innovator & Internship Program has been carefully designed taking into consideration the ever-changing and increasingly complex world we inhabit these days. The need of the hour is to prepare the youth of the nation to develop content knowledge, build life skills, and gain fluency in STEM fields.

During the program, the students not only gain technical knowledge but also inculcate professional skills such as effective communication, teamwork, leadership, critical thinking, problem solving and self-management while also gaining insight into business and customer relationships. As in most cases, the success of such training and mentoring programs depends upon the quality of Mentors and the 'Art of Mentoring'. The partners should ensure the chosen mentors must bring experiential knowledge. Considering the

background of teams and innovation area, mentors should be carefully aligned with the teams. The backgrounds and innovation area dealt by the teams should be a consideration in the allocation of mentors to them to ensure.

Induction
Integrating students in the program effectively

Mentoring
Exchange of ideas and sharing of experiences to provide the right exposure to the students

Demo Day
Student's projects are acknowledged and their innovative spirit is celebrated

Once the SIP Program culminates, the opportunities are endless and cover the whole gamut of interest areas, allowing every student innovator a scope in the field of innovation, like:

1. The teams' real-world entrepreneurial journey may take off by filing the patent applications, designing logos and launching their product at community and school level.
2. Students becoming the brand ambassadors of Innovation and Entrepreneurship in their respective village/ district/ city.
3. Inspiration for other students to pick up Tinkering, Innovation and Entrepreneurship as a career.
4. Formation of cluster communities of ATLs within the region to foster creativity and celebrate innovation.





"We wanted students to take their ideas to the next level through our sessions and provide them with deeper insights into innovation and design thinking and help them build better solutions"

— Mr. Snehal Shetty, COO (Amrita TBI)

7.3 THE FUTURE

By nurturing the entrepreneurial spirit, young tinkereres are capable of creating their own skill pool depending on their interests. The goal of ATL SIP is to build an entrepreneurial mindset and confidence within student-entrepreneurs. Any innovation created within an ATL has the potential to be a global trailblazer. Inculcating a constant hunger for knowledge and a global view at an early age will help these students to become global citizens and future makers. This hunger can only be provided by the current legion of industry and academia experts and organisations.

A powerful component of the Tinkering Movement in India is initiating and supporting the formation of social relationships between mentors and learners. Our current education system struggles to tap into resources available in the community like the Alumni network of any School. Today, our culture is richer with information, resources, and opportunities than ever before[15].

We have seen early success with some 'outlier' ATLs, Mentors of Change and AICs, who are inspiring us everyday. It is important in this regard to recognize such enablers and work closely with them to create programs such as SIP. The Mentor Organisations have not just enrolled themselves as 'experts' but as co-owners and designers of the SIP. The need to work with stakeholders as true partners is strongly felt to decentralize and democratize AIM's initiatives, such as the Student Innovator Program. Democratization will help AICs and partners to implement the SIP, with a flavour of their expertise and vision.

This shared commitment to open exploration, fostering creativity, and entrepreneurship will significantly help to push the ATL movement forward and bring the Indian Education and Pedagogy system to the 21st century. 5 years into the future, we foresee that India will spur young entrepreneurs who were once student innovators for the ATL SIP program.

#MakersGonnaMake

#HappyTinkering

15 MakerSpace Playbook-https://makered.org/wp-content/uploads/2014/09/Makerspace-Playbook-Feb-2013.pdf

ACKNOWLEDGEMENTS

8

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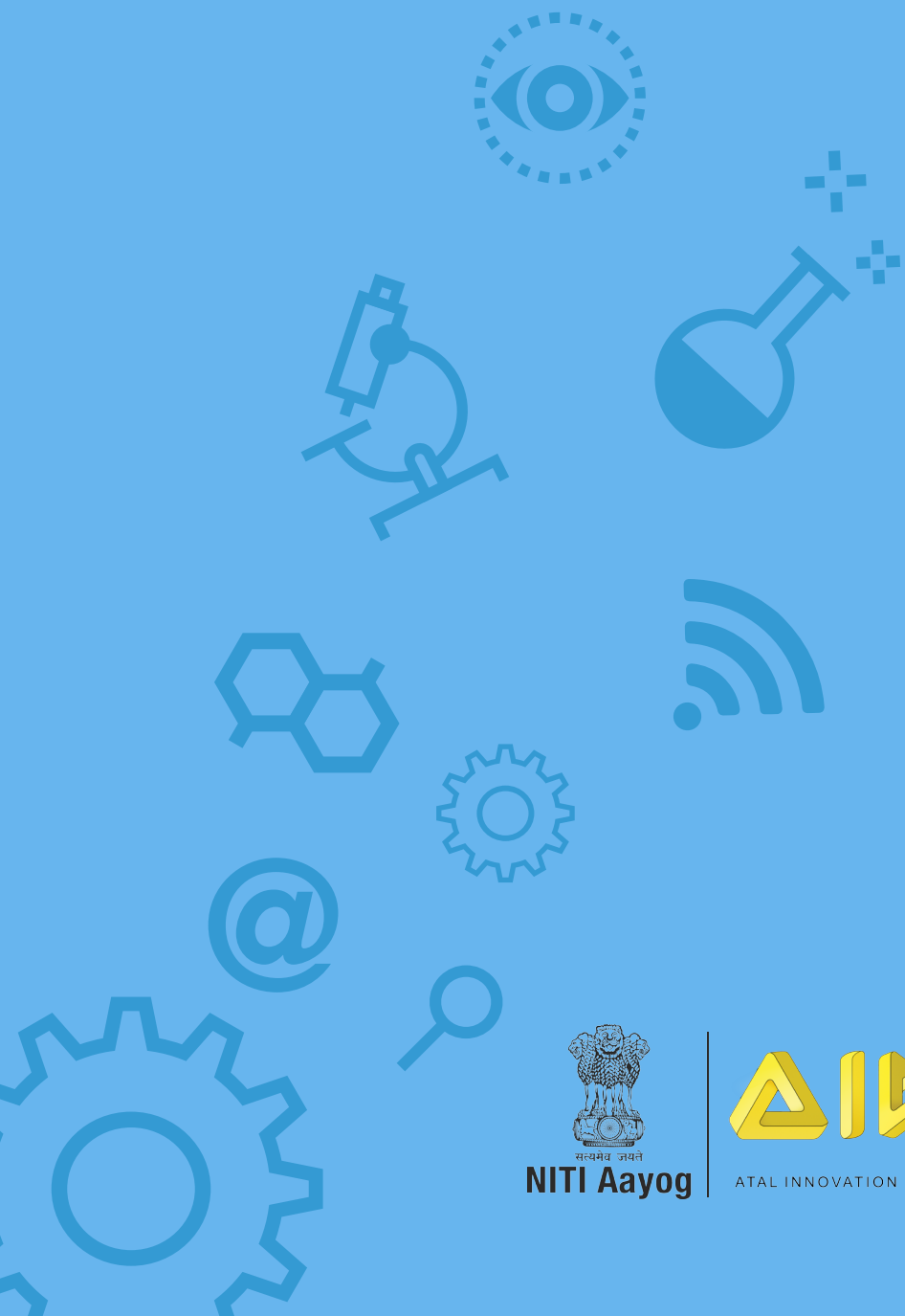
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