

# Atal Tinkering Labs- A Push to Accelerate Entrepreneurial Attitude Among Young Minds in India

Ekta Tripathi (Research Scholar)

Department of Commerce

Harishchandra Post Graduate College, (MGKVP) Varanasi

**Abstract:-** Linking tinkering, technology, and innovation to societal outcomes will help India flourish economically and socially. India is implementing structural reforms to establish itself as a worldwide innovation hub. To meet the changing business need education system in India required to be reshaped using innovation. This will accelerate growth for a new India. Connecting the traditional teaching method with modern experiential learning will enable India to move towards the path of development. This article describes India's government-led initiative to equip students with 21st-century skills, including creativity, innovation, critical thinking, social and cross-cultural collaboration, and ethical leadership, with the goal of creating a New India. With a vision to "Cultivate One Million Children in India as Neoteric Innovators," Atal Tinkering Labs (ATLs) were introduced by Prime Minister Narendra Modi as a part of the Atal Innovation Mission. The objective of this scheme is to develop a culture of innovation and entrepreneurial attitude among young minds. This paper tries to examine the role of ATLs in the economic development of India by boosting innovation and entrepreneurial attitudes among the youth. It also examines the impact of ATLs on creating a skilled work force and promoting the economic growth of the country.

**Keywords:-** Atal Tinkering Labs, Innovation, Entrepreneurial Attitude, Economic Growth.

## I. INTRODUCTION

Atal Tinkering Labs have evolved into a revolutionary endeavour in the realm of education that focuses on developing students' creativity, inventiveness, and problem-solving abilities. These labs were launched by the government of India as a part of the Atal Innovation Mission, which offers young minds a rare chance to experiment, tinker, and come up with creative solutions to real-world problems.

The main objective of ATLs is to cultivate an innovative and inquisitive culture in students, which empowers them to become future-ready and to contribute to the socio-economic development of the nation. Equipped with modern technologies like 3D printers, robotics kits, IOT gadgets, and more, these labs provide a platform for students to explore their creative potential and unleash their entrepreneurial spirit.

These Atal Tinkering Innovation Laboratories (ATLs) are being established in schools across the country as part of the larger mission called "Cultivate One Million Children in India as Neoteric Innovators." The programme aims to develop traits such as curiosity, inventiveness, and creativity in young minds while also fostering skills like design thinking, computational thinking, adaptive learning, and physical computing. (Atal Tinkering Labs 2023).

## II. ABOUT ATAL TINKERING

Tinkering refers to the process of finding creative solutions to problems. Tinkering is an attempt to try something new. It always promotes innovation. It results in thinking differently, trying something new, and finding creative solutions to problems.



**Fig.1: Result of Tinkering**

Thus, the Atal Tinkering Lab is an initiative of the government wherein a space or an area is provided to the young minds, which helps them develop an innovative and entrepreneurial attitude. It is a space for making ideas a reality and for thinking exponentially rather than in a structured, sequential fashion. ATL is a national-level programme initiated by NITI Aayog that exposes students as young as 12 to the world of technological innovation. Students are free to experiment, think outside the box, fail, and even come up with something in an ATL. The curriculum is made to give students the 21st-century abilities they need, like the digital production process, computational thinking, critical thinking, design thinking, and teamwork. Through experimentation, exploration, and self-learning, ATL empowers teachers and students to think creatively and differently about challenges and come up with unique solutions. ATL is also helping members of the community who are interested in innovation, such as parents, mentors, and other individuals, to bring their ideas to reality. Schools that are chosen to establish the ATL can receive grant-in-aid up to ~ 20,00,000/- (Rupees Twenty Lakhs Only) under the ATL initiative. The major aims of this programme are:

- To create innovative thinking
- To establish a work environment in schools where young minds may develop and shape ideas through hands-on, do-it-yourself initiatives.
- To provide facilities for working with cutting-edge technologies and tools such as 3D printers, open-source microcontroller boards, sensors, and so on to generate technological advancement.
- To provide chances for young students to work and learn in a flexible atmosphere while also helping to develop innovative answers to India's specific problems.

➤ *Objective of the Study*

- To know how ATLs are accelerating entrepreneurial attitudes in young minds.
- To know what are the achievement of Atal Tinkering Labs.

### III. PROMINENT INITIATIVES OF ATAL TINKERING LABS

#### A. *ATL Marathon:*

Every year, AIM hosts the ATL Marathon, a national competition designed to encourage young students to be innovative and entrepreneurial. The competition consists of a number of tasks and challenges, and the winners will get rewards and mentoring to help them refine their ideas.

#### B. *ATL Tinkering Curriculum:*

A complete curriculum created to give students practical learning experiences in STEM subjects is the ATL Tinkering Curriculum. Science, electronics, robotics, open-source microcontroller boards, sensors, and 3D printing are all included in the curriculum's courses.

#### C. *ATL Equipment Manual:*

A guidebook that offers comprehensive details on the tools and equipment available at Atal Tinkering Labs is called the ATL Equipment Manual.

#### D. *AIoT integration in curriculum:*

Through this effort, AIM has partnered with CBSE and Intel to include Artificial Intelligence (AI) and the Internet of Things (IoT) into the CBSE School Curriculum. The objective is to integrate "Tinkering" with new technologies such as Artificial Intelligence into formal teaching.

**E. ATL Student Innovator Programme & Student Entrepreneurship Program:**

The two programs that are awarded to the top-performing students in the ATL Marathon Competition are SEP and SIP. Through collaboration with corporate partners and incubation centers, the ATL SIP offers students mentorship, training, and exposure to further develop their innovations into products that are ready for the market through internships. The best SIP program participants join the Student Entrepreneurship Program (SEP), where they launch enterprises and business ventures based on their products.

**F. ATL Community Day:**

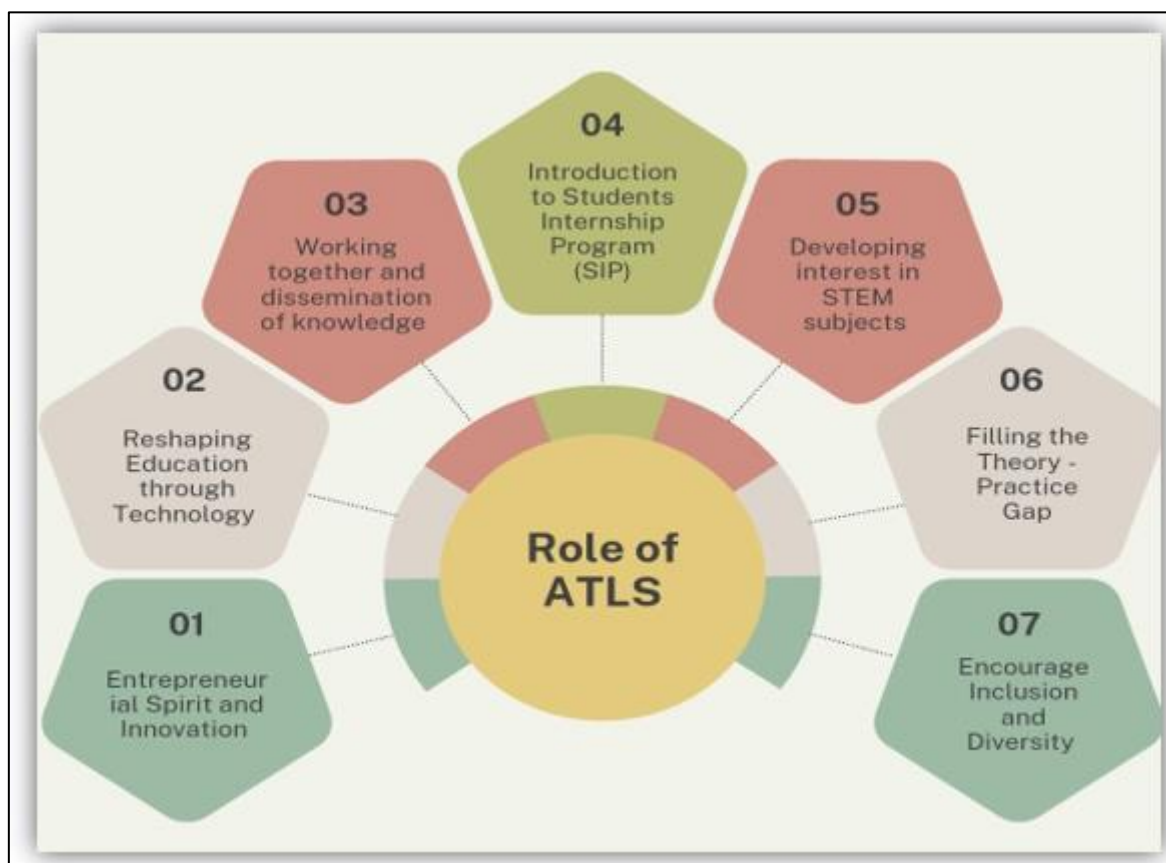
ATL Community Day is a national celebration designed to encourage young children without access to ATLS to be innovative and entrepreneurial. The lab is open to community schools that are close to the ATL schools so they can participate in project construction and tinkering. A number of workshops, discussions, and competitions are part of the event.

**G. ATL Tinkerpreneur:**

ATL Tinkerpreneur is a seven-week virtual summer Bootcamp that takes place in June and July. By the end of the Bootcamp, students will have acquired the essential digital skills and frameworks needed to launch their own online business. Over 5000 team ideas were seen at the recent Bootcamp; the top 100 of these received financing and internship chances from the Indian School of Business.

**IV. ROLE OF ATLS IN ACCELERATING ENTREPRENEURIAL ATTITUDE AMONG YOUNG MINDS IN INDIA**

The report of the World Economic Forum’s Future of Work 2020 predicts that about 80 million jobs will evaporate in the next decade. These jobs will be replaced by 97 million new jobs, for which people must endeavour to empower and train individuals to tackle such a situation. Tinkerpreneur will act as a game changer. In order to make young minds more driven towards the path of innovation, ATLS play a crucial role, which is discussed as follows:



**Fig. 2: Role of ATLS**

**A. Entrepreneurial Spirit and Innovation:**

ATLS function as catalysts for innovation and entrepreneurship, enabling students to think creatively and solve issues in the real world. ATL fosters students ability to discover possibilities, prototype ideas, and exhibit their innovation through projects and contests, all of which are vital skills for aspiring entrepreneurs.

**B. Reshaping Education Through Technology:**

ATL introduces students to modern technologies like coding and programming, robotics, and artificial intelligence and equips them with the skills that are needed to flourish in the digital era. By incorporating modern technology into the learning process, ATLS make education more interesting, relevant, and accessible, bridging the gap between theoretical knowledge and practical application.

**C. Working Together and Dissemination of Knowledge:**

ATLs promote an environment of teamwork and information sharing by bringing together students, professors, industry professionals, and mentors to share ideas and expertise. ATL Lab connects with local businesses, universities, and research institutes to offer students the opportunity to learn from professionals and acquire insights into many industries and career choices.

**D. Introduction to Student Innovator/Internship Program (SIP):**

The ATL Student Innovator Program aims to help students transition from innovators to entrepreneurs. AIM SIP aims to train students with innovative ideas in business and entrepreneurship.

**E. Developing interest in STEM subjects.**

By making STEM education more entertaining and accessible, ATLs hope to pique students' interest in science, technology, engineering, and mathematics. Experiential learning exercises help students develop a better understanding of STEM principles and their real-world applications.

**F. Filling the Theory-Practice Gap:**

Traditional classroom education frequently focuses on theoretical principles, disconnecting students from real-world applications. ATLs fill this gap by providing hands-on experiences that supplement classroom instruction, allowing students to grasp how theoretical knowledge translates into practical solutions.

**G. Encourage Inclusion and Diversity:**

ATLs embrace students of all backgrounds and abilities, creating an inclusive learning atmosphere in which everyone may participate and contribute. By celebrating variety and

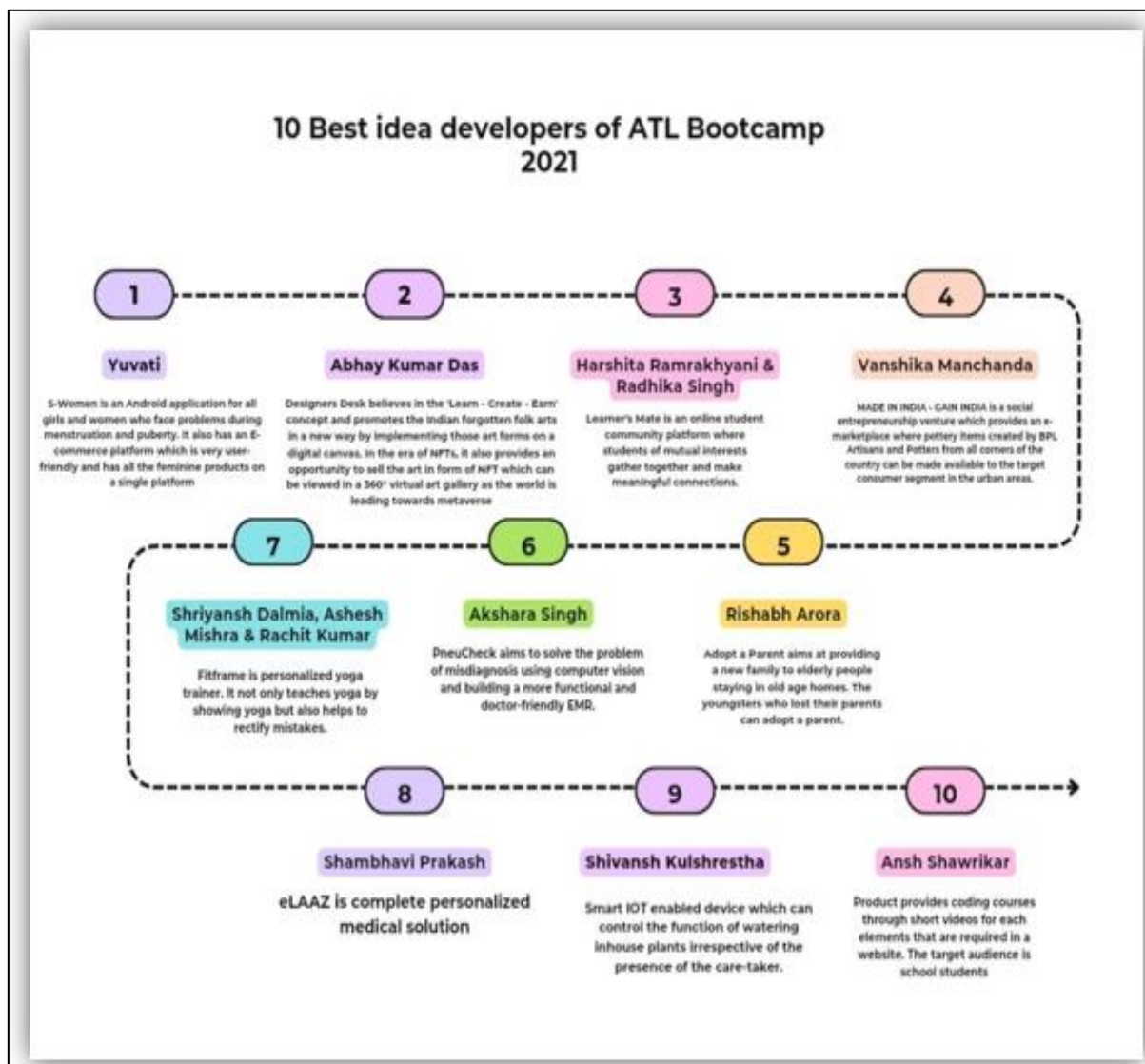
promoting collaboration, these labs enable students to learn from one another and use their unique perspectives to solve complicated problems.

**V. ACHIEVEMENTS OF ATAL TINKERING LABS****A. The Atal Tinkering Bootcamp:**

The famous Indian School of Business (ISB) and Atal Innovation Mission (AIM), NITI Aayog, collaborated to create a unique program called "Atal Catalysts @ISB" in December 2021 with the aim of fostering the Top 100 Business Venture Ideas that resulted from the ATL Tinkerpreneur Bootcamp. In this Bootcamp, students were taught various skills during the summer vacation. At the conclusion of the Bootcamp, ATL Tinkerpreneur built a fully functional digital business venture by utilising the expertise and practical experience of over 650 Mentors of Change, with over 9000 students having participated. Teams and students in the top 100 were mapped to ISB to further develop their concepts. Following that, the teams/students who had the top 100 ideas under consideration had a range of master workshops and mentoring sessions that improved both their products and themselves. The topics covered in the master classes were;

- Entrepreneurial Ecosystem & Mindset
- Competitor Analysis & Market Research
- Idea Validation, Product or Idea Development
- Digital Marketing & Branding
- Finance & HR
- Investor Pitch & Pitching Techniques

After the completion of master classes, an event called 'The Big Pitch' was organised where the teams showcased their ideas to the panel. Out of different ideas, 10 most promising ideas were selected, which were:



**Fig. 3: Idea Developers of the ATL Bootcamp**  
(Source: <https://www.pib.gov.in/PressReleasePage.aspx?PRID=1827009>)

Furthermore, there is already a wealth of data demonstrating the positive effects of this journey. In order to illustrate the argument, allow me to quickly discuss a few case stories here:

**B. Case Studies and Triumphant Stories**

➤ **Team Saaf Water**

Global recognition of the ATLS' accomplishments has not been lacking. Recently, "Saaf Water," an invention by an ATL alumni team, won \$200,000 in IBM's Call for Code competition. Saafwater is an AI-IoT platform that keeps an eye on the quality of water in real time to detect contamination and efficiently disseminate remedial actions to restore it. The group came together as finalists for the ATL Marathon's Student Innovator program.

➤ **Ravinder Bishnoi (Kiekie Pvt Ltd)**

Ravinder, from Rajasthan, is presently pursuing a B.Tech. He chose to develop a gadget to solve noise pollution because of his perseverance in trying to find a solution. He

worked on the Vehicle Horn Control Assembly (VHCA), which lowers the horn's intensity in regions where it is not permitted and blocks the horn in other locations. He finished first in the ATL Marathon in 2017 after entering. His attention was piqued during the school's ATL sessions, when he worked on his prototype. In addition, Atal Incubation Centres (AIC) extended an offer to him for the Student Innovator Programme (SIP). He then took part in an Ideathon hosted by Atal Community Innovation Centres (ACIC) RISE, which is located in Mohali, Chandigarh. He won first place in the ACIC RISE-organised Ideathon. He was then given an incubator at ACIC RISE under the name KieKie Private Limited. Additionally, his start-up received funding of Rs. 1 crore through an award under the Atal New India Challenge (ANIC) 2.0.

➤ **Mohnish Dhruv (Atal Divyang Rath)**

With the revolutionary chair-cum-vehicle known as the Atal Divyang Rath project, people with disabilities can use restrooms without any limitations. Mohnish Kumar Dhruv, a young inventor from Bilaspur, Chhattisgarh, spearheaded the

project. He hails from a humble family and is passionate about social change. Numerous awards have been bestowed upon the project, including the National Inspire Award and the chance to showcase their idea to Indian Prime Minister Shri Narendra Modi during National Technology Week in 2023. The project intends to improve the lives of numerous people with special needs across the nation and submit a patent for their idea.

#### ➤ *'Smart Goggles' Project*

Another creative idea was developed by St. Mary's Convent Girls Higher Secondary School, Thrissur, class IX students. They created "Smart Goggles" to assist a visually challenged student in the school. The third place was earned by the tinkerers, Hannah Reethu Sojan, Anncila Reji, Annlin Bijoy, and Anjeleena VJ, who completed the project in about a month. The project has an ultrasonic sensor that detects objects in its route and, if the distance is too great, sounds a buzzer. This device helps the blind and visually handicapped become more aware of their surroundings so they can navigate on their own without assistance. "We have learned a lot in the tinkering lab in this one year, from soldering to coding," the children exclaim, describing it as a first-of-its-kind experience.

#### ➤ *Robot With Human Connect*

Students in class IX, Christy F. Vattakuzhy, Daniel Christo K. J., and Sreenandan C. S. from St. Paul's CEHSS, won second place with their "Caring Robot" project. The robot, which combines technology and human interaction, uses servomotors and controlled gear motors to transport goods. It also has entertaining features like lights and music. With a mobile app, the robot may be operated. With the help of IR sensors in its hands, it can play games and do handshakes. It is operated by an app on a remote controller.

#### ➤ *Eco Pen*

Yasashwini Vanappali, a Vizianagaram student in class 6, invented the "Eco-pen," an environmentally friendly writing instrument. She received multiple awards for this invention, including a cash prize from the India International Science Festival. She has also taught her classmates how to build eco-pens in a number of workshops. Yasashwini was guided by her father, who is also the school's ATL In-Charge, as she experimented and created her invention. He claims that despite her hearing impairment, she has never let it stop her from pursuing her artistic goals.

#### ➤ *Multipurpose Agriculture Robot*

Priyavarshini filed the "Multipurpose Agriculture Robot" proposal in 2018. This invention is highly helpful to farmers since it can carry out five tasks simultaneously, including planting, watering, sprinkling, applying fertilizer and pesticides, and plowing. Since solar energy powers the

gadget, it is also an environmentally friendly invention. The initiative was chosen to be one of the Top 100 teams in the ATL Marathon, AIM's premier national innovation competition. As part of the Student Internship Program, she and her team had the opportunity to visit the Atal Incubation Centre MIT in Pune, Maharashtra, to further develop and execute their concept. In Delhi, she also had the opportunity to meet Nobel Peace Prize winner Shri Kailash Satyarthi. She was chosen for the AIM SIRIUS Innovation program, a bilateral innovation initiative between India and Russia for student innovators, after her team was picked among the top 50. As a result, she was given the chance to attend a week-long student exchange bootcamp in Russia. Additionally, Priyavarshini had the opportunity to introduce President Putin to her idea. She also gave the keynote address at SHESTEM, a bilateral initiative between Sweden and India to encourage women and girls to pursue careers in STEM, during Sweden-Indo Nobel Week 2020, serving as an inspiration to all young girls who are innovators.

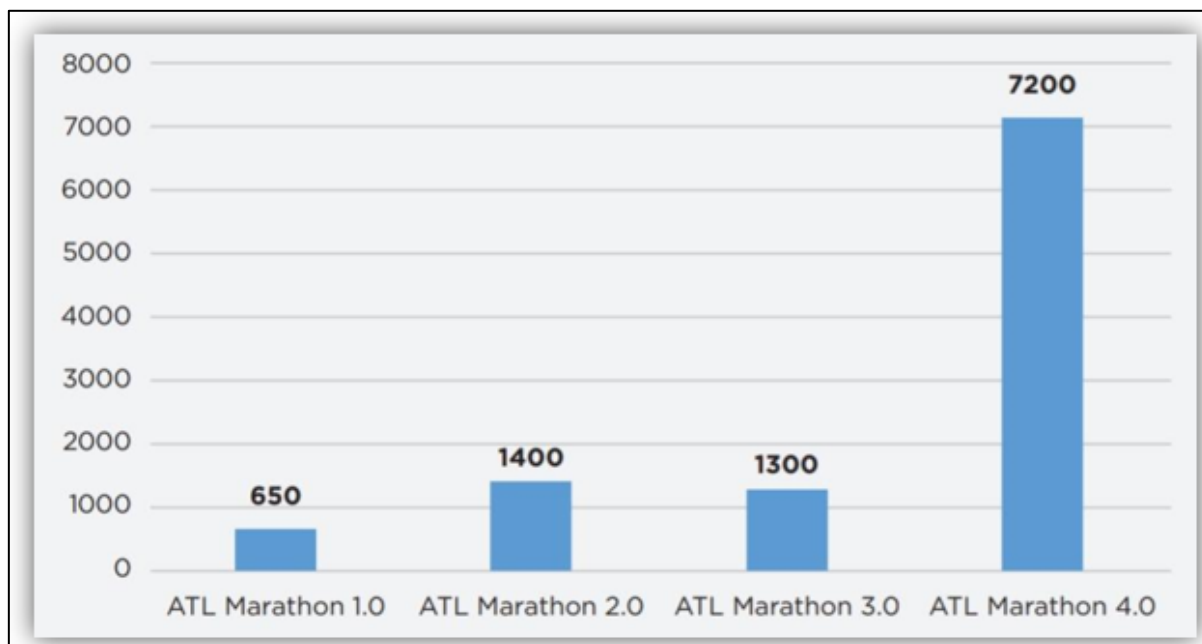
## VI. ATL MARATHON PARTICIPATION HISTORY

The ATL Marathon's first season began in 2017–18 and concentrated on six themes: clean energy, waste management, healthcare, smart mobility, water resources, and agriculture technologies. These themes are in line with India's national priority sectors. The top 30 teams at ATL Marathon 1.04 came from 20 different Indian states and union territories. Two more theme areas were added to the ATL Marathon in its second season: Sustainable Development Goals and Architecture & Design.

The ATL Marathon's first two seasons assisted participants in honing all required STEM skills. The confidence to use Makerspace tools in schools was acquired by the ATL community as a whole. In ATL Marathon 3.0, "Mindful Innovations for a Greater Good" was the theme. Voting for selected problem statements under four important themes—Quality Education, Inclusivity and Equality for All, Sustainable Environment and Justice, Health and Hygiene—was open to ATL students.

The ATL Marathon 4.0 carried on its predecessor's four milestone strategy. The ATL Marathon 3.0, which tackles the global COVID-19 pandemic, was motivated by the Prime Minister's "Aatmanirbhar Bharat" rallying cry and its five pillars—Economy, Infrastructure, System, Demography, and Demand.

Till date, over 10,000 ATL innovators have developed ideas and submitted them to AIM for review. The graph below shows the ATL Marathon's consistent increase in participation:



**Fig. 4: ATL Marathon Participation History (Source: ATL STUDENT INNOVATOR PROGRAM HANDBOOK)**

From the above studies, it is very evident that initiatives like Atal Tinkering Labs are paving the way for the entrepreneurs and leaders of tomorrow. The young innovators taking part in the ATL are clearly evolving from being consumers of solutions to producers of those solutions.

## VII. CONCLUSION

An essential component of addressing the global talent opportunity gap is promoting innovation. To combat it, we must adopt a bottom-up, worldwide strategy. India's educational system has to be innovatively revamped to meet evolving corporate requirements. In order to create a New India, this article outlines the government-led effort in India to provide students with 21st-century abilities such as creativity, innovation, critical thinking, social and cross-cultural collaboration, and ethical leadership. "Tinkering" and "Making" are innate human abilities that technology must now accept. And this is the path that the Atal Innovation Mission has started. As of December 2020, more than 7000 ATL schools—which encompass more than 90% of all districts and 110 Aspirational Districts of India—have been sanctioned out of the 14916 schools that had been chosen to become ATLs.

More than 5000 team ideas were seen in ATL Tinkerpreneur's past editions, demonstrating the program's effectiveness. Notably, the esteemed Indian School of Business (ISB) offered cash and coveted internship opportunities to the top 100 teams from the previous year.

All things considered, the Atal Tinkering Lab is vital in influencing the course of education in India by providing pupils with the knowledge, attitude, and self-assurance they require to prosper in a world that is becoming more and more reliant on technology. ATLs are not only revolutionising education but also building the groundwork for a more

inventive and affluent India by fostering the next generation of innovators and problem solvers.

## REFERENCES

- [1]. Atal Innovation Mission (AIM): NITI Aayog (2022) by Press Information Bureau Ministry of Information and Broadcasting.
- [2]. Atal Innovation Mission (2018) by Atal Tinkering Laboratories 'A Guidelines for setting up of Tinkering'.
- [3]. Atal Mission for Rejuvenation and Urban Transformation AMRUT (2015) Smart Cities Mission by PM <https://youtu.be/AEHDT5Wj-tw>
- [4]. Atal Tinkering Labs (2023) by NITI Aayog 'Government of India' <https://aim.gov.in/atl.php>
- [5]. Naye Naye Dishayein Naye Nirmaan Naya Bharat (2019) 'The Atal Tinkering Lab Handbook'
- [6]. NITI Aayog
- [7]. Online Art Classes (2023) at your Fingertips. Tinkerly
- [8]. One-Stop Solution for Setting up the Perfect Atal Tinkering Labs (2020) STEMpedia
- [9]. Orientation Brochure (2023) India Atal Tinkering Lab
- [10]. Prasar Bharati (2016) 'by DD News Channel of India's Public Service Broadcaster' <https://youtu.be/aNetP3NvGB4>
- [11]. Tinkerly <https://tinker.ly/tinkering-lab-what-is-it-and-why-do-we-need-it/>
- [12]. Atal Innovation Mission (2017). ATL-Application\_Guidelines-2018.
- [13]. Chhabra Manas (2019). Tinkering Lab -Enabling innovation.
- [14]. Education Commission (2016). The Learning Generation: Investing in Education for a Changing World.
- [15]. Grabowski Wehrell Diana (2021). 'Tinkering as a Pedagogy for STEM Learning'

- [16]. ATL Curriculum : <https://aim.gov.in/atl-curriculum.php>
- [17]. ATL Handbook 1.0:  
[https://aim.gov.in/The\\_ATL\\_Handbook.pdf](https://aim.gov.in/The_ATL_Handbook.pdf)
- [18]. ATL Handbook 2.0:  
[https://aim.gov.in/pdf/ATL\\_Handbook\\_2021.pdf](https://aim.gov.in/pdf/ATL_Handbook_2021.pdf)
- [19]. Beyond Tinkering book
- [20]. SIP Handbook Digital Pdf
- [21]. Introduction to Atal Tinkering Lab Pdf
- [22]. <https://www.pib.gov.in/PressReleasePage.aspx?PRID=1827009>
- [23]. <https://aim.gov.in/ATL-Tinkerpreneur/index.html>
- [24]. <https://www.stemrobo.com/the-role-of-atal-tinkering-labs-in-shaping-tomorrows-innovators/>
- [25]. <https://www.educationtimes.com/article/campus-beat-college-life/99734720/how-atal-tinkering-labs-are-instilling-innovation-entrepreneurship-among-schoolchildren>
- [26]. <https://education21.in/atal-tinkering-labs-have-transformed-stem-and-electronics-education-in-schools-across-india/>
- [27]. [https://www.linkedin.com/pulse/empowering-innovation-understanding-atal-tinkering-labs-dev-thapiyal-cpnne?utm\\_source=share&utm\\_medium=member\\_android&utm\\_campaign=share\\_via](https://www.linkedin.com/pulse/empowering-innovation-understanding-atal-tinkering-labs-dev-thapiyal-cpnne?utm_source=share&utm_medium=member_android&utm_campaign=share_via)
- [28]. <https://aim.gov.in/student-dec-blog.php>
- [29]. <https://www.tice.news/enticing-angle/aim-atal-innovation-mission-niti-aayog-tinkering-lab>