



Assessment of Atal Tinkering Labs

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INFONOMICS

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This report documents findings from the Assessment of 500 Atal Tinkering Labs (ATLs) across India. The assessment is based on interviews with the principals of the schools having ATLs and the ATL In-charges. The assessment also comprises of qualitative findings aggregated with the help of Focus Group Discussions (FGDs) with parents, and the students. The assessment was carried out by Athena Infonomics Private Limited, Flat No. 2A, Jeyamkondar, New no. 40 (Old no. 12), Murrays Gate Road, Alwarpet, Chennai – 600 018. Tamil Nadu, India.

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Abbreviations

AAC	ATL Advisory Committee
ACIC	Atal Community Innovation Centre
AI	Artificial Intelligence
AIC	Atal Incubation Centres
AIM	Atal Innovation Mission
ANIC	Atal New India Challenges
ARISE	Atal Research & Innovation for Small Enterprises
ATL	Atal Tinkering Lab
ATL IC	ATL In-Charge
B.Ed	Bachelor of Education
CBSE	Central Board of Secondary Education
Co-Ed	Co-educational
CSIR	Council of Scientific and Industrial Research
DAC	Development Assistance Committee
DIY	Do-It-Yourself
DRDO	Defence Research and Development Organisation
DST	Department of Science and Technology
E3C	Enhanced Evaluation of Effective Change
EMRS	Eklavya Model Residential Schools
Fablabs	Fabrication Labs
FGD	Focus Group Discussion
GeM	Government-e-Marketplace
ICMR	Indian Council of Medical Research
ISRO	Indian Space Research Organisation
JSTSE	Junior Science Talent Search Examination
KVPY	Kishore Vaigyanik Protsahan Yojna
MoC	Mentor of Change
MoM	Minutes of Meetings
NCERT	National Council for Educational Research and Training
NEP	New Education Policy
NIDHI	National Initiative for Developing and Harnessing Innovations
NITI	National Institution for Transforming India
NTSE	National Talent Search Examination
OECD	Organization for Cooperation and Economic Development
PFMS	Public Finance Management System
PhD	Doctor of Philosophy
R&D	Research and Development
RAA	Rashtriya Avishkar Abhiyan
SOP	Standard operating procedures
STEM	Science, Technology, Engineering, and Mathematics
UC	Utilization Certificate
UT	Union Territory
WoF	Wall of Fame

Executive Summary

Background

In the past few years, integration of technology in schools has seen an increasing trend, not only because it is a need of the hour but also Integration of STEM (Science, Technology, engineering, and Mathematics) in the school curriculum has the potential to prepare students with 21st-century skills and bridge the lack of skilled human resources. The concept of “tinkering” has gained significant importance both globally and in India, particularly in the context of education, innovation, and skill development.

In alignment with the technology labs and its need to promote STEM and scientific temper in schools Atal Innovation Mission, in the year 2016-17 introduced Atal Tinkering Labs, fondly called ATLs, which aimed at not only providing space to the young minds to collaborate and experiment, but also give wings to their scientific creativity. Since its inception, Atal Tinkering Labs (ATLs) has been instrumental in cultivating an environment conducive to the free thinking, innovation, and problem-solving capabilities of young students.

The evaluation focused on key areas, including infrastructure, student engagement, ATL events, schoolbased innovations, fund utilization, operational compliance, and the educational and career journeys of ATL students. The assessment period covered the funding years from fiscal year 2016-17 (initiation of the first Atal Tinkering Lab) to fiscal year 2019-20.

The assessment findings will primarily be used by Niti Aayog involved in the program, with recommendations

likely to feed into adaptations of ATL 2.0. Further, the report will also be shared with external stakeholders, including the relevant government stakeholders and other implementing partners.

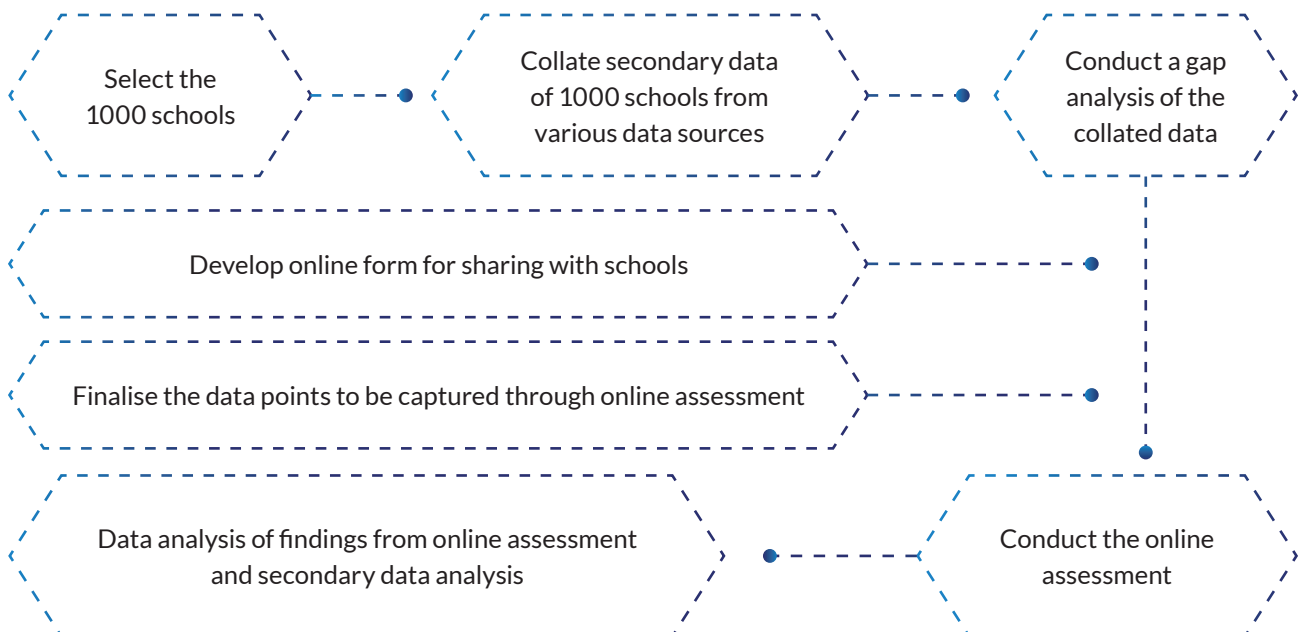
Purpose Of The Assessment And Intended Audience

To ensure the efficacy of the ATL program, Athena Infonomics was entrusted to carry out a third-party assessment with objectives to evaluate ATLs’ performance, grant utilization, and compliance. This comprehensive assessment utilized both quantitative and qualitative parameters to gauge the success of ATLs in fostering innovation and transforming mindsets among students, teachers, and parents.

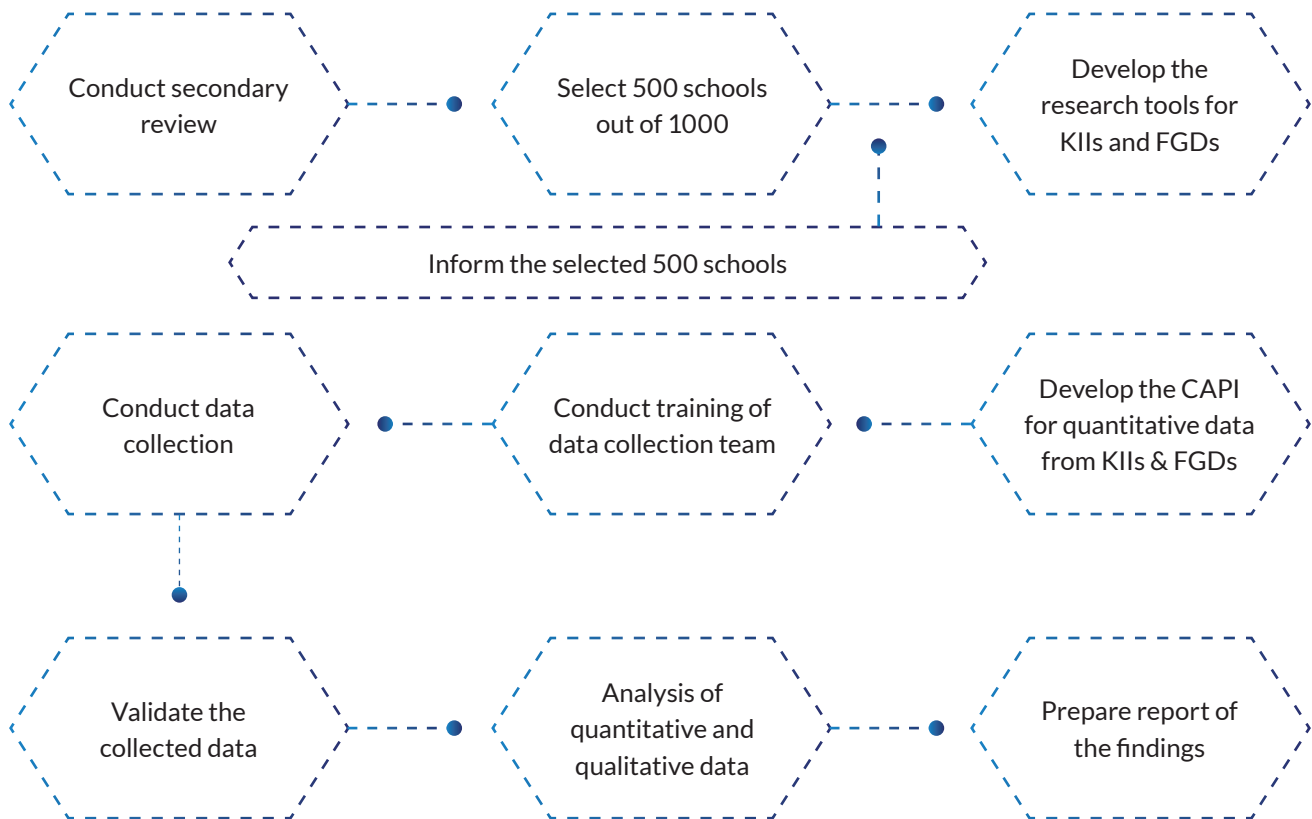
Assessment Methodology

The assessment adopted a mixed-method approach. Before initiating the primary research, a secondary data analysis (of the 1000 ATLs) was carried out to review various data sources available on the program implementation and compliance on various parameters along with review of its institutional structure, alongside the alignment of research tools. In addition to the secondary analysis, this phase also initiated an online assessment of 1000 ATLs selected from a total of 4978 schools across India. The selection process involved zonal and state-level sampling, prioritizing the representation of schools from categories of “Rural- Urban Geography; Government-Private Schools; and Aspirational- Non-aspirational Districts”. The primary research comprised of visiting 508 ATLs, which were selected from the 1000 ATLs, also ensuring the representation of schools from various categories.

Phase 1-Secondary Research & Online Assessment



Phase 2- Primary Data Collection at School Level



The assessment is based on interviews with the principals of the schools having ATLs and the ATL In-charges. The assessment also comprises of qualitative findings aggregated with the help of Focus Group Discussions (FGDs) with parents, and the students.

Evaluation evidence was assessed using the Organization for Economic Co-operation and Development's Development Assistance Committee (OECD/DAC) criteria of relevance, effectiveness, efficiency, coherence, and sustainability.

Assessment Findings

The findings of the assessment measuring the performance of funded ATLs in terms of ATL Establishment, Infrastructure at the School and ATL, Human Resources for ATL, Enabling Ecosystem, Inside the Operation Mode of ATLs, Monitoring and Reporting Compliance, Student Engagement and Participation, Project Development and Innovation, Impact on Academic Ecosystem and Financial Status and Compliance.

ATL Establishment

The ATL was founded at the school for branding purposes, to differentiate itself from other educational institutions, as a cause of pride in being affiliated with AIM, and as an additional source of brand value for the institution. Furthermore, according to 84% of respondents, ATL

was seen as a platform that encouraged creativity and design tinkering in addition to drawing pupils to science and technology. According to the findings, 74% of schools established their ATLs in less than six months. The compliance for procuring through GeM- Using an approved vendor was highest for rural schools (62%), followed by the schools in aspirational districts (60%), and government schools (59%).

Infrastructure at the School and ATL

The AIM guidelines emphasize setting up the ATL 'In/near the main building' as it enables easy access and frequent visits by the concerned. The findings highlight high compliance with the operational guidelines, as 90 percent of the schools had their ATL in the main building of the school. The majority of the ATLs have a single dedicated room in alignment with the requirements set by the AIM. The schools were inclined towards dedicating a single room to the ATLs, rendering it a place of importance in the school. The data indicates a high degree of compliance with the ATL room size requirements of AIM, to ensure sufficient space for its operation. The data shows that most of the ATLs were well-equipped with essential and fundamental infrastructure, including laptops and internet facilities.

Human Resources for ATL

Operational compliance assessment of the ATLs highlighted that 98 percent of the ATLs had an assigned ATL In-charges. Further, schools consistently prioritized the training of teachers and ATL In-charge on ATL activities, with 70 percent having trained their teachers.

Enabling Ecosystem

69 percent of the schools reported the establishment of the vital and mandatory ATL Advisory Committee (AAC).

Inside the Operation Mode of ATLs

Having a fixed timetable is one of the key indicators to measure the importance given to the ATL and its associated activities. Consequently, more than half of the schools ensured seamless integration of ATLs into their educational ecosystems by conducting fixed ATL sessions at least twice a week, at the same maintaining separate attendance records for these sessions.

Monitoring and Reporting Compliance

The findings for the assessment revealed that 74 percent of the schools logged into ATL dashboard. Out of the 74 percent, 69 percent of the schools said that the clear instructions from AIM was one of the key factors that influenced their decision to log into the dashboard.

Student Engagement and Participation

Notably, ATLs were utilized without discrimination between male and female students. Although, student enrollment in the ATLs remained consistent, the innovation output from ATLs displayed a consistent increase, with rural schools demonstrating heightened enthusiasm in this regard.

From the 493 schools, 3.1 lakh students participated in ATL related events over the years since its induction. Around 2 lakhs students from these 493 schools has participated in various non- ATL events/completions since the induction of ATL in the schools. For Non-AIM and AIM events, the number of students participating has increased almost every year.

Project Development and Innovation

The data highlights that the school on average has created approximately 10-16 innovations from the year 2016-17 to 2022-23. In the years spanning from 2017-18 to 2019-20, overall, the average number of innovations being created in the ATLs has witnessed a steady increase.

Overall, there has been an increase in the number of innovations being developed in the ATLs.

When seen across categories, rural schools have shown more enthusiasm for creating innovations. Rural schools' enthusiasm for innovations was also underscored in qualitative discussions when school authorities pointed out that establishing ATLs in rural and tribal areas has provided students with opportunities to learn and transform their ideas, which would not have been possible otherwise.

When analyzed further across the categories, it is notable that schools in non-aspirational districts and government schools have also displayed enthusiasm in generating innovations.

Impact on Academic Ecosystem

With the introduction of ATLs, students have not only acquired new skills, but have also been able to transform the way they perceive STEM, as 75 percent of the schools reported a positive approach of students towards science and technology, and 69 percent of schools reported that more students were pursuing science for higher studies after the establishment of ATLs. Notably, as per 58 percent of the schools, the establishment of ATLs has also led to the enhancement of 21st century skills in students, leading to diverse career opportunities.

Assessment of the change in mindset of school authorities highlighted the positive impact of the ATL, as ATLICs reported that it had provided them with leadership experience (60%), and exposed them to innovation trends, and professional and career development opportunities (58%).

ATL also made it easy for the teachers to engage with the students (67%) and gave a platform to expose the students to the practical aspects (55%). It is also pertinent to note that the impact and utility of ATL extended beyond the schools, as 40 percent of the ATLs were made accessible to community schools and students from the nearby areas.

Financial Status and Compliance

The assessment of fund utilization highlighted that over 90 percent of the ATLs effectively utilized the one-time establishment cost. Additionally, 78 percent of the ATLs also effectively utilized the O & M (Operation and Maintenance Grant). Further,

85 percent of ATLs have submitted Utilization Certificates (UC), indicating a proactive enthusiasm of the schools.



RECOMMENDATIONS

Enhanced Communication Strategy: AIM should develop a synchronized communication strategy with clear instructions for ATL processes and improve the website as a central information hub. Consider implementing a monthly newsletter for stakeholder outreach.

- **Strategic Promotion of ATL Events:** Promote ATL events strategically through ATL ICs' WhatsApp groups and leverage Mentor of Change influence. Utilize social media for engaging posts and videos. Organize state/regional-level events for greater recognition.
- **Continuous Monitoring and Evaluation:** Involve ATLs in continuous monitoring and evaluation, revamping existing procedures. Actively engage MoCs and institutions for real-time on-ground information.
- **Innovative All-in-One Platform:** Explore an innovative integrated platform developed by an IT partner to automate data points, streamline workflows, and allow AIM to focus on strategic endeavors.
- **Integration with Curriculum:** Integrate ATLs into the school curriculum, collaborating with experts for interdisciplinary learning. Include ATL project participation in assessments and collaborate for teachers' professional development.
- **Efficiency and Quality of MoCs:** Improve the efficiency and quality of MoC initiative by ensuring understanding, flexibility, and continuous updates. Transform it into a rewards-based initiative with recorded and approved sessions for knowledge sharing.
- **Parental Involvement:** Foster greater parental involvement by publicizing ATL's achievements and highlighting its contributions to children's education. Ensure parents understand the significance of ATL.
- **Inclusivity and Community Engagement:** Promote inclusivity for students with special needs and mandate community engagement from the application stage. Extend inclusiveness beyond schools.
- **Sustainability and Collaboration:** Partner with industry associations, academic institutions, and sectoral bodies to advocate for ATL adoption. Share success stories to inspire other ATLs.
- **Empower ATL Human Resources:** Empower Empower ATL human resources by involving one ATL In-charge with overall responsibility and ongoing teacher training. Expand self-learning materials and introduce online training for continuous development.
- **Align with National Education Policy:** Create an environment for organic ATL demand by engaging with education boards to align with the new National Education Policy directives, focusing on experiential learning. Establish Model ATLs as exemplars.
- **Career Guidance and Advanced Courses:** Provide career guidance and expand ATL offerings with intermediate and advanced courses. Collaborate with experts and leverage established platforms for accessibility. Foster stronger ties between education and industry.

These recommendations aim to enhance the impact, efficiency, and sustainability of the ATL program, ensuring its continued success in nurturing innovation among students and fostering positive transformations in education.



01 Introduction

This section presents an overview of the Tinkering concept, its relevance for India and an introduction to the Atal Tinkering Labs (ATLs) set up by Atal Innovation Mission (AIM) under the aegis of National Institute for Transforming India (NITI) Aayog.

1.1 Introduction to the Tinkering Concept

In the past few years, integration of technology in schools has seen an increasing trend, not only because it is a need of the hour but also in the past decade countries¹ have faced a lack of engineers, scientists, and information technology experts. Integration of STEM (Science, Technology, engineering, and Mathematics) in the school curriculum also has the potential to prepare students with 21st-century skills and bridge the lack of skilled human resources.

The concept of “tinkering” has gained significant importance both globally and in India, particularly in the context of education, innovation, and skill development. Tinkering involves hands-on learning, experimentation, and problem-solving through practical experiences. Following is an overview of the concept of tinkering and its relevance in both global contexts.

- Tinkering is closely associated with the global “**Maker Movement**,”² which emphasizes the creation of physical objects, often using technology like 3D printing, electronics, and software. Makerspaces, which are collaborative workspaces for tinkering and making, have become popular worldwide.
- Tinkering aligns with the principles of **STEM (Science, Technology, Engineering, and Mathematics) education**. It encourages students to explore STEM concepts through hands-on activities, fostering critical thinking and problem-solving skills.
- Tinkering promotes an **innovative mindset** by encouraging individuals to explore new ideas and solutions. It is seen as a precursor to **entrepreneurship**, as it nurtures creativity and the ability to develop practical solutions to real-world problems.

1.2 Relevance of STEM Education in India

STEM (Science, Technology, Engineering, and Mathematics) education is highly relevant in India as it provides global competitiveness. A strong STEM foundation is essential to ensure that India remains competitive in the international job market and as a hub for technology and innovation.³ STEM graduates are in high demand across various industries, including IT, engineering, healthcare, and finance. A STEM education provides students with the practical skills and problem-solving abilities that are highly sought after by employers, increasing their employability. STEM education is essential to understand and navigate the rapid advancements in fields such as artificial intelligence, robotics, biotechnology, and data science. It prepares students to adapt to evolving technologies. The Indian government has launched various initiatives, such as the “Make in India” and “Digital India” campaigns, which emphasize the importance of STEM education for economic development and self-reliance.

The Government of India has recognized the importance of STEM (Science, Technology, Engineering, and Mathematics) education and has taken several initiatives to prioritize and promote STEM education across the country. Apart from ATLs, some of the high-level initiatives by the Government in this direction, include:

- **National Education Policy (NEP) 2020** places a strong emphasis on STEM education. It recognizes the significance of cultivating scientific temper and analytical thinking in students from a young age. The policy calls for the integration of STEM subjects into the curriculum, starting from the foundational level.
- **Rashtriya Avishkar Abhiyan (RAA)** is an initiative aimed at strengthening the culture of science and mathematics education in schools. It encourages teachers to adopt innovative teaching methods for STEM subjects.

² Willingham, T. & Boers, J.D. (2015). Introduction to Makerspaces in (Eds.) Makerspaces in Libraries. ROWMAN & LITTLEFIELD, p. 1

³ Chawla, S., Tomar, P. & Gambhir, S. (2021). Design and implementation of IoT based Low cost, effective learning mechanism for empowering STEM education in India. Turkish Journal of Computer and Mathematics Education.

- **National Council for Educational Research and Training (NCERT):** NCERT, the apex body for school education in India, continually develops and updates STEM-related curricula and textbooks to ensure that they are in line with global best practices and pedagogical approaches.
- **National Initiative for Developing and Harnessing Innovations (NIDHI):** NIDHI is a program under AIM that supports and promotes innovation and entrepreneurship, particularly in STEM fields. It provides funding, mentorship, and resources to startups and innovators.
- **Research and Development Funding:** The government allocates funds for research and development (R&D) in STEM fields. Various institutions, including the Department of Science and Technology (DST) and the Indian Council of Medical Research (ICMR), provide grants and scholarships for STEM research.
- **Scholarship Programs:** The government offers scholarships for students pursuing higher education in STEM disciplines. These scholarships aim to encourage talented students to pursue STEM careers.
- **Promotion of Scientific Research:** Government agencies like the Indian Space Research Organisation (ISRO), the Council of Scientific and Industrial Research (CSIR), and the Defence Research and Development Organisation (DRDO) actively engage in cutting-edge scientific research and development projects.
- **STEM Olympiads:** The government supports and promotes STEM Olympiads and competitions at the national and international levels to identify and nurture young talent in science and mathematics.
- **Digital India:** The Digital India campaign encourages digital literacy and the use of technology, which is essential in STEM education.
- **Skill India:** The Skill India initiative focuses on skill development in various sectors, including STEM. It offers training programs and certifications to enhance employability in STEM-related industries.

STEM education is highly relevant in India due to its critical role in economic growth, technological advancement, innovation, employability, and addressing societal challenges. It equips students with the skills and knowledge needed to thrive in a rapidly changing world and positions India as a leader in science and technology on the global stage.

1.3 Introduction to Atal Tinkering Laboratories (ATLs)

In alignment with the technology labs and its need to promote STEM and scientific temper in schools Atal Innovation Mission, in the year 2016-17 introduced Atal Tinkering Labs, fondly called ATLs, which aimed at not only providing space to the young minds to collaborate and experiment, but also give wings to their scientific creativity. Funneling in the resources to the schools to establish and run the ATLs was a challenge. For that purpose, infrastructure was created, facilitating the creation of a one-of-a-kind ecosystem in India. Taking into consideration the importance of an ecosystem to promote STEM in Indian classrooms, it was only relevant that the ATLs' functioning was assessed for its performance, utilization of resources, and compliance with government guidelines.

The initial focus has been towards creating an institutional framework, to nurture innovation and entrepreneurial

mindset. Through the Atal Tinkering Labs (ATL), AIM is fostering innovation at the school level, wherein students get an opportunity to experience design thinking and widen their intellectual horizons in pursuit of solutions to day-to-day problems and showcase their innovations at prestigious platforms.

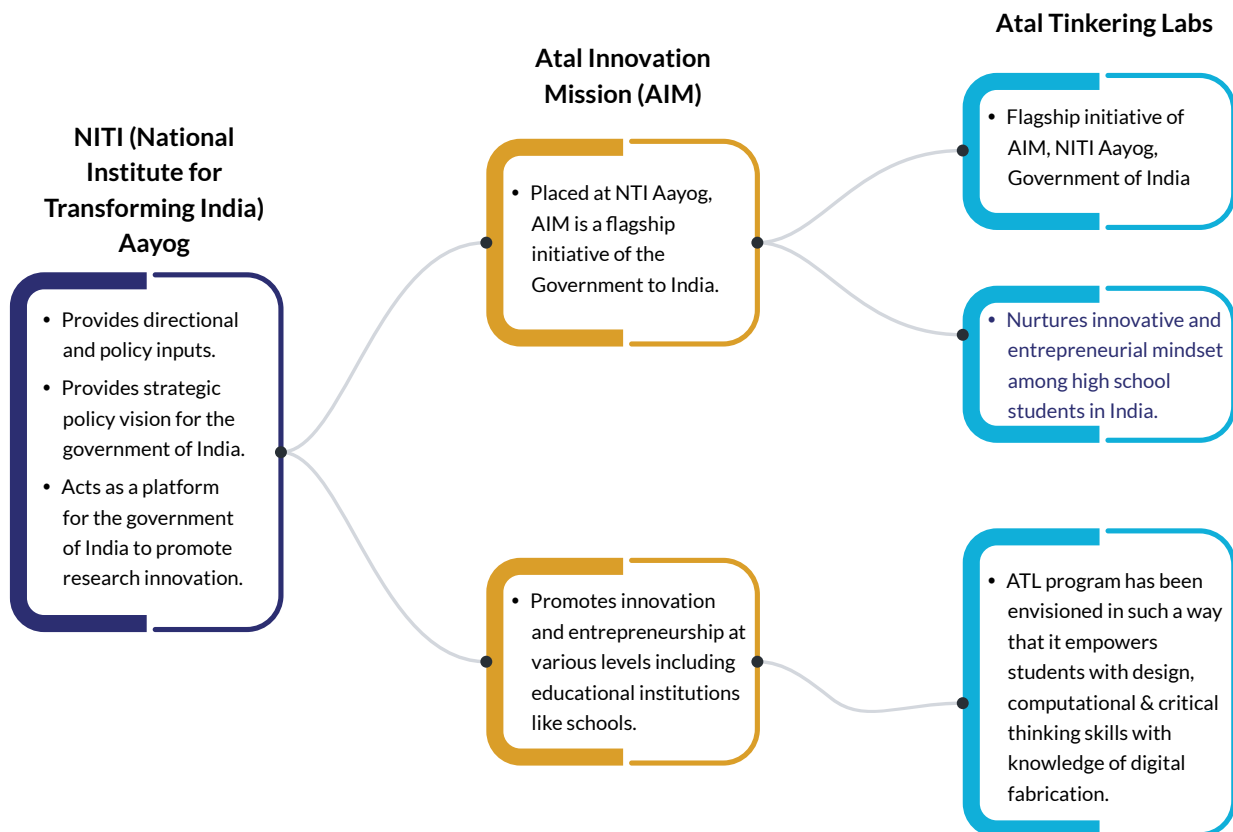
The Mentor of Change (MoC) Program is another citizen-led national movement being led by AIM, wherein skilled professionals provide pro-bono mentoring to young ATL innovators, with a strong sentiment towards nation-building. AIM's Atal Incubation Centres (AICs) are creating world-class ecosystems for start-ups to flourish, with the required handholding including access to mentoring and investor networks. AIM realised the importance of making innovation a national movement, wherein citizens felt the responsibility to create impact and contribute towards the same.

Figure 1: AIM ecosystem



Launched by AIM in collaboration with five Ministries of the Government of India, the Atal New India Challenges (ANIC) provided innovators an opportunity to propose technological solutions in 24 different areas of national importance. The selected innovations received grant-in-aid along with support for swift productization and commercialisation. And finally, another program, in the final stages of conceptualization, AIM-Atal Research and Innovation in Small Enterprises (ARISE) encourages the Ministries to invest in research and innovation, and thereby accept innovation from small enterprises into the public system, through a comprehensive framework for procurement.

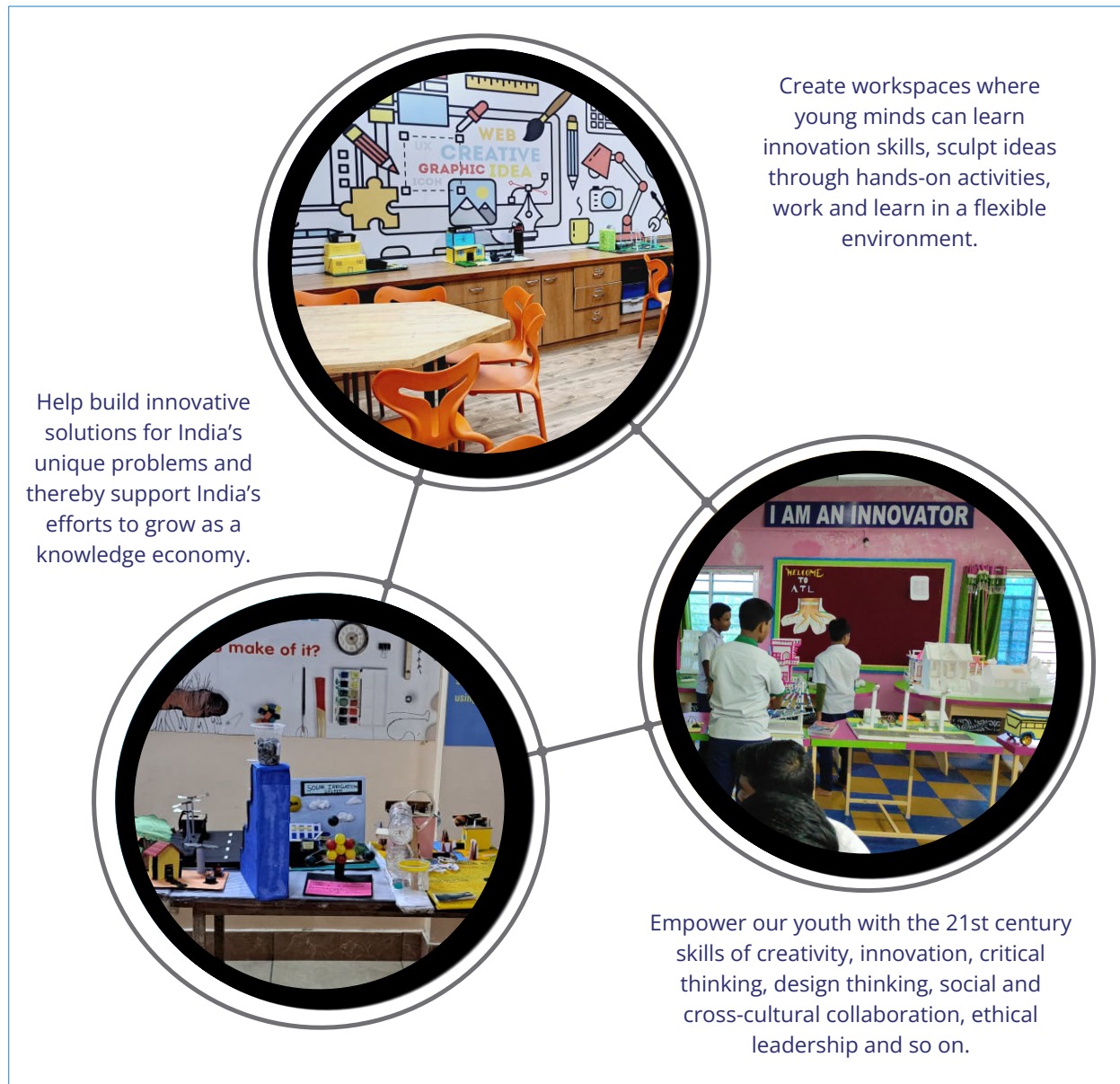
Figure 2: Establishment of ATL



The ATLs have been envisaged to be the hub for innovation, invention, making, tinkering, and giving shape to ideas solving local and global problems using technology. It is expected that these labs will play the role of incubators of

ideas and inspire the young students of our country to step out of their comfort zones and work on novel concepts, embrace future skills as well and develop confidence and personality skills. The key objectives of ATL are:

Figure 3: Purpose of ATLs



Source: AIM

Overall, the concept of tinkering is gaining traction in India as it aligns with the country's aspirations to become a hub for innovation and entrepreneurship. Initiatives like ATLs are instrumental in promoting tinkering and

fostering a spirit of innovation among Indian students, thereby contributing to the nation's growth and development.

The background image shows a science laboratory. At the top, a banner displays various colorful icons. Below it, a whiteboard is covered with scientific diagrams, including a globe, a molecular structure, and a lightbulb. In the center, there are wooden cabinets and a table with laboratory equipment. In the foreground, several black stools with blue seats are visible. A large blue diamond-shaped overlay is positioned on the left side of the page, containing the section title and a paragraph of text.

02 Research Design

This section elaborates on the research design utilised for the ATL evaluation. It also details the sampling methodology adopted to select the initial 1000 ATLs for the secondary data analysis and the subsequent selection of 500 ATLs for the visit and primary data collection.

2.1 Need for the Assessment of ATLs

ATLs since FY 2016-17 have created an environment for young students to think freely, to innovate, and to be the problem solvers for their community. As a validation mechanism and to ensure the effective functioning of the ATL program, a third-party assessment was needed to assess their performance, grant utilization, and compliance with the program.

The assessment measured quantitative parameters which determined whether ATLs have succeeded in providing a space to nurture free innovation as well as creating a shift in mindset among its different stakeholders i.e. students, teachers, and parents.

2.2 Evaluation Objectives

The evaluation objectives are as follows: -

- Assess the performance of funded ATLs in terms of infrastructure, student engagements, ATL events, and innovations carried out in the schools.
- Measure effective utilization and compliance of the ATL scheme by reviewing parameters like fund utilization, operational compliance, and the database available at AIM for funded schools.
- Track the education and career journey of ATL students such as career options chosen by school alumni post-establishment of ATLs.
- Track the change in mindset of ATL in-charges, principals, and teachers working in ATL schools through the number of projects undertaken in STEM, skills developed in innovation, technology, and entrepreneurship by schoolteachers and students.
- Understand the impact on the community post the introduction of the ATL program towards affinity in STEM, entrepreneurship skills, and career options taken by school students.

2.3 Period of the Evaluation

The reference period to be considered for the evaluation was from the funding year of ATLs from FY 2016- 17 (setting up of the first Atal Tinkering Lab) to FY 2019-20.

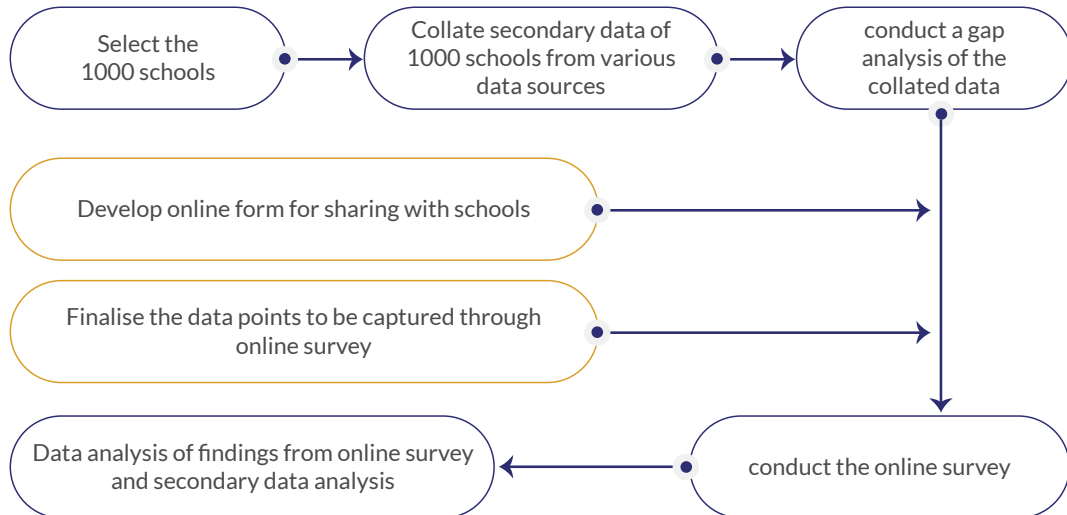
2.4 Evaluation Methodology

The evaluation adopted a mixed-method approach for primary data collection to collate evidence from different stakeholders. Before initiating the primary data collection, a secondary data analysis (of the 1000 ATLs) was carried

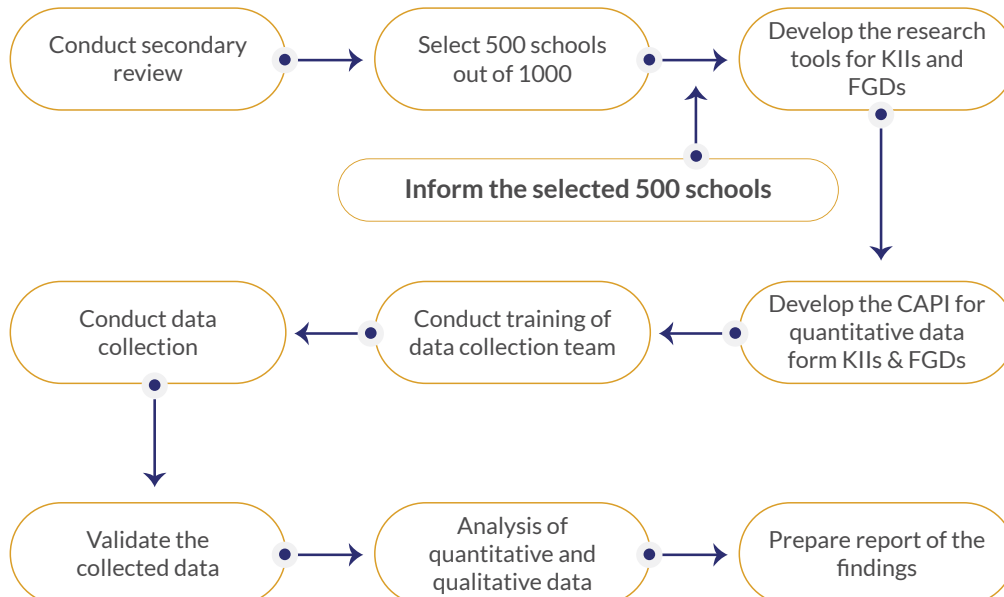
out to review various data sources available on the program implementation and compliance on various parameters.

Figure 4: Evaluation Methodology

Phase 1 - Secondary Research & Online Survey



Phase 2 - Primary Data Collection at School Level



This assessment was guided by the Quality Standards for Evaluation of the Development Assistance Committee (DAC) of the Organization for Cooperation and Economic Development (OECD).

Table 1: Assessment Criteria

Criteria	Description
Relevance	<ul style="list-style-type: none"> The assessment examined the extent to which the objectives of the program correspond to the expectations of the target groups, the needs of the region, and the country's priorities
Effectiveness	<ul style="list-style-type: none"> The assessment explored the achievement of intended results, unintended outcomes, contributing/hindering factors, and lessons learned.
Efficiency	<ul style="list-style-type: none"> Assessed the timeliness, utilisation, and optimal use of resources during program implementation.
Impact	<ul style="list-style-type: none"> The assessment aimed to identify the significant impacts
Coherence	<ul style="list-style-type: none"> Assessed the compatibility or fit of the intervention with other activities by government partners and other development actors. Assessed the compatibility of ATL to the academic setting within the schools.
Sustainability	<ul style="list-style-type: none"> The assessment explored whether the benefits resulting from the program would continue beyond the intervention period and if there has been sufficient buy-in from all the stakeholders. Challenges to achieving sustainability were also explored.
Fidelity	<ul style="list-style-type: none"> The assessment explored whether the program was implemented according to the plan, key changes in intervention design or delivery, and the reasons for these changes.

Source: Athena Infonomics Private Ltd.

Phase 1 of the assessment:

Phase 1 of the assessment was initiated with a detailed secondary analysis of the program data to achieve the following objectives:

- Understanding of the current situation in ATL and existing interventions
- In-depth review of the ATL program

- Understand the overall program institutional structure and interventions

The secondary analysis had dual purposes- firstly the exercise helped the research team to familiarise themselves with the program and the functioning of ATLs; secondly, it helped to align the research tools. Athena team reviewed the following documents as part of the secondary analysis:

Table 2: Documents reviewed

S.N	Documents reviewed
1	Operational manual of ATL
2	Standard guidelines for ATL
3	ATL curriculum
4	ATL training tools
5	Guidelines for setting up of Tinkering Laboratories under Atal Innovation Mission
6	Standard operating procedures (SOP)
7	ATL portal
8	Submitted Utilization Certificate
9	Monthly quarterly and annual reports
10	PFMS (Public Finance Management System) manual

Source: Athena Infonomics Private Ltd.

Phase 1 of the assessment further included secondary data analysis and an online survey among 1000 ATLs.

Table 3: Sample at zonal level

Zone	Sample Size
Central	60
East	140
North	320
Northeast	60
South	320
West	100
Total Sample	1000

These activities were initiated post-selection of the 1000 ATLs. All 4978 schools spread over states in India (all schools funded till March 2020) were considered for the selection of 1000 ATLs. The following sampling plan was adopted.

Sample at the zonal level: All the States/UTs were categorised into six zones and the zone-wise sample was determined by NITI Aayog. The following table details the distribution determined by NITI Aayog.

Sample at the state level: The derived zone-wise sample was proportionally distributed across the states/UTs within the zone basis the number of ATL schools prevalent.

The following table details the state/UT-wise number of ATL schools and the sample size derived.

Table 4: State/UT-wise number of ATL schools and the sample size derived

Zone	States/UTs	Number of ATLs at State/UT	Total ATLs at the Zone	Zonal Level Sample Size	State/UT Level Sample Size
Central	CHHATTISGARH	231	525	60	26
	MADHYA PRADESH	294			34
East	ANDAMAN & NICOBAR ISLAND	10	439	140	3
	BIHAR	71			23
	JHARKHAND	66			21
	ODISHA	185			59
	WEST BENGAL	107			34
North	CHANDIGARH	16	1237	320	4
	DELHI	149			39
	HARYANA	192			50
	HIMACHAL PRADESH	64			17
	JAMMU AND KASHMIR	40			9
	PUNJAB	124			32
	RAJASTHAN	227			59
	UTTAR PRADESH	377			98
	UTTARAKHAND	48			12
North East	ARUNACHAL PRADESH	25	372	60	4
	ASSAM	199			32
	MANIPUR	60			10
	MEGHALAYA	11			2
	MIZORAM	21			3
	NAGALAND	20			3
	SIKKIM	24			4
	TRIPURA	12			2

Zone	States/UTs	Number of ATLs at State/UT	Total ATLs at the Zone	Zonal Level Sample Size	State/UT Level Sample Size
South	ANDHRA PRADESH	359	1540	320	75
	KARNATAKA	360			75
	KERALA	250			52
	PUDUCHERRY	15			3
	TAMIL NADU	400			83
	TELANGANA	156			32
West	DADRA AND NAGAR HAVELI	3	865	100	0
	GOA	17			2
	GUJARAT	335			39
	MAHARASHTRA	510			59
	Grand Total	4978	4978	1000	

Source: Athena Infonomics Private Ltd.

Selection of districts: In the states/UTs the districts were arranged in a descending order based on the number of ATL schools and the highly prevalent districts were selected up to the required ATL schools. In states with a higher prevalence of ATLs, we selected more districts to ensure the spread of the sample. Selection of 'aspirational districts'

was also done to ensure their representation. The following table presents the selected districts and their 'aspirational district' status. A total of 91 districts were selected out of which, 14 were aspirational districts (13%). A list of selected districts and their status of aspirational districts has been given below.

Table 5: Selected districts and the status of their aspirational district

Zone	State	Selected District Name	Aspirational District (Yes/No)	State/UT Level Sample Size
Central	CHHATTISGARH	BALOD	14	No
		MAHASAMUND	7	Yes
		RAIPUR	5	No
	MADHYA PRADESH	BHOPAL	7	No
		RAJGARH	7	Yes
		SAGAR	20	No
East	ANDAMAN AND NICOBAR ISLAND	SOUTH ANDAMAN	3	No
	BIHAR	AURANGABAD	6	Yes
		BANKA	4	Yes
		BHAGALPUR	5	No
		BHOJPUR	3	No
		PATNA	5	No
		BOKARO	3	Yes
	JHARKHAND	EAST SINGHBHUM	11	Yes
		RANCHI	7	Yes
		BALANGIR	9	Yes
	ODISHA	CUTTACK	6	No
		GANJAM	12	No
		KHORDHA	16	No
SUNDARGARH		16	No	

Zone	State	Selected District Name	Aspirational District (Yes/No)	State/UT Level Sample Size
	WEST BENGAL	KOLKATA	9	No
		PASCHIM MEDINIPUR (WEST MEDINIPUR)	7	No
		PURBA MEDINIPUR (EAST MEDINIPUR)	18	No
East	CHANDIGARH	CHANDIGARH	4	No
	DELHI	EAST DELHI	12	No
		NORTH WEST DELHI	12	No
		SOUTH WEST DELHI	15	No
	HARYANA	BHIWANI	14	No
		FARIDABAD	10	No
		GURGAON	14	No
		JIND	12	No
	HIMACHAL PRADESH	KANGRA	8	No
		MANDI	7	No
		SHIMLA	2	No
	JAMMU AND KASHMIR	ANANTNAG	4	No
		BARAMULLA	2	Yes
		JAMMU	3	No
	PUNJAB	AMRITSAR	12	No
		JALANDHAR	10	No
		LUDHIANA	10	No
	RAJASTHAN	AJMER	7	No
		ALWAR	10	No
		CHURU	15	No
		JAIPUR	19	No
		TONK	8	No
	UTTAR PRADESH	ALIGARH	17	No
		ALLAHABAD	10	No
		GAUTAM BUDDHA NAGAR	21	No
		GHAZIABAD	18	No
		GHAZIPUR	17	No
		KANPUR NAGAR	15	No
UTTARAKHAND	DEHRADUN	4	No	
	UDHAM SINGH NAGAR	8	Yes	

Zone	State	Selected District Name	Aspirational District (Yes/No)	State/UT Level Sample Size
Northeast	ARUNACHAL PRADESH	EAST KAMENG	4	No
	ASSAM	BARPETA	8	Yes
		KAMRUP	5	No
		KAMRUP METROPOLITAN	5	No
		LAKHIMPUR	14	No
	MANIPUR	IMPHAL EAST	4	No
		THOUBAL	6	No
	MEGHALAYA	EAST KHASI HILLS	2	No
	MIZORAM	AIZAWL	3	No
	NAGALAND	DIMAPUR	3	No
SIKKIM	EAST SIKKIM	4	No	
TRIPURA	WEST TRIPURA	2	No	
South	ANDHRA PRADESH	GUNTUR	14	No
		KRISHNA	14	No
		VISAKHAPATNAM	26	Yes
		YSR DISTRICT, KADAPA (CUDDAPAH)	21	Yes
	KARNATAKA	BELAGAVI (BELGAUM)	24	No
		BENGALURU (BANGALORE) URBAN	34	No
		MYSURU (MYSORE)	11	No
		UTTARA KANNADA (KARWAR)	6	No
	KERALA	MALAPPURAM	18	No
		PALAKKAD	20	No
		THIRUVANANTHAPURAM	14	No
	PUDUCHERRY	PONDICHERRY	3	No
	TAMIL NADU	CHENNAI	15	No
		COIMBATORE	19	No
		ERODE	25	No
		MADURAI	9	No
		NAMAKKAL	15	No
TELANGANA	HYDERABAD	12	No	
	MEDAK	4	No	
	RANGAREDDY	16	No	
West	GOA	SOUTH GOA	2	No
	GUJARAT	AHMEDABAD	8	No
		SURAT	31	No
	MAHARASHTRA	KOLHAPUR	45	No
		MUMBAI CITY	3	No
		OSMANABAD	11	Yes

Source: Athena Infonomics Private Ltd.

Selection of ATLs: From the selected districts the required number of ATLs were randomly selected. While the selection was random, it was ensured that Eklavya Model Residential Schools (EMRS) meant for Scheduled Tribe children in remote areas were represented in the selected sample. In case of being randomly selected, the schools already covered as part of earlier visits by AIM/NITI Aayog representatives or had 'Returned Grant/Failed Transaction', were replaced to omit duplication of information.

The key findings derived from the secondary data analysis of the selected 1000 ATLs are presented in the next section.

Phase 2 of the assessment:

Phase 2 of the assessment involved visits to 508 ATLs and collection of primary data. The selection of 508 ATLs for the visit was done from the 1000 ATLs identified for the secondary data analysis. The selection followed the following process.

State selection: Within each zone, the number of states to be selected was determined by the sample size to be covered. Athena randomly selected 2 states in zones with 70 or fewer samples while 4-5 states were randomly selected in zones that had more than 70 sample representations. The zonal sample was further distributed proportionally within the selected states. The table below presents the state-wise sample distribution.

Table 6: Number of ATLs selected by zone and state

Zone and State	Sample Size
Central	30
CHHATTISGARH	13
MADHYA PRADESH	17
East	70
ODISHA	44
WEST BENGAL	26
North	160
DELHI	28
HARYANA	31
JAMMU AND KASHMIR	3
RAJASTHAN	37
UTTAR PRADESH	61
Northeast	30
ASSAM	27
NAGALAND	3
South	160
ANDHRA PRADESH	42
KARNATAKA	42
KERALA	29
TAMIL NADU	47
West	50
GUJARAT	20
MAHARASHTRA	30
Grand Total	500

Source: Athena Infonomics Private Ltd.

Selection of districts and ATLS: The number of districts to be selected was determined by the state sample size. A total of 43 districts were selected after considering the inclusion of state capitals/major cities. The derived sample of the state was further distributed proportionately

among the selected districts. The ATLs for the visit were randomly selected from the districts. The following table presents the derived sample at the state and district level.

Table 7: Number of ATLs selected by state and district

Zone/State/District	Sample Size
Central	30
CHHATTISGARH	13
BALOD	10
RAIPUR	3
MADHYA PRADESH	17
BHOPAL	5
SAGAR	12
East	70
ODISHA	44
CUTTACK	5
GANJAM	11
KHORDHA	14
SUNDARGARH	14
WEST BENGAL	26
KOLKATA	9
PURBA MEDINIPUR (EAST MEDINIPUR)	17
Northeast	30
ASSAM	27
BARPETA	6
KAMRUP	4
KAMRUP METROPOLITAN	5
LAKHIMPUR	12
NAGALAND	3
DIMAPUR	3
South	160
ANDHRA PRADESH	42
VISAKHAPATNAM	23
YSR DISTRICT, KADAPA (CUDDAPAH)	19
KARNATAKA	42
BELAGAVI (BELGAUM)	15
BENGALURU (BANGALORE) URBAN	21
MYSURU (MYSORE)	6
KERALA	29
MALAPPURAM	14
PALAKKAD	15

Zone/State/District	Sample Size
TAMIL NADU	47
CHENNAI	10
COIMBATORE	12
ERODE	16
NAMAKKAL	9
West	50
GUJARAT	20
SURAT	20
MAHARASHTRA	30
KOLHAPUR	27
MUMBAI CITY	3
North	160
DELHI	28
EAST DELHI	9
NORTH WEST DELHI	9
SOUTH WEST DELHI	10
HARYANA	31
BHIWANI	11
FARIDABAD	9
GURGAON	11
JAMMU AND KASHMIR	3
JAMMU	3
RAJASTHAN	37
ALWAR	8
CHURU	13
JAIPUR	16
UTTAR PRADESH	61
ALIGARH	14
GAUTAM BUDDHA NAGAR	18
GHAZIABAD	15
GHAZIPUR	14

Source: Athena Infonomics Private Ltd.

It was a requirement to ensure a similar representation of ATLs for the assessment as compared to the entire dataset. The following table presents the representation of ATLs across various categories.

Table 8: Proportional representation of ATLs at various stages of selection

Categories	In the Universe of 4978 ATLs (%)	In the Sample of 1000 ATLs (%)	In the Sample of 500 ATLs (%)
Rural	60	52	54
Urban	40	48	46
Non-Aspirational Districts	87	87	90
Aspirational Districts	13	13	10
Government School	66	62	63
Private School	34	38	37
Co-Ed School	92	92	92
Girls Only	8	8	8
CBSC School	31	37	36
Other Board	2	3	3
State Board	67	60	61
TRANCHE 1 Sanction Time			
2016	5	8	7
2017	2	2	1
2018	16	14	14
2019	75	74	75
2020	2	2	3

Source: Athena Infonomics Private Ltd.



During the visit to the ATLs, it was identified that 15 schools out of the 500, did not have any ATL set up. To ensure overall sample is not reduced much, it was agreed to include additional 8 ATLs from the districts where the data collection was ongoing, and the teams were present.

With the additional 8 ATLs, a total of 508 ATLs were visited by Athena team of which the **planned research activities were conducted in 493 ATLs (those with ATL set up).**

2.5 Primary Data Collection Timeline

The visit to the selected ATLs was carried out in a phased manner with the first phase covering 100 ATLs as pilot. The training of the data collection teams and the subsequent visit to these 100 ATLs were conducted between the 4th to 24th of July 2023. The visit to the remaining ATLs was initiated post the presentation of findings from the pilot and this phase was concluded on 2nd September 2023.

2.6 Key Challenges Faced during the Assessment

- More than one-fourth of the selected ATLs didn't have a contact number or the given number was incorrect. Therefore, the teams had to visit the schools without a scheduled/prior appointment, resulting in many refusals from the schools.
- Despite prior communication about the pending visit, some schools denied entry or there was an absence of key stakeholders (Principal or ATL IC) leading to multiple visits to the schools.
- Disruptions to the data collection in many states due to extreme weather conditions and flood situations led to the closure of schools.
- Recently joined Principals or ATL ICs were not well informed about the ATL, thereby leading to extended time during the visit for interaction and recording of reviews at the ATL level.



OBSERVES ATL COMMUNITY DAY



CREATIVITY



CRITICAL THINKING



INNOVATION



03

Insights from the 500 ATL Visits

Insights gleaned from the analysis of 500 Atal Tinkering Lab (ATL) visits provide a comprehensive understanding of the program's impact and effectiveness. These visits not only shed light on the diverse range of projects undertaken by students but also highlighted the collaborative and innovative learning environment fostered within the ATL.

This comprehensive analysis serves as a valuable resource for further refining the ATL program and amplifying its positive influence on students' holistic development.



3.1 ATL Establishment

This sub-section explores the process of establishing an ATL for a school. It highlights the motivations of the schools behind setting up the ATL and the key influencers which made the setting up of the ATL a possibility, along with time taken and challenges in

3.1.1 Reasons for Setting Up the ATL

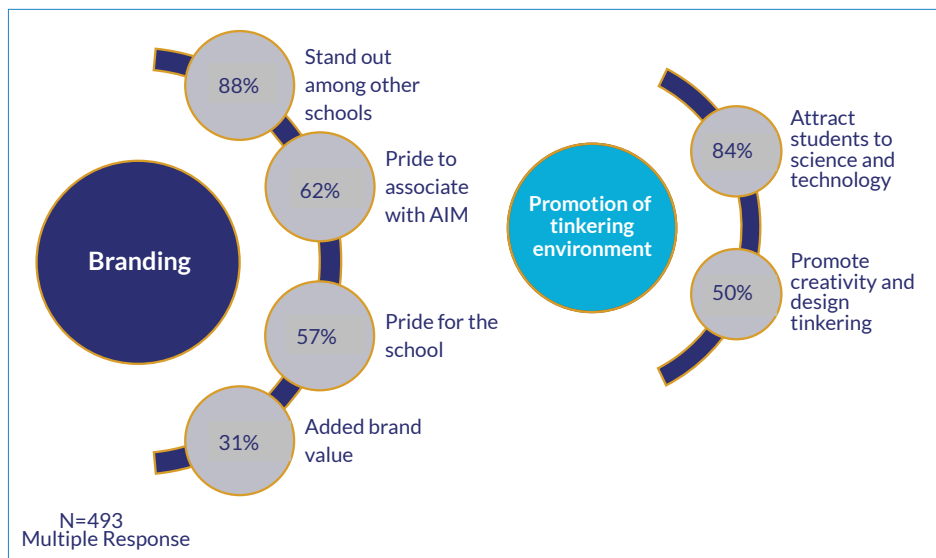
ATL was started as an initiative by AIM to create an ecosystem for STEM education in schools so that future innovators with 21st-century skills could be nurtured, creating 1 million youth innovators. Consequently, schools have leveraged this opportunity to establish the ATLs for a myriad of reasons.

On visiting the schools, **principals were probed regarding the reasons that influenced the schools’ decision to apply for the ATL.** It has been interesting to note that most of

the reasons for which the ATL had been established in the school revolved around branding. The principals reported that the unique branding offered by ATL has been a primary motivator for its introduction in schools. For 88 percent of the principals, ATL was recognized as an opportunity to stand out amongst other schools, for 62 percent, it was a matter of pride to associate with AIM, for 57 percent, establishment of the ATL was a matter of pride for the school, and for 31 percent ATL was a source of added brand value to the school.

Further, ATL was also considered a platform to not only attract students to science and technology (84%), but also to promote creativity and design tinkering (50%). However, the difference between the branding and promotion of tinkering environment factors indicates that the idea of ATL as a platform to ignite tinkering is still gaining momentum.

Figure 5: Reasons for Setting Up the ATL



Source: Athena Infonomics Private Ltd.

The results indicate that it is important to sensitize the schools to the true objectives of ATL right from the inception stage so that ATLs primarily remain a pathway for promoting tinkering. To foster ATLs’ perception as a prime pathway for tinkering and STEM environment, it is suggested that a platform be created to showcase the innovations from various schools, boosting the perception of ATLs as an environment of learning.

3.1.2 Key Influencers in Setting Up the ATL

Principals were asked regarding the stakeholders, influencing the decision to apply for the ATL. It was found that the decision to set up an ATL in the school involved a complex network of stakeholders and an effective collaboration between these stakeholders. The school principal (76%) played a central role in making decisions related to setting up ATLs, followed by the school management (72%).

It is pertinent to mention that science teachers (56%) and other teaching staff (47%) were also instrumental in influencing the setup of ATL in the school.

The involvement of students (30%) and parents (20%) in influencing the decision to set up the ATL does indicate a consultative approach adopted by the schools to establish the ATLs. However, the involvement of parents and students remains low. The qualitative discussions with parents, students and MoCs also indicated that parents were not well versed in the purpose of the ATLs, which could also be one of the reasons for low involvement of parents as key influencers. However, involving parents/PTA in all aspects of ATL operation could enhance its effectiveness. Parental engagement offers two-fold advantages: -

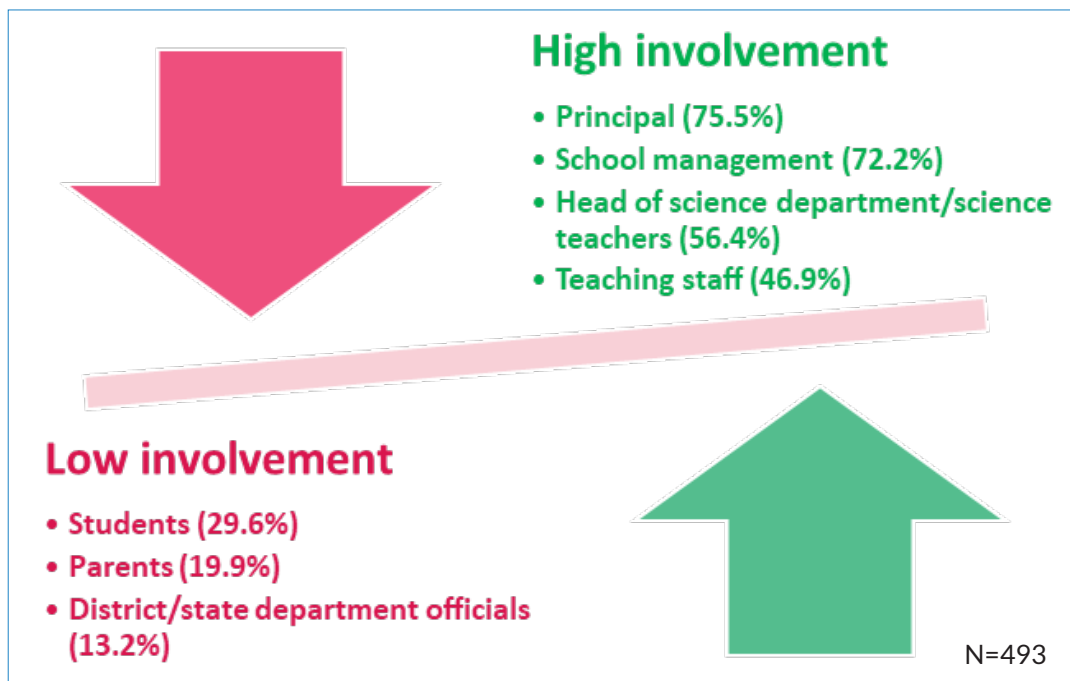
- External accountability for the school to ensure ATL functionality.
- Parental support, can sometimes influence their participation in ATL activities.

It is also pertinent to highlight that for 13 percent of the schools, officials from the district/state departments also played a key role in influencing the decision to set up the ATL. However, one of the key recommendations that emerged from the qualitative discussions with the school authorities was that they were quite keen on receiving help from government officials.



“To make ATLs more effective, I would like to suggest that a nodal agency should be set up at state level, which would be instrumental in helping the ATLs in case there was a problem” - ATL IC, Government, Rural, Chhattisgarh.

Figure 6: Key Influencers for Setting Up ATLs



Source: Athena Infonomics Private Ltd.

It is important to mention here that the Influence of education department officials to set up ATL was mostly reported from schools in Rajasthan, Tamil Nadu, Uttar

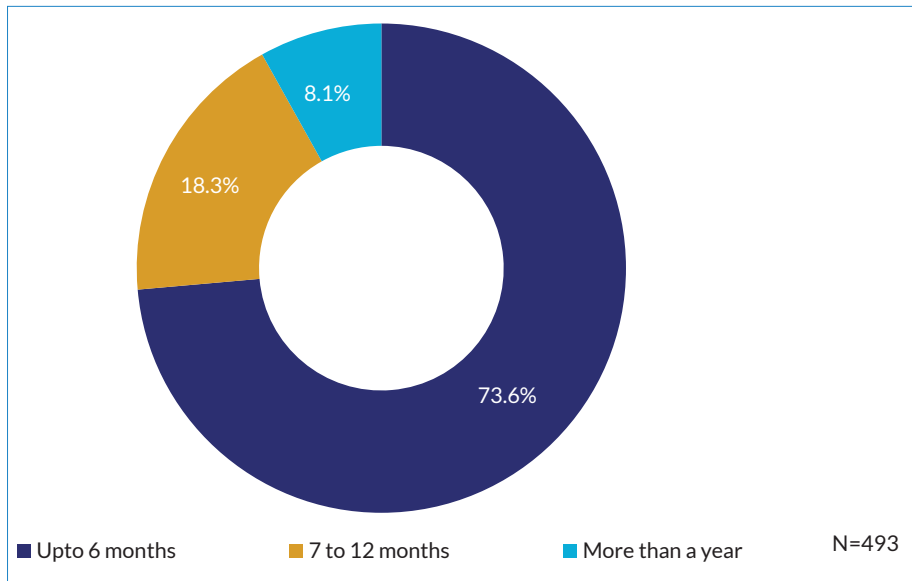
Pradesh, Chhattisgarh. Among the schools that reported influence of officials, 60% were government schools.

3.1.3 Time Taken to Set Up the ATL

ATLs were to be established as soon as possible (between 3-4 months) from the date of release of funds or grant-in-aid from the AIM. Principals highlighted the time that was taken to set up the ATLs. The data shows that 74 percent of schools set up their ATLs within the 6 months. This

indicates a need for AIM to consider allowing a minimum of 6 months for ATL setup. Further, a substantial number of schools also took up to a year to set up ATLs, i.e. 18 percent took 7 to 12 months and 8 percent took more than a year to establish the ATLs.

Figure 7: Time Taken to Set Up the ATLs

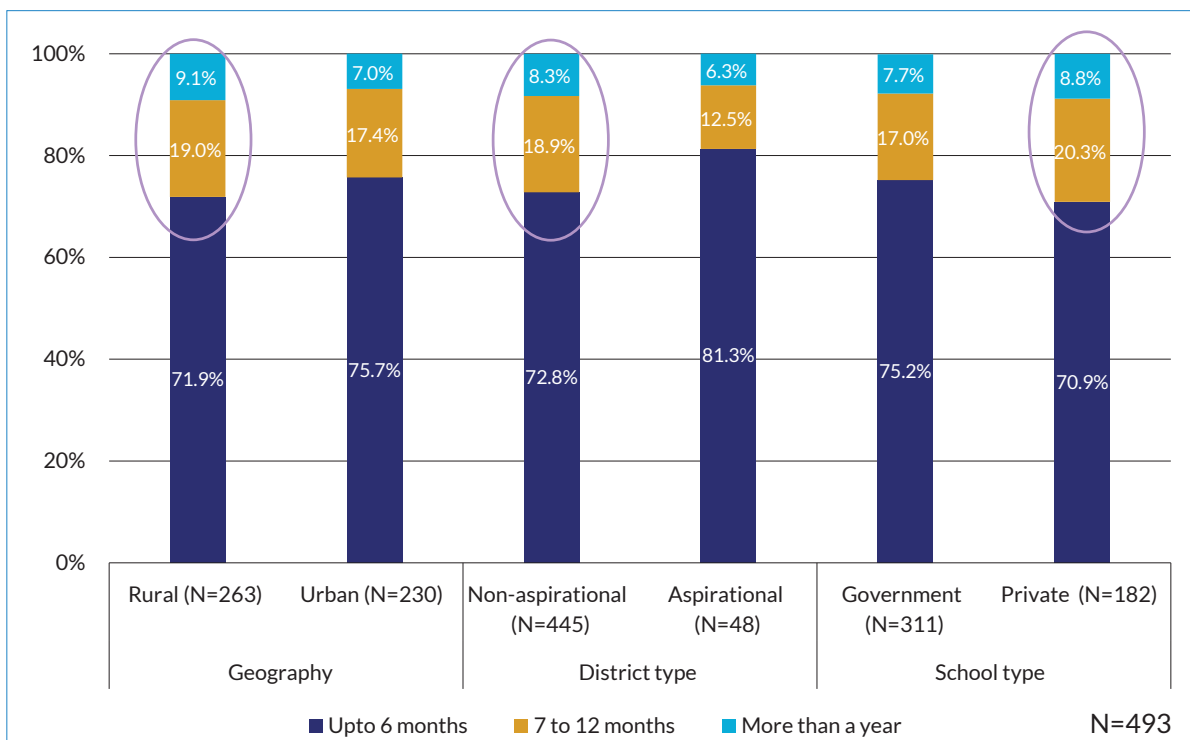


Source: Athena Infonomics Private Ltd.

When compared to their counterparts, a higher proportion of schools in rural, non-aspirational districts and schools

under private ownership required over 6 months to establish ATLs.

Figure 8: Time taken by schools (By Categories)



Source: Athena Infonomics Private Ltd.

3.1.4 Challenges Faced in Setting Up the ATL

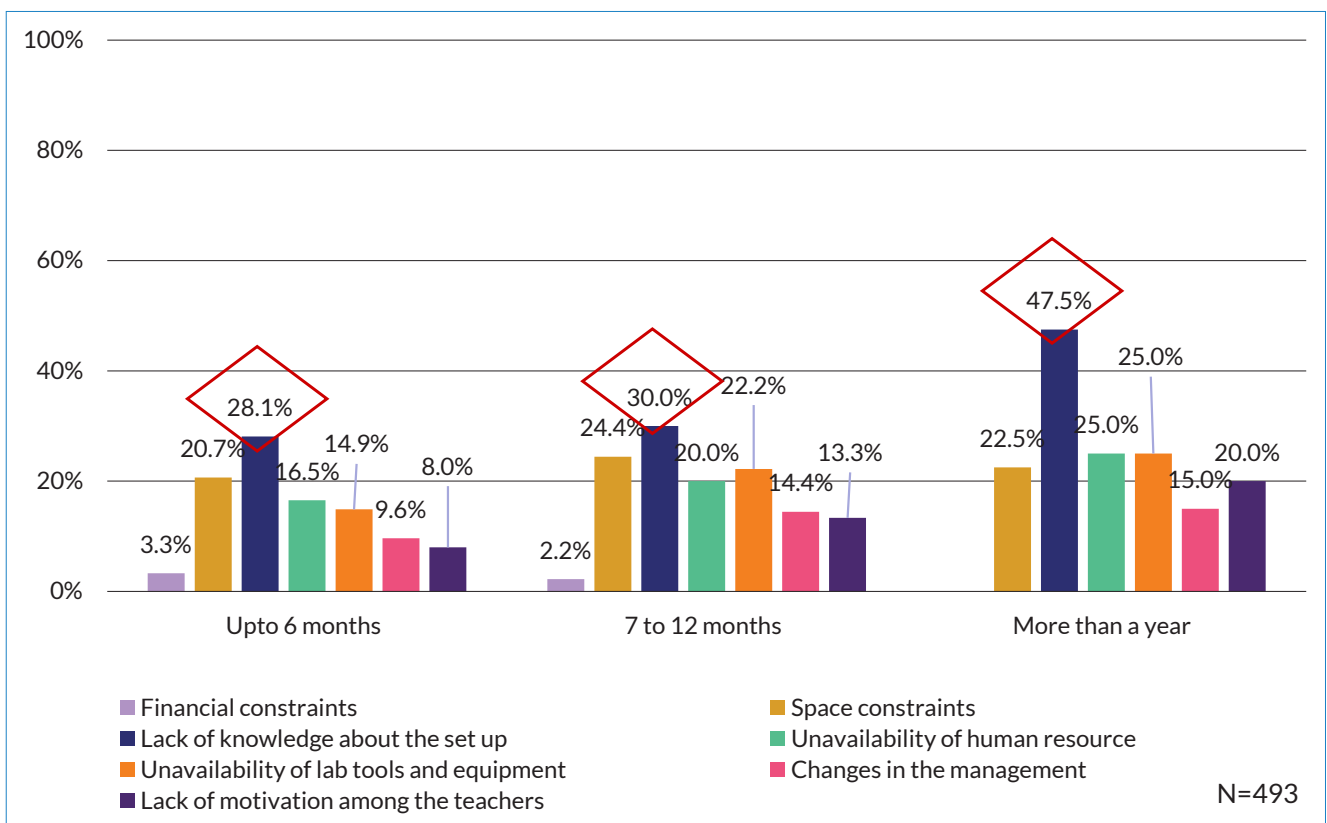
To further understand the reason for 26 percent schools taking more than 6 months to establish the ATLs, challenges faced by schools in setting up the ATLs were analyzed in tandem with the time taken to set up the ATLs.

According to the principals, the primary challenge in implementing ATLs has been the insufficient understanding of their setup, causing significant delays in their establishment. Lack of knowledge emerged as one of the primary challenges for schools not only taking 6 months, but also 7 to 12 months, and more than a year to establish their ATLs. It was also highlighted during

qualitative discussions that due to schools' limited knowledge, they often **heavily rely on vendors** during the initial stages. This reliance subsequently **leads to increased vendor interference** in the operation of ATLs.

Other key obstacles prolonging the construction phase of ATLs include space limitations, a dearth of human resources, and equipment shortages. Space limitations were highest for schools taking 7 to 12 months for ATL set up (24.4%), unavailability of human resources and equipment shortages were highest for the schools taking more than a year to set up the ATLs (25%).

Figure 9: Challenges in Setting Up the ATL



Source: Athena Infonomics Private Ltd.

Challenges were also analyzed across categories, which highlighted that, a higher proportion of private schools (63%) reported no challenges in the setting up of ATL. Lack of knowledge on the setup was highest for the

government schools (36%). It is also pertinent to note that only 39 percent of government schools reported no challenges, a clear indication that they faced most of the challenges as compared to their counterparts.

Table 9: Challenges Faced by Schools (By Categories)

Percentage of Schools Across Categories	Geography		District Type		School Type	
	Rural (N=263)	Urban (N=230)	Non- Aspirational (N=445)	Aspirational (N=48)	Government (N=311)	Private (N=182)
No challenges	48.3%	47.4%	47.6%	50.0%	39.2%	62.6%
Lack of knowledge about the setup	31.2%	28.7%	31.0%	20.8%	36.3%	19.2%
Space constraints	21.7%	21.3%	22.2%	14.6%	27.0%	12.1%
Unavailability of human resource	17.1%	18.7%	18.0%	16.7%	19.6%	14.8%
Unavailability of lab tools and equipment	17.9%	16.1%	16.6%	20.8%	20.3%	11.5%
Changes in the management	10.3%	11.7%	10.6%	14.6%	13.8%	6.0%
Teachers' lack of motivation	9.5%	10.4%	9.0%	18.8%	12.5%	5.5%
Financial constraints	0.8%	5.2%	3.1%	0.0%	1.3%	5.5%

Source: Athena Infonomics Private Ltd.

The findings highlight that lack of knowledge emerged as one of the key challenges in setting up the ATL. However, this challenge was countered by the schools to the best of their ability. Qualitative findings highlight that when schools

embarked on setting up the ATL, it was a new concept, and they made all the efforts to learn and implement. They utilized this opportunity to gain more information about the ATL and apprised their students about the purpose of ATLs.



“When we established ATAL it was new for us. First, we saw it, then we got the information and then we provided it to the children.” - Principal, Private, Urban, Gujarat

*“We have taken workshops. When the lab was first started, we had sessions for all the students in the class. We told them about the role of ATL and the reason for having the ATL in the school. We also told them how we are different from the normal robotics labs in many schools. **We have also received support from AIM.....**So we have explained this to the students and have told them how they can use it ATLs in the future.” - Principal, Private, Urban, Gujarat*

Further, qualitative findings from the discussions with the MoCs highlighted that lack of knowledge on the part of the schools can also be proactively countered by AIM

by popularizing the online resources created by them. Furthermore, online resources were suggested to be created which could highlight specific ATL related procedures.



“AIM should make learning materials in video formats on various ATL related procedures e.g., accessing the ATL portal, uploading Utilization Certificate etc. and publish these online, so that schools can learn these procedures on their own.” - Mentor of Change

The findings from the challenges were in juxtaposition with the findings from the awareness of the guidelines. It found that 83% of ATL ICs were aware of the availability of a guideline to ‘ATL setup’. However, taking into consideration the challenges, there is an observable disconnect between availability of a guideline and its actual usage. Given that ATL is a novel concept, AIM has already made available many audio-visual resources addressing informational issues on the set-up. However, the knowledge gap still

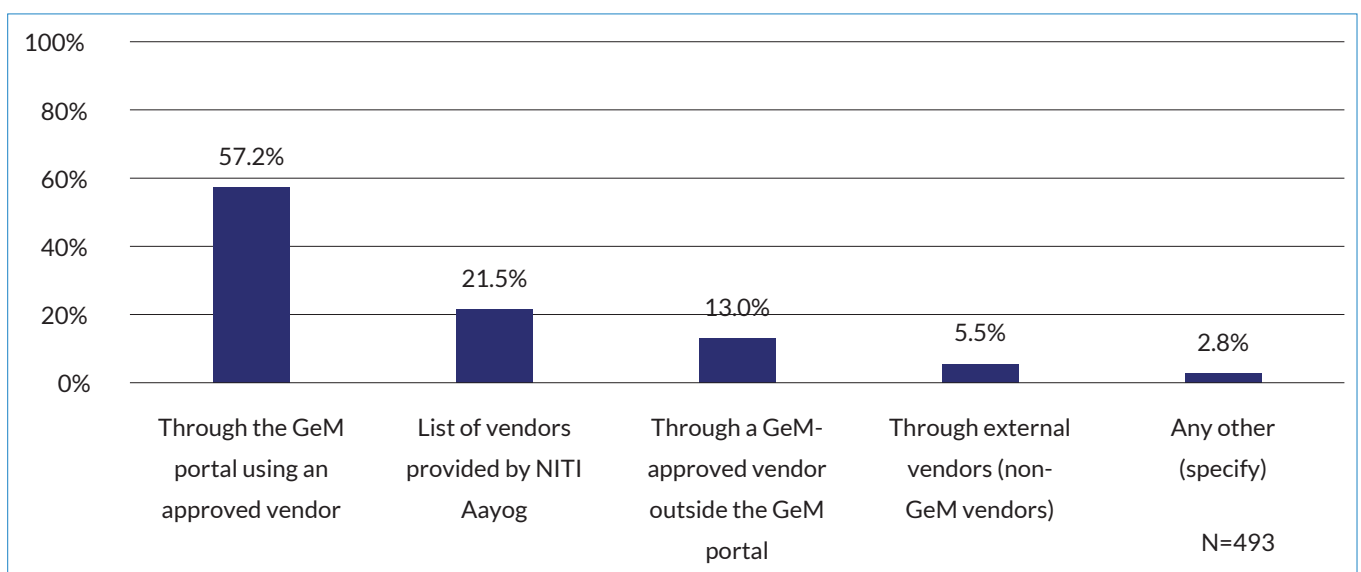
exists. To address this, AIM should make an effort to popularize these audio-visual resources so that the schools do not depend solely on the ATL setup guideline document. A combination of document and audio-visual resources can provide the most comprehensive and effective educational or communication experience. Further, AIM should consider providing orientation for principals once their application for ATL is approved, so that alignment between the guidelines and its usage can be sought.

3.1.5 Procurement Process Adopted

The successful establishment of ATLs hinged on a well-structured procurement process for the tools and equipment for the ATLs. **Principals were probed on the procurement process followed while setting up the ATLs.** It was highlighted that the schools procured the tools and equipment for the ATLs through various channels, although the majority of the schools (57%) procured equipment for the ATL from an approved vendor

through GeM portal, 22 percent of the schools procured through the list of vendors provided by the NITI Aayog, and 13 percent of the schools procured through a GeM (Government-e-Marketplace) approved vendor outside the GeM. 6 percent of the schools procured the tools and equipment through non-GeM vendors, whereas only 3 percent schools procured the tools from other means deemed convenient for them.

Figure 10: Procurement Process for the ATLs



Source: Athena Infonomics Private Ltd.

When analyzed across different categories, it was found that compliance for procuring through GeM- Using an approved vendor was highest for rural schools (62%), followed by the schools in aspirational districts (60%), and government schools (59%). Further, the prevalence of

procuring through non-GeM vendors was also the highest for rural schools (7%), followed by the government schools and schools in non-aspirational districts (6% each).

Table 10: Procurement Process Followed by the Schools Across Categories

	Overall	Geography		District type		School type	
	Total (N=493)	Rural (N=263)	Urban (N=230)	Non-aspirational (N=445)	Aspirational (N=48)	Government (N=311)	Private (N=182)
Approved vendor through the GeM portal	57.2%	62.4%	51.3%	56.9%	60.4%	58.8%	54.4%
List of vendors provided by NITI Aayog	21.5%	22.4%	20.4%	20.7%	29.2%	21.5%	21.4%
Through a GeM-approved vendor outside the GeM portal	13.0%	6.8%	20.0%	13.7%	6.3%	10.0%	18.1%
Through external vendors (non-GeM vendors)	5.5%	6.8%	3.9%	6.1%	0	6.1%	4.4%
Any other	2.8%	1.5%	4.3%	2.7%	4.2%	3.5%	1.6%

Source: Athena Infonomics Private Ltd.

3.1.6 GeM Utilization

GeM utilisation was also understood with the help of secondary analysis of the 1000 ATLs. The data highlights that only 41 percent of ATLs utilized GeM (Government-e-Marketplace) for purchases. Non-utilization was higher

among the urban and government schools. Further analysis revealed that the average purchase through the GeM was worth before INR 6.2 lacs rupees and the total amount spent through GeM was INR 278.08 Cr.

Table 11: GeM Utilization by the 1000 ATLs

	Total (N=1000)	Rural (N=523)	Urban (N=477)	Govt. (624)	Private (376)
Utilized GeM	40.9%	49.1%	31.9%	37.5%	46.5%

Source: Athena Infonomics Private Ltd.

When GeM utilization was analyzed for the 493 ATLs, data highlighted that out of the 400 schools eligible for procuring equipment through GeM, 84 percent of the ATLs did procure the equipment through GeM. Out of the 64 schools, which did not procure equipment through GeM, 20 percent were not aware of the GeM facility, 13 percent felt that GeM had limited options for the items, 11 percent were not registered in the GeM, 9 percent had their own procurement system, and 6 percent found that vendors on GeM had higher prices in comparison to the external vendors. Out of the schools having procured the equipment

through GeM, although 53 percent faced no issues, 21 percent reported it to be a time taking process, 17 percent reported that the after-sale support was poor, and 12 percent reported that there was a delay between placing the order and getting the delivery. Consequently, schools also highlighted some suggestions to improve the GeM, 22 percent recommended that the GeM portal should have a better interface, 23 percent recommended that more vendors should be available on the portal, and 25 percent recommended to reduce the time gap between order placement and delivery.

3.2 Infrastructure at the School and at the ATL

This sub-section explores the prevalence of various infrastructural facilities in the school, which makes it easy for the ATLs to thrive in the school. Further, the section also captures the status of the ATL infrastructure in detail along with adherence to safety practices and branding guidelines.

3.2.1 Presence of Various Laboratories in the school
During the visits, ATL In-charges (ATL ICs) were probed pertaining to the prevalence of various laboratories, other than ATL, in the school. Most of the schools reported the prevalence of computer (92%), chemistry (91%), physics (90%), and biology (87%) laboratories. Mathematical laboratory was prevalent in 59 percent of the schools while a smaller proportion of schools reported dedicated Artificial Intelligence (AI) laboratories (19%).

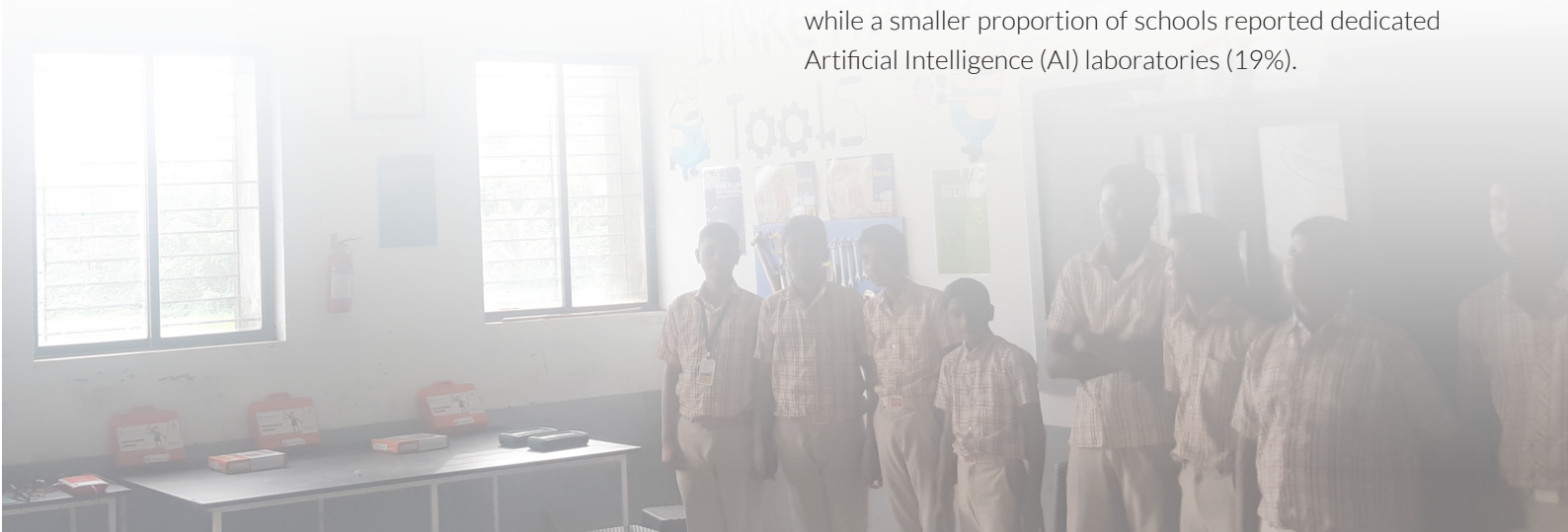
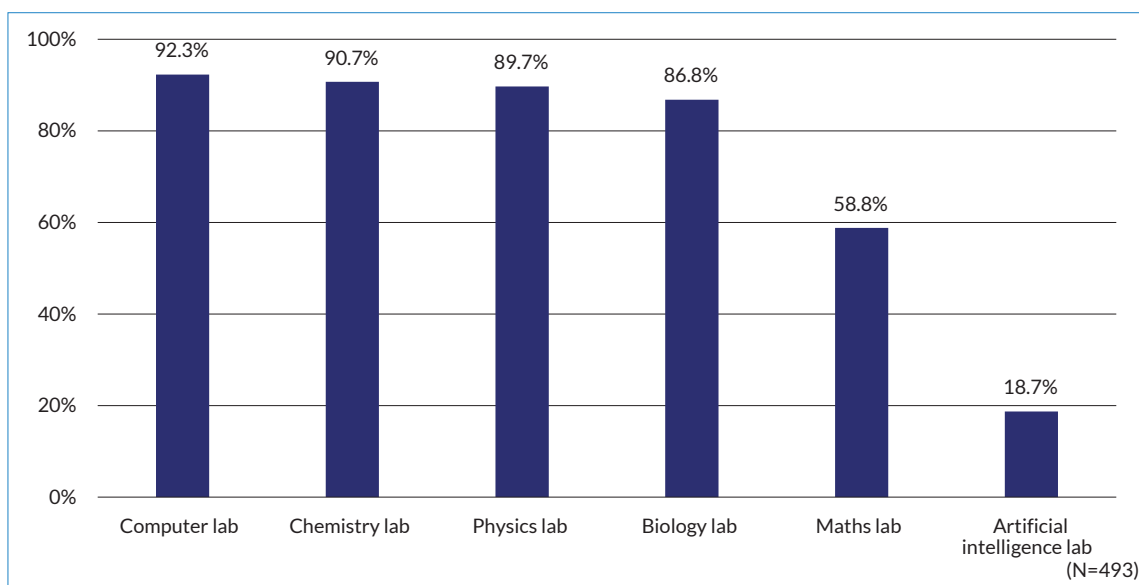


Figure 11: Prevalence of Laboratories in the Schools



Source: Athena Infonomics Private Ltd.

When analyzed across different categories, it was observed that the schools in urban settings; from non-aspirational districts, and the privately managed had a

higher prevalence of various laboratories as compared to their counterparts.

Table 12: Prevalence of Laboratories (By Categories)

	Geography		District Type		School Type	
	Rural (N=263)	Urban (N=230)	Non-Aspirational (N=445)	Aspirational (N=48)	Government (N=311)	Private (N=182)
Computer lab	88.6%	96.5%	93.9%	77.1%	90.0%	96.2%
Chemistry lab	85.9%	96.1%	91.7%	81.3%	90.7%	90.7%
Physics lab	84.0%	96.1%	90.3%	83.3%	89.1%	90.7%
Biology lab	81.0%	93.5%	87.4%	81.3%	85.5%	89.0%
Math lab	50.6%	68.3%	59.6%	52.1%	50.2%	73.6%
Artificial intelligence lab	12.5%	25.7%	20.7%	0	12.9%	28.6%

Source: Athena Infonomics Private Ltd.

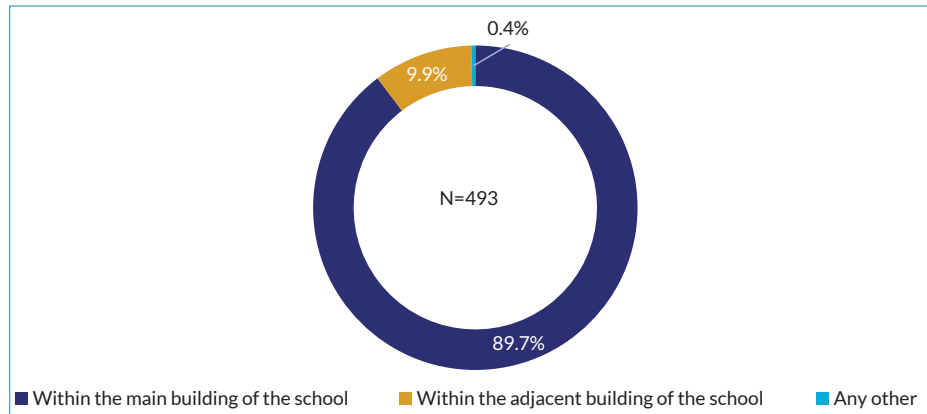
3.2.2 Creating a Sound Infrastructure for the ATL

Location of the ATL

The AIM guidelines emphasize setting up the ATL ‘in/near the main building’ as it enables easy access and frequent visits by the concerned. **ATL ICs were asked about the location of the ATL in their schools.** The findings highlight

high compliance with the operational guidelines, as 90 percent of the schools had their ATL in the main building of the school. The prevalence of ATLs within the main building was highest amongst the private schools (95 %). Only 10 percent of the schools had their ATL situated in a building adjacent to the main school building.

Figure 12: Location of the ATLs



Source: Athena Infonomics Private Ltd.

Table 13: Location of the ATLs (By categories)

	Geography		District Type		School Type	
	Rural (N=263)	Urban (N=230)	Non-Aspirational (N=445)	Aspirational (N=48)	Government (N=311)	Private (N=182)
Within the main building of the school	87.5%	92.2%	89.9%	87.5%	86.8%	94.5%
Within the adjacent building of the school	12.2%	7.4%	10.1%	8.3%	12.5%	5.5%
Any other	0.4%	0.4%	0.0%	4.2%	0.6%	0.0%

Source: Athena Infonomics Private Ltd.

Number of Rooms and Separate Laboratory Space for ATL

Observation of the ATL room revealed that 80 percent of the ATLs were established in a single-room setup, while 20 percent of the ATLs were established across two rooms. The

presence of a single dedicated room was highest among the rural schools (83%) followed by the schools in aspirational districts (86%), while the prevalence of two rooms for the ATL was the highest among the urban schools (25%).

Table 14: Number of Rooms Dedicated to the ATLs

	Overall	Geography		District Type		School Type	
	Total (N=493)	Rural (N=263)	Urban (N=230)	Non-Aspirational (N=445)	Aspirational (N=48)	Government (N=311)	Private (N=182)
One single room	79.8%	82.7%	75.2%	79.1%	85.5%	80.1%	79.1%
Two rooms	20.3%	16.3%	24.8%	20.9%	14.6%	19.9%	20.9%

Source: Athena Infonomics Private Ltd.

The data highlights that the majority of the ATLs have a single dedicated room in alignment with the requirements set by the AIM. The qualitative discussions with the school

authorities also highlighted that schools were inclined towards dedicating a single room to the ATLs, rendering it a place of importance in the school.



"We (school) have made a separate room for the ATL. We have made it in the way it should be." – **Principal, Government, Urban, Maharashtra.**

It is also pertinent to highlight that in addition to the number of rooms dedicated to the ATL facility, **ATL ICs were also asked to clarify whether the ATLs were a standalone laboratory or it shared space with other laboratories of the school.** 96 percent of the ATLs had a dedicated space (laboratory), which again highlights the efforts of the

schools to construct the ATL in alignment with the AIM guidelines and keeping in mind the requirements and needs of the students. The remaining 4 percent of ATLs shared their space with the physics or the computer or the chemistry laboratory.

Table 15: Availability of dedicated space for ATL

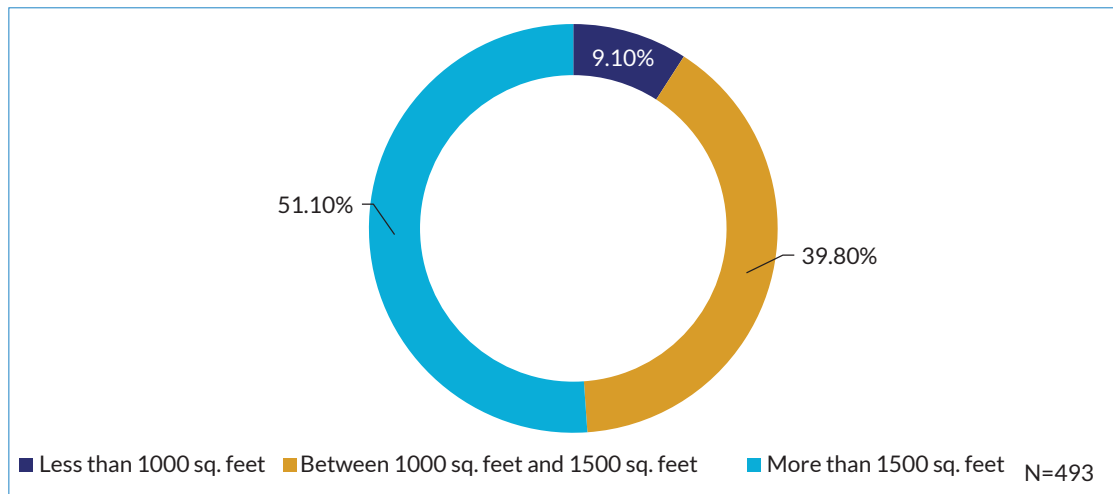
	Overall	Geography		District Type		School Type	
	Total (N=493)	Rural (N=263)	Urban (N=230)	Non-Aspirational (N=445)	Aspirational (N=48)	Government (N=311)	Private (N=182)
ATLs with dedicated space	95.5%	95.8%	95.2%	96%	91.7%	95.5%	95.6%

Physical Space of Layout of the ATL Setup

As per the AIM guidelines, the required built-up space for the **ATLs is 1500 square feet for plains and at least 1000 square feet for hilly areas.** ATL ICs were requested to tell the enumerators about the size of the ATL room. The responses

highlight that 51 percent of the ATLs visited had a size of more than 1500 sq. feet while 40 percent of the ATLs were constructed in the area between 1000 sq. feet to 1500 sq. feet. Only 9 percent of the ATLs were built in a space of less than 1000 sq. feet.

Figure 13: Room Size of the ATLs



Source: Athena Infonomics Private Ltd.

Further, when analysed across various categories, highest proportion of schools in the hilly areas face challenges to adhere to the minimum space requirement of at least 1000 square feet.

Table 16: Room Size of the ATLs (By Categories)

	Geography		District Type		School Type		Region	
	Rural (N=263)	Urban (N=230)	Non- Aspirational (N=445)	Aspirational (N=48)	Government (N=311)	Private (N=182)	Hilly (N=32)	Non=hilly (N=461)
Less than 1000 sq. feet	10.6%	7.4%	9.4%	6.3%	11.3%	5.5%	28.1%	7.8%
Between 1000 and 1500 sq. feet	35.4%	44.8%	39.6%	41.7%	36.3%	45.6%	59.4%	38.4%
More than 1500 sq. feet	54.0%	47.8%	51.0%	52.1%	52.4%	48.9%	12.5%	53.8%

Source: Athena Infonomics Private Ltd.



“Our school has given a lot of space for ATL. We have given a cupboard to tools. We have kept the equipment in good condition and provide the students with the most technical knowledge.” -Principal, Government School, Rural, Gujarat.

The data indicates a high degree of compliance with the ATL room size requirements of AIM, to ensure sufficient space for its operation. The qualitative discussions with the principals and ATL In-charges also highlighted that giving ample space for the ATL was one of the key factors for some of the schools which helped them boost the effectiveness of the ATL. Ample ATL space gave space for the students to come and indulge themselves in hands-on activities. In addition to providing space, principals also highlighted the need to keep the ATL organized and equipped.

It is pertinent to note that 9 percent of the ATLs were functional in a space less than 1000 sq. feet. This indicates a need to encourage the schools to adhere to the recommendations and to prioritize the creation of

larger spaces for their ATLs. This suggestion is driven by the aim to facilitate ATL activities with ease, ensuring that students have sufficient room to engage in hands-on learning, experimentation, and innovation.

ATL Layout Verification

The reported physical space/layout for the ATL was also verified by the enumerators by reviewing the drawing submitted and/or through observation. 100 percent verification was conducted. The verification process revealed that 86 percent of the ATLs having reported the size of more than 1500 sq. feet was verified to be correct, while the remaining 14 percent of the ATLs’ size was not as claimed. For 89 percent of the ATLs having reported the size of between 1000 sq. feet to 1500 sq. feet was verified to be correct.

Table 17: ATL Size Verification

	Verified the ATL Layout*	ATL size not as claimed
Less than 1000 sq. feet	67%	33%
Between 1000 and 1500 sq feet	89%	11%
More than 1500 sq. feet	86%	14%

*Source: Athena Infonomics Private Ltd. * Size for all the ATLs was verified. Verification either after reviewing the drawings or upon confirming the size matches the reported measurements through observation.*

3.2.3 Compliance with Infrastructural Requirements and Safety and Branding Guidelines

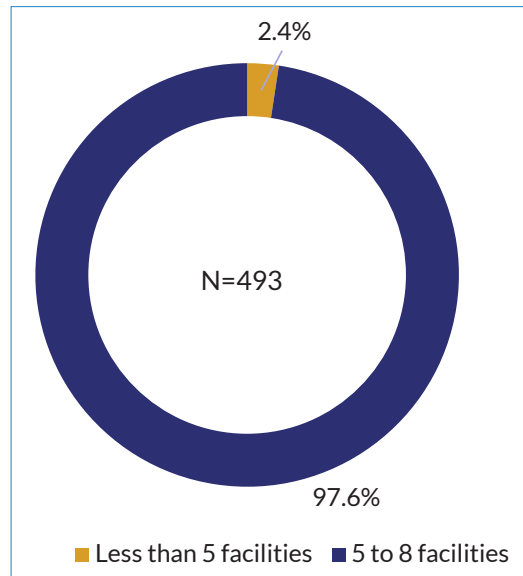
This section highlights the data that had been gathered on observation by the enumerators pertaining to the facilities in the ATL, branding and safety branding compliances.

Availability of Infrastructure in the ATL

For the purpose of analysis, the infrastructural facilities were divided into “Must-have basic facilities”, and “Recommended enhanced facilities”. The figure below

highlights the ATLs’ compliance to “Must-have basic facilities” as per the ATL operational manual were 8 in number and included- Ventilation, Storage facilities, Power supply, Fan/AC/lights/plug points, Furniture, Laptop, Internet in School, and Video conferencing ATLs’. The data shows that most of the ATLs (98%) were well-equipped with most of the essential amenities.

Figure 14: Availability of Basic Facilities in ATLs

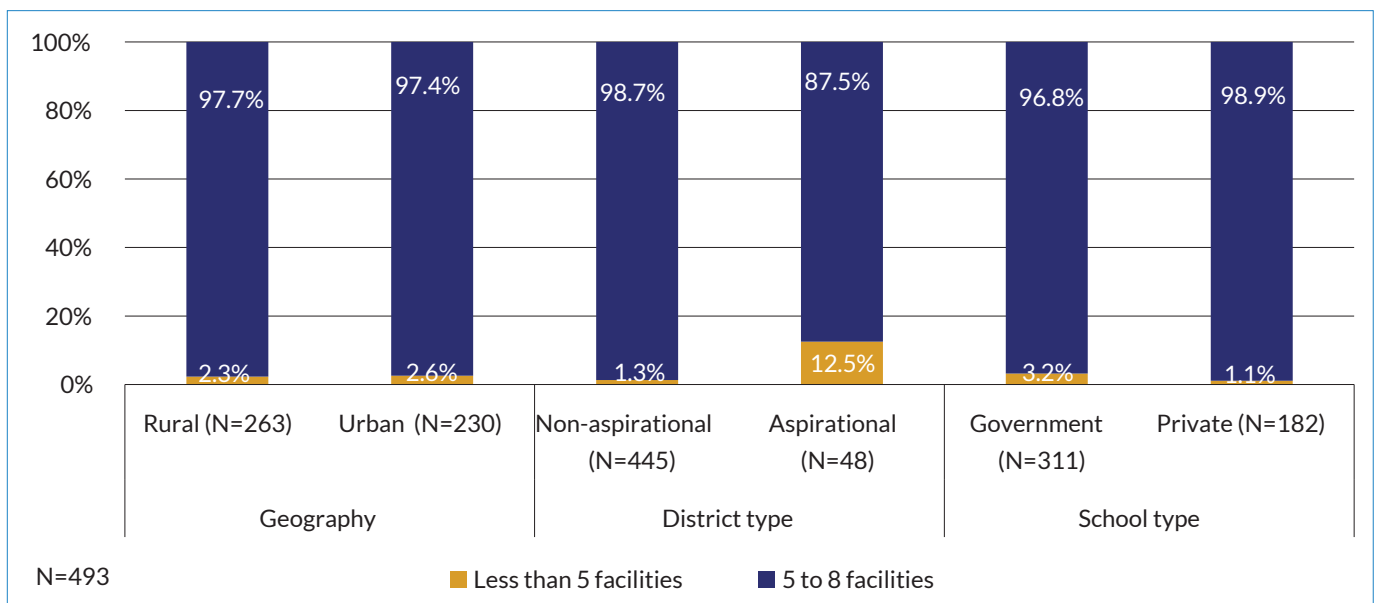


Source: Athena Infonomics Private Ltd.

When analysed across categories, it was seen that although most schools adhered to the requirement of equipping the ATLs with at least 5 to 8 basic facilities, there were schools with fewer than five basic facilities,

which were predominantly located in aspirational districts, underscoring the necessity of collaborating with state and district administrations to assist schools in developing these amenities.

Figure 15: Availability of Basic Facilities in ATLs (By Categories)

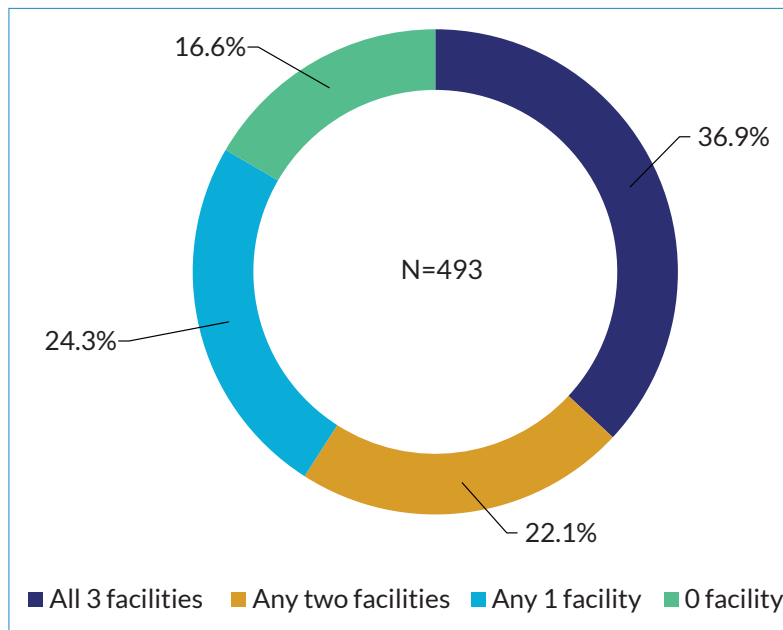


Source: Athena Infonomics Private Ltd.

The figure below shows the compliance to “Recommended enhanced facilities”, which were 3 in number- Wi-Fi (in ATL), Wash basin, Water cooler. Although not obligatory, the existence of these enhancement facilities showcases

the school’s dedication to fortifying the infrastructure of ATLs, with 83% of ATLs possessing at least one such facility.

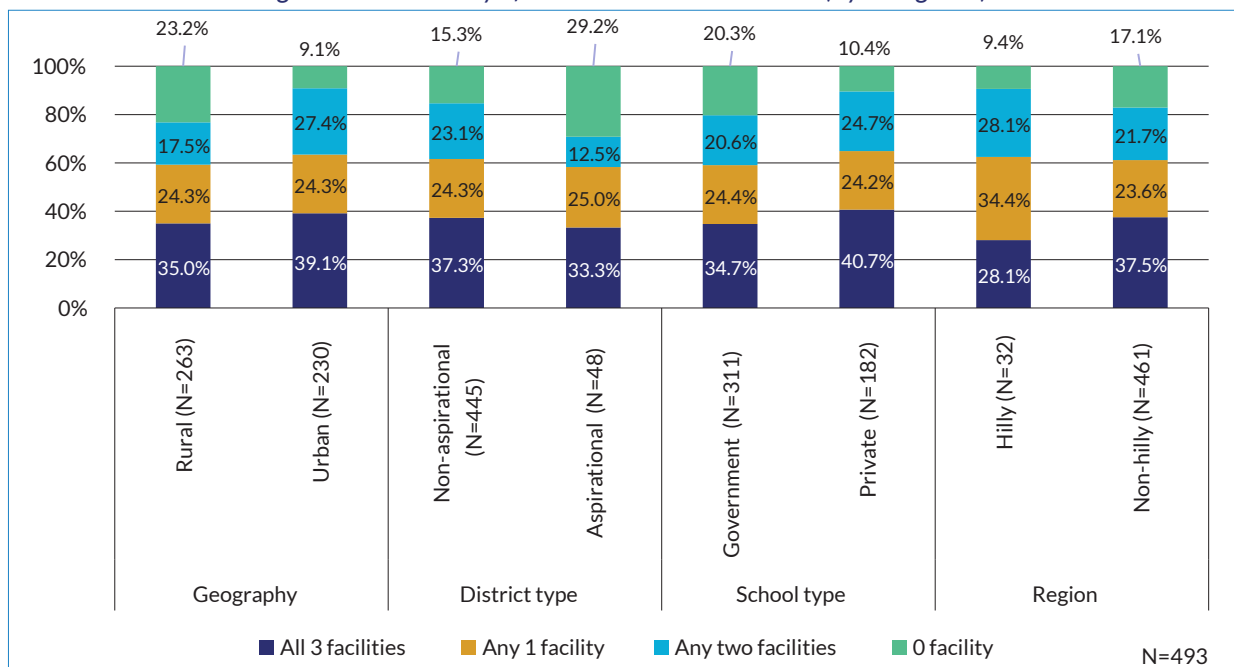
Figure 16: Availability of Enhanced Facilities in ATLs



Source: Athena Infonomics Private Ltd.

When analyzed across categories, it was seen that a higher proportion of schools in rural, aspirational districts, and government institutions lacked enhancing facilities compared to their counterparts.

Figure 17: Availability of Enhanced Facilities in ATLs (By Categories)



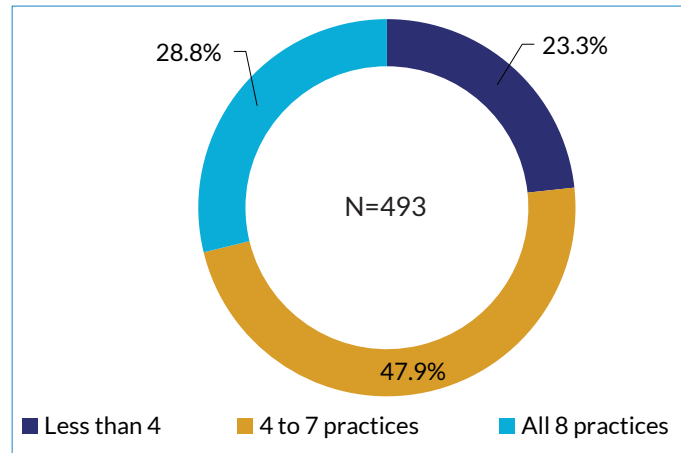
Source: Athena Infonomics Private Ltd.

Safety Protocol Display

ATL Operational Manual is specific on organizing principles to make the space a safe and positive place to work and learn for all its users. For this purpose, AIM has given a list of safety protocols which need to be put on display. These are 8 in number- labelling materials and equipment, proper arrangement of machines and devices, safe disposal of waste,

safety noticeboard, emergency procedures, safety certificate, separate location for soldering stations, and safety guidelines board. To understand the compliance, the display of each of these protocols was also observed by the enumerators. The data shows that 77 percent of the ATLs displayed at least 4 to 8 safety notices as recommended, demonstrating a strong commitment to the well-being of the students.

Figure 18: Safety Protocol Display in the ATLs

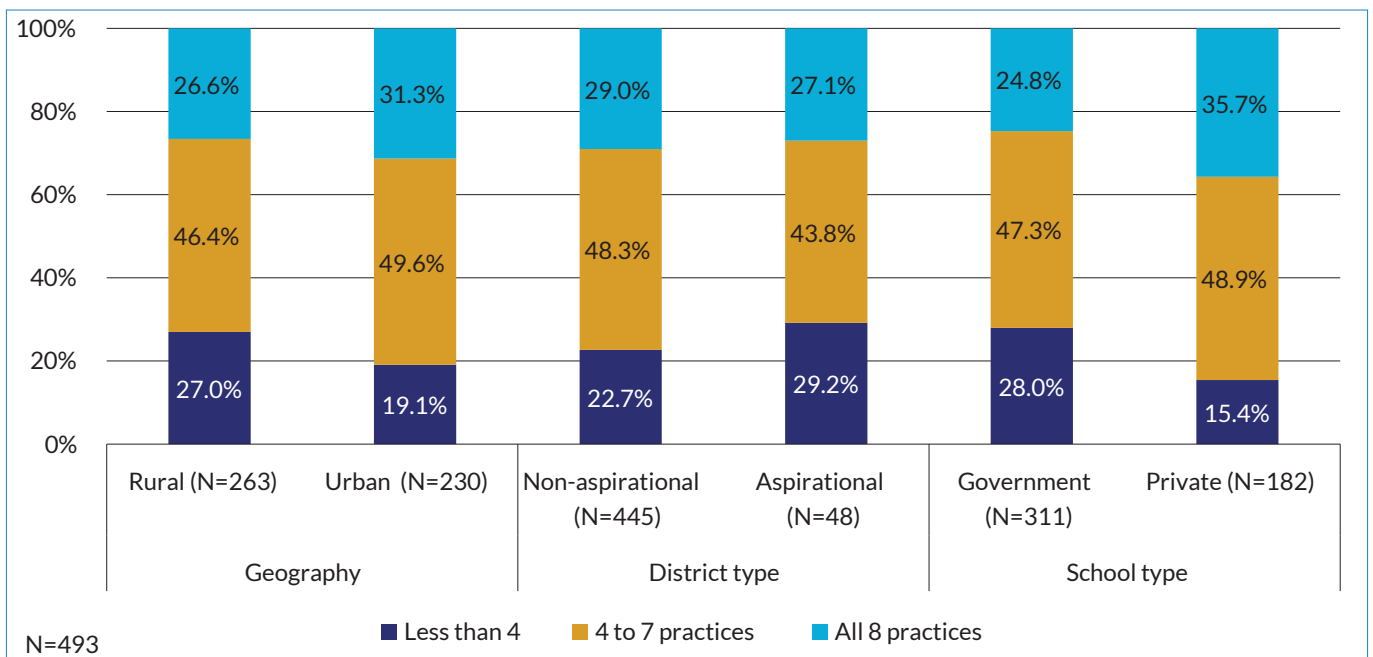


Source: Athena Infonomics Private Ltd.

When analyzed across categories, it was seen that the display of less than 4 safety notices is notable among rural and government schools, and schools in aspirational districts. This indicates room for improvement, which needs to be addressed, as Safety notifications are essential

to create a secure tinkering environment, and there is room for improvement in schools to ensure full adherence to these practices. This can be achieved through consistent engagement with schools and ATL ICs.

Figure 19: Safety Protocol Display in ATLs (By Categories)



Source: Athena Infonomics Private Ltd.

Compliance with Branding Guidelines

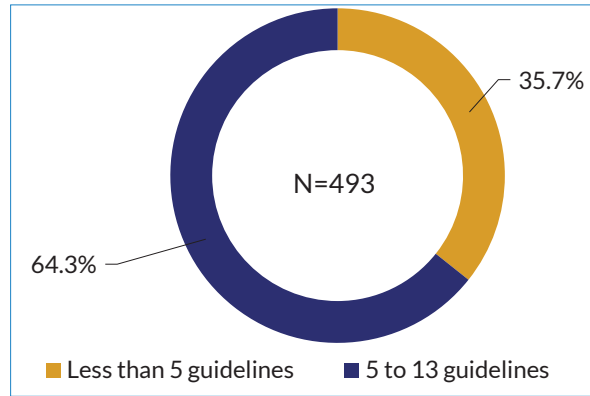
Annexure 7 of the ATL Operational Manual is specific on recommended branding guidelines. These are 13 in number:- I am an Innovator Banner, Gears Design on Wall, Wall posters - 3 posters, For tools station, For Exit, Fire extinguisher instruction, For safety purposes - Notify the instructor of any issues or problems, For safety &

security purposes - instruction for students - STOP - PPE signage (in red), For 3D printer workstation, For 3D printer workstation - Do not operate 3D printers without instructor approval. Injury can occur if equipment misused, For soldering station, For keeping the Lab organized & clean, and Right to Know compliance center box.

Compliance to these guidelines was also observed by the enumerators. The data shows that 64% of ATLs complied with 5 to 13 branding guidelines, underscoring their

emphasis on branding, as reflected in the motivations behind establishing the ATLs.

Figure 20: Branding Guidelines Compliance in ATLs

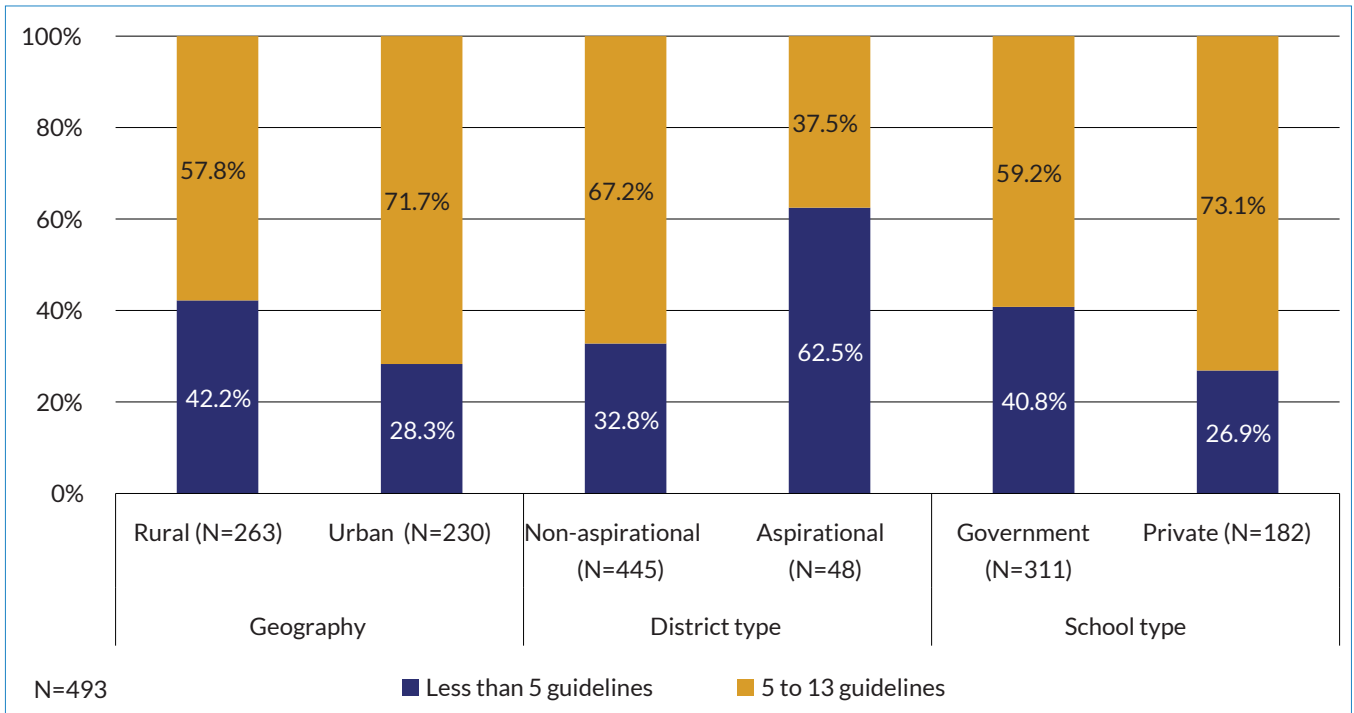


Source: Athena Infonomics Private Ltd.

When analyzed across categories, it was observed that the compliance to branding guidelines was lowest in aspirational districts followed by rural and government schools. It is crucial to motivate schools to adhere to

branding guidelines, as several of these branding elements are intended for the benefit of primary users of ATL (students).

Figure 21: Branding Guidelines Compliance in ATLs (By Categories)



Source: Athena Infonomics Private Ltd.

3.3 Human Resources for ATL

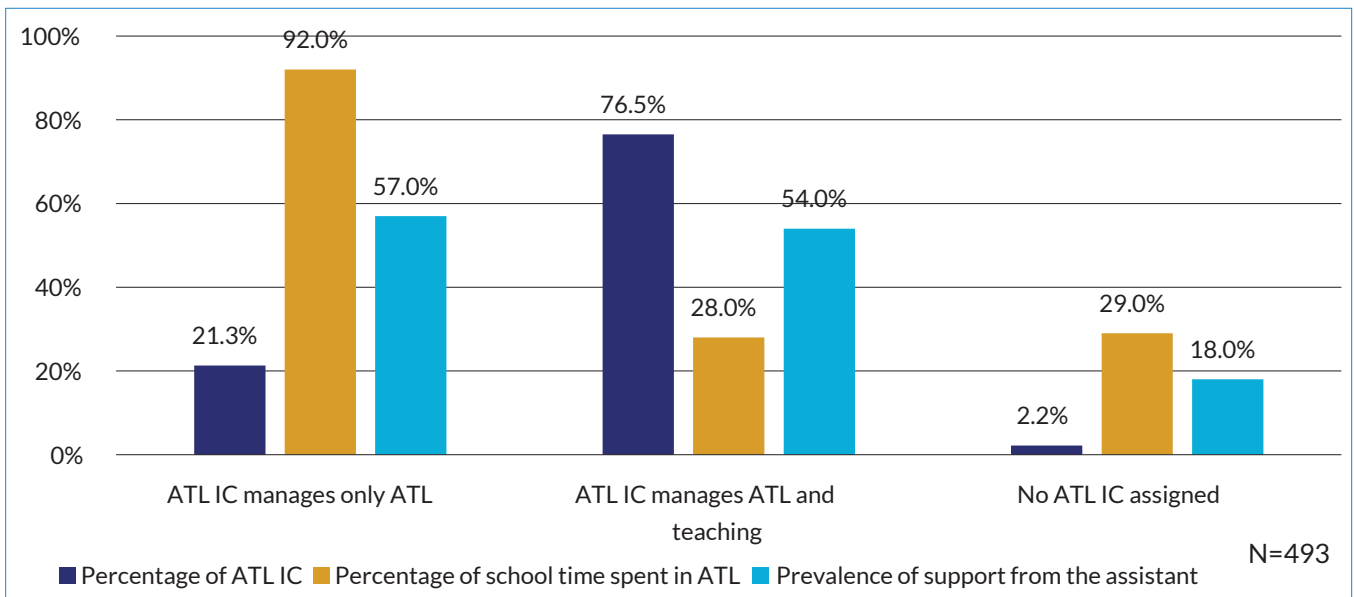
This sub-section details the findings regarding the extend of teachers’ engagement with ATL, availability of ATL in-charge, duties of ATL in-charge, and time devoted to ATL.

3.3.1 Assigned ATL In-Charge and Teachers Supporting ATL

For this section principals of the school were probed on the nature of job of the ATL IC; honorarium paid to the ATL IC; and number of teachers engaged in the ATL in the current academic year. Further, the ATL ICs were probed on the number of hours spent by them in the school, number of days in a week spent in the school, number of hours devoted to the ATL on a regular day, and appointment of assistant trainer for the ATL. AIM guidelines had provided for a provision of appointment of one ATL IC with an honorarium of INR 5,000.

The findings highlight that 21.3 percent of ATLs had appointed exclusive ATL ICs. Exclusive ATL ICs spent 92 percent of their time on the ATL related work, and they had support of assistants in 57 percent of the ATLs. 77 percent of the ATL ICs managed not only the ATL related work, but also teaching responsibilities. For these ATL IC, time spent on ATL related work was only 28 percent out of the time they spent in the schools. In this case an assistant was appointed in 54 percent of the ATLs. In 2.2 percent of the ATLs, no ATL IC was appointed and in this case 18 percent ATLs appointed assistant for the ATLs. In this case, the teachers who managed the ATLs spent 29 percent of their time on ATL related activities.

Figure 22: Work Profile of ATL IC and Prevalence of ATL Assistant



Source: Athena Infonomics Private Ltd.

It is noteworthy to highlight that schools did make an effort to support the ATL with the best of their ability by involving as many teachers as possible, including the ATL ICs. The data highlights that 1 teacher was involved by 53 percent of

the schools, 2 teachers were involved by 28 percent of the schools, and 3 teachers were involved by 20 percent of the schools.

Table 18: Number of Teachers Involved in the ATL

Number of teachers involved in ATL (includes ATL IC)	%
1 teacher	52.7
2 teachers	27.6
3 teachers	19.7

Source: Athena Infonomics Private Ltd.

Involvement of teachers was incentivized by the schools by paying them an honorarium. However, only 26 percent of the schools paid an honorarium to the ATL ICs, and 27 percent of the schools paid an honorarium to the assistants.

Majority (45%) of the schools paid an honorarium of up to INR 1,500 to ATL ICs, 30 percent of the schools paid

more than INR 5,000 to the ATL ICs, and 25 percent of the schools paid INR of up to 1,501 to 5,000. At the same time 14 percent of the schools paid an honorarium of more than INR 5,000 to ATL assistant, 5 percent of the schools paid an honorarium of up to INR 1,500, and majority of the schools (82%) of the schools paid an honorarium of up to INR 1,501 to 5,000 to the ATL assistants.

Table 19: Pattern of Honorarium Payment to ATL IC and Assistant

Pattern in honorarium payment to....		ATL IC	ATL Assistant
% of schools paying any honorarium		26.3%	26.9%
Amount of honorarium (in INR)	Up to 1500	44.6%	4.5%
	1501 to 5000	25.4%	82%
	More than 5000	30%	13.5%

Source: Athena Infonomics Private Ltd.

The findings suggest that the involvement of other teachers in the ATL is minimal, which affects ATLs’ optimal utilization, making the facility inaccessible to students when an ATL IC is absent. Further, exclusive ATL ICs also spent majority of their time on the ATL activities, as required by them, which also ensures that ATL was accessible and also ATL was equipped with requisite manpower to guide the students.

These findings are indicative of a need to assign not only dedicated ATL In-charges to the ATL but also engage more teachers, so that dedicated ATL-related work can be undertaken, creating more innovations, and rendering

more critical, design thinking and problem-solving skills to the students. Qualitative discussions with the mentors also highlighted the need to designate more teachers for the ATL so that more attention could be paid to the ATL. It was further reported that having only one teacher/individual responsible for the ATL created difficulties- firstly absence of ATL in-charge, be it for a shorter duration, impacted the functioning of the ATL, secondly, only one teacher/individual getting all the limelight sometimes leads to friction among the teaching staff leading to deliberate hindrances to the functioning of ATL.



“Schools need to involve more teachers in the ATL, so far, all the things are being done by the ATL In-charge. More teachers will ensure more engagement and continued management of the facility (ATL). We have observed decline in the performance of ATL due to the transfer of the ATL in-charge. It is required to involve all other teachers, at least the teachers who are interested, in the functioning of ATL thereby the whole system doesn’t get affected by the transfer or absence of ATL in-charge.” -Mentor of Change

On the other hand, schools are also gradually understanding the need to devote more human resources to the ATLs. Qualitative discussions revealed the inclination of the

schools to engage more than one teacher especially dedicated to the ATL with STEM background to maintain the quality of instruction within the ATL.



“Although we have one ATL in-charge, we have assigned other teachers as well. One of the teachers are with engineering background, so that the teachers have the knowledge to guide the children and no disturbance in the regular functioning of the ATL.” **Principal, Private, Urban, Chennai.**

Educational Qualification of the ATL In-Charges

ATL ICs were probed on their educational qualifications.

The highest qualification for the ATL In-charge was postgraduation (35%), followed by B.Ed (25%), whereas only 11 percent were graduates. When it comes to their

academic background, 61 percent of them were from the science stream, 11 percent were from the computer science stream, and 9 percent were from the mathematics stream.

Table 20: Qualification of the ATL In-Charge

Highest qualification (N=493)		Stream of higher educational qualification (N=493)	
Postgraduate	35.1%	Science	60.9%
B.Ed (Bachelor of Education)	24.5%	Computer Science	10.8%
Graduate	10.5%	Mathematics	8.9%
Ph.D./Post Doctorate	6.9%	Electronics	5.3%
M.Ed (Master of Education)	5.3%	Engineering	4.1%
M. Phil	3.7%	Commerce	1%

Source: Athena Infonomics Private Ltd.

When probed, most of the Mentors of Change reported that the educational stream of the ATL in-charge is not

the critical aspect rather it is the motivation and interest of the assigned teacher that makes all the difference.



“The ATL in-charge or even the principal having STEM background do not assure successful functioning of ATL. Ultimately it all comes down to the level of motivation and interest the stakeholders (ATL in charge and principal) have. In fact, the ATL in-charge should be selected only in the basis of his/her interest.” - **Mentor of Change**

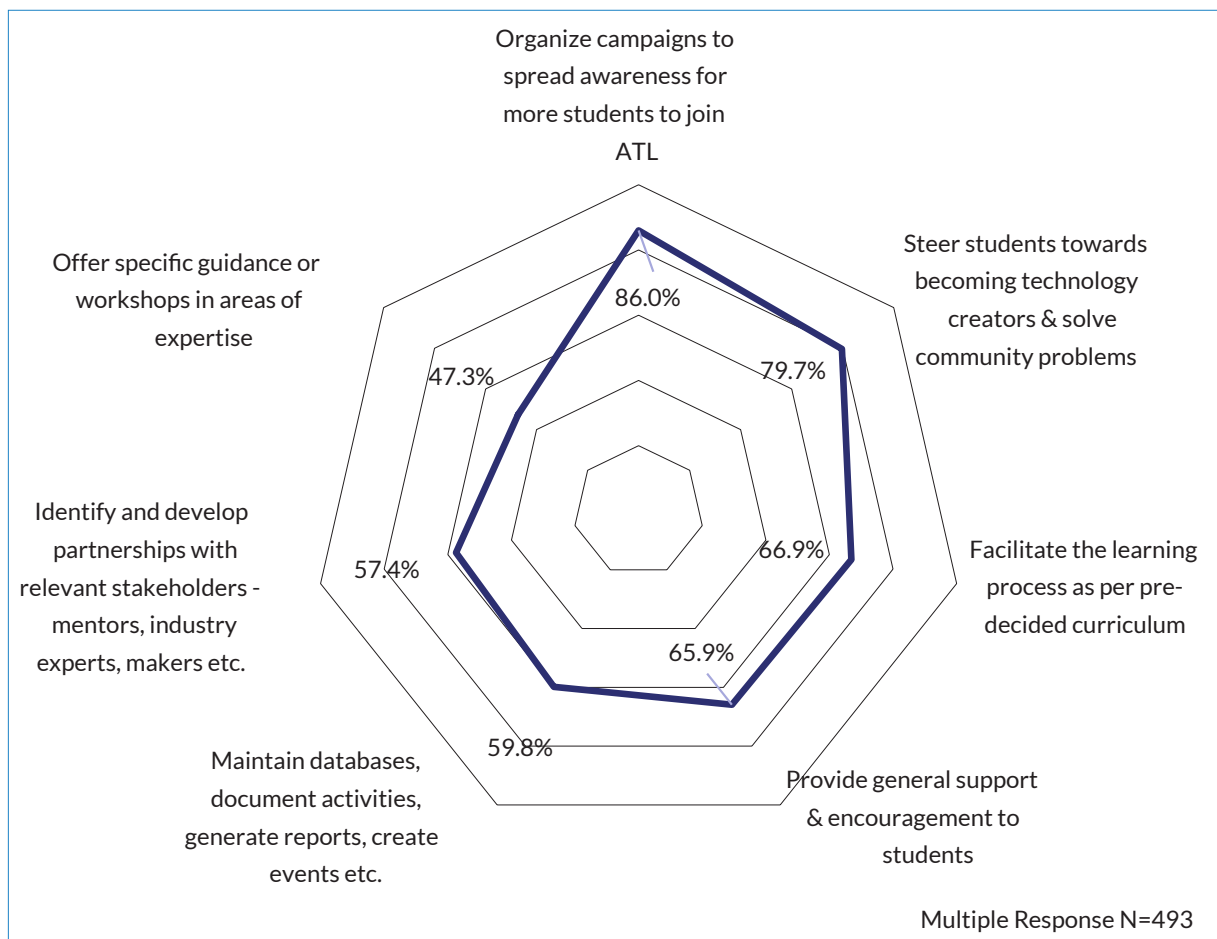
Roles and Responsibilities of the ATL In-charge

AIM has specified the roles and responsibilities of the ATL in-charge and during the visit to the schools, **ATL ICs were probed on their roles and responsibilities performed as the in-charge (wherever assigned) or by the person who manages the ATL (in those schools where there was no assigned ATL in-charge).**

To facilitate a better understanding of the roles performed by the ATL ICs, the responsibilities were divided into two broad categories of “more involved responsibilities” and the “less involved responsibilities”.

The data shows that ATL ICs were more involved in promoting the ATL to attract the students (86%), guiding students to create tech-driven solutions (80%), supporting predefined curriculum for learning (67%), offering students general support and encouragement (66%), manage data, document, report and plan events (60%), fostering partnerships with stakeholders (57%), providing expertise-focused guidance and workshops (47%).

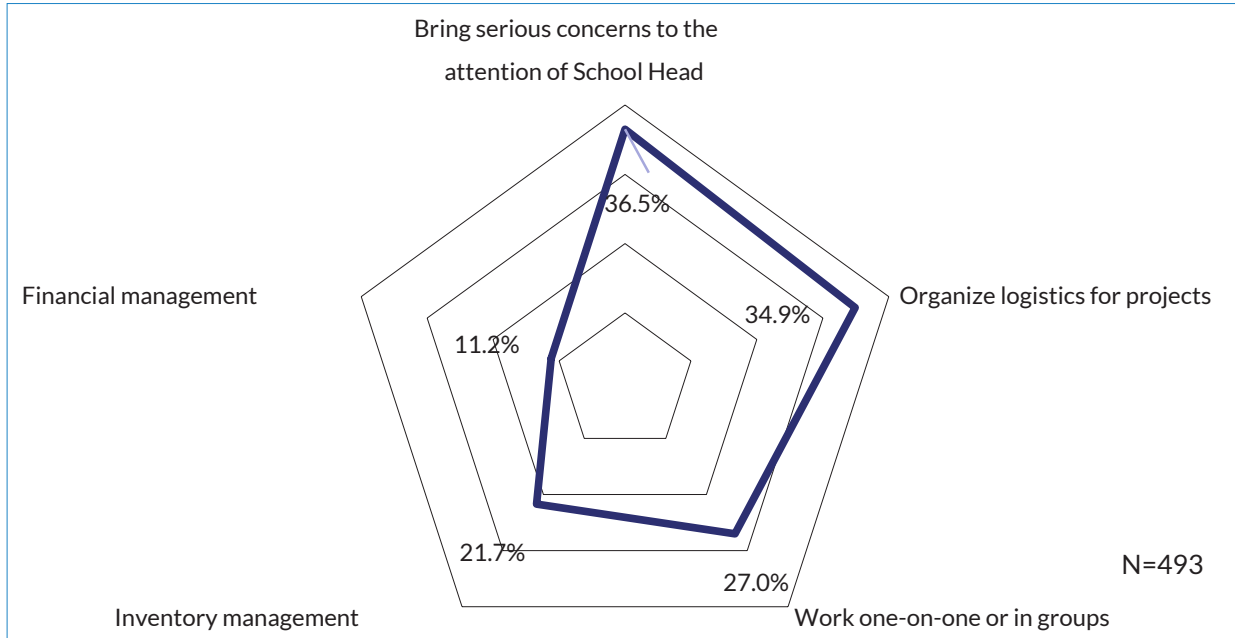
Figure 23: More Involved Responsibilities of ATL ICs



Source: Athena Infonomics Private Ltd.

ATL ICs were less involved in reporting major concerns to the school head (37%), organizing logistics for projects (35%), inventory management (22%), and financial management (11%).

Figure 24: Less Involved Responsibilities of ATL ICs



Source: Athena Infonomics Private Ltd.

The primary responsibilities of ATL ICs center on managing the ATL and raising awareness about its presence, to attract more students to join, thus fostering a tinkering environment within schools. Inventory and financial management responsibilities were reported by fewer than 30 percent of ATL ICs. This aligns with the low awareness of inventory management guidelines, with only 4 percent of ATL ICs being aware of them.

Financial and inventory management tasks are typically handled by their respective sections in the school (finance and administration) with limited oversight from the ATL IC. Therefore, sensitizing the principal and giving the

reigns of financial management to the principal is crucial to ensure compliance with established practices.

Subjects and Classes Taught by the ATL In-Charge

ATL ICs were asked to respond to the classes and the subjects that were taught by them. The majority of the ATL ICs (67%) taught science, followed by mathematics (21%), computer science (16%). Less than 10 percent of the ATL ICs taught electronics, and less than 5 percent ATL ICs taught English, arts/social science, regional language, and commerce. Further, the teaching responsibilities of ATL ICs seemed to be at par across classes from 6 to 12, albeit a little heavy from classes 10 to 8.

Table 21: Subjects and Classes Taught by ATL ICs

Subjects taught by the ATL IC	Percentage
Science	66.9%
Mathematics	20.7%
Computer Science	15.6%
Electronics	7.7%
English	2.8%
Arts/Social science	2.4%
Regional language	1.8%
Commerce	1.0%

Classes taught by the ATL IC	Percentage
Class 11	41.8%
Class 12	40.4%
Class 10	65.3%
Class 9	60.6%
Class 8	51.3%
Class 7	33.7%
Class 6	30.6%

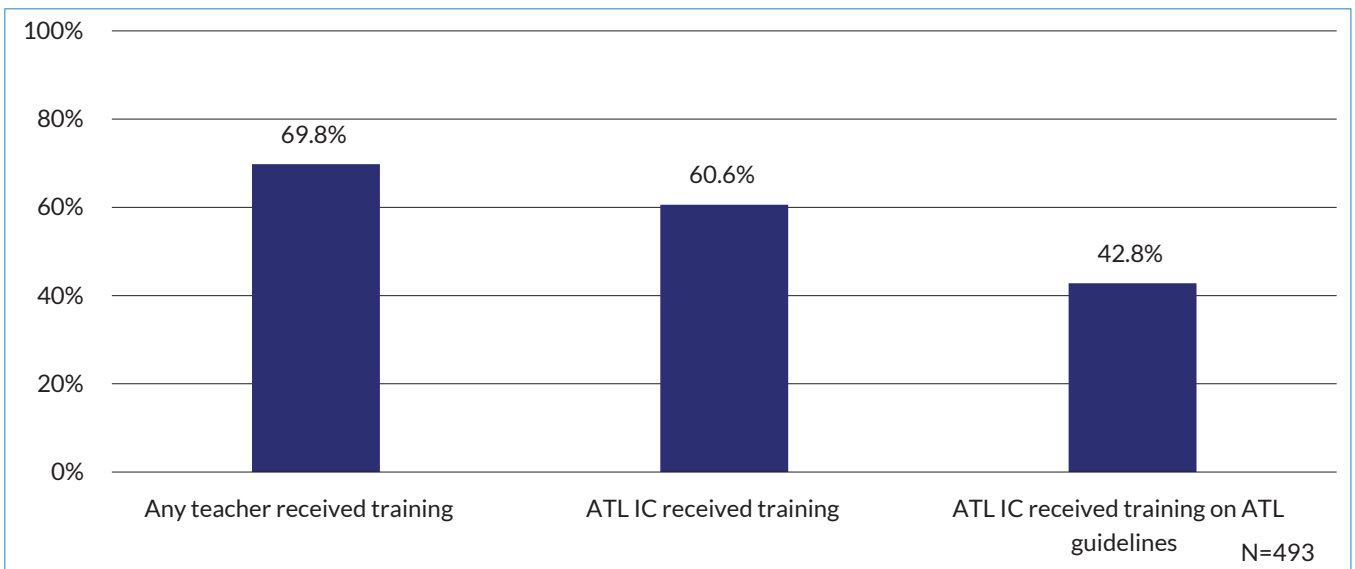
Source: Athena Infonomics Private Ltd.

3.3.2 ATL Related Training for ATL IC and School Teachers

Schools were probed on whether the teachers at the schools attended ATL related training, challenges faced while attending the training and suggestions to improve the training. Further, the ATL ICs were probed on whether they had attended any ATL related training, training related to the ATL related guideline, and were also probed on

their awareness of the ATL related guidelines. While 70% of schools reported their teachers receiving ATL training, only 60% of current ATL ICs received any training, and a mere 42% had training on ATL-related guidelines. This underscores the need for ongoing training and orientation for ATL ICs.

Figure 25: Exposure to ATL Related Trainings by Teachers and ATL ICs

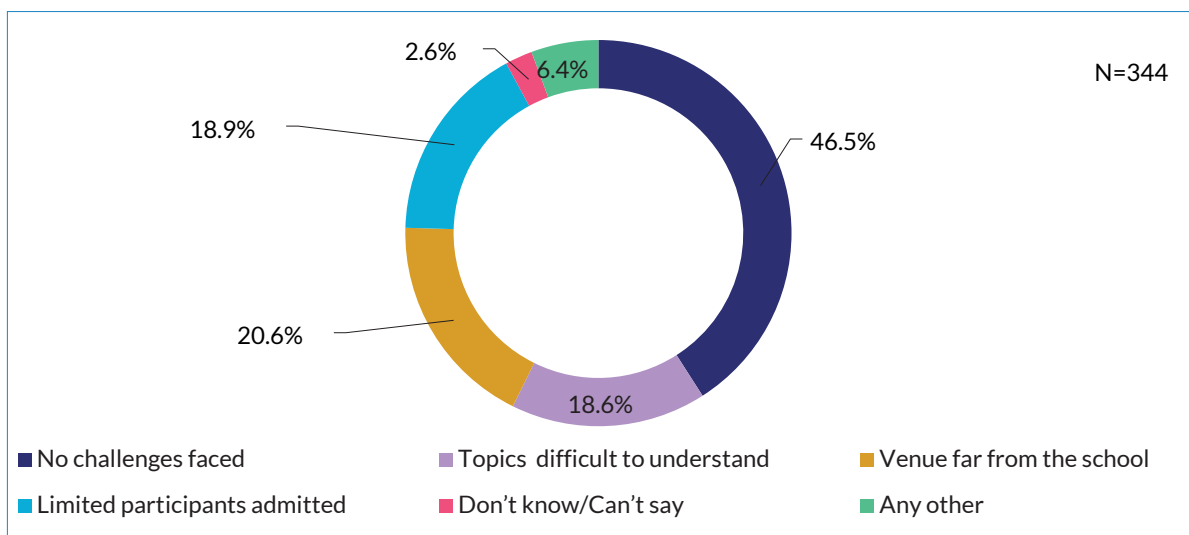


Source: Athena Infonomics Private Ltd.

Out of the 70 percent of the schools (344 out of 493) that reported their teachers having attended the training also highlighted numerous challenges faced while attending the training. Although 47 percent of the schools reported no challenges, there were 21 percent of the schools that

highlighted that the training venue being far away from the school was one of the biggest challenges, followed by the difficulty of the topics covered, and limitations on the number of participants that could attend the training (19% each).

Figure 26: Challenges Faced by the Teachers in ATL Related Training



Source: Athena Infonomics Private Ltd.

Additionally, 70 percent of the schools also made significant recommendations to improve the training. 45 percent recommended inclusion of more practice sessions, 40 percent recommended conducting training sessions closer to the school, 30 percent each recommended inviting sector experts to conduct the class and providing reference materials. Further, 29 percent also recommended providing after training support, and 14 percent complained that duration of the training program was not sufficient.

Since the primary challenges for training attendance were the venue’s location and the complexity of the topic. Organizing satellite training closer to the participants and simplifying the training content could enhance participation and comprehension. A combination of digital and on-ground trainings will enable integration of more participants in the training. Creating a cadre of master trainers will also facilitate better reach of the trainings as envisioned by AIM. These suggestions are quite relevant, since qualitative discussions also highlighted that schools are willing to send their teachers for the training, as it gives them a rare opportunity to learn something new about the ATLs.



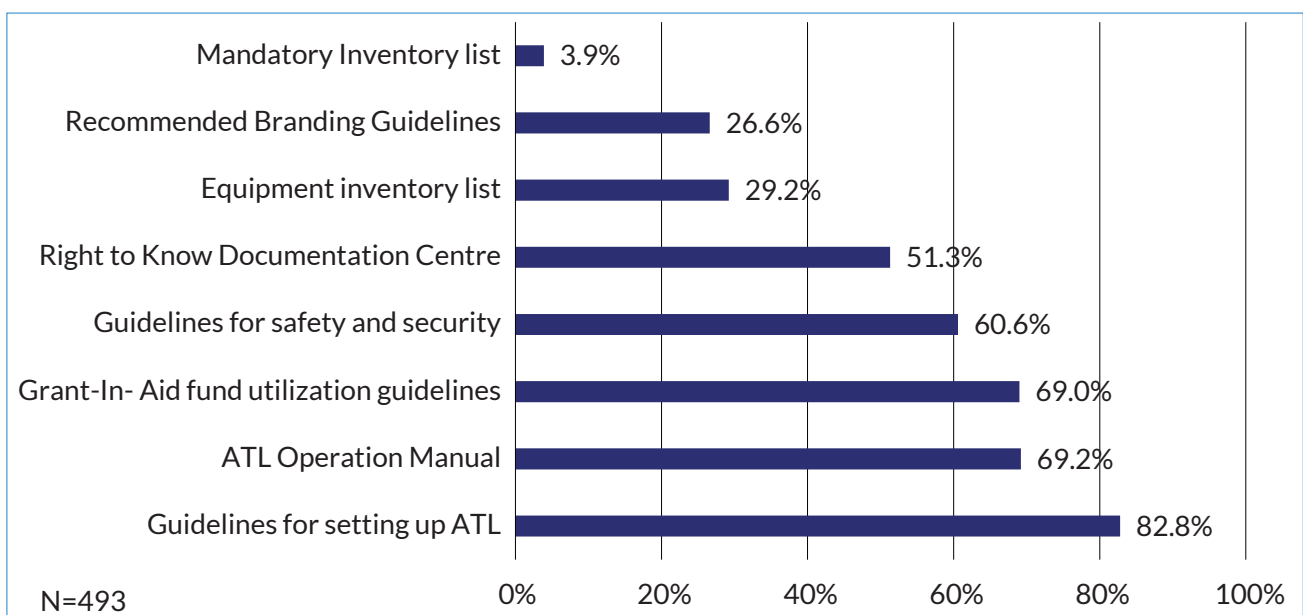
“We are sending the teachers for the workshops more frequently, so that we know new trends that are being incorporated in the ATLs, things that we need to do This not only gives us the knowledge about new things, but we also come to know about practices being undertaken in new schools, so that we can also introduce unique practices within our schools.”

Principal, Private, Urban, Chennai.

It is also pertinent to point out here that although 43 percent of the ATLs had reported attending the training on the ATL related guidelines, the finding seems to be inconsistent with some aspects of awareness of the

guidelines. The findings highlight that although 83 percent of the schools reported awareness about the guidelines for setting up the ATLs, lack of knowledge on the ATL set up was one of the key challenges in setting up the ATLs.

Figure 27: ATL ICs’ Awareness on the ATL Related Guidelines



Source: Athena Infonomics Private Ltd.

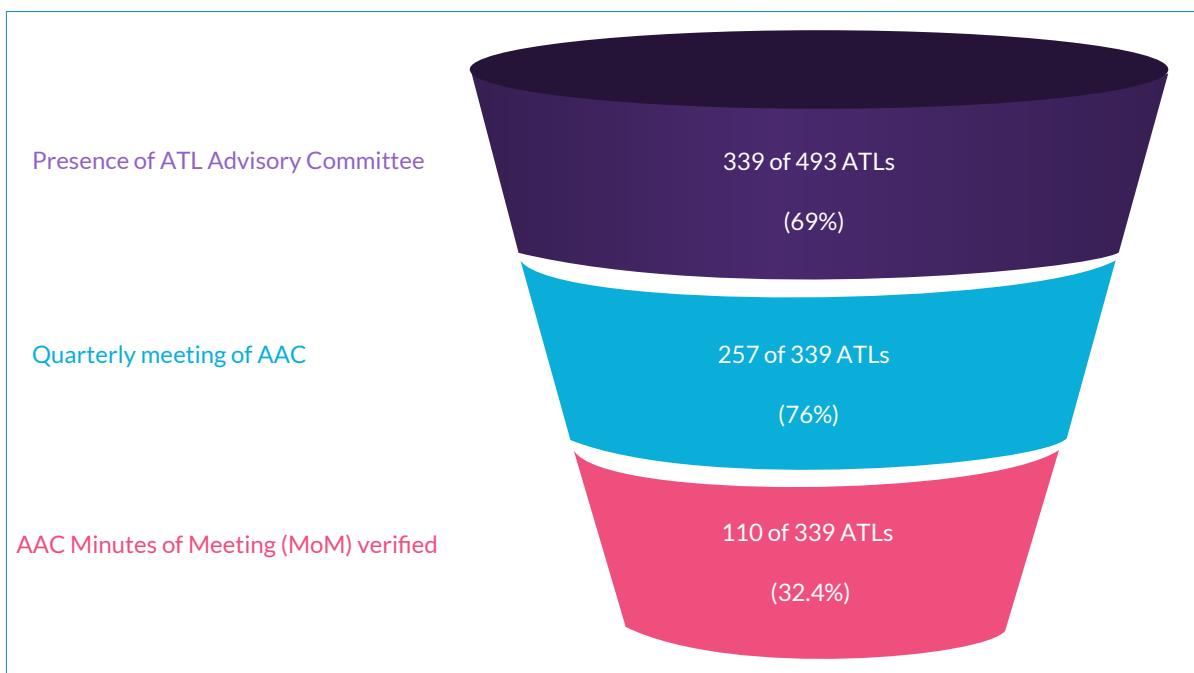
3.4 Enabling Ecosystem

This sub-section presents the findings on the compliance of the ATLs with the enabling ecosystem put into place by the AIM. This section explores the prevalence of ATL advisory committees, Mentor of Change, and the benefit of training received by the schools.

3.4.1 ATL Advisory Committee (AAC)

Principals of the schools were probed on the presence of AAC in the schools, its membership, frequency of the AAC meeting and maintenance of the AAC meeting. While having an ATL Advisory Committee (AAC) is a mandatory element in the ATL ecosystem, it was not established in 31% of the schools. Ensuring the formation of AAC in all ATLs is of utmost importance as such regulatory internal systems would have positive impact on the functioning of ATL in the school.

Figure 28: AAC in Schools



Source: Athena Infonomics Private Ltd.

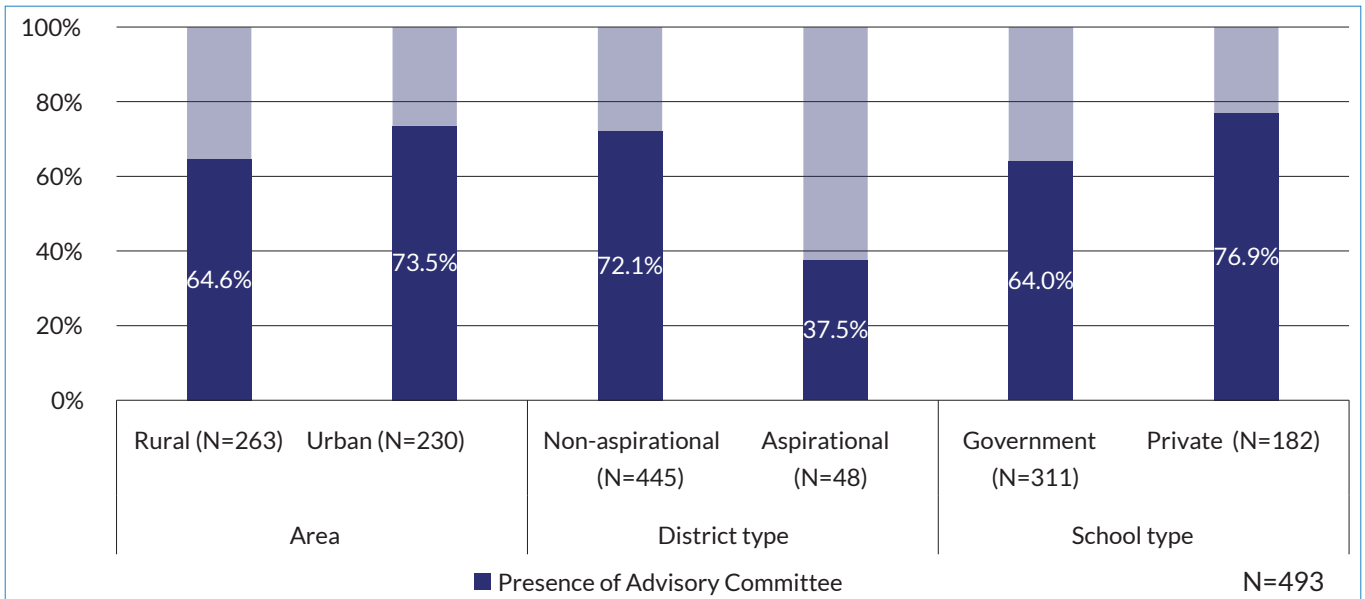
In one-fourth of the ATLs with AAC, quarterly meetings were not held. Only 32% of ATLs with AAC adhere to the maintenance of MoM. It is essential to establish a protocol for AAC activities and make AAC a mandatory component of ATL functioning. MoM verifications were not conducted in the remaining ATLs because the ATL IC or Principal

could not produce it, either due to their inability to locate it or due to misplacement.

When analyzed across categories, the prevalence of AAC was highest among private schools and lowest among schools in aspirational districts, rural areas, and government.



Figure 29: Presence of ATL Advisory Committee (AAC) (By Categories)

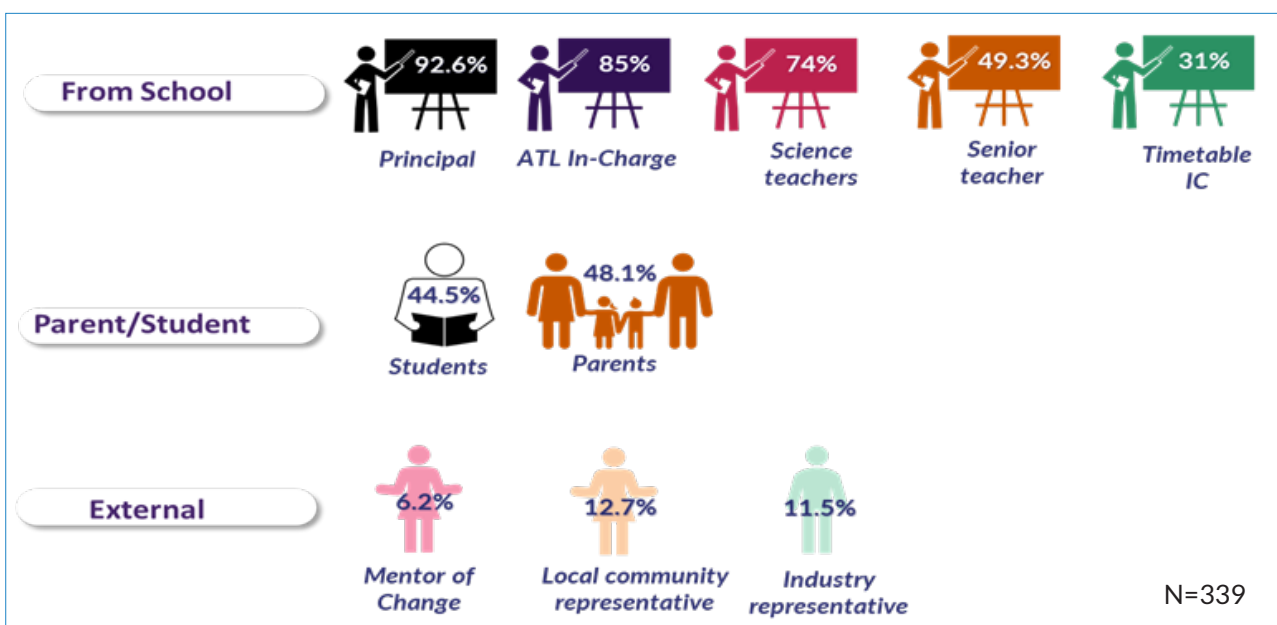


Source: Athena Infonomics Private Ltd.

AAC's required membership as per the AIM's guidelines is:- Principal, Vice Principal and/or Senior member, ATL IC, Representative from local industry / local community / young innovators / reputed academia / alumni / industry and student representative/ 2 parents. The data highlights that out of the 69 percent of the schools that had constituted the AAC, they had made an effort to include the members as per the recommendations. 93 percent

of schools ensured the involvement of the principal in the AAC, while 85 percent of the schools had ensured the presence of ATL in-charge in the AAC. As per the reporting from the schools, the AAC also included science teachers (74%), vice-principal/senior teacher/headmaster (49%), parents (48%), student representatives (45%), and industry representatives (12%).

Figure 30: AAC's Membership



Source: Athena Infonomics Private Ltd.

The data aids in concluding that schools have faced challenges in the formation of AAC. To address the challenge of formation of AACs in government and other schools, schools may be encouraged a flexibility to add ATL related agenda points in the existing committees of the schools like School Management Committees (SMCs).

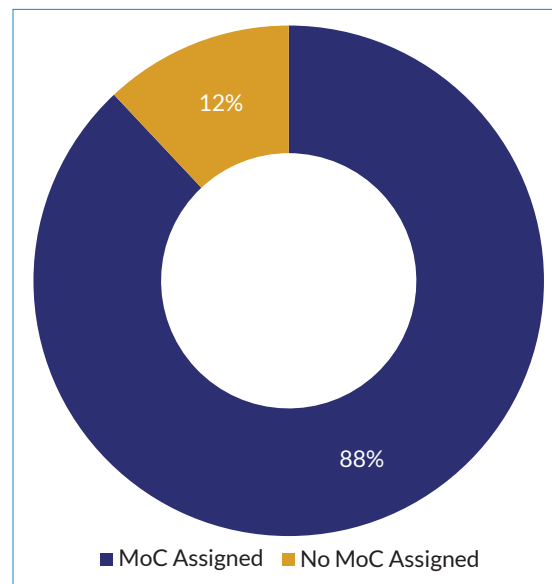
Further, with regard to the AAC’s membership, even with the presence of the principal and ATL IC, the AAC remains incomplete, with minimal representation from parents, students, and external stakeholders. Schools should be motivated to exert greater effort in including industry,

community, and MoC representation in the AACs. Such diverse representation could catalyze enhanced performance and accountability. While the ATL operational manual provides suggestions for AAC composition, it may be beneficial to specify a list of ‘must-have’ members to enhance compliance.

3.4.2 Mentorship and Guidance

The Mentor of Change (MoC) status was first analyzed for the 1000 ATLs. The data shows that 88 percent of the ATLs were assigned with MoC.

Figure 31: ATLs’ MoC and Adoption Status (1000 ATLs)



Source: Athena Infonomics Pruvate Ltd.

For the purpose of analysis of 493 ATLs, **school principals were probed on the appointment of Mentor of Change (MoCs), external experts, frequency of engagement with MoCs, kind of support being received from the MoCs, challenges faced with MoCs, and suggestions for the improvement of the MoCs.** Although not mandatory, the Mentor of Change (MoC) is a key component introduced to provide mentorship, guidance, and industry-relevant

exposure to the students. Since AIM has the data pertinent to the MoC allocation for the ATLs, analysis was conducted to understand the status of the MoC allocation for the 493 ATLs visited. According to the AIM data, 88 percent of ATLs visited were assigned with MoC. Further analysis of the data from the interaction with school stakeholders revealed that of the 432 ATLs with an assigned MoC, only 41 percent could confirm the same.

Figure 32: Presence of Mentor of Change (MoCs)



Source: Athena Infonomics Private Ltd.

The discussions with Mentors of Change provided insights into this variation. The MoCs and Regional MoCs reported that many of the MoCs were not performing their duties and were in a defunct status. The MoCs reported multiple reasons for such a situation-

- 1) The MoCs came on board with different expectations such as remuneration for their service, high recognition, etc.
- 2) Many schools did not allow the MoCs to contribute as they were reluctant to allow an external intervention

- 3) The vendors who supplied the ATL influenced the school to prevent MoC’s engagement
- 4) Lack of interest from the school stakeholders to engage with the MoC

The MoCs also reported that a lack of proper introduction of the MoC to the ATL also impacted their engagement with ATLs. They reported that in most cases, the formal e-mail from AIM to the ATL informing them about the allocation of an MoC was overlooked or missed thereby creating confusion and mistrust.



“AIM should incentivize the mentors’ participation by offering them financial support when they need to travel for ATL related activities. The absence of such initiatives has resulted in a considerable decline in the engagement of MoCs.”-

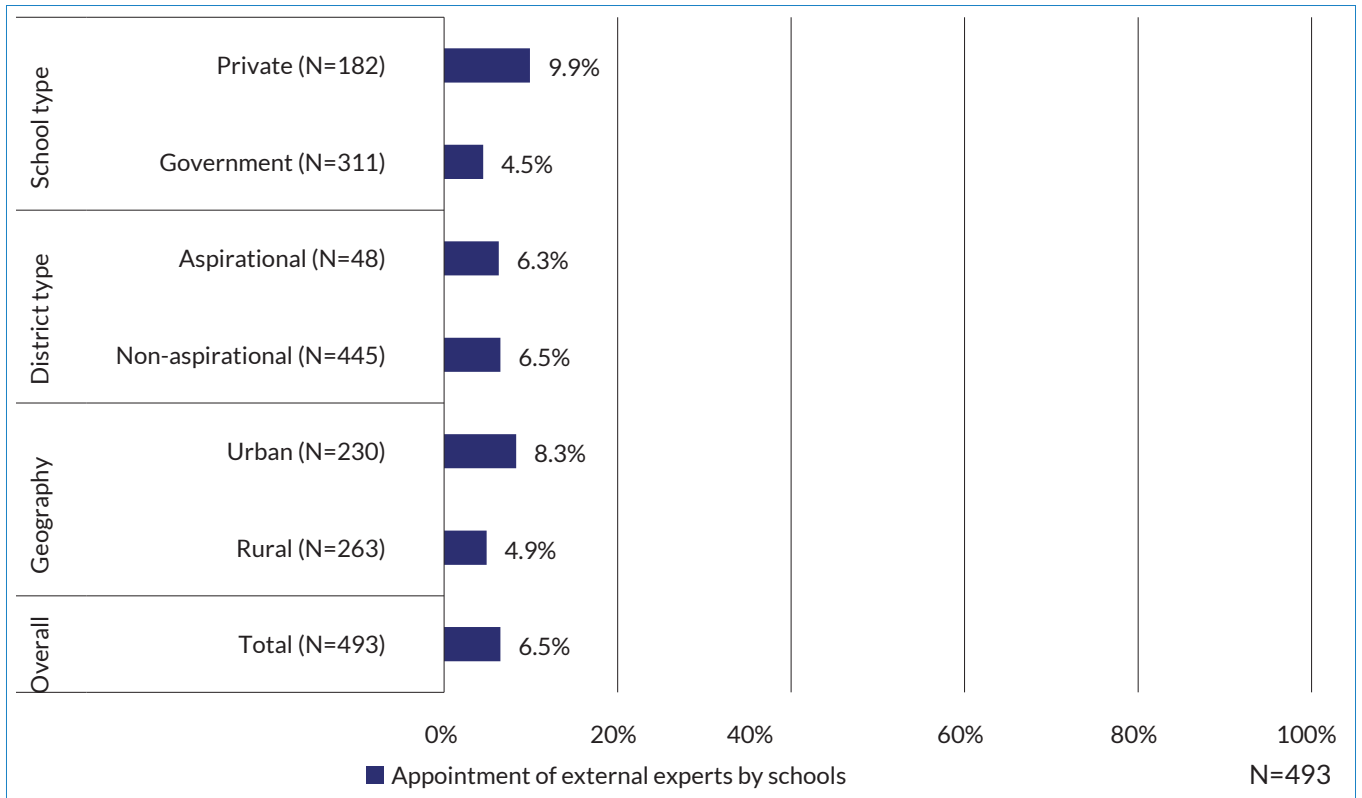
Mentor of Change, Maharashtra.

External Experts

In addition to the assigned MoC some of the schools also demonstrated a willingness to go the extra mile to acquire more support in the form of external experts, which they had appointed on their own. Out of the 493 ATLs visited

7 percent of the schools reported appointing external experts for the ATLs. Prevalence for the external experts was the highest for private schools (10%), followed by the urban schools (8%).

Figure 33: Appointment of External Experts by the Schools



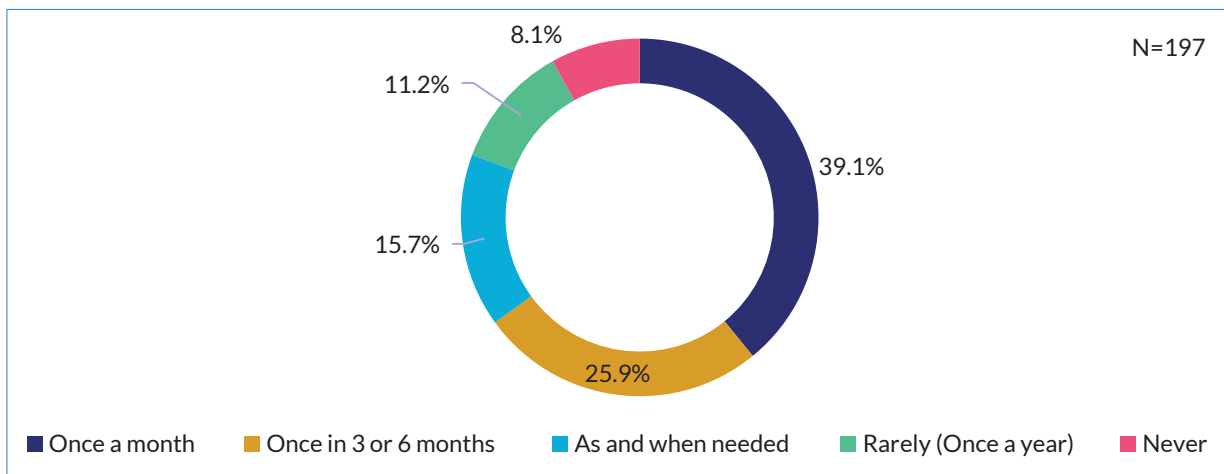
Source: Athena Infonomics Private Ltd.

Engagement with MoCs and External Experts

For this analysis, all those schools were considered, which acknowledged the presence of MoCs and/or had appointed external experts on their own. The data shows that

engagement with MoCs and/or external experts was done at least once a month (39%), and once in 3 or 6 months (26%).

Figure 34: Engagement with MoCs and External Experts



Source: Athena Infonomics Private Ltd.

However, there were also schools, which engaged with the MoCs and/or external experts as and when needed (16%), rarely (11%), and never (8%), which again highlights that MoCs' engagement with the schools needs more improvement.

Despite this variation, 81% of ATLs with a MoCs regard them as a significant factor in the success of the ATLs, underscoring the potential impact they can have on these labs. Consequently, it becomes pertinent to understand the kind of support that the MoCs provide to the schools. 70 percent schools with MoCs and/or external experts highlighted that the one of the key supports received from mentors was support in conducting activities in the ATL, 66 percent each reported support in participating in events, and innovation, 65 percent highlighted support in conducting sessions for ATL students, 52 percent highlighted that mentors also supported in training ATL ICs and teachers, 43 percent said that they received support in conducting facility visits for ATL students, and 36 percent reported that mentors were instrumental in sharing ATL success stories with the outside world.

Challenges faced with Mentors and External Experts

48 percent of the schools with mentors and/or external experts reported that one of the key challenges is getting time with the experts and/or mentors, 27 percent each

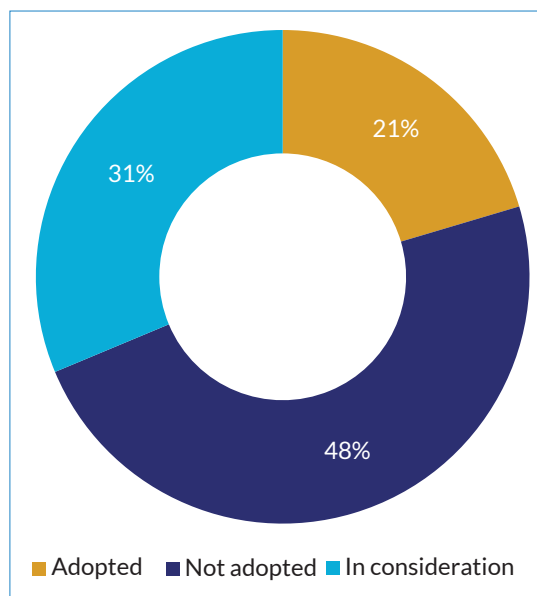
reported that MoCs were not responsive, and their skill set was not a match with the requirement, 22 percent felt that the MoCs' contribution to the ATL functioning was minimum, and 11 percent reported that MoCs were not accommodative of the schools' requests.

Considering the myriad of challenges faced with the mentors, schools also suggested some areas of improvement. 45 percent of the schools with mentors and/or external experts suggested that the roles and responsibilities of the mentors should be well-defined, 41 percent each recommended the orientation of the mentors with the relevant skill set, and their supervision, making them accountable (37%), and 23 percent of the schools also suggested that schools should be allowed to suggest the MoCs.

3.4.3 Adoption Status of ATLs

The adoption status of the ATLs was first analyzed for 1000 ATLs. The data shows that 21 percent of the ATLs were adopted by a reputed organization, whereas 48 percent were not adopted. However, 31 percent of the ATLs were considering being adopted by a reputed organization, so that more engagement and learning opportunities could be provided to the ATL students.

Figure 35: ATLs' Adoption Status (1000 ATLs)

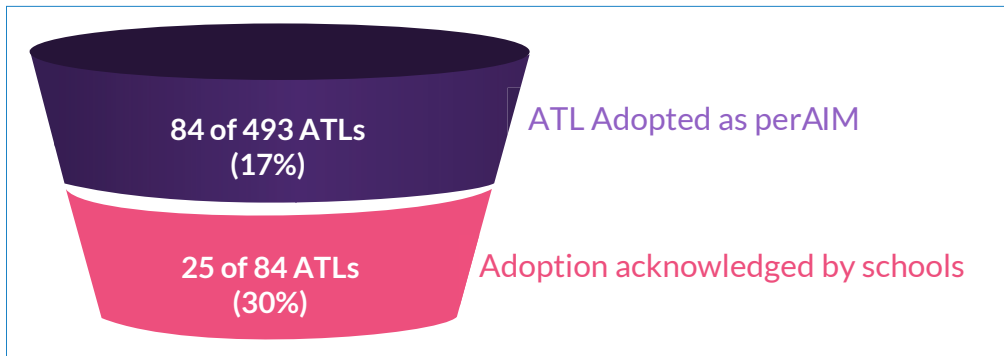


Source: Athena Infonomics Private Ltd.

For the purpose of analysis of 493 ATLs, Schools were probed whether they had partnered with any reputed organizations and were also asked about their satisfaction with the adopter organizations. Although, not mandatory, to further strengthen the enabling ecosystem for the ATLs,

AIM collaborated with reputed organizations from the field of STEM and engaged them to adopt ATLs. As per the data of AIM, only 17 percent of ATLs from the 493 visited were adopted and among them, only 30 percent of the ATLs could report about the adoption.

Figure 36: Adoption Status of the ATLs



Source: Athena Infonomics Private Ltd.

Since only 25 out of the 84 adopted ATLs acknowledged their adoption or perceive themselves as currently adopted, a reassessment of the initiative is imperative. It is essential to clearly define and align the expected outcomes for the adopters to ensure effective intervention in the ATLs. This orientation should be provided to both parties to facilitate the seamless integration of the initiative and its intended outcomes. The disparity between expectations and actual delivery has been a significant obstacle to effective adoption in certain instances.

When probed about the level of satisfaction the ATLs had with their adoption and the level of engagement with the

organization, 80 percent of the ATLs reported 'complete satisfaction'.

Schools were also probed about their level of satisfaction with the adopter organization and a majority of the ATLs reported satisfaction on all the parameters like engagement provided by the organization (80%), guidance provided (78%), platform for students (76%), and brainstorming ideas (70%). However, there were some areas which required more improvement i.e., technical support, access to adopter's facilities, and networking opportunities.

Table 22: Satisfaction with Adopter Organizations



Parameters of Engagement	Level of satisfaction
Engagement provided by the organization	80%
Guidance	78%
Platform for students	76%
Brainstorming ideas	70%
Technical support	69%
Access to adopter's facilities	66%
Networking opportunities	63%

Source: Athena Infonomics Private Ltd.

3.4.4 Engagement with AIM

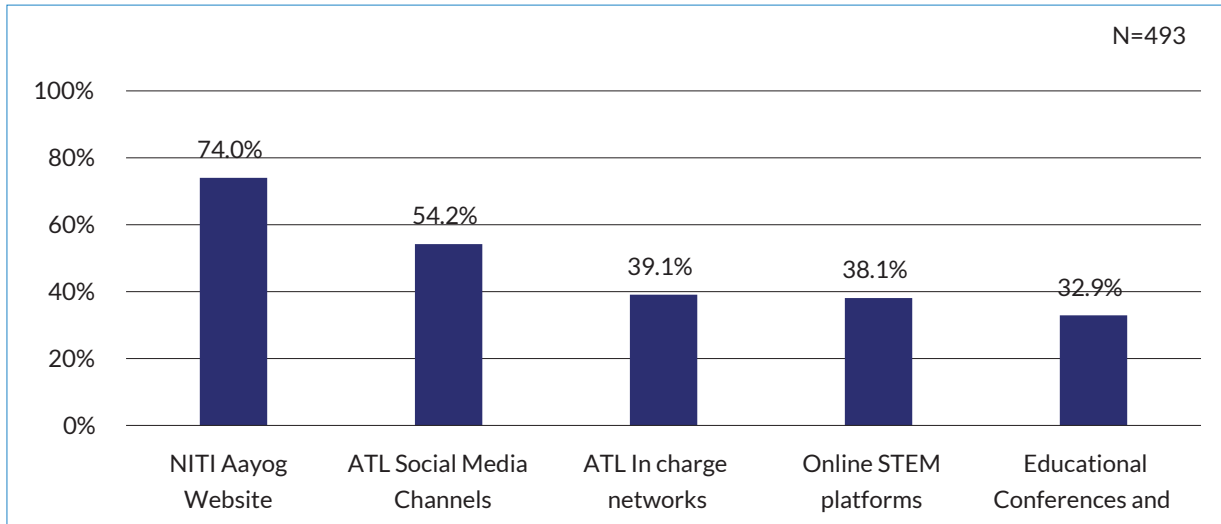
This section highlights the various information exchange platforms and opportunities provided by the AIM and how schools utilize them. **ATL ICs were probed on the sources of information about various ATL related events, channels through which ATL information from AIM is received, and**

AIM's social media handles followed by the ATL IC and/or the school.

Communication Channels from AIM to ATL

The most used resource for information about events related to ATL was the AIM website followed by ATL social media channels and ATL IC Networks.

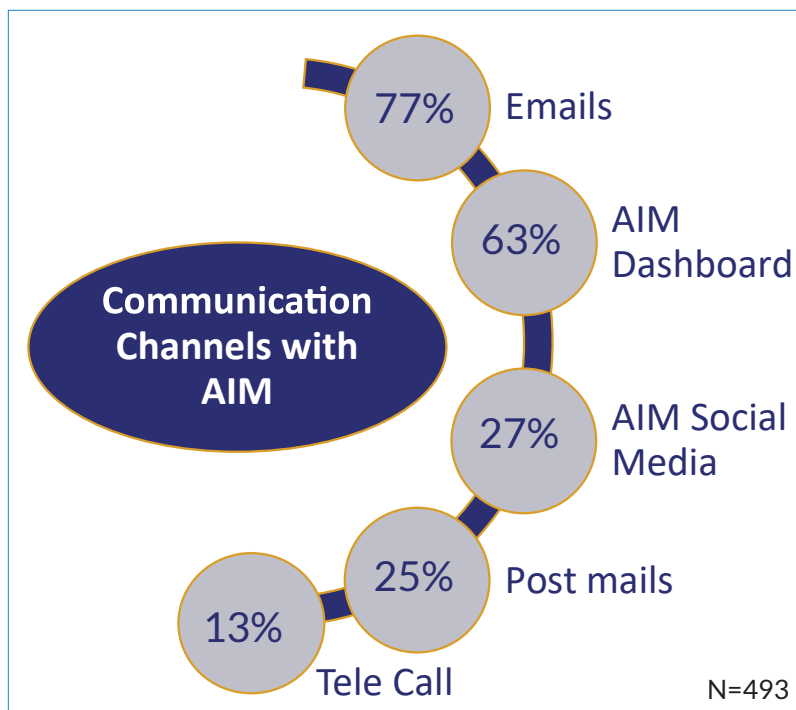
Figure 37: Source of Information for ATL Events



Source: Athena Infonomics Private Ltd.

The graph below highlights that one of the most important sources of information about ATLs from AIM was emails (77%) followed by AIM Dashboard (63%), social media handles (27%), and post mails (25%).

Figure 38: Source of Information for About the ATLs from AIM

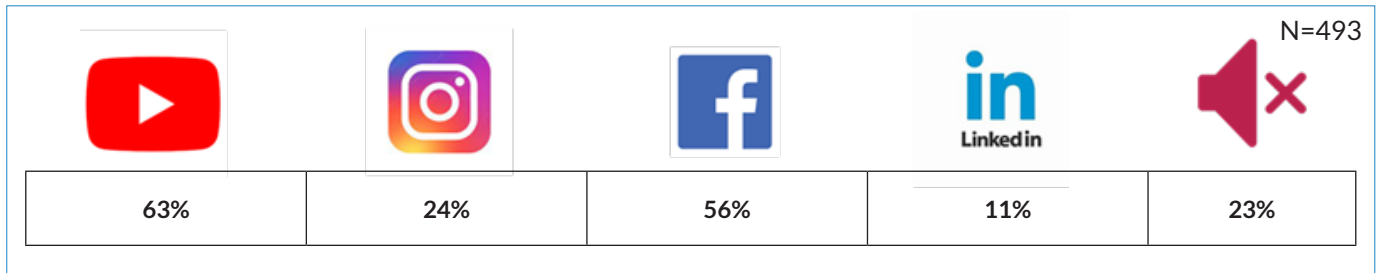


Source: Athena Infonomics Private Ltd.

The data highlights that social media handles were also a key source of information for the schools to gain information about the ATLs. Consequently, it is only relevant to highlight the social media channels followed by the schools. 63 percent of the schools followed AIM's

Youtube channel followed by AIM's Facebook account (56%), and 24 percent of the schools also followed AIM's Instagram handle, 11 percent followed LinkedIn, and 23 percent did not follow any social media handle.

Figure 39: Social Media Handles Followed by the Schools



Source: Athena Infonomics Private Ltd.

Discussions with the school authorities highlight that for some of the schools, information flow with AIM has been critical not only during the establishment phase but also during the functioning.



"We are bringing in different things from different mediums. We are getting information from outside. We are taking the information as a basis and then we continue to work devotedly." – **Principal, Government, Rural, Maharashtra**

However, it is pertinent to highlight that despite the importance of information as highlighted by the schools, AIM should leverage social media platforms as a key component for enhanced engagement, rather than treating it as a mere notice board. The prioritization of these platforms should align with their popularity and usage among ATLs.

AIM should also adopt a more interactive communication approach due to concerns raised by several ATLs about email overload from AIM, which has led to the overlooking of critical messages. Additionally, we may explore the introduction of more standardized initiatives, such as a newsletter.

Experience with AIM

AIM had consistently played a pivotal role in providing training and support to the ATLs (Atal Tinkering Labs). These schools maintained an ongoing relationship with

AIM by sharing weekly activity photos, creating a symbiotic relationship. AIM's active presence served as a driving force, inspiring and accelerating skill development among the ATLs, ultimately contributing to the enhancement of their innovative abilities. Furthermore, discussions revealed that AIM had demonstrated commendable responsiveness in addressing schools' queries. This prompt communication not only strengthened the relationship between AIM and the schools but also aided in meeting compliance requirements such as Utilization Certificates (UC). This streamlined interaction ensured that schools could efficiently manage their documentation and reporting obligations, ultimately fostering more effective and mutually beneficial collaboration between AIM and the educational institutions. Overall, AIM's contributions extended beyond training to encompass vital support and seamless communication, enriching the ATL program's success.



"I interacted with AIM regarding uploading of UC, as I was facing problems. It was not showing there (in the portal). They respond well and are prompt to respond. I contacted them over the phone as well, the person (that I spoke to) was helpful-

ATL IC, Government, Urban, Chennai

During discussions with ATL IC, it became evident that schools found communicating with AIM to be remarkably straightforward. Queries submitted through the ATL support portal were efficiently addressed, ensuring a smooth exchange of information. Notably, schools had multiple dedicated phone numbers at their disposal for direct communication with AIM, enhancing accessibility

and responsiveness. This collaborative approach fostered effective communication channels, ultimately benefiting the schools and their engagement with AIM. The convenience of this communication system played a vital role in facilitating the flow of information and support between schools and AIM, creating a more productive and efficient partnership.



"By talking with AIM, I have also increased my knowledge. And as my knowledge increases, I get inspired to learn something new."- Principal, Private, Urban, Gujarat

However, there were also a few instances where more interaction and support from the AIM was sought by the school authorities.



"The interaction is the only part where we need some guidance. If more guidance and more interaction is there, that would be better, we think." – Principal, Private, Urban, Chennai

In some cases, ATL ICs noted that their engagement with AIM was subject to the decisions of higher school authorities rather than their discretion. This highlights the necessity to nurture an autonomous relationship between ATL ICs and AIM. By doing so, we can facilitate greater innovation within the ATLs, enabling them to operate more independently and drive creativity without external constraints. This shift towards autonomy can empower ATL ICs to make timely and tailored decisions, ultimately

fostering a more dynamic and innovative environment within the ATL program.

A pivotal recommendation arising from the qualitative discussions on AIM engagement highlighted the importance of timely communication. This critical insight underscores the need for schools and ATLs to receive information promptly, enabling them to respond effectively to upcoming events and initiatives.



“Recently we got the mail for PM Modi NEP function at Delhi. We got the invite at the last minute. If the communication would have been at least week or two in advance, we would have been able to go and attend the event. That communication alone is lagging, otherwise AIM is doing a wonderful job in communicating the activity and newsletter, everything is perfect.” - ATL INC, Private, Urban, Chennai

Timely communication serves as the linchpin for successful coordination and planning within the AIM program. It empowers educational institutions and ATLs to make informed decisions, prepare adequately, and participate enthusiastically in various events and activities. Furthermore, it fosters a sense of readiness and adaptability, ensuring that opportunities for innovation and skill development are maximized. In essence, the emphasis on timely communication is not just a procedural matter; it's a fundamental element that enhances the overall effectiveness and impact of AIM engagement. It empowers schools and ATLs to proactively engage with

AIM initiatives, fostering a more dynamic and responsive partnership in the pursuit of innovation and education.

As far as communication with AIM was concerned, a few Mentors of Change highlighted the need to include “innovation” in all aspects starting from communication, information dissemination, monitoring, and reporting. They also highlighted the importance of increasing the team size at AIM level for better management of ATLs and associated stakeholders.

3.5 Inside the Operation Mode of ATLs

This section highlights the efforts made by the schools to integrate the ATL within the academic mechanisms of the school.

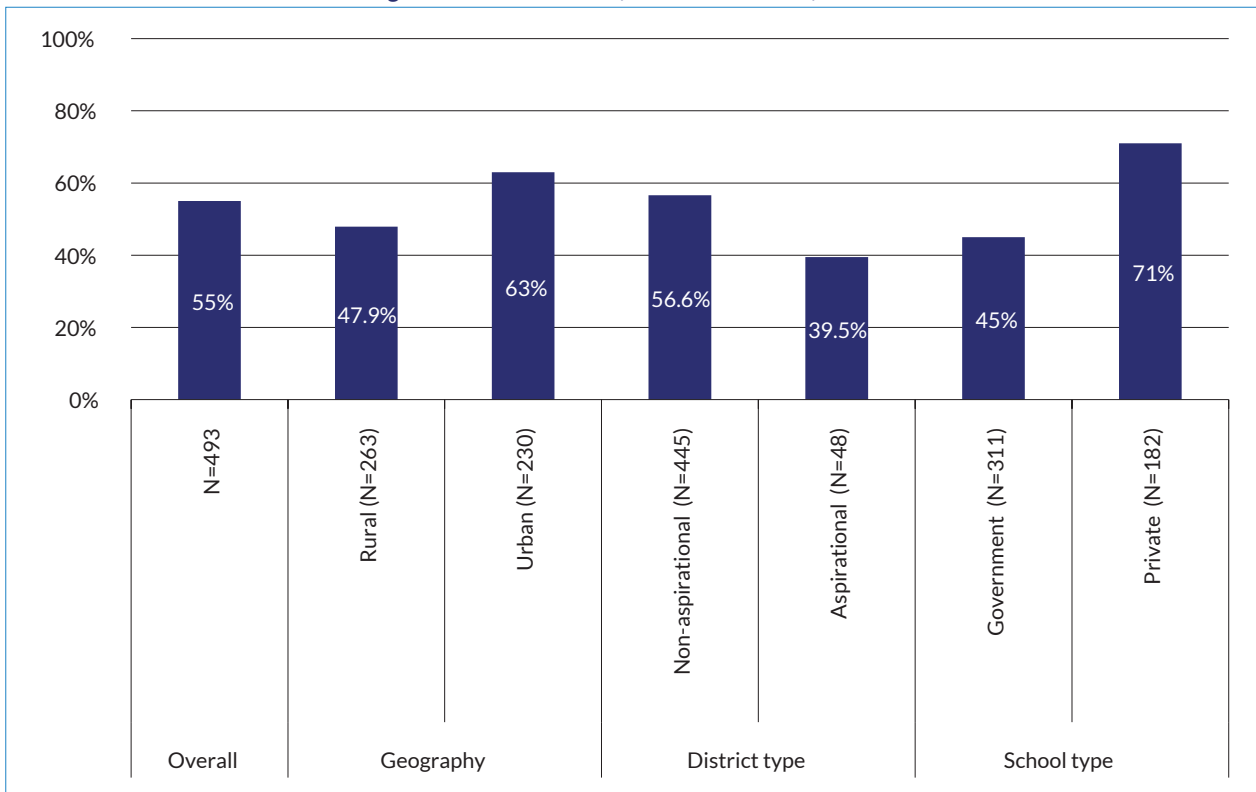
3.5.1 Aligning ATL with the School's Schedule

ATLs have a directional curriculum wherein the onus is on the schools to come up with ways to integrate it into schools' s curriculum. ATL ICs were probed on the presence of fixed timetable for ATLs in the schools, on efforts for making ATLs more accessible (where fixed timetable was not present), on separate attendance registers for the ATLs, and number of sessions and times in week in which ATL classes were arranged for classes 6-12. ATL ICs were also asked to verify the timetable and attendance registers.

Fixed Timetable for ATLs

Having a fixed timetable is one of the key indicators to measure the importance given to the ATL and its associated activities. The data highlights that 55% ATLs have successfully integrated ATL sessions into their school timetables. To achieve further integration, increased engagement with schools is essential. The integration of ATL into the timetable is more common among private, urban, and schools in aspirational districts compared to their counterparts.

Figure 40: Prevalence of Fixed Timetable for ATLs

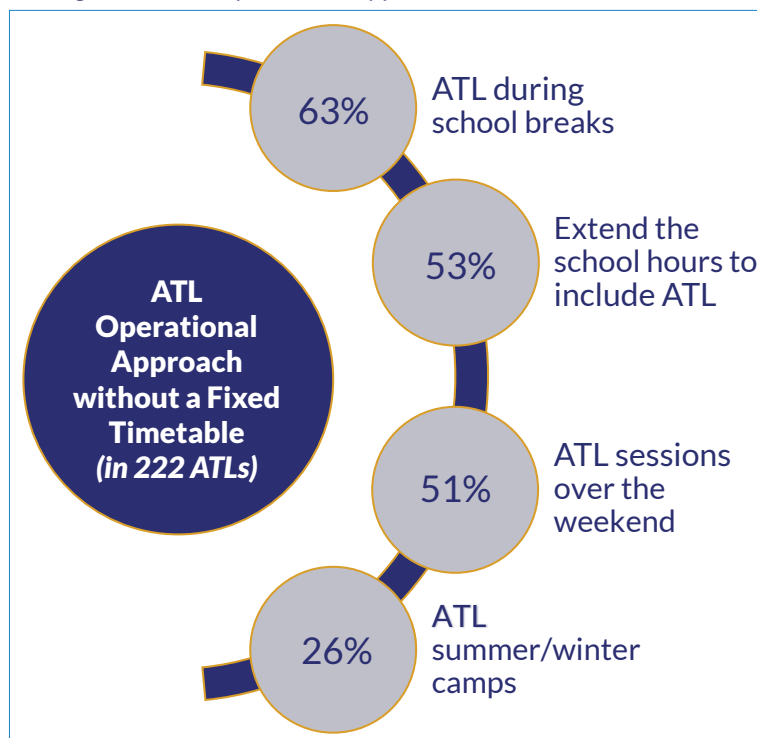


Source: Athena Infonomics Private Ltd.

The schools with no separate timetable for the ATL were making the extra effort to make the ATL more accessible to the students as 63 percent (out of 171 schools) of them reported conducting the ATL activities during the school

breaks, while 53 percent of schools reported extending the school hours to include ATL related activities, and schools also reported conducting ATL sessions over the weekend (50%).

Figure 41: ATL Operational Approach without Fixed Timetable



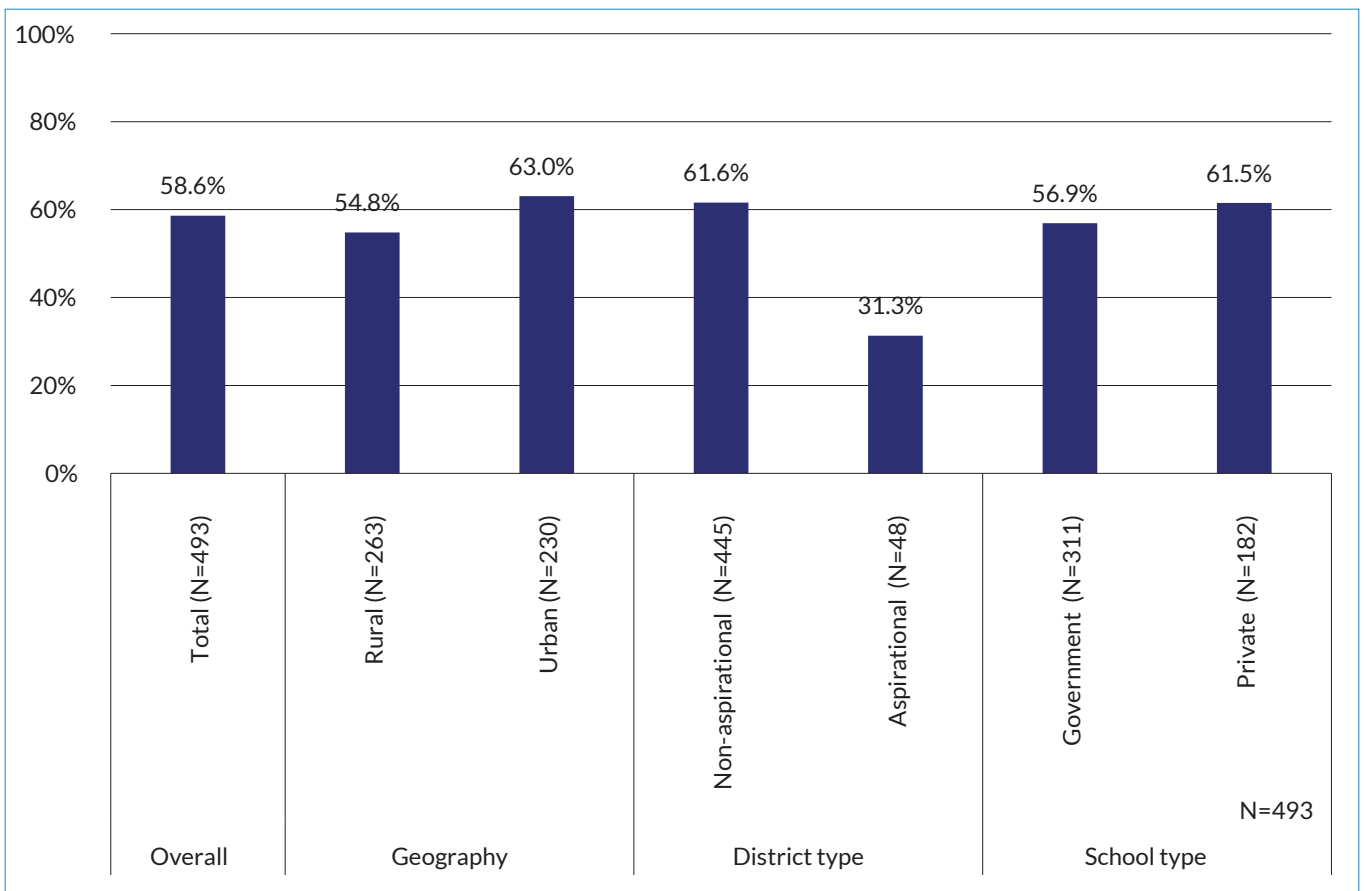
Source: Athena Infonomics Private Ltd.

Schools' proactive efforts to integrate ATLs to the best of their ability are commendable. However, for a more effective adoption of ATL within the school system, AIM should encourage schools to integrate ATL into the school timetable. The absence of a designated timetable for ATL could negatively impact resource allocation and students' exposure.

Separate Attendance Register for ATLs

58% of schools-maintained attendance registers for their ATL students. Integration of the attendance register was at par across categories, except for in the schools in the aspirational districts wherein the prevalence was the lowest.

Figure 42: Integration of Attendance Registers



Source: Athena Infonomics Private Ltd.

3.5.2 ATL Sessions in the Schools

Understanding the extent of ATL sessions was instrumental in knowing how ATL can be harmonized with the schools' ecosystem. As per the findings, the schools had made a substantial effort to integrate the ATL by assigning it an

average of 2 sessions per week with an average of 45-50 minutes for each session. No significant difference was observed across the various categories.

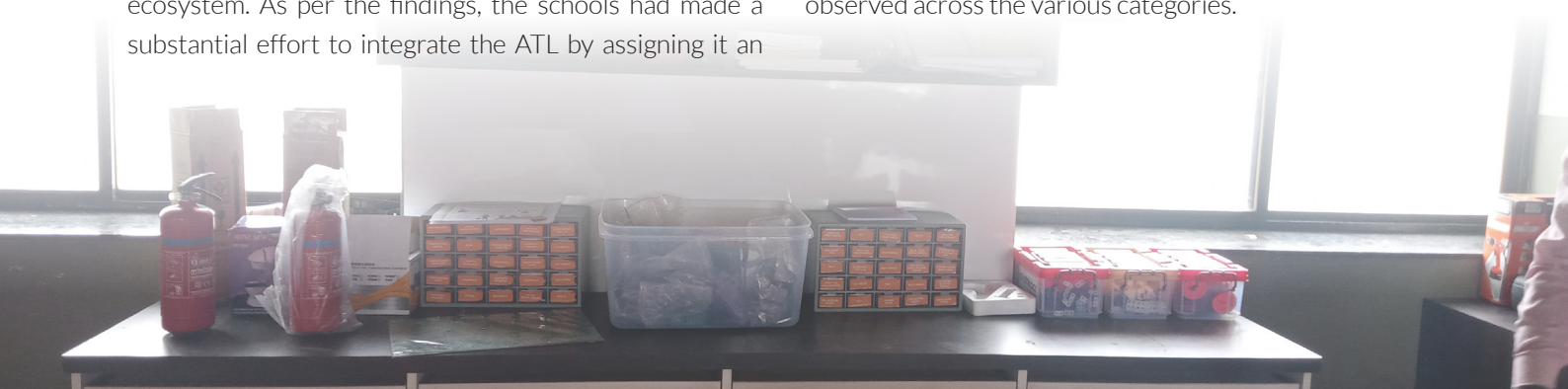


Table 23: Average Number of Sessions Dedicated to the ATLs

		Average Number of Sessions			Average Minutes per Session		
		Classes 6-8	Classes 9-10	Classes 11-12	Classes 6-8	Classes 9-10	Classes 11-12
Geography	Total (N=493)	2.1	2.0	1.9	49.5	49.0	46.1
	Rural (N=263)	2.1	2.0	1.8	51.8	50.0	48.0
	Urban (N=230)	2.1	2.1	2.0	46.6	47.9	44.2
District Type	Non-aspirational (N=445)	2.1	2.0	1.9	49.5	49.1	45.9
	Aspirational (N=48)	2.1	2.0	1.7	49.4	48.3	48.6
School Type	Government (311)	2.0	2.0	1.8	51.8	50.1	47.8
	Private (N=182)	2.2	2.1	2.0	45.5	47.4	44.0

Source: Athena Infonomics Private Ltd.

3.6 Monitoring and Reporting Compliance

This section provides the findings on the ATL Dashboard usage and adherence to reporting compliance by the ATLs.

3.6.1 ATL Dashboard and its Usage

ATL dashboard and its usage was first analyzed for the 1000 ATLs in the first stage. As per the dashboard access data, 73 percent of the ATLs accessed the ATL dashboard at least once, whereas the remaining ATLs were yet to access

the dashboard. Non-access was higher for rural and private schools. Further, as per the available database, 57 percent of the ATLs sent their teachers for ATL-related training.

Table 24: ATL Dashboard Access by 1000 ATLs

% of ATLs	Total (1000) %	Rural (523) %	Urban (477) %	Govt. (624) %	Private (376) %
Dashboard access	73	68.3	77.8	74.5	69.9

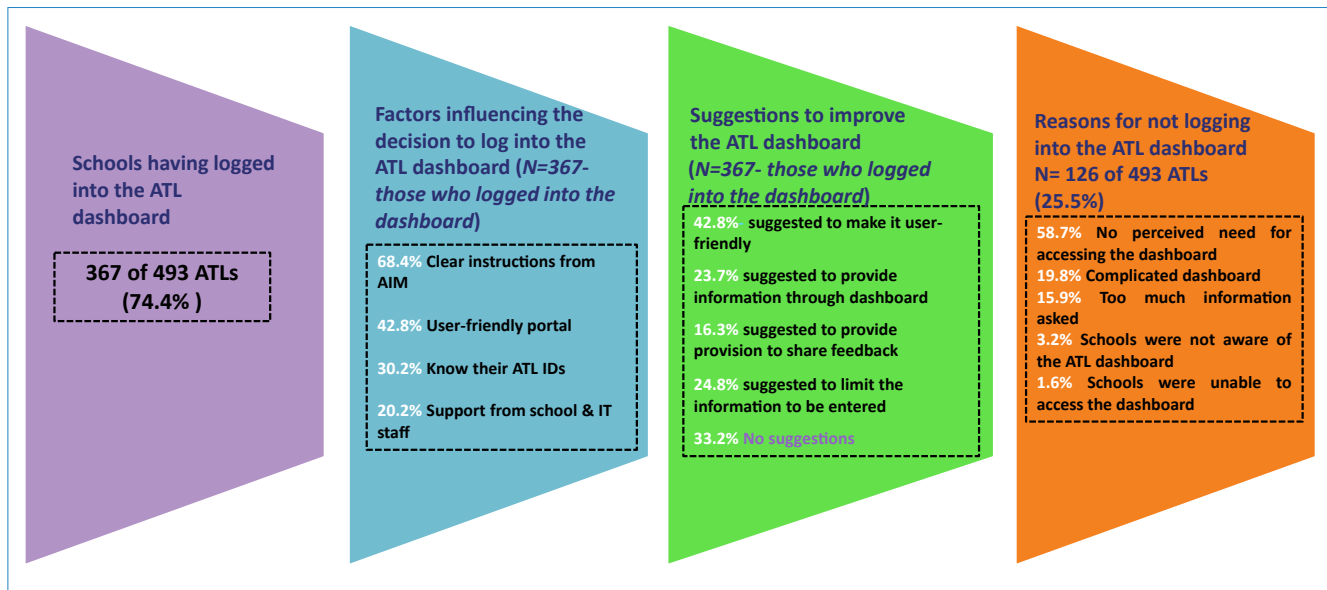
Source: Athena Infonomics Private Ltd.

The ATL dashboard is one of the key mechanisms implemented by the AIM to facilitate the monitoring of the ATLs. Schools use the dashboard to upload various documents like the Utilization Certificate (UC) etc. **Schools were probed on whether they had logged into ATL dashboard, the factors which influenced the decision to log into the ATL dashboard, suggestions for improving the dashboard, and the reasons for not logging into the dashboard.**

The findings for the assessment of 500 ATLs revealed that 74 percent of the schools logged into ATL dashboard. Out of the 74 percent, 69 percent of the schools said that the clear instructions from AIM was one of the key factors that influenced their decision to log onto the dashboard. Further, 43 percent of the schools reported user-friendly portal,

30 percent of the schools reported access to ATL IDs, and 20 percent of the schools reported support from school & IT staff as some of the other factors influencing the decision to log onto the dashboard. Furthermore, 74 percent of the schools also gave a few recommendations to improve the ATL dashboard. 49 percent of the schools suggested to make the dashboard user-friendly, 24 percent of the schools suggested to provide information through the dashboard, 16 percent recommended that ATL dashboard should have a provision to share feedback, and 25 percent recommended that information to be entered on the dashboard should be limited.

Figure 43: Usage of ATL Dashboard by the Schools



Source: Athena Infonomics Private Ltd.

Among those schools that reported not accessing the ATL dashboard, 59 percent of schools reported that they did not perceive any need to access the dashboard, 20 percent schools reported that ATL dashboard was complicated, 16 percent of the schools said that there is too much information is asked to be filled on the dashboard, 3 percent were not aware of the ATL dashboard and 2 percent of schools were unable to access the dashboard.

One of the most important aspects of making the dashboard user-friendly would be simplifying the kind and frequency of information required to be filled in on the dashboard.

3.6.2 Reporting Compliance

Schools are encouraged to upload ATL related information monthly. **ATL ICs were probed on the frequency of reporting various aspects on the dashboard, the challenges faced by them in filling the information on the ATL dashboard, and satisfaction with the dashboard.**

Frequency of Reporting on ATL Dashboard about school, student engagement and activities conducted in the ATL has been highlighted below. The data shows that monthly reporting compliance is the highest.

Table 25: Reporting Compliance on Various Aspects

Yearly/Half Yearly	Quarterly	Monthly	One time	Never
15.7%	12.0%	55.3%	4.4%	12.8

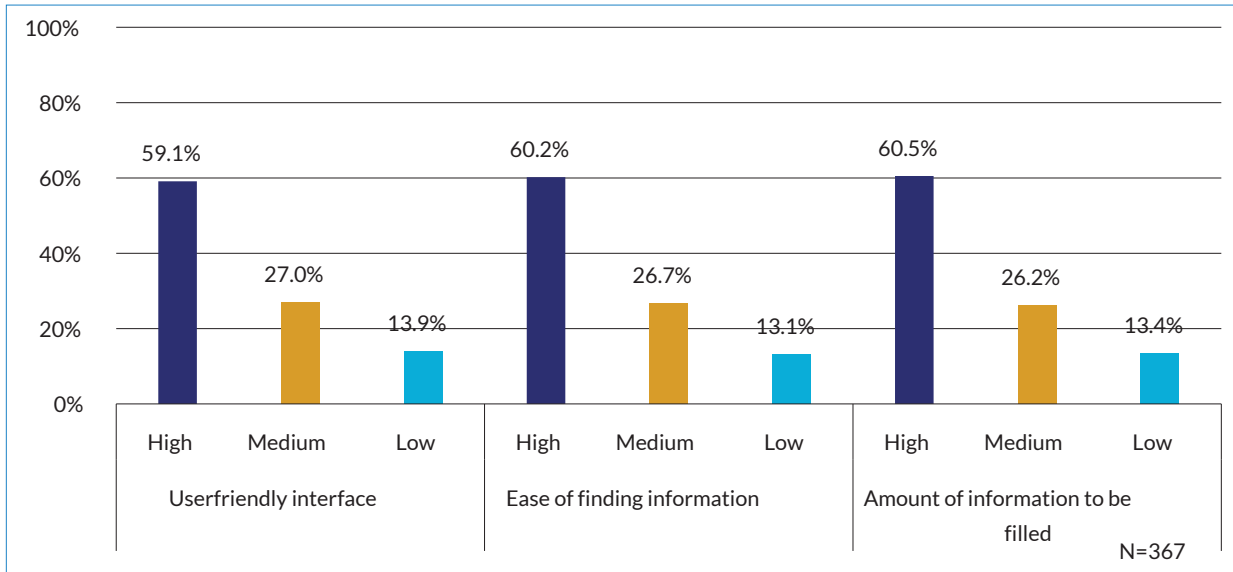
Source: Athena Infonomics Private Ltd.

3.6.3 Satisfaction with ATL Dashboard

Schools were also probed on their level of satisfaction with the ATL dashboard on various parameters. More than 50 percent of the schools reported a high level of satisfaction

with its user-friendly interface, ease of finding information, and amount of information needed to be filled out on the dashboard. Although, there is room for enhancing the overall user experience.

Figure 44: Satisfaction with ATL Dashboard



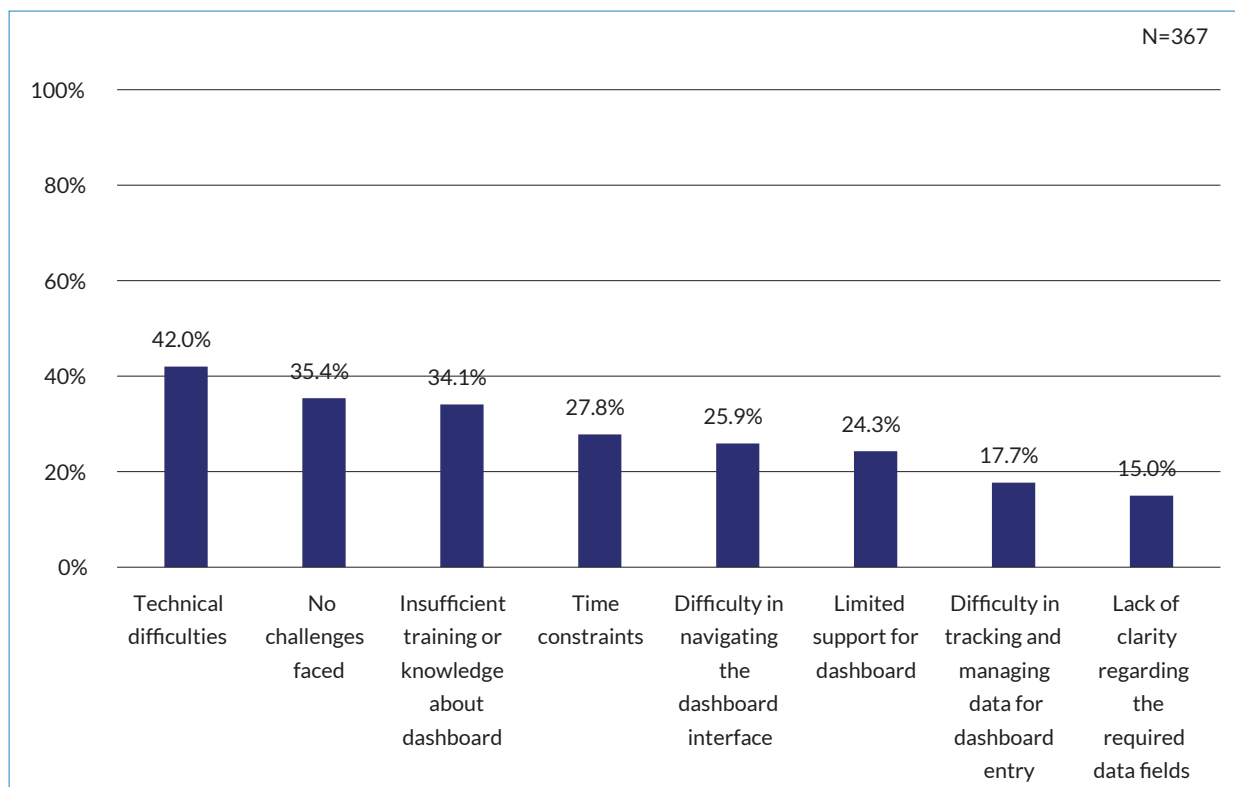
Source: Athena Infonomics Private Ltd.

3.6.4 Challenges with ATL Dashboard

Despite a high level of satisfaction with the ATL dashboard, 42 percent of the schools reported that they faced technical difficulties in accessing the dashboard. 34 percent of the schools stated that they had insufficient knowledge and training on the ATL dashboard, and 28 percent of the schools reported that they had time constraints that challenged

their ability to fill in relevant information on the ATL dashboard. Furthermore, 26 percent reported difficulty in navigating the dashboard interface, 24 percent complained about the limited support pertaining to the dashboard, and 18 percent reported difficulty in tracking and managing data for the dashboard.

Figure 45: Challenges while Filling Information on ATL Dashboard



Source: Athena Infonomics Private Ltd.

3.7 Student Engagement and Participation

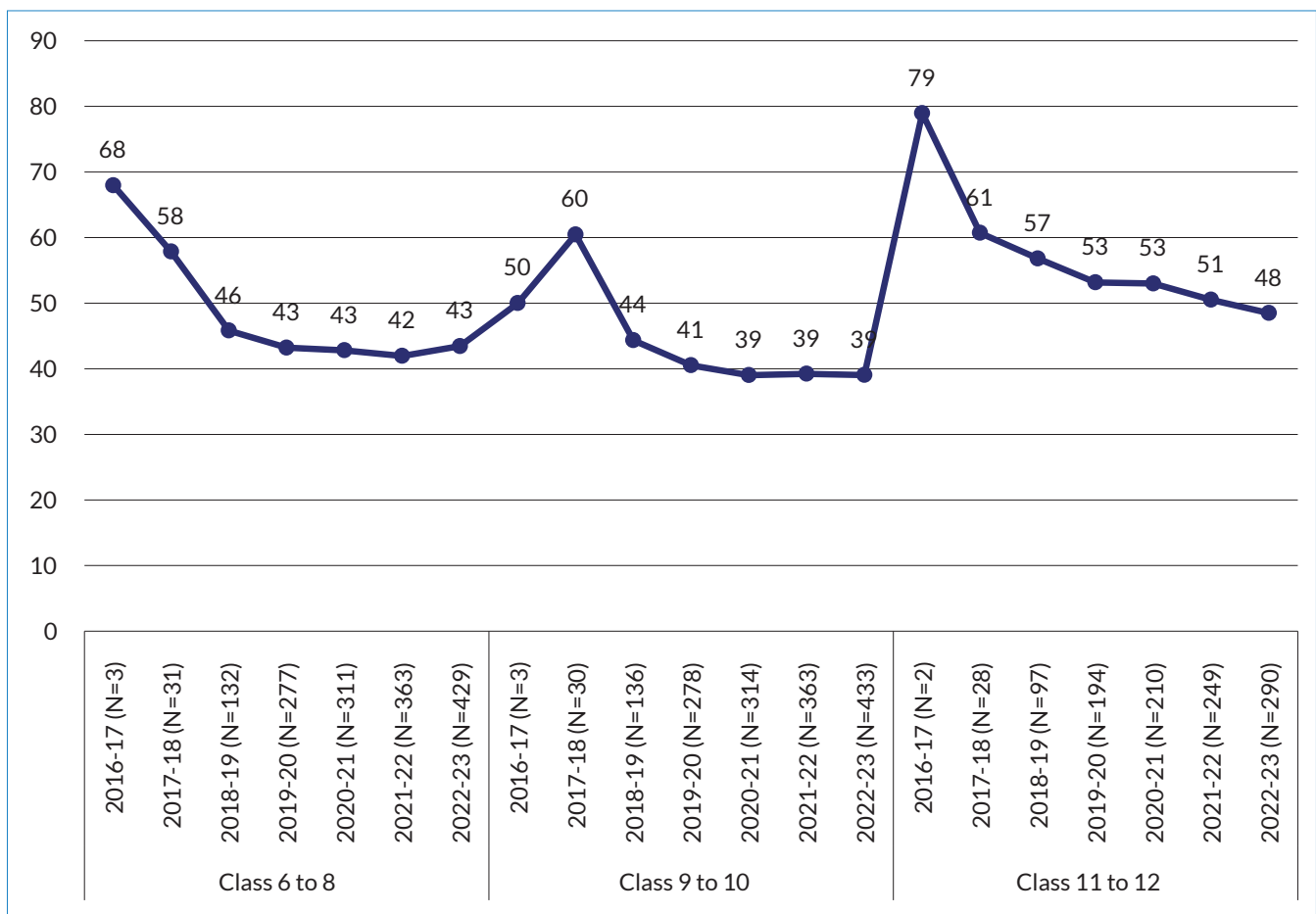
This section highlights the student enrollment in the ATL and the number of students using the ATL. This section also takes stock of the organization of ATL-related activities by the school and student participation in various competitions.

3.7.1 Students Enrolled and Using ATL

Student enrollment in the ATLs is one of the most important signifiers of the importance of the ATLs in the schools. It indicates the level of usage of the ATL within the school. The more the usage, the more the potential ATL has to positively impact the school and its ecosystem. Further, schools are required to maintain record of student enrollment in the ATL. **ATL ICs were probed on the number of students enrolled in ATL in classes 6th to 12th; number**

of students (boys and girls) using the ATL facility from September 2022-February 2023. The data below highlights the overall proportion of year-wise student enrollment in classes 6-8, 9-10, and 11-12. The proportion of student enrollment in the ATL across the classes has remained consistent from the academic year 2016-17 to 2022-23.

Figure 46: Overall Proportion of Students Enrolled in ATL - Compared To Students Enrolled in the School (By class and by academic year)



Source: Athena Infonomics Private Ltd.

Consistent student enrollment is a good sign. However, more work needs to be put in by the schools and AIM to promote ATLs as hubs of innovation, which can increase student enrollment across classes. This is pertinent because the data on the impact of ATLs on the mindset of

students also highlighted that ATLs' contribution towards increasing the ability of the students to relate to the school curriculum, enhancing their innovation skills, and enhancing the spirit of entrepreneurship is relatively low.

3.7.2 Funding Year-Wise Students' Enrollment Journey in the ATL

The data was also analysed to dive deeper into the student enrolment journey on the basis of the funding years of the ATLs. The data highlights that student enrollment

in the ATLs has been consistent. As the number of ATLs increased, the student enrollment increased in such a way that at the overall level the proportion of enrollment has remained consistent.

Table 26: Funding Year-Wise Student Enrollment in ATL

Classes	School Academic Year	Funding year				Total
		2016-17 (N=43)	2017-18 (N=67)	2018-19 (N=175)	2019-20 (N=208)	
Class 6 to 8	2016-17	68				68
	2017-18	59	36			58
	2018-19	65	27	48	66	46
	2019-20	61	30	39	54	43
	2020-21	70	33	37	42	43
	2021-22	62	28	41	42	42
	2022-23	68	32	40	41	43
Class 9 to 10	2016-17	50				50
	2017-18	62	40			60
	2018-19	67	23	48	75	44
	2019-20	62	28	35	51	41
	2020-21	68	26	32	43	39
	2021-22	63	24	36	42	39
	2022-23	67	24	35	41	39
Class 11 to 12	2016-17	79				79
	2017-18	61	25			61
	2018-19	64	36	66	94	57
	2019-20	65	36	51	69	53
	2020-21	71	43	48	55	53
	2021-22	68	43	45	51	51
	2022-23	61	34	44	52	48

Source: Athena Infonomics Private Ltd.



3.7.3 Year-Wise Students' Enrolled in ATL

The data highlights that the proportion of student enrollment in the ATL has remained consistent over the years.

Table 27: Year-Wise Students Enrolled In the ATL

Academic year	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Students enrolled in the school for class 6 to 12 <i>(Absolute Number)</i>	1578	41143	153762	254020	262382	314599	371957
Students enrolled in ATL for class 6 to 12 <i>(Absolute Number)</i>	1010	24389	73230	112992	114753	135156	160155
Proportion of students enrolled in ATL for class 6 to 12 <i>(In Percentage)</i>	64.0	59.3	47.6	44.5	43.7	43.0	43.1

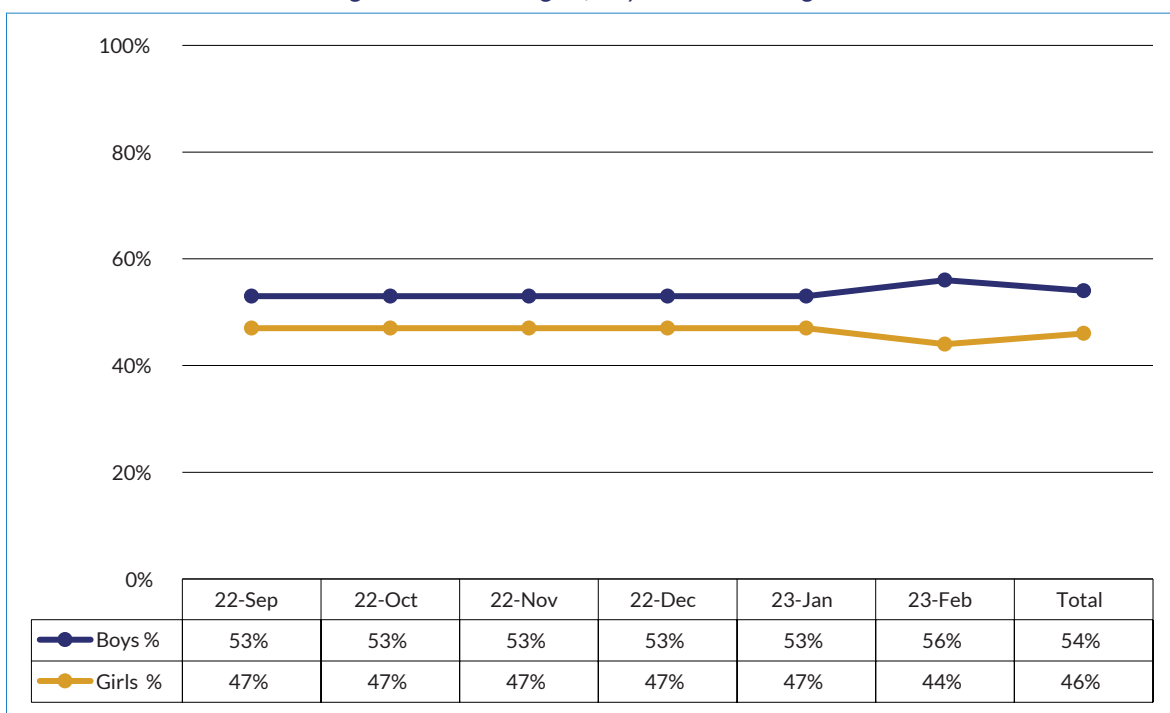
Source: Athena Infonomics Private Ltd.

3.7.4 Usage of ATL by Boys and Girls

This analysis is the percentage proportion of the boys and girls using the ATL between September 2022 and February 2023. The minimal difference in ATL usage between boys

and girls indicates that both genders have equal access to ATL, promoting equity.

Figure 47: Percentage of Boys and Girls using ATL



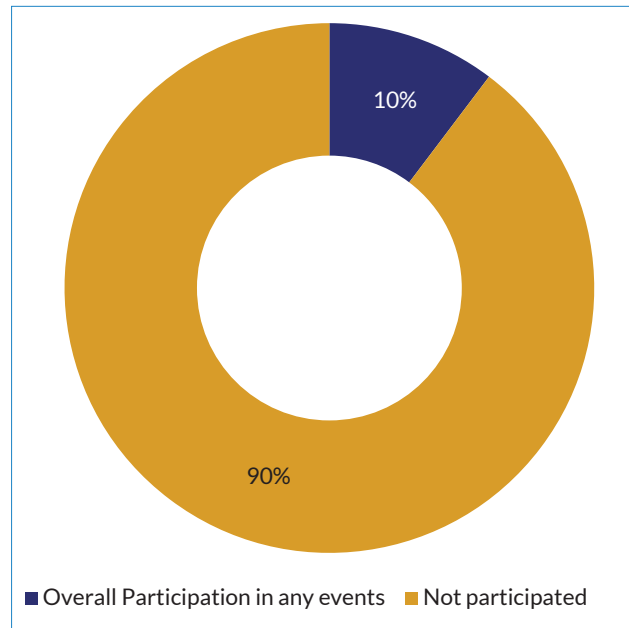
Source: Athena Infonomics Private Ltd.

3.7.5 Student Participation in ATL Events

Student participation in events was first analyzed for the 1000 ATLs. The engagement data highlighted that participation in ATL related events had been low as only 10 percent of the ATLs reported participation. The further

breakdown of the ATL related events has been presented below for ATL Marathon, App Challenge, Tinkerpreneur, and Space Challenge.

Figure 48: Overall Participation in ATL Events (1000 ATLs)

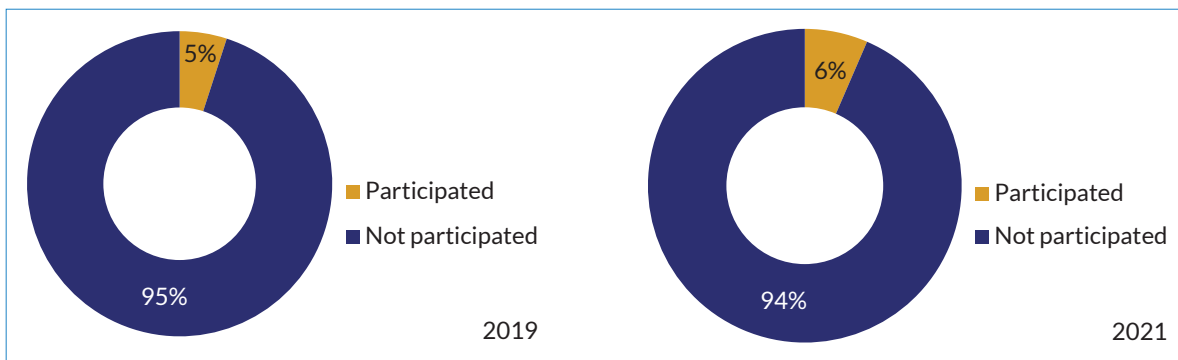


Source: Athena Infonomics Private Ltd.

Participation in the ATL marathon of 2019 and 2021 did not witness substantial participation by the ATLs. In both the years more than 90 percent of ATLs did not participate.

Participation of male students in both years (74% and 53% respectively) was more than the female students (26% and 47% respectively).

Figure 49: ATLs' Participation in ATL Marathon 2019 & 2021 (1000 ATLs)

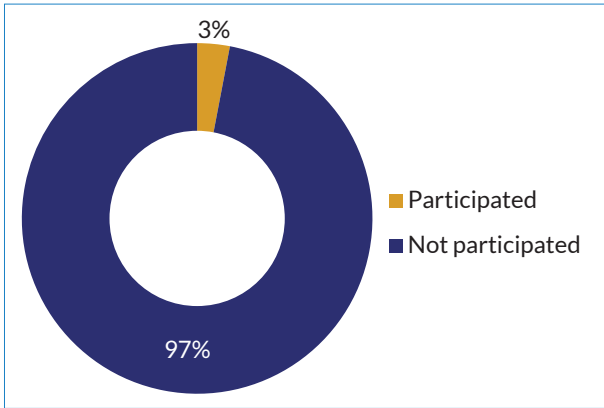


Source: Athena Infonomics Private Ltd.

Similarly low participation was witnessed in App Challenge and Tinkerpreneur, 2022, as more than 90 percent of the ATLs did not participate in these events. Further, the

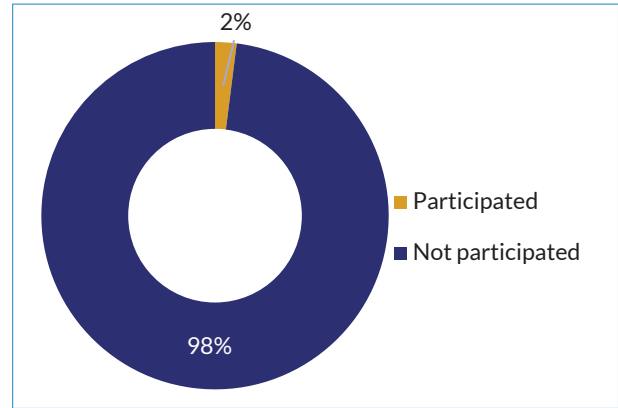
participation of male students for both these events stood at 73% and for female students, the participation stood at 27%.

Figure 50: ATLs' App Challenge Participation



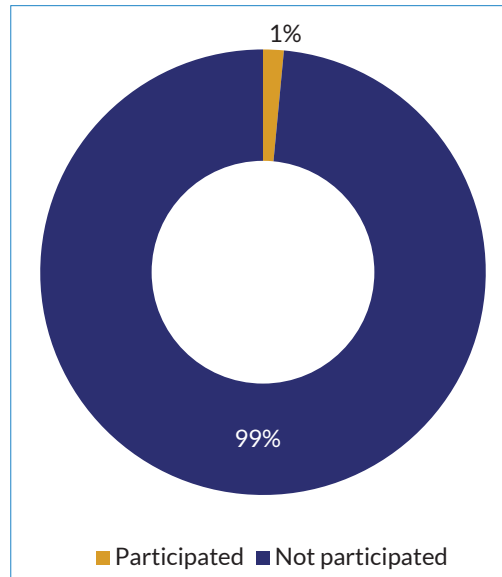
Source: Athena Infonomics Private Ltd.

Figure 51: ATLs' Tinkerpreneur Participation (1000 ATLs)



The trend of non-participation continued for the Space Challenge as well, as only 1 percent of the ATLs participated in the challenge.

Figure 52: ATLs' Space Challenge Participation (1000 ATLs)

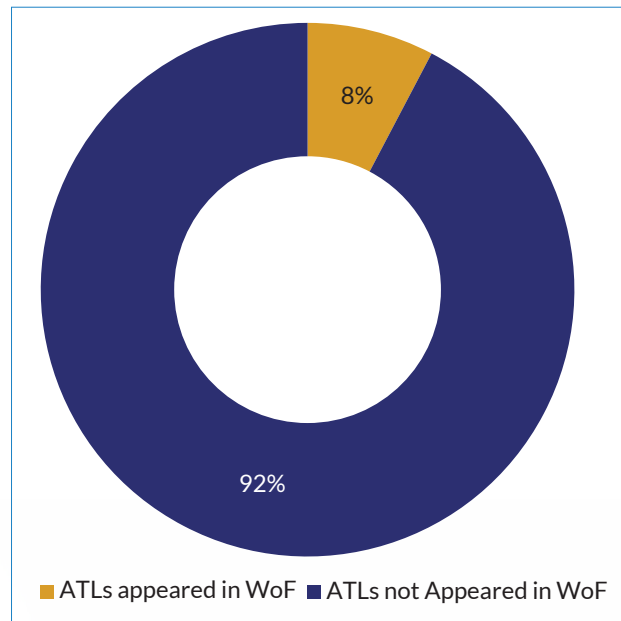


Source: Athena Infonomics Private Ltd.

Assessment of the 1000 ATLs also analyzed unique initiative in the name of Wall of Fame (WoF) was brought to give recognition to the ATLs and their bright students developing noteworthy innovations. The data shows that only 8 percent of the ATLs appeared in the WoF. Further,

the number of times bright students appeared in the WoF was 268. 38 percent of the WoF submissions were done by the school and 31 percent of submissions were done by the teachers while the rest (24%) were by students.

Figure 53: ATLs Appearing on the WoF (1000 ATLs)



Source: Athena Infonomics Private Ltd.



3.7.6 Student Participation in Post COVID-19 ATL Events

For the purpose of analysis of 500 ATLs, **ATL ICs were probed on ATL related activities conducted by schools in the Post COVID-19 time, the number of students that participated, school participation in AIM and Non-AIM events and the number of students that participated in AIM and Non-AIM events.**

The table below highlights the average number of activities conducted by the schools in the Post COVID-19 time (2021 onwards), and average number of students that participated in these activities. The data highlights that the average number of activities across categories ranged from 4-6. However, a large number of student participation was witnessed in exhibitions (145) and lectures (218).

Table 28: Post COVID-19 (2021 onwards) Activities Conducted by Schools

Events		Overall	Geography		District type		School type	
		Total (N=493)	Rural (N=263)	Urban (N=230)	Non-aspirational districts (N=445)	Aspirational districts (N=48)	Government (N=311)	Private (N= 182)
Regional/ National level competitions	Average number of activities conducted	5	5	5	5	6	5	5
	Average student participation	52	50	55	45	193	33	86
Exhibitions/ Fairs/ Carnivals	Average number of activities conducted	4	4	5	4	1	4	4
	Average student participation	145	99	176	149	74	155	130
Workshops on problem solving	Average number of activities conducted	4	4	4	4	2	4	5
	Average student participation	96	68	118	98	38	69	133
Lectures by experts	Average number of activities conducted	5	7	4	5	0	4	6
	Average student participation	218	317	145	218	0	207	233
Summer/ winter camps	Average number of activities conducted	5	5	5	5	1	4	6
	Average student participation	63	56	69	64	25	71	54
Intra-school competitions	Average number of activities conducted	6	3	7	6	0	4	7
	Average student participation	79	79	79	79	0	58	102

Source: Athena Infonomics Private Ltd.

Further, it is pertinent to point out here that private schools, followed by the rural schools showed more inclination to organize lectures by experts, and intra-school competitions were organized more by the urban and private schools. Although, schools have been consistently making an effort to provide platforms for students so that they can showcase their skills and innovations, there is

still a need to foster the ATL ecosystem in the rural and government schools, so that they could be encouraged to organize more ATL-related events. This is pertinent because competitions have become a platform for students and schools to represent themselves on the national stage, thereby motivating more innovations across the country.



“We have used different methods to take ATL to a higher level. We have organized competitions. We have a science fair every year and the students are working with more interest than before and they also encourage everyone.”- Principal, Government, Rural, Gujarat.

3.7.7 School Participation in Non-AIM Events

For the purpose of this analysis, Non-AIM events were total 5 in number:- National Talent Search Examination (NTSE), Junior Science Talent Search Examination (JSTS), Kishore Vigyanik Protsahan Yojana (KVPY), National Science Olympiad (NSO), The INSPIRE Awards.

Schools have consistently made efforts to boost their involvement in non-AIM events. The incidence of non-participation in any of the events has declined over the years, as the ecosystem for the schools to participate in the competitions has also improved over the years in the form of number of competitions and higher awareness. After attempting to boost their participation, the majority of schools have continued to engage in 1 to 3 events.

Table 29: School Participation in Non-AIM Events

School academic year	Events Participation	Prevalence
Non-AIM events 2016-17	None of the Events	80.5%
	At least 1 Event	9.7%
	2-3 Events	8.7%
	4-5 Events	1.0%
Non-AIM events 2017-18	None of the Events	77.7%
	At least 1 Event	10.8%
	2-3 Events	10.1%
	4-5 Events	1.4%
Non-AIM events 2018-19	None of the Events	70.2%
	At least 1 Event	13.2%
	2-3 Events	13.0%
	4-5 Events	3.7%
Non-AIM events 2019-20	None of the Events	63.3%
	At least 1 Event	18.1%
	2-3 Events	14.8%
	4-5 Events	3.9%

School academic year	Events Participation	Prevalence
Non-AIM events 2020-21	None of the Events	60.9%
	At least 1 Event	20.7%
	2-3 Events	14.8%
	4-5 Events	3.7%
Non-AIM events 2020-21	None of the Events	53.1%
	At least 1 Event	27.6%
	2-3 Events	14.4%
	4-5 Events	4.9%
Non-AIM events 2022-23	None of the Events	50.1%
	At least 1 Event	28.0%
	2-3 Events	16.8%
	4-5 Events	5.1%

Source: Athena Infonomics Private Ltd.

3.7.8 School Participation in AIM Events

For the purpose of analysis AIM events were Total 6 in number:- ATL Marathon, App Challenge, Tinkerpreneur,

Community Day, Space Challenge, Tinkering Day (2022-23). Year-wise events which were considered for analysis were:-

Table 30: Year-Wise Event Consideration for AIM Events

Year	Event
2016-17	None
2017-18	ATL Marathon
2018-19	ATL Marathon, Community Day
2019-20	ATL Marathon, Community Day
2020-21	Space Challenge, Community Day, ATL Marathon, App Challenge
2021-22	Community Day, ATL Marathon, Tinkerpreneur, Space Challenge
2022-23	ATL Marathon, Tinkering Day, Community day, Tinkerpreneur

Source: Athena Infonomics Private Ltd.

The data highlights that the participation in AIM events has grown over the years. However, it's worth noting that more than half of the schools still fall into the category of not

participating in any of the events. This suggests that AIM events may require promotion to encourage more schools to participate.

Table 31: School Participation in AIM Events

Events	Number of Events	School Participation
AIM events 2016-17	None of the Events	100.0%
AIM events 2017-18	None of the Events	97.0%
	At least 1 Event	3.0%
AIM events 2018-19	None of the Events	88.4%
	At least 1 Event	11.6%
AIM events 2019-20	None of the Events	80.3%
	At least 1 Event	13.2%
	2 Events	6.5%
AIM events 2020-21	None of the Events	77.7%
	At least 1 Event	11.8%
	2-3 Events	10.1%
	4 Events	0.4%
AIM events 2021-22	None of the Events	69.0%
	At least 1 Event	15.0%
	2-3 Events	12.6%
	4 Events	3.4%
AIM events 2022-23	None of the Events	52.7%
	At least 1 Event	19.5%
	2-3 Events	19.5%
	4 Events	8.3%

Source: Athena Infonomics Private Ltd.

3.7.9 Student Participation in AIM and Non-AIM Events

The table below highlights the number of students participating in various competitions and challenges. From the 493 schools, 3.1 lakh students participated in ATL related events over the years since its induction. Around 2 lakhs students from these 493 schools have participated in various non-ATL events/completions since the induction of ATL in the schools. For Non-AIM and AIM events, the number of students participating has increased almost every year. However, there is still a need to advertise these competitions in a timely fashion so that schools and students have ample time to prepare for the competitions.

There is also a need for these competitions to be organized in such a way that there is no clash between the competitions and the important events in the school, which however, may not be possible across the country, given different timelines of school opening and closing, but perhaps the competition dates could also be varied in different years, giving equal opportunity to all the schools.

Table 32: Student Participation in Non-AIM and AIM Events

	Non-AIM Events					AIM Events					
	National Talent Search Examination (NTSE)	Junior Science Talent Search Examination (JSTS)	Kishore Vigyanik Protsahan Yojana (KVPY)	National Science Olympiad (NSO)	The Inspire Awards	ATL Marathon	App Challenge	Tinkerpreneur	Community Day	Space Challenge	Tinkering Day (2022-23)
2016-17	3162	429	562	11414	238						
2017-18	3421	618	719	11436	351	548					
2018-19	5037	1773	1116	18231	582	1605			4312		
2019-20	9563	1574	1116	19769	951	2413			6172		
2020-21	7963	1511	1101	16792	1810	2728	88		9908	562	
2021-22	28232	1359	1445	16849	1572	3719		4537	217076	1070	
2022-23	7911	2433	2013	20429	1606	4326		3319	13205		37069

Source: Athena Infonomics Private Ltd.

These competitions are not only a platform to showcase talent and skills, but preparing for these competitions enables the students and teachers to gain hands-on experience, which has emerged as one of the main

pathways to engage students within the ATL, which has also increased their level of interest in STEM and allied activities.



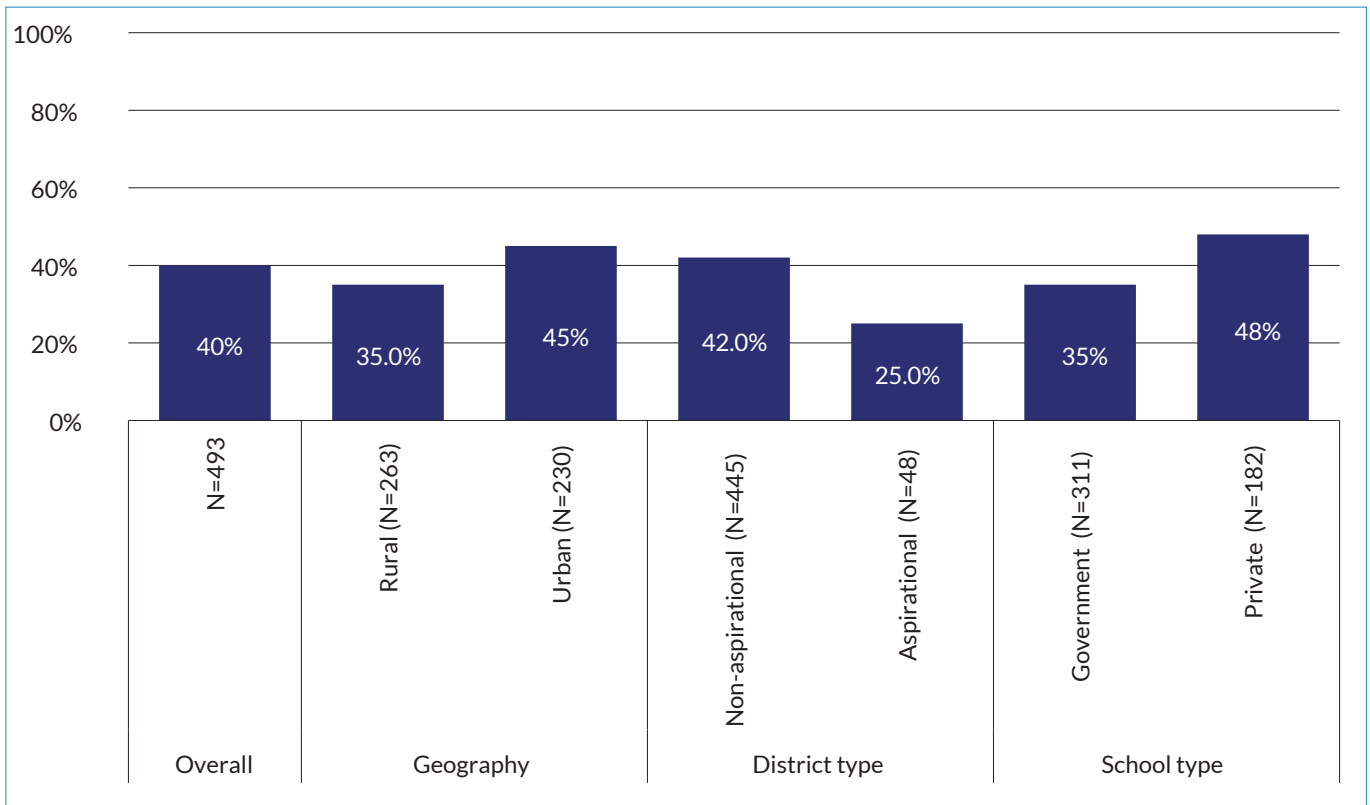
“We gave lot of DIY (Do-It-Yourself) activities to the students who have been doing these activities with a lot of interest. If they are doing an easy simple activity, it is already in social media, even if they are trying the activity, it makes them very interested in activities. Further, after completing the activity and getting an output for the activity, they are not only interested but are also very happy at something that is done by them.” – ATL INC, Private, Urban, Chennai.

3.7.10 Community Engagement

One of the key outcomes expected of the ATLs in the schools is accountability on the part of the schools to engage the community and share the benefits of having a state-of-the-art **ATL in the community. Schools must maintain a record of other schools being supported by the ATL on a quarterly basis. ATL ICs were probed on the number of other schools availing the benefits of their ATL, the frequency external school students visiting the ATL, and the average number of students visiting the ATL per visit.**

While ATLs are designed to serve students beyond their host school, only 40% currently extend this accessibility to other schools and students. Given that the ‘brand value’ is a primary motivator for ATL applications, as previously discussed, it is crucial for AIM to guide schools regarding the inclusion of other schools and students in their ATL activities. To ensure adherence to this principle, AIM could incorporate specific engagement targets into the application process, mandating formal agreements of collaboration between participating schools.

Figure 54: Engagement with Community Schools/Students



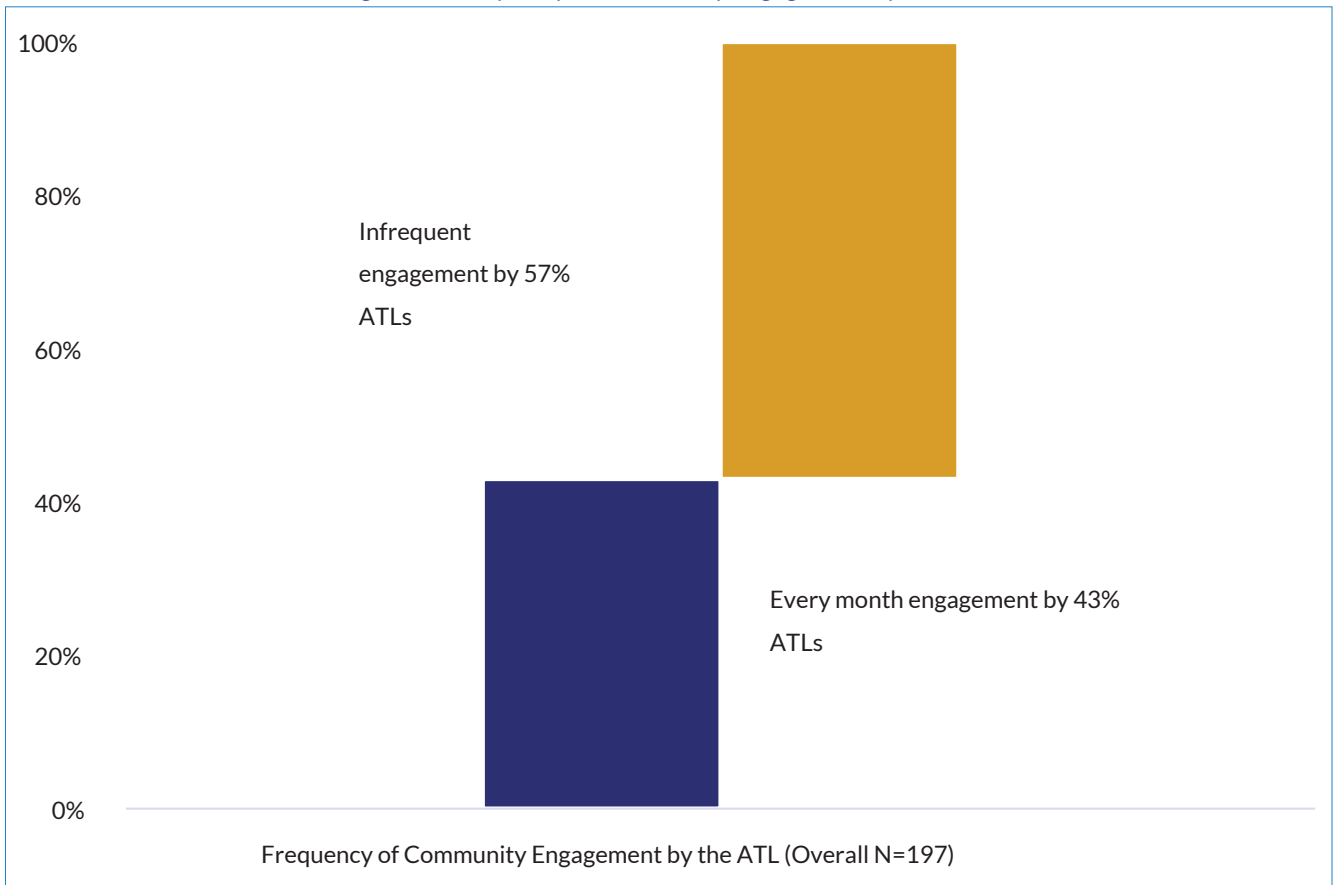
Source: Athena Infonomics Private Ltd.

Frequency of Community Engagement by the ATLs

43 percent of the schools engaged with the community every month. However, the majority (57%) engaged infrequently with the community. However, per visit on average 56 students visited the ATL, which indicates that despite low engagement by schools, a substantial number of students were being reached. It further indicates that to maximize the impact of community engagement, AIM

should encourage more frequent interactions with other schools and students. Community engagement should transcend being a mere compliance requirement, instead focusing on providing students with regular exposure to the ATL, nurturing their curiosity, creativity, and imagination.

Figure 55: Frequency of Community Engagement by the ATL



Source: Athena Infonomics Private Ltd.

3.8 Project Development and Innovation

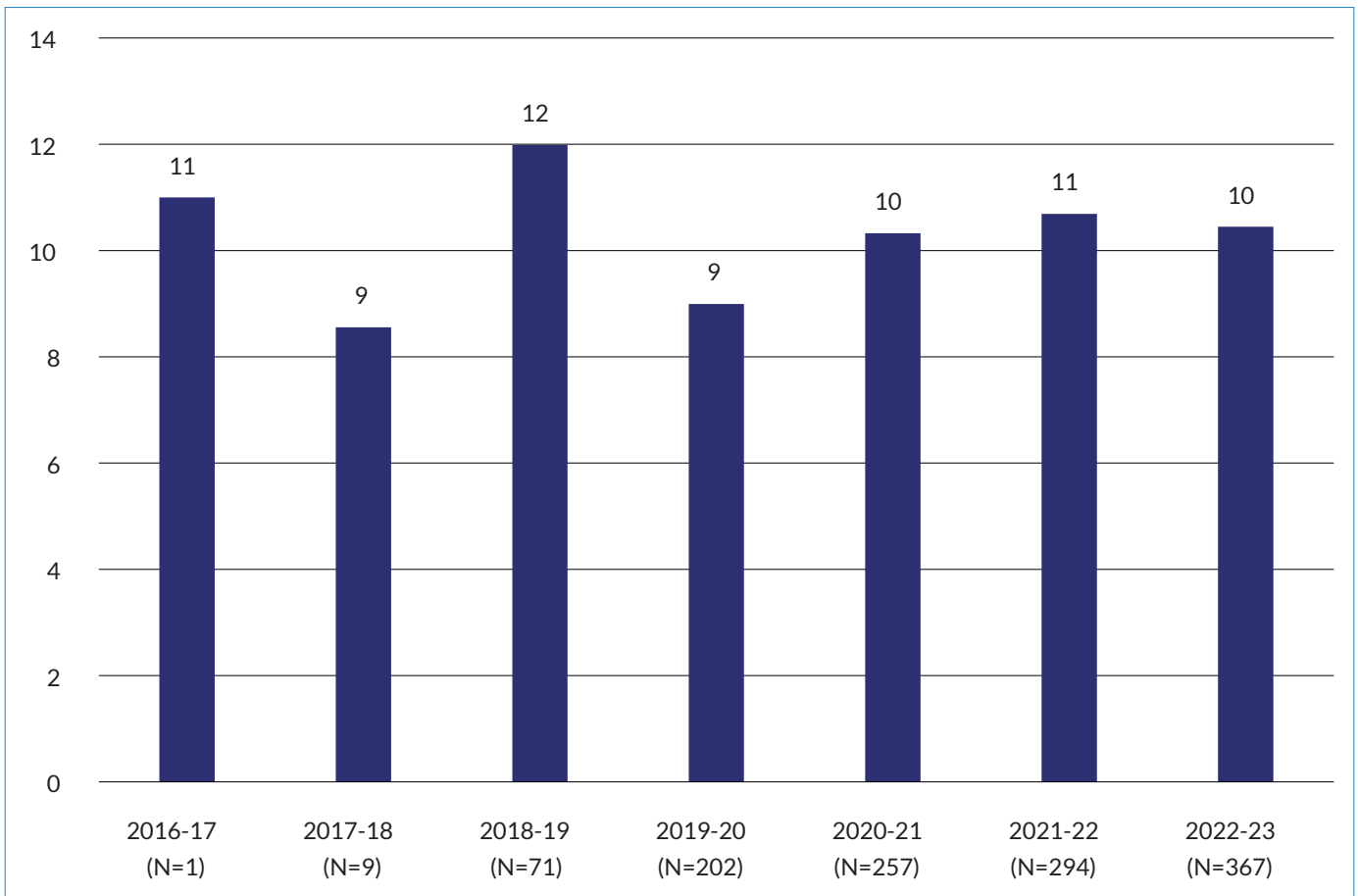
This section seeks to capture the innovations that were developed in ATLs across the country.

3.8.1 Year-Wise Average Number of Innovations

The purpose of the ATLs in the schools is manifold. It was envisioned to make the students job-market-ready with 21st-century skills, by equipping them with critical thinking, problem-solving, and design thinking, and training them to create solutions for real-world problems. These solutions have been manifested in terms of the innovations being developed in the ATLs across the country.

ATL ICs were probed on the number of innovations developed in the ATLs. The data highlights that the school on average has created approximately 10-15 innovations from the year 2016-17 to 2022-23. In the years spanning from 2017-18 to 2019-20, Overall, the average number of innovations being created in the ATLs has witnessed a steady increase.

Figure 56: Average number of innovations developed by the ATLs



Source: Athena Infonomics Private Ltd.

When seen across categories, rural schools have shown more enthusiasm for creating innovations. Rural schools' enthusiasm for innovations was also underscored in qualitative discussions when school authorities pointed out

that establishing ATLs in rural and tribal areas has provided students with opportunities to learn and transform their ideas, which would not have been possible otherwise.

Table 33: Average number of innovations in ATLs - By Categories

School academic year	Geography		District Type		School Type	
	Rural (N=215)	Urban (N=177)	Non-aspirational districts (N=352)	Aspirational districts (N=40)	Government (N=246)	Private (N=146)
2016-17	11			11	11	
2017-18	9	8	8	10	9	8
2018-19	13	11	12	12	10	16
2019-20	10	9	9	9	8	10
2020-21	11	10	10	9	10	11
2021-22	12	10	11	11	11	11
2022-23	11	9	10	12	10	11

Source: Athena Infonomics Private Ltd.

3.8.2 Year –Wise Absolute Number of Innovations

In general, there has been an increase in the number of innovations being developed in the ATLs. When analyzed across categories, it is notable that schools in non-

aspirational districts have produced a higher number of innovations. Furthermore, government and rural schools have also displayed greater enthusiasm in generating innovations.

Table 34: Year –Wise Absolute Number of Innovations

School academic year	Overall	Geography		District Type		School Type	
	Total	Rural	Urban	Non-aspirational districts	Aspirational districts	Government	Private
2016-17	N=1	N=1			N=1	N=1	
	11	11			11	11	
2017-18	N=9	N=4	N=5	N=7	N=2	N=7	N=2
	77	35	42	57	20	61	16
2018-19	N=71	N=30	N=41	N=62	N=9	N=44	N=27
	851	401	450	743	108	418	433
2019-20	N=202	N=88	N=114	N=184	N=18	N=107	N=95
	1817	840	977	1662	155	896	921
2020-21	N=257	N=128	N=129	N=232	N=25	N=146	N=111
	2654	1386	1268	2432	222	1431	1223
2021-22	N=294	N=151	N=143	N=264	N=30	N=174	N=120
	3143	1783	1360	2821	322	1864	1279
2022-23	N=367	N=204	N=163	N=327	N=40	N=230	N=137
	3834	2287	1547	3340	494	2353	1481
Total	12387	6743	5644	11055	1332	7034	5353

Source: Athena Infonomics Private Ltd.

3.8.3 Funding Year –Wise Number of Innovations

Innovations in the year 2016 point towards the enthusiasm in the beginning phases of the ATL establishments whereafter consistent efforts have been witnessed on the parts of the ATLs to keep innovating.

Table 35: Funding Year –Wise Number of Innovations

School academic year	Funding Year							
	2016-17 (N=43)		2017-18 (N=67)		2018-19 (N=175)		2019-20 (N=208)	
	Average number of innovation	Number of ATLs that innovated	Average number of innovation	Number of ATLs that innovated	Average number of innovation	Number of ATLs that innovated	Average number of innovation	Number of ATLs that innovated
2016-17	11	1						
2017-18	9	7	7	2				
2018-19	8	18	11	22	15	31		
2019-20	9	29	9	38	10	87	8	48
2020-21	11	30	11	32	11	93	10	102
2021-22	12	32	10	44	10	101	11	117
2022-23	11	36	10	50	11	129	10	152

Source: Athena Infonomics Private Ltd.

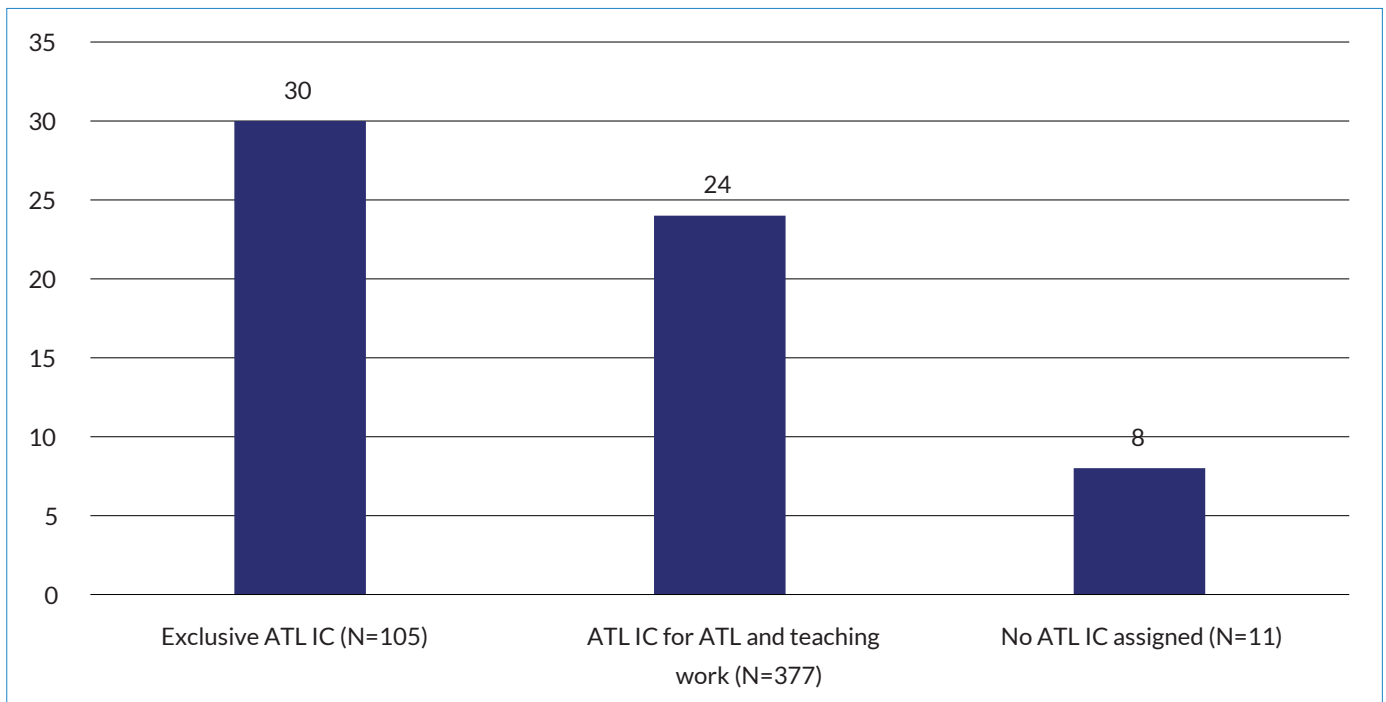
3.8.4 Relationship Between Work Profile of ATL In-Charge and Innovations

To further understand the factors which could influence the innovation development in the ATLs, the innovations data was analysed in tandem with the presence of exclusive ATL IC.

The data shows that ATLs with exclusive ATL In-charge performed better in terms of average innovations developed.

The difference in the average number of innovations underscores the need to encourage schools to appoint exclusive ATL ICs, for which there is already a provision in the grant-in-aid. Exclusive ATL IC’s ability to give undivided attention would also mean greater exposure for the students. Further, engagement of multiple teachers in the operation of ATL would further enhance its utility, in case the schools are not assigning an exclusive ATL IC.

Figure 57: Relationship Between Work Profile of ATL In-Charge and Innovations



Source: Athena Infonomics Private Ltd.

3.8.5 Qualitative Findings on Innovations

The data arouses curiosity regarding the kind of innovations that were developed by the students. Qualitative discussions with school authorities and other stakeholders have given an insight into the same. From the most basic solutions to the day-to-day problems, the students have also tried their hands at some of the most

sophisticated ideas. This information was analysed to categorize the innovations. Qualitative discussions with school authorities revealed the primary innovations in their ATLs. The team also conducted observation of projects developed by the ATLs (those available/in display).

Figure 58: Innovations Developed by ATLs

Intelligent Flushing System, Smart Dustbin, Water Tank Alarm, LPG Leakage Protection, Automatic Sanitizer Dispenser, Farmers' Laser Protection, Laser Security System, Motion Sensitive Blind-Stick, Coal Bicycle, Sound Sensitive Doors, Solar Lamps, Grandparents' Notification System, Soil Analysis, Wild Vision-protect animals, Mini robots, Drone, telescope, auto water sprinkler, car sensors, sonic sensors, Robo walker, Robo server, Handwriting machine, Hovercraft machine, Landslide monitoring, Robotics, Robot Car, Smart safes, Germ Aqueous Filter, Germ Expansion Gate, Garage Aqueous Filter, Smart Eye Table, Eye Desk, Security Machines, Smart Parking System, Smart safety Helmet, Sandwich Dust, Motion detector, Hydrosonic sensor, Car air purifier, Robo race

Source: Athena Infonomics Private Ltd.

Students have been innovative and applied their skills to augment the day-to-day living experience of their families and their communities, which has won them and their school recognition.



Water tank alarm

"One of the most important success stories for us is when children come to us with small problems and achieve them. For example, the water tank was full and water was falling, so they built a water tank, which made them very happy."

- ATL INC, Government, Rural, Chhattisgarh



Intelligent flushing system

"Our students have created a system which does not allow people to open the bathroom door until and unless they have used the water to clean up after them"- **Principal, Government, Rural, Chhattisgarh**



Sound sensitive doors

"Our students were able to learn to create sound system with the help of which doors could be opened"- **Principal, Government, Rural, West Bengal**



Solar lamp

"Our students learnt to create a solar lamp in the ATL. The unique thing was that, if we charge the battery with solar energy for use, the child can understand how to produce something good in a minimum cost. minimum expenses we can produce a good product which is useful for society." - **Principal, Government, Rural, Haryana**



Notification system for grandparents

"One of our students, whose grandmother is sick and has a light voice and our student is unable to hear the grandmother from another room. So, our students made a notification system wherein when the grandmother shakes her hand, the notification is received by the student in form of a light. Our students mad this and were able to accomplish it with the help of a sensor"- **Principal, Private, Urban, Haryana**



Helping the disabled use the dustbin

"Our students made a smart dustbin which will help the disabled person. The people can stand nearby the dustbin and the dustbin will automatically open by the sensor." - **ATL INC, Government, Urban, Odisha**



Motion sensitive stick for the blind

"One of our students has created a blind stick. She found a blind man in her neighbourhood who was unable to walk. To help him she innovated a stick, which through sensation helps the blind man know the direction in which he is walking. This helps him in finding the stumbling block before he falters" - **Principal, Private, Urban, Odisha**



LPG leakage protection

"A student from our school made a safety gadget to stop the leakage of LPG cylinder. The student was also awarded the Inspiring Manak Award in 2013-21." - **ATL INC, Government, Rural, Odisha**



Coal bicycle

"Children used the lessons they learnt in the ATL to build a bicycle. It was innovative, because it was powered by coal, which made the bicycle function like a bike" - **Principal, Government, Rural, Odisha**

During the COVID-19 when the world was grappling with the worst problems, the ATL students decided to contribute to the solution, by devising hand sanitizer equipment, which would allow them to sanitize without touching, thereby reducing the possibility of COVID-19 transmission.

Students have also gone on to provide solutions for their larger community e.g., some students thought and innovated a solution, that would alert the farmers with the help of notifications on the phone, in case there was an intruder (animals) in their farm, that could destroy the crops.

Another innovative project, which was targeted towards the farmers of the country was helping them understand the amount of fertilizer needed in agricultural practices.



Laser security for farmers

“Students made a prototype alarm system.....by using four plain mirrors and a laser light. The mirrors would focus the reflected light back to the common field area. So, if there was an intrusion, light would stop.....alerting the farmer.”- ATL INC, Private, Urban, Haryana

“During the COVID-19 time, the students felt that they should make a sanitizer that would not require anyone’s touch. So, the students used the sensors to make an automatic hand sanitizer, which is still functional, and students continue to use it.” - ATL INC, Government, Rural, Odisha



Fertilizer analysis for farmers

“The first project known as TerraMetra is for the farmers...it’s helpful for them, as it will tell them about the exact amount of fertilizer they have to add and it helps them to increase their crop yield.”- ATL INC, Private, Urban, Haryana

Students have been working on numerous innovative projects, which aided in their overall development and have given them exposure about various new technologies like laser security, and students seem very happy about it.

Day-to-day issues in urban India like accessing pure water have also been tried to be solved by the ATL students.



“We were doing a project called Laser Security. We did a project on the collapse of the dam and there was a jumper, a go-pad, a motherboard, a battery, a breadboard, an IEC, an LED, which was DC and the other was AC. DC means direct current and the other is DC. And there was a water pump. Its main scheme was electric conservation.”- FGD Students, Government, Urban, Odisha



“I made a water-based model for the AT marathon. It was completed by the end of last year. The idea was that a person would bathe in the water, and the purity of the water would be measured by a water and TDS sensor. I participated in numerous competitions, and won second prize.” - FGD Students, Private, Urban, Haryana

3.9 Impact on Academic Ecosystem

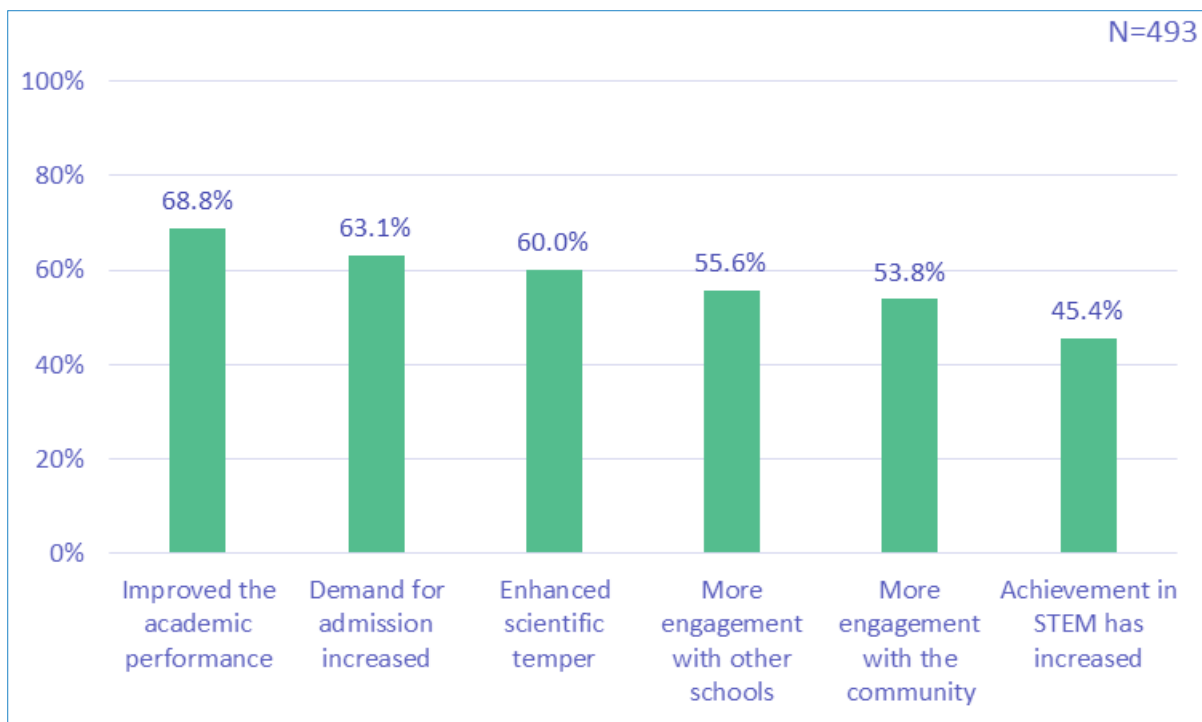
This section highlights the impact of the ATLs on the academic ecosystem. It explores the impact of the ATLs on the school, teaching and students.

3.9.1 Impact on the Schools

Schools have benefitted from the ATL program in numerous ways. The layered impact of the ATLs on the school and its ecosystem has also been highlighted through the probing carried out with the ATL ICs. **The ATL ICs were asked about the ways in which ATL has benefitted them, the overall impact of ATLs on teachers, teaching practices and mindset of students.**

This nuanced analysis of ATL ICs' responses facilitating the impact of the ATLs on the school and its ecosystem shows that 69 percent of the schools reported improved academic performance after the establishment of the ATL, followed by 63 percent reporting an increase in demand for admission. 60 percent of the schools also reported that after the establishment of the ATL, there has been an enhancement in the scientific temper of the students. Furthermore, more than 50 percent of the schools reported increased engagement with the schools and the community.

Figure 59: Impact of ATLs on the Schools



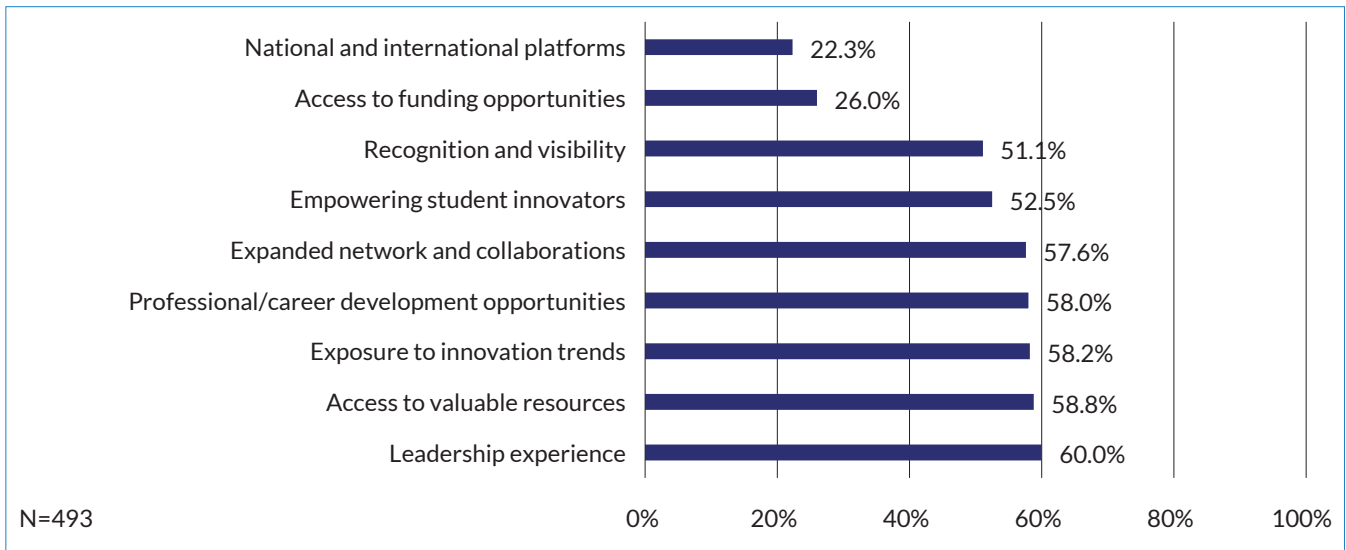
Source: Athena Infonomics Private Ltd.

ATLs have had a positive impact on schools, leading to improved academic performance, enhanced scientific temper, and greater achievements in STEM subjects. These outcomes directly contribute to increased demand for school admissions. Additionally, ATLs have boosted school engagement with other institutions and the wider community, improving the school's reputation and brand value and further contributing to increased admission demand. Since ATLs improved academic performance and enhanced scientific temper, AIM should consider including such cases studies, demonstrating the improved performance in its monthly newsletter and through other platforms.

3.9.2 Benefits of ATL for the ATL IC

Assessment of the benefits revealed ATLs have been reported to provide leadership experience (60%). 59 percent of the schools stated that having ATLs in the schools has given them and their students' valuable access to the resources, and 58 percent of schools stated that ATLs have given them exposure to the innovation trends and have also given their students professional and career development opportunities. Further, ATLs have not only empowered the student innovators (52%) but have also expanded the network of the schools (58%).

Figure 60: Benefits of ATL for the ATL ICs



Source: Athena Infonomics Private Ltd.

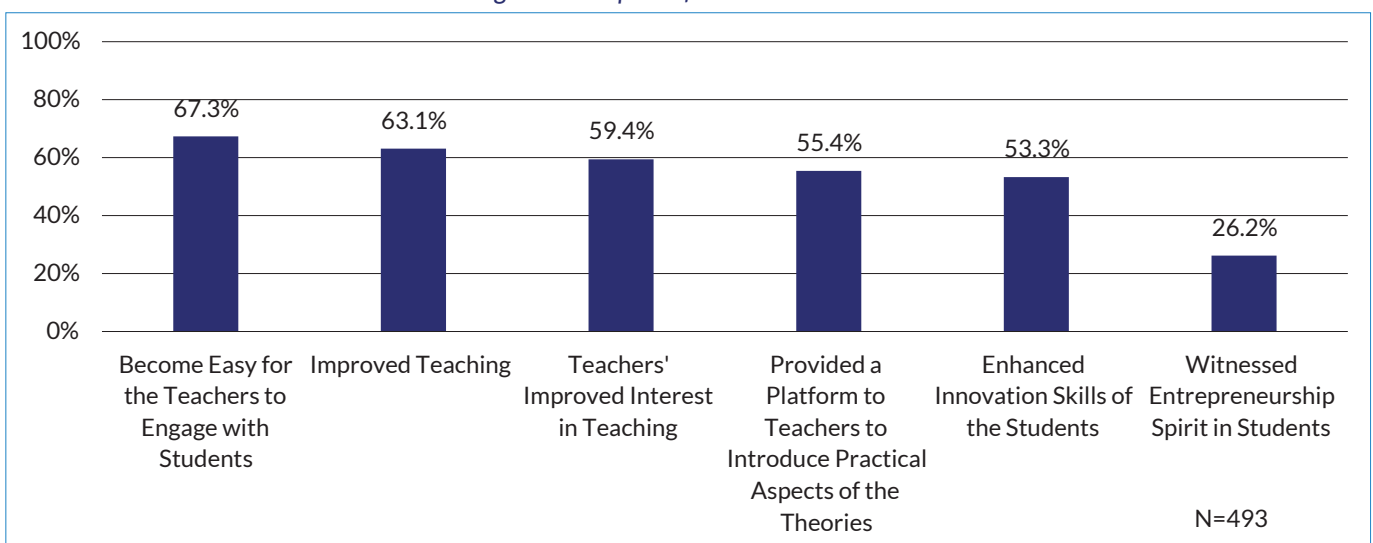
Despite the majority of ATL ICs having teaching roles in addition to their ATL IC duties, they have reported reaping the benefits in their teaching and professional spheres. The ATL ecosystem has also provided ATL ICs with a platform to explore new areas of learning, simultaneously offering opportunities to showcase their potential by mentoring and guiding students in their innovative pursuits.

3.9.3 Impact on Teachers and Teaching Practices

The noteworthy impact of the ATLs has also introduced nuanced influence on the teachers and the teaching

practices. The data shows that after the introduction of the ATLs, for 67 percent of the schools, it has become easy for the teachers to engage with the students and 63 percent also reported an improvement in the teaching of the teachers, followed by 59 percent reporting improved interest of the teachers in teaching, 55 percent reported that ATLs have provided a platform to the teachers to introduce practical aspects to the theories, for 53 percent of the schools ATLs were instrumental in enhancing innovation skills of the students.

Figure 61: Impact of ATLs on Teachers

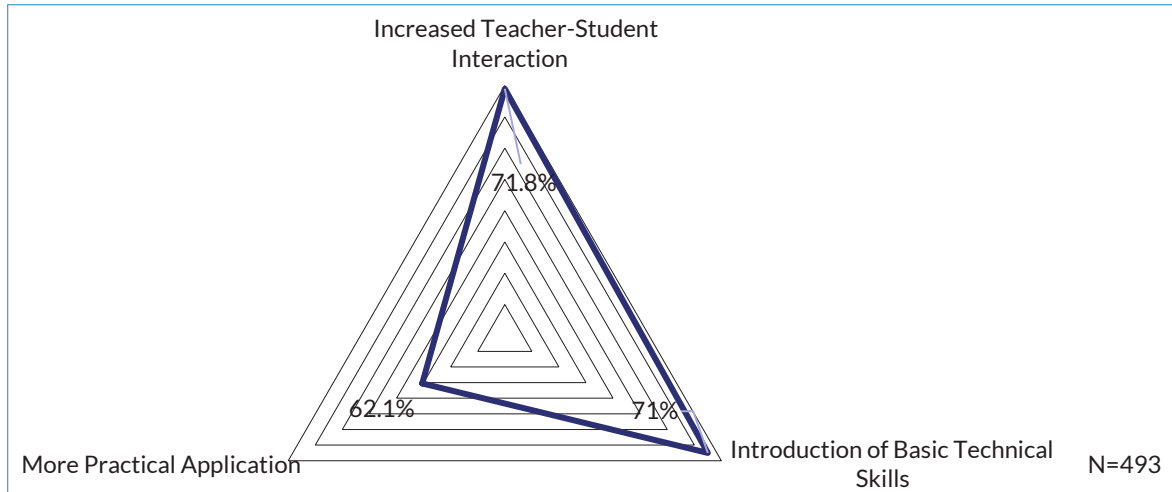


Source: Athena Infonomics Private Ltd.

Taking into consideration the impact of ATL on teachers, it would only be relevant to highlight the ways in which ATL has improved the teaching practices in the school. 72 percent of the schools reported that ATL establishment

has increased the student-teacher interaction in the school, which perhaps facilitates the increased practical application (62%) and introduction of basic technical skills (71%).

Figure 62: Impact of ATLs on the Teaching Practices in the School



Source: Athena Infonomics Private Ltd.

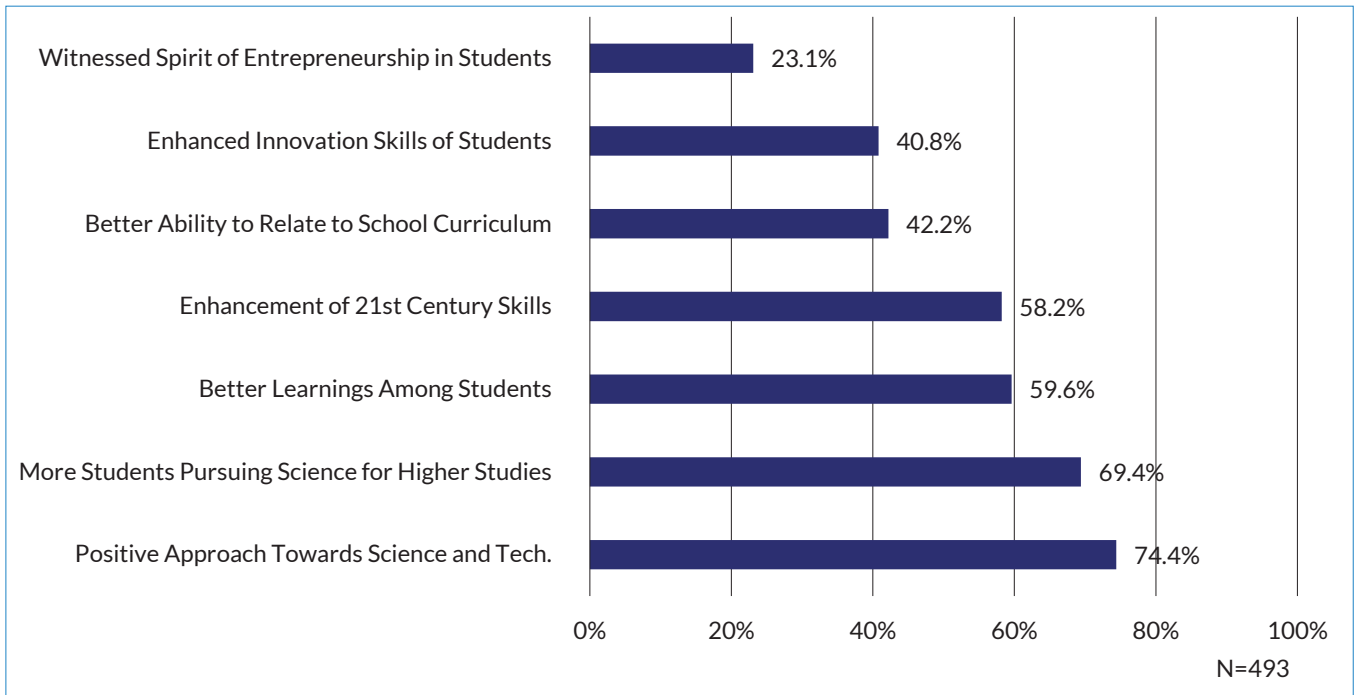
ATLs in schools have promoted increased teacher-student engagement, creating opportunities to integrate practical aspects with theoretical teachings. This engagement not only enhances the quality of education but also fosters innovation skills among both students and teachers. AIM should consider allowing teachers, those who have shown improvement in engagement, to lead some of the ATL related training, which would also showcase the teachers’ improved skills, at the same time incentivizing their participation in ATL.

3.9.4 Impact on the Mindset

ATLs were specifically established to create an ecosystem for the students, so that they could be made employment ready by equipping them with 21st century skills. The graph below highlights the impact of the ATL on the mindset of the students. The data shows that after the establishment of the ATLs in the school students not only have a positive approach towards science and technology, but more students have begun to pursue science for higher studies. It has also led to the enhancement of 21st century skills, facilitating better learning outcomes among students.



Figure 63: Impact of the ATLs on the Mindset of Students



Source: Athena Infonomics Private Ltd.

The presence of ATLs in schools has notably influenced students by positively shaping their attitudes toward science subjects. Revitalizing the ATL curriculum to address these challenges is essential to fully harness the potential impact it could have on the innovation and entrepreneurship ecosystem of the country.

3.9.5 Impact on Students’ Education and Career Choice

ATL’s establishment and functioning in the schools has had a profound impact on the education and career choices of students. The data highlights, as stated by 95 percent of the principals, that after the establishment of the ATL, not only has the student’s interest in STEM subjects increased, but even more students are opting for STEM now. 97 percent of the principals believe that after the establishment of ATLs, more students have chosen careers in the field

of STEM. Furthermore, approximately 97 percent of the principals stated that ATL has been instrumental in providing a platform for the students to understand STEM, apply design thinking principles, and it has also inculcated an innovative mindset among students.

In-depth qualitative discussions with school authorities have unveiled profound insights into the transformative effects of ATLs on students’ education. Among these impacts, a standout achievement has been the noticeable enhancement of students’ knowledge base, critical thinking abilities, and problem-solving skills. This development is so profound that it equips students to tackle challenges across diverse fields, ensuring their preparedness to identify problems and effectively apply their acquired knowledge from the ATL.



“If they see any problem in their field, they can use the knowledge gained from the ATLs and make a small project.”
- Principal, Government, Rural, Gujarat

This newfound capacity for critical thinking and problem-solving would empower students to transcend disciplinary boundaries, allowing them to address real-world issues with confidence and competence.

ATLs have notably bolstered science enrollment in schools, positively impacting students' scientific acumen and unlocking a plethora of opportunities within the field.

This surge in enrollment reflects a heightened interest in scientific exploration and learning, fostering a more robust scientific temperament among students. Beyond nurturing curiosity, this trend creates a promising pathway for students to pursue diverse scientific avenues, offering a broader spectrum of career prospects and fostering a society that values and advances scientific knowledge.



"If we talk about the science team, if there were 100 students in the 10th grade, then there were 40 students in the science team. Now, after knowing about the technology, if there are 100 students in our class, 80% of them prefer science and the rest prefer engineering and technology." - **Principal, Government, Rural, Gujarat**

Historically, the predominant choice for students after completing secondary school was either pursuing graduation or opting for commerce-related courses. These options held greater appeal due to a lack of practical knowledge exposure during their school years. However, the discussions highlighted a notable transformation in this pattern, as students are now increasingly drawn towards acquiring practical knowledge through ATLs. This shift

reflects a growing recognition of the value of hands-on learning experiences, diversifying students' post-secondary education choices and equipping them with vital skills for various fields beyond the traditional academic and commerce pathways. Some school authorities also pointed out that after the establishment of the ATL, students have begun to choose IT subjects and have also gone abroad to pursue higher studies.



"The students are now going towards science because they are getting practical knowledge. Earlier they were studying only through books." - **Principal, Government, Rural, Gujarat**

3.9.6 Qualitative Findings on the Impact on the Mindset & Education of Students- KIIs

- **Novelty** - At ATL, teachers and students both are learning something new every day.

ATL has offered a unique platform and opportunity for students that they did not have access to otherwise.



"I am engaged in exploring new avenues, taking the initiative to experience various aspects of innovations, and dedicating my time to create innovative projects. ATL IC and students are also involved in giving shape to innovative ideas." - **Principal, Private, Urban, Odisha**

- **Joy of learning-** Students creating and trying innovative ideas is a joyful activity for them and for teachers it is a joy to watch them learn and experiment.



“Opening of the ATL was a matter of great joy. Students are learning a lot, as many changes are taking place. Our students are also joining new subject streams. This is because of the ATL. That is why we feel very proud that ATL has opened here.”

- Principal, Private, Urban, Odisha

- **Constant learning-** Continuous exposure to the ATLs has enabled students to learn in a continuum. Their knowledge, skills, and design thinking has been enhanced



“We had been in a breakdown for two years due to COVID. After that, when we started again, there were only theory classes and small practical classes. We have not yet found such a big success. But we have found one success that the children who participate in ATL,, are constantly cooperating and the focus is how can we learn new things.....”

- Principal, Private, Urban, Odisha

- **Skills upgradation-** ATLs provide an environment for students to participate in hands-on activities, which equips them with more practical skills.



“We have had a lot of success story from our ATL lab..... Our two students won several prizes for skills interaction in session, presentation skills -

Principal, Private, Rural, Odisha

- **Environment for co-learning-** Students learn practical application, which they share with others and thus foster a spirit of teamwork and empathy



“When the children come to the ATL lab, they come, learn, and teach the practical things to the other children as well, inspiring other children. This is one of our biggest achievements.”-

Principal, Private, Rural, Haryana

These opportunities have translated into various outcomes for the students. ATLs have not only molded the mindset of students **but have also influenced parents, especially when they witness their children’s improved performance.** Parents have grown to appreciate their children and their involvement in STEM.

When students create simple innovations using readily available items from their local markets, they not only introduce something novel but also **acquire the ability to solve everyday problems using accessible resources.**

Engaging in ATL activities **provides students with a vision for their future careers,** allowing them to spread their wings and pursue science to its fullest potential.

With the introduction of ATLs in schools, **students have gradually developed confidence in utilizing technology.**

Students are getting more interested in understanding how they can apply the knowledge they acquire in ATLs to their everyday lives.

Following the establishment of ATLs, **students in rural areas are being introduced to technology** and innovation, and they are also showcasing their talents on a national level.

With the establishment of ATLs, **Tribal children are gaining valuable knowledge** and getting educational opportunities.

3.10 Financial Status and Compliance

3.10.1 Utilization Certificate (UC) Compliance

Secondary analysis of the UC compliance was analyzed in the first stage of the ATL assessment. As per the data of

1000 ATLs till May 2023, around 73 percent of ATLs had submitted the UC. Non-compliance was higher among the rural and government schools.

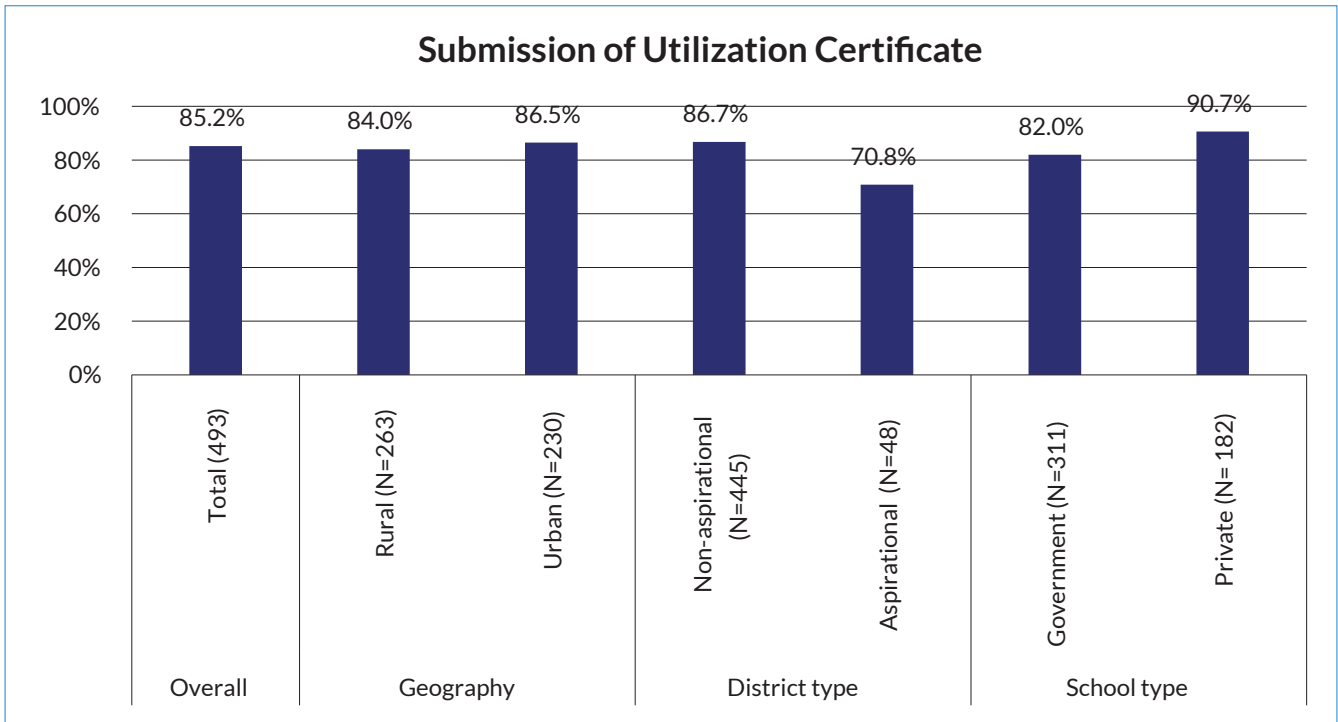
Table 36: UC Submission Status (1000 ATLs)

% of ATLs	Total (1000) %	Rural (523)	Rural	Urban	Non-aspirational
Submitted UC	72.8	69.2	76.7	71.5	75.0
No submitted	27.2	30.8	23.3	28.5	25.0

Utilization Certificate Compliance (UC) is one of the most important compliances for schools. **ATL ICs were probed on the latest year of UC submission and the reasons for not submitting the UC.** According to the analysis, 85% of ATLs have submitted Utilization Certificates (UC), which indicates a high degree of compliance. Nevertheless, the gap

underscores the ongoing necessity to educate ATLs about different compliance requirements and their adherence. Consequently providing a step-by-step guide (preferably in the vernacular languages) is essential to streamline the process of preparing and submitting UC.

Figure 64: Year of Latest Submission of Utilization Certificate



Source: Athena Infonomics Private Ltd.

When analysed across categories, it was observed that compliance for the UC submission is highest for the private schools, with no significant difference across categories, except for in schools in the aspirational districts, wherein the non-compliance is the highest, underscoring the importance of consistently emphasizing compliance.

Funding year wise data shows that schools funded in the year 2016-17 demonstrated highest UC submission compliance whereas schools funded in the year 2019-20 demonstrated the lowest UC submission compliance.

To address this gap, orientation regarding the UC should include the school principal, as the finance section of the school is mostly responsible for the UC.

Table 37: Funding Year Wise Submission of Utilization certificate

2016-17(N=43)	2017-18(N=67)	2018-19(N=175)	2019-20(N=208)
95.3%	85.1%	86.3%	82.2%

Source: Athena Infonomics Private Ltd.

3.10.2 Utilizing the One-time Establishment Cost

AIM followed an established procedure for disbursing grant-in-aid to the schools wherein the one-time establishment cost of INR 10 Lac was given as the First Tranche of payment. **ATL ICs were asked to provide details of the utilization of the one-time establishment cost provided to the ATLs.** The table below highlights the average spend of one-time establishment cost by a school on various categories. The data shows that on average a 94 percent of

the schools spent INR 4,71,824 on equipment, 90 percent of the schools spent INR 1,32,987 on advanced prototyping tools, 94 percent of the schools spent INR 1,45,395 on laptops and projectors, and 92 percent of the schools spent INR 2,04,262 on refurbishment of the ATLs. It is pertinent to point out here that 259 schools have utilized more than INR 50,000 for procurement of advanced prototyping tools and materials, indicating schools' willingness to experiment with contemporary ideas.

Table 38: Utilization of One-time Establishment Cost by the ATLs

Components for which the amount was allocated	Percentage of schools utilized	Total	Geography		District Type		School Type	
			Rural	Urban	Non-aspirational	Aspirational	Government	Private
Average amount spent by the schools (INR)								
Procurement of ATL equipment as per the ATL equipment list (INR 6,50,000 allocated)	94%	N=463	N=253	N=210	N=419	N=44	N=293	N=170
		4,71,824	4,68,217	4,76,170	4,69,170	4,97,097	4,81,755	4,54,707
Procurement of advanced prototyping tools and materials (INR 50,000 allocated)	90%	N=446	N=245	N=201	N=403	N=43	N=282	N=164
		1,32,987	1,29,297	1,37,485	1,37,602	89,736	1,38,771	1,23,042
Procurement of laptops, and a projector (INR 1,50,000 allocated)	94%	N=464	N=255	N=209	N=421	N=43	N=282	N=164
		1,45,395	1,47,821	1,42,435	1,45,420	1,45,146	1,42,624	1,50,231
Refurbishment of the ATL (INR 1,50,000 allocated)	92%	N=456	N=249	N=207	N=412	N=44	N=291	N=165
		2,04,262	1,96,293	2,13,848	2,09,992	1,50,605	1,87,610	2,33,629

Source: Athena Infonomics Private Ltd.

3.10.3 Fund Utilization for Operation and Maintenance of ATLs

The table below highlights the utilization of grant-in-aid for the operation and maintenance of the ATLs. The data shows that 54 percent of the schools spent on average INR 37,184 on the repair and maintenance of the ATL, 56 percent of the schools spent INR 49,842 on the purchase of consumables,

and 33 percent of the schools spent INR 11,201 on the travel and accommodation of the ATL faculty. Furthermore, 31 percent of the schools also spent an average of INR 11,703 on organizing ATL-related events, and 17 percent of the schools spent INR 5,282 on conducting outreach activities.

Table 39: Fund Utilization by the ATLs for the Operation and Maintenance

	Percentage of schools utilized	Total	Geography		District Type		School Type	
			Rural	Urban	Non-aspirational	Aspirational	Government	Private
		<i>Average amount spent by the schools (INR)</i>						
Repair & Maintenance of ATL equipment	54%	N=265	N=136	N=129	N=244	N=21	N=154	N=111
		37,184	33,935	40,899	36,723	41,458	32,188	45,722
Purchase of consumables/spares	56%	N= 275	N= 134	N=141	N=258	N=17	N=163	N=112
		49,842	43,110	57,541	52,420	25,942	43,930	59,946
Travel & accommodation reimbursement	33%	N=165	N=74	N=91	N=152	N=13	N=91	N=74
		11,201	10,505	11,998	11,827	5,405	9,632	13,884
Organizing intra and in ATL-related events	31%	N=153	N=69	N=84	N=145	N=8	N=83	N=70
		11,703	7,416	16,604	12,372	5,495	10,987	12,925
For conducting ATL community outreach	17%	N=82	N=34	N=48	N=79	N=3	N=38	N=44
		5,282	3,489	7,332	5,662	1,758	3,484	8,354

Source: Athena Infonomics Private Ltd.

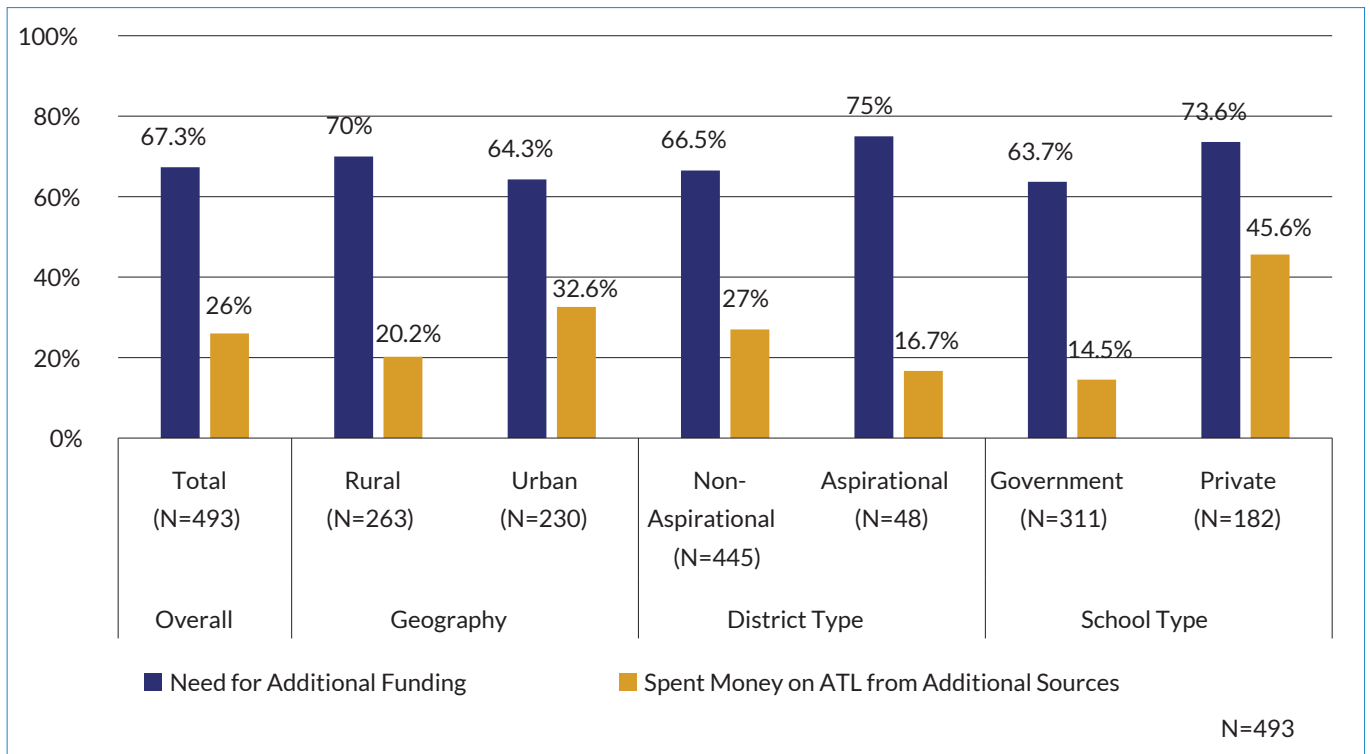
3.10.4 Additional Funding for the ATLs

ATL functioning is a resource-intensive initiative that may require additional funds in many instances. Consequently, the additional funding needs of the schools were also probed, so that appropriate recommendations, if necessary, could be made. **Schools were probed on whether they felt the need for additional funding for ATL, whether they spent money for the ATL from sources other than the amount received from AIM, the additional amount that was spent, the sources for additional funds, the reason to spend more money, and the purpose for additional funds.** The data highlights that 67 percent of the schools felt a need for additional funding, but only 26 percent (128 schools) of the schools spent funds on ATL from additional sources. The prevalence of spending from additional sources was highest for private schools and lowest for government schools.

This finding is quite relevant because for 89 percent of the schools (out of 128) the source of additional funds was the school, which indicates that private schools have better access to additional school funds in comparison to other categories of schools. Out of the 128 schools having spent additional funds, 27 percent each spent INR 3,00,001 and above and between INR 50,001 to 1,00,000. 22 percent of the schools spent less than INR 50,000.

It is important to mention that 62.5 percent of the schools felt that the spending of additional funds was necessary for the ATL functioning, and 50 percent of the schools felt additional funding was necessary to cater to the number of students using the ATL. For 54 percent of the schools additional funding was used to procure tools, 38 percent of the schools used the additional funding to participate in ATL events, 37 percent of the schools used the additional funding for setting up the physical space for the ATL, and 35 percent of the schools used the additional funding for the salary of extra trainer.

Figure 65: Need for Additional Funding by the ATLs



Source: Athena Infonomics Private Ltd.



3.11 Summary of Qualitative Findings

This section explores the qualitative findings that emerged from the discussions with the principals and the ATL In-charges. Recommendations for the sustainability of the

ATLs not only emerge from suggestions given by the respondents but also from the insightful efforts taken by the schools to boost the effectiveness of their ATLs.

3.12 Qualitative Discussions with School Authorities

1. Steps taken by the schools to improve ATL performance

- Timely appointment of **teachers for the ATL, particularly those with engineering backgrounds:**
 - It was considered crucial to appoint teachers for ATLs in a timely manner to ensure that the labs can start functioning as planned. Delays in appointments could hinder the effective implementation of activities and programs within the ATLs, potentially causing missed opportunities for students to engage with STEM (Science, Technology, Engineering, and

Mathematics) education. Further, the mention of teachers with engineering backgrounds highlights the importance of subject matter expertise. Teachers with engineering qualifications are well-equipped to guide students in STEM-related projects, as they have a strong foundation in scientific and engineering principles. They can provide valuable insights and mentorship to students interested in pursuing STEM fields.



"..... For ATL 2 teachers are appointed and these 2 teachers come with an engineering background, having the necessary knowledge to guide the children and that is one of the reasons that we have appointed a person with engineering background. And we are also frequently sending the teachers for the workshop to know the new trends and new initiatives being undertaken by the ATL. This also gives them an opportunity to learn about ATL related practices being undertaken in other schools and by other children." - **Principal, Private, Urban, Tamil Nadu**

- Ensured **ample space for establishment and functioning**, allowing students the freedom to engage in hands-on activities:- Providing adequate resources underscored the importance of creating a conducive environment within educational institutions for experiential learning. By allocating sufficient physical space and resources,

educational institutions facilitated practical and hands-on experiences for students. According to the school authorities, this not only promoted a deeper understanding of academic concepts but also encouraged creativity, innovation, and critical thinking.



"Our school has given a lot of space to the ATL..... We have kept the equipment in good condition and provide the students with technical knowledge. We teach them to use the equipment so that they can create innovative projects. We also ensure their participation in competitions, so that they showcase their talent at national level." - **Principal, Government, Rural, Gujarat**

- Engaging **students in inter-school competitions** to showcase their talents, benefiting both students and teachers:- As demonstrated above, schools made an effort to engage students in competitions. It provided students with a platform to showcase their talents. These competitions also encouraged healthy competition, boosted self-confidence, and inspired a sense of achievement. Importantly, it also benefited the teachers by providing them with opportunities for professional development and collaboration with colleagues from different schools.

2. Integration of ATL into the school curriculum

- **Ensuring regular classes along with regular school schedule:-** School authorities ensured continuity in ATL education through the implementation of **a fixed timetable and overall curriculum, to** ensure the seamless integration of Atal Tinkering Labs (ATL) in the curriculum. By adhering to a set schedule, schools could allocate dedicated time slots for ATL activities, ensuring that students have regular access to these innovative learning experiences. Some schools introduced mandatory **ATL classes twice a week** and utilized Fridays and Saturdays for ATL classes for different grades. A well-structured curriculum for ATL provides a comprehensive roadmap for students, outlining the skills and knowledge they will acquire over time.



"We have fixed a time for ATL. We have made a timetable, so that it becomes practical and easy for them to attend the ATL classes. We have made a timetable so that the students can learn their theory with practical hand-on experience in ATL classes." - **Principal, Government, Urban, Gujarat**

- Organized ATL **lectures with the assistance of industry experts:-** Organizing Atal Tinkering Lab (ATL) lectures with the assistance of industry experts was considered as a proactive step to enrich the educational experience for students. These expert-led sessions could bring real-world knowledge and practical insights into the classroom, bridging the gap between theoretical learning and practical application. Industry

experts, with their in-depth understanding of current trends and developments, could provide students with valuable perspectives and expose them to the latest innovations and technologies. Such interactions can ignite students' passion for STEM subjects, inspire their career choices, and foster a deeper appreciation for the real-world applications of their academic studies.



"To make the ATL more effective, I think, of course, it's a very beautiful program, there are a lot of interactions happening between schools, but I think more experts should be coming frequently and talking to children and give their guidance." - **Principal, Private, Urban, Haryana**

3. Impact of ATL education on the future pathways for students in STEM

- It was acknowledged that establishment of ATLs has **transformed the way students choose their subjects/ careers:-** There has been an acknowledgement of profound transformation in the way students have begun to make decisions about their academic subjects and future careers after the establishment of ATLs. ATLs have emerged as dynamic platforms that

nurture innovation, creativity, and hands-on problem-solving skills among students. They expose learners to a wide array of STEM-related activities and cutting-edge technologies, which can be a pivotal factor in influencing their choices. As students engage with these labs, they often discover new passions and talents they might not have encountered through traditional classroom learning.



“Earlier students chose Army field, or they were more interested in Arts. After the establishment of the ATLs, it has changed a bit, as their interest in science has increased.” - Principal, Government, Rural, Chhattisgarh

- Practical education within the **ATLs has instilled confidence in students to pursue careers as scientists and engineers**, as it has empowered them to convert theoretical knowledge into practical models:- The incorporation of practical education within Atal Tinkering Labs (ATLs) has had a transformative effect on students, instilling in them the confidence to pursue careers as scientists and engineers.
- Exposure to technology within the ATL ecosystem has **made students more aware of technology:- In addition to adding practical element to the**

theoretical dimension, exposure to technology within the Atal Tinkering Lab (ATL) ecosystem has significantly heightened students’ awareness of the role and impact of technology in our daily lives. These well-equipped labs provide students with hands-on experience with cutting-edge technologies, tools, and equipment, allowing them to explore and experiment in a supportive and innovative environment. Consequently, ATLs have given exposure to new skills such as coding, 3D development, and other valuable skills.



“I have seen the development of scientific temperament, thinking and innovation skills in students. I have also witnessed an overall development of teachers, especially in science teachers, as their way of teaching has improved because after the establishment of ATL they have been able to take their teaching to next level by adding practical elements.” - Principal, Private, Urban, Madhya Pradesh

4. Experience of schools with AIM's engagement

- School authorities seek **more interaction and guidance from AIM:-** School authorities are actively seeking increased interaction and guidance from the Atal Innovation Mission (AIM), especially regarding matters related to Utilization Certificate (UC) compliance, events for student participation. It underscores the importance

of collaborative and supportive relationship between educational institutions and AIM. Schools authorities suggested regular interaction with AIM (even electronic) and/or **occasional face-to-face interactions**, possibly in the form of workshops, should also be included to facilitate a well-rounded engagement experience



"When we talk to officials at AIM, Niti Aayog and ATL directly, the first thing that we hear is that the mail has been sent, but the phone calls that we receive are of vendors..... We can't talk face to face or directly with the officials. We face problems in how to include our children in various events. If we were able to talk directly to the government officials frequently, we would then be able to solve many problems." - **Principal, Private, Urban, Odisha**

5. Suggestions to make ATL more effective and sustainable

- As demonstrated above, school authorities recommend increased and consistent communication from AIM. Further, school authorities also emphasized the importance of **sustained funding** to continue the operation of ATLs.
- **Establishing mechanisms to seek assistance from district or state-level authorities in the operation of ATLs:-** They proposed the creation

of a **district-level group that could serve as a channel for schools to access more ATL-related information and address their concerns.** The proposal for the establishment of a district-level group reflects a forward-thinking approach aimed at enhancing the accessibility of information and addressing concerns related to Atal Tinkering Labs (ATLs). This concept envisions a centralized platform where schools can connect, collaborate, and share knowledge and experiences concerning ATL initiatives.



"I am thinking that a group should be formed at the district level which would provide information to the school and solve any problems that the schools might face, so that ATLs in the area can do well." - **Principal, Government, Urban, Gujarat**

- For smoother operation, school authorities **advocated for reduced interference from vendors and availability of skilled instructors**

(MoCs). They pointed out that vendors were not very reliable and do not provide high quality equipment.



“The vendors are not very reliable. All the vendors who come to us, they don’t talk about reliable things.”
- **Principal, Government, Rural, Haryana**



“More funding is required, firstly, because in this funding, we are not able to procure all the equipment, and secondly, the equipment taken from the vendors is low quality and is not functional.”- **ATL IC, Government, Rural, West Bengal**

6. Influence on students’ education and career

- **The presence of ATLs has led to a positive impact on students’ educational preferences. More students are now opting for subjects like science, IT, and technology.** As a result, students

are gaining recognition in their chosen fields. Further, ATLs have been recognized for **fostering an environment where children can excel in technology, get** equipped with 21st-century skills such as design thinking and practical expertise.



“ATLs give exposure to the students in advanced technology, so after gaining experience in 3D technologies and new advancements, students can boost up their career in technology.”- **ATL IC, Private, Rural, Haryana**



“Before the establishment of ATLs, students were not very well aware about many career opportunities. I think design thinking and innovation brought many new subjects in our school. With the launch of ATLs we have been able to bring new subjects like artificial intelligence, typography, information technology in our school, which are equipping the students with employable skills.”- **ATL IC, Private, Urban, Haryana**

3.13 Students' Perception of the ATLs and its Impact

1. Awareness about AIM

- Students were well-informed about the fundamental objectives behind the establishment of the Atal Innovation Mission (AIM). According to the students, AIM, with its multi-faceted approach, served as a catalyst for fostering technological advancement within schools. It provided an ecosystem that not only encouraged but actively supported the integration of technology and innovation into the educational

landscape. Furthermore, students recognized AIM's commitment to promoting and nurturing the talents of young scientists, instilling in them a sense of empowerment and motivation to explore the realms of science and technology. AIM's role as a facilitator for transforming ideas into reality was particularly impactful.



"Atal Innovation Mission is an initiative by the government.... to promote the young scientists and the young minds to help them build and make their ideas into reality and help make India a great nation, where young scientists are promoted so that there is always innovation upcoming in our India." - **Students, Private, Urban, Haryana**

2. Awareness about ATL

Students were keenly aware of the diverse and enriching purposes that Atal Tinkering Labs (ATLs) serve. Firstly, ATLs were recognized as invaluable platforms for learning something new, where students have the opportunity to explore and engage with a wide array of innovative concepts and technologies. Secondly, students understood that ATLs were hubs for nurturing their creative problem-solving abilities,

as they were empowered to conceive and develop solutions that can have a positive impact on society. Lastly, students appreciated that ATLs provided them with a platform to showcase their creativity, allowing them to express themselves and share their innovative ideas with their peers and the broader community.



"The children get to learn something new. If there is a problem and the solution is not in their hands, then they can talk about it in the ATL and make a product that can help people." - **Students, Government, Rural, Chhattisgarh**

3. Positive differences between ATL and other science laboratories:-

For the students, the perception of Atal Tinkering Labs (ATLs) as distinct from traditional science laboratories lay in the positive differences they offered. While conventional science laboratories were associated with conventional teaching methods and practical experiments aligned with the established curriculum, ATLs were seen as innovative spaces that transcended these boundaries. ATLs were recognized as hubs for learning new and unconventional subjects, such as drones and futuristic technologies, which went beyond the confines of the traditional curriculum. This exposed students to cutting-edge concepts, fostering

a spirit of exploration and curiosity. Moreover, ATLs empowered students with the ability to innovate, providing them with the tools and resources to turn their creative ideas into reality. They served as catalysts for practical problem-solving and critical thinking, nurturing a mindset of innovation. Most notably, ATLs were celebrated as platforms for students to bring their imaginations to life. Here, they could conceptualize, design, and build their innovative projects, showcasing their creativity and originality.



"In ATL Here we learn about electricity. In science lab, we learn about the use of chemicals. The ATL lab is the art and technology lab where we learn about 3D printers, computer coding, light, ultrasonic sensors, buzzers, and lights. In science lab, we can use chemicals to find out the importance of any substance..... In ATL Lab, we think about making an invention. We get the idea of how to make it. We can catch the mistakes that are made....."

- Students, Government, Rural, Chattisgarh

4. Features of the ATL that received positive feedback:-

The positive feedback received from students regarding the features of the Atal Tinkering Lab (ATL) reflected the profound impact these innovative learning spaces have on their educational journey. Firstly, ATLs were commended for offering an environment that facilitated the translation of theoretical knowledge into practical models. Moreover, students appreciated the exposure to new and cutting-edge knowledge, including coding,

sensors, and 3D printing. This broadened their horizons and equipped them with the skills necessary to thrive in a rapidly evolving technological landscape. The emphasis on hands-on learning experiences was particularly valued, as it enhanced their problem-solving abilities. ATLs were celebrated for their role in nurturing innovation and creative thinking, encouraging students to think outside the box and develop novel solutions.



"ATLs provide a very good balance between the theoretical and the practical classes as it mixes both the classes together and forms a way of learning for the students that is really effective and quick."

- Students, Private, Urban, Haryana

5. Features of the ATL that were challenging:-

Students have candidly acknowledged some challenges they face in Atal Tinkering Labs (ATLs), shedding light on areas that require attention and improvement. One primary concern voiced by students was the difficulty in attending ATL sessions due to the concurrent demands of their regular curriculum. This often restricted their participation to free periods or times when they had gaps in their schedules, such as during Art class. Another challenge identified by students was the lack of clear hygiene instructions for using the machines and equipment in

ATLs. Furthermore, students highlighted a shortage of functional equipment in some ATLs. Addressing these challenges is essential to maximize the potential of ATLs and provide students with the best possible learning experiences. It involves a balanced approach that considers scheduling conflicts, safety protocols, and the availability of resources to ensure that ATLs remain dynamic and effective hubs for innovation and hands-on learning.

3.14 Parents' Perception of the ATLs and its Impact

- 1. Awareness about ATL and its purpose :-** Parents whose children are actively engaged in Atal Tinkering Labs (ATLs) and are witnessing them immerse themselves in innovative projects and solutions are indeed aware of the existence and purpose of ATLs. These parents have firsthand experience of the transformative impact ATLs can have on their children's education, fostering a sense of creativity, problem-solving, and practical application of knowledge. However, their concern primarily revolves around finding the right balance between the time dedicated to regular academic coursework and the time invested in ATL activities. Striking this balance is essential, as it ensures that students can excel both in their conventional academic subjects and in their innovative pursuits within ATLs.
- 2. Feedback on ATL from the children:-** Feedback from students to their parents regarding Atal Tinkering Labs (ATLs) reflects a notably positive impact on their interests and aspirations. Many students have expressed a growing interest in science and technology as a direct result of their experiences in ATLs. These innovative learning environments have sparked their curiosity and enthusiasm, instilling a

deeper appreciation for STEM subjects. Furthermore, students have been actively sharing their experiences and newfound interests with their parents. They report a high level of satisfaction with the career possibilities that ATLs have unveiled and the hands-on experience of working on new ideas within the ATL ecosystem. This feedback signifies that ATLs are not only enhancing students' academic knowledge and practical skills but also broadening their horizons and inspiring them to consider STEM-related career paths.

- 3. Changes in children after attending ATL :-** Parents have observed remarkable changes in their children after their participation in Atal Tinkering Labs (ATLs). One notable transformation is the increase in their confidence when it comes to problem-solving. The hands-on experiences and innovative projects undertaken in ATLs have equipped students with valuable skills that enable them to approach challenges with newfound self-assurance. Furthermore, parents have noticed that their children have become more aware and willing to bridge the gap between theoretical knowledge and practical application.

3.15 Qualitative Discussions with the Mentor of Change (MoCs)

1. Sensitization of schools

MoCs emphasized the importance of sensitizing schools on the true objectives of ATL and of the MoCs, so that they could allow the MoCs to engage with the students and teacher. This was important to be done right from the inception to ensure the desired outcomes.

2. Creation of platforms to showcase innovations

They proposed the creation of a platform to showcase the innovations from various schools, with the goal of boosting the utilization of ATLs for tinkering and fostering healthy competition among them.



“There needs to be a national level platform, which can showcase the innovations created by the students. This can highlight the achievements created by the students and highlight the contribution of the teacher, incentivising the participation in ATL.” - Mentor of Change

3. Involvement of parents

It was suggested to involve parents/PTA in all aspects of ATL operation to enhance effectiveness and

accountability. Parental motivation can sometimes influence their participation in ATL activities.



“At least once or twice a year parents can be involved in the hands-on activities in the ATL, which will give them an idea about the kind of work that is being undertaken in the ATL.” - Mentor of Change

4. Involvement of MoCs in the Atal Advisory Committee

Some schools invite MoCs to be part of their committee meetings and their contribution and suggestions are well appreciated. Their presence also adds an element of accountability from the school's side to ensure better performance of ATL.

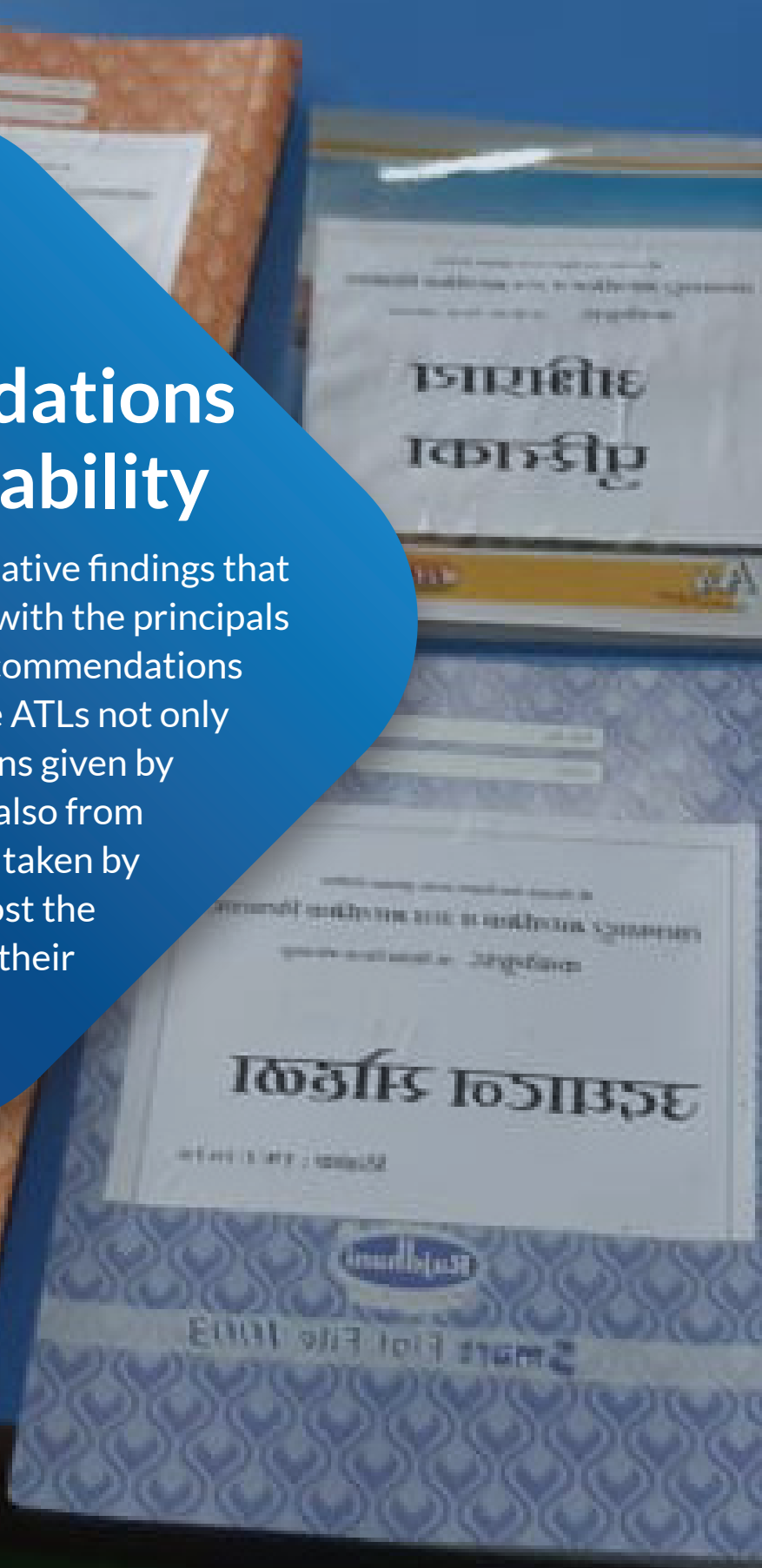
5. Align MoC-ATL

MoC-ATL relation is not always cordial as there has been gap in the expectations at both levels. MoCs also join the program with misguided expectations or due to compulsion from their organization/institutes.

04

Recommendations for Sustainability

This section explores the qualitative findings that emerged from the discussions with the principals and the ATL In-charges. Recommendations for the sustainability of the ATLs not only emerge from suggestions given by the respondents but also from the insightful efforts taken by the schools to boost the effectiveness of their ATLs.



Recommendation 1: Synchronized Communication Strategy

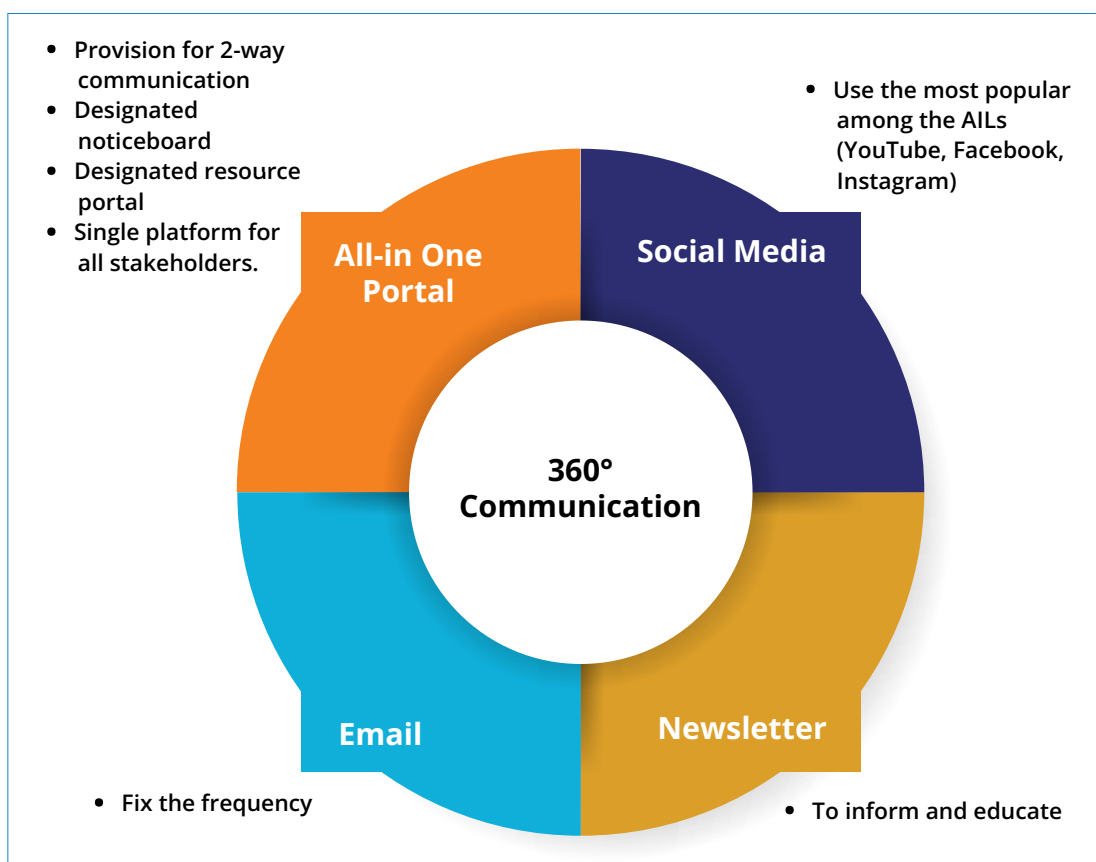
Responsible Organisations: AIM, Schools

Findings from this evaluation reveal that Ad hoc communication from AIM to ATLs leads to communication lapses. AIM relied more on email communication (77%) and observed it to be a time-consuming exercise and social media posts do not facilitate further actions. Consequently,

putting communication at the forefront of AIM’s processes is relevant to solving all information related challenges. Hence, a synchronized communication strategy is recommended, which includes:-

1. Synchronized Communication Using Apt Channels

Figure 66: 360° Communication



Source: Athena Infonomics Private Ltd.

Actions for Effective Social Media Management

- AIM must focus on popular channels - YouTube, Facebook, Instagram.
- AIM should consider more video content/posts.
- AIM should encourage ATLs to start their own social media pages and post their innovations and activities.
- AIM should adopt strategies to increase the reach (selective usage of key words, tags).
- AIM and schools should circulate posts/videos of ATL activities (currently used more as a notice board).
- AIM should create posts to facilitate actionable steps with easy access to links and other details to initiate immediate action from the viewer.

2. Establish a Primary Mode of Communication

Monthly Newsletter

- Newsletter should be published on fixed date of every month.
- It should have a fixed structure.
- It should comprise of content that is easy to read.
- It should be rich with pictorial representation.

Newsletter content suggestions

- Newsletter should inform the schools about upcoming activities/events.
- It should comprise of summary of completed activities/events.

- Newsletter should inform about the action to be taken by ATLs (data upload/submission).
- It should also contain Tinkering topic/s of the month.
- It should have a section that could detail out any one aspect about the ATL.
- It should utilize the space to throw spotlight on ATL, Students, MoCs.

3. Clarity and Precision in Communication

In addition to the comprehensive communication strategy including social media and monthly newsletter, it is also recommended that easy-to-understand instructions are developed on every aspect of the ATL, taking into consideration the language differences across the country.

Recommendation 2: Increase participation in ATL events

Responsible Organisations: AIM, Schools

Assessment of the ATLs highlights that there is scope for more active participation in ATL events (48% of ATLs participated in any of the ATL events in 2022-23) Consequently, to increase participation, multi-level

approach is recommended, so that the events can be popularized.

Popularizing the events

Table 40: Strategy to Popularize the Events

	Increase the efficiency
Steps to be taken at AIM	<ul style="list-style-type: none"> ● Leverage WA groups of ATL ICs to promote the events ● Leverage MoCs to promote the event and participation from mentee schools ● Create the social media post with a direct link to the event page to facilitate immediate action ● Share engaging content in the form of teaser videos, behind-the-scenes content, or student testimonials, etc. ● Organize state/regional-level events to promote them ● Recognise the winners and participants ● Utilise the video materials (submitted as part of application) to recognise the participation and attract more ATLs
Steps to be taken at ATL	<ul style="list-style-type: none"> ● Thorough planning and preparation for the events in advance ● Timely communication with students to ensure their participation

Source: Athena Infonomics Private Ltd.

Recommendation 3: Continuous monitoring and evaluation

Responsible Organisations: AIM

Assessment of the ATLs reveals that was observed that due to limited team strength at AIM office, and given the scale of the program, continuous on-ground monitoring is challenging. Further, current monitoring and evaluation systems are scattered, and challenges are observed in accessing and analyzing the data. Consequently, monitoring and evaluation approach is recommended to redefined.

1. Redefine and innovate M&E

- AIM should develop web/app-based data collection, reporting sheets, and data templates that align with ATL indicators.
- AIM should introduce self-sustaining automation for verification, analysis, and dissemination.
- AIM should Inform-Educate-Engage ATLs in the M&E system rather than considering them as a mere data providing source.

2. Develop/refine Theory of Change for the Program (ToC)

- AIM should map out the logical sequence of activities, outputs, outcomes, and impacts

the ATL program aims to achieve, providing a comprehensive understanding of how the interventions lead to desired outcomes.

- AIM should Inform-Educate the stakeholders about the ToC.

3. Actionable feedback to ATLs

- Basis the monitoring, AIM should share actionable feedback with the ATLs to ensure improvement in the implementation and to do any course correction as needed.
- Identify 'eye on the ground'
- AIM should Involve MoCs/institutions to provide real-time information, observations, or assistance. This can be especially valuable for decision-making, problem-solving, or staying informed about developments.
- AIM should conduct regular feedback sessions with these stakeholders to gather the details

Figure 67: Developing Instructional Material for the ATL Functioning



Source: Athena Infonomics Private Ltd.

Recommendation 4: All-in-One integrated platform for ATL

Responsible Organisations: AIM, Empaneled Private Organization in the Field of STEM, Schools

Assessment of the ATLs highlights that there are challenges in accessing the current ATL dashboard by schools (Technical difficulties 42%). Further, challenges were also observed in easy access of data by the AIM team. Further, multiple platforms exist for single intervention with no data validation mechanism in place to check the information filled by ATLs. Moreover, human intensive data monitoring, analysis, and reporting; and no system validation or automation. Consequently, it is recommended that an all-in-one integrated platform for ATL is designed with the help of an IT partner, who shall be onboarded for this purpose.

A. Value augmentation by IT partner

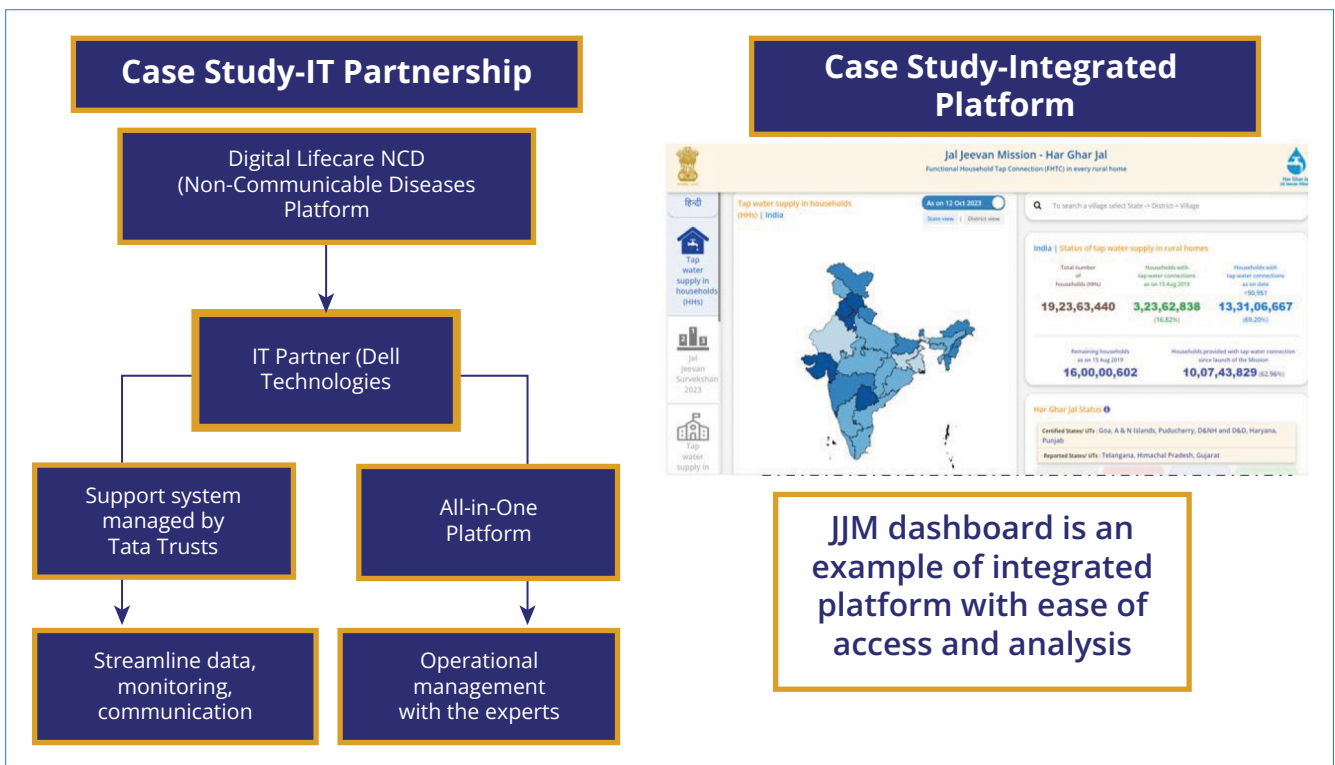
- A more advanced and innovative platform should be envisioned by the IT partner.

- The IT partner should provide a continued support system to run and maintain the platform.
- Integration of various data points and automation in data validation process should be incorporated.
- Onboarding the IT partner will relieve the Core AIM team from operational management.

B. Suggestive Features in the ATL Integrated Platform

- Single platform to inform, report and assess
- AI/automation integrated
- Integrate chatbot and knowledge resources
- Easy data capture
- Cross platform integration

Figure 68: IT Partnership Case Study



Source: Athena Infonomics Private Ltd.

Recommendation 5: Integration of ATLs with the curriculum

Responsible Organisations: AIM and Schools

Assessment of the ATLs highlights that currently no academic advantage/incentive for being involved in ATL. Academic excellence is prioritized over the engagement in ATL activities. Further, no policy level initiatives to promote ATL thereby the adoption is mostly through school level motivation/decision. Consequently, three action points are recommended for successful integration of the ATLs with the curriculum:-

1. Introduce interdisciplinary learning within ATL

- AIM should create a blueprint for interdisciplinary learning within ATL.
- AIM should Collaborate with curriculum experts and educators to map out how ATL activities can complement and enhance existing subjects and topics in the curriculum.

- AIM should consider engaging at policy level, so that ATL is considered as a necessary facility in the school.
- 2. Grade/academic incentivisation of ATL participation**
- Engagement in the ATL projects should be incorporated into the overall assessments to incentivize the participation of the students in the ATL.
- 3. Professional development training to the teachers**
- Schools in collaboration with the AIM could provide professional development training to the teachers, which will not only familiarize them with the ATL, but will also equip them with additional skills.

Recommendation 6: Improve the efficiency and quality of the Mentor of Change initiative

Responsible Organisations: AIM, Empaneled Private Organization in the Field of STEM, Schools

Findings of the assessment highlight that although MoCs were an add-on initiative, they are recognized as a key stakeholder for the success of ATL (81% of those who have an MoC). Further, discussions with school authorities revealed that the skill gap in the assigned MoC restricts the schools from exploring new areas of learning

and innovation. Also, MoC-ATL relation is not always rewarding as there has been a gap in the expectations at both levels. MoCs also join the program with misguided expectations or due to compulsion from their organization/institute. Hence, it is pertinent to make recommendations for the improvement of the MoC initiative.

Table 41: Recommended Action Points to Improve the MoC Initiative

	Increase the efficiency	Quality and Recognition	Scale-up the reach of ATL learning content
Steps to be taken at AIM	<ul style="list-style-type: none"> ● Orient the MoCs about their roles. ● Develop a MoC pool for schools to pick and choose. ● Establish a platform for communication and interaction between MoC and ATLs ● Monitor the engagement between ATLs and MoCs and regularly update the MoC pool based on their level of engagement 	<ul style="list-style-type: none"> ● Focus on quality of MoCs onboarded rather than quantity ● Engage with reputed institutions to identify MoCs ● Categorise/label MoCs based on their engagement. MoCs level of engagement should be the checkpoint for their recognition and rewards. 	<ul style="list-style-type: none"> ● Promote recording of MoC sessions and teachers' sessions ● Establish a QC mechanism at local level to review and approve the recorded sessions. ● Regular upload of sessions and its promotion
Steps to be taken at ATL	<ul style="list-style-type: none"> ● Induct at least one MoC for the ATL ● Frequent engagement with MoC ● Utilise the MoC pool to expose students to a variety of subjects. 	<ul style="list-style-type: none"> ● Share feedback on MoCs with AIM ● Promote MoC program among known experts. 	<ul style="list-style-type: none"> ● Record key sessions ● Share recordings of engaging sessions with students ● Actively involve in QC mechanism

Source: Athena Infonomics Private Ltd.

Recommendation 7: Parents to become the catalyst in ATL

Responsible Organisations: Schools, MoCs

Assessment of the ATLs highlights that parents' involvement in the decision making around ATLs' functioning is limited- 20% of schools included parents while taking decision to set up ATL and only 48% of schools with an AAC included parents as its members. Discussions with school authorities and students revealed that parents play a critical role in the decision of students to participate in the ATL. Further, parents perceive involvement in ATL as a hindrance to their wards' studies.

Lack of academic incentive further discourages parents from engaging their wards in the ATL. Interactions with parents revealed that the purpose of ATL is not known to many and not concerned about the activities in ATL due to lack of exposure. Consequently, it is only relevant that parents are involved in the ATLs' functioning, so that parents can positively influence the students' participation in ATLs.

Table 42: Recommended Action Points to Make Parents a Catalyst

	Involve parents in ATL related activities	Promote the achievements of ATLs
Steps to be taken at AIM	<ul style="list-style-type: none"> ● Effort to incorporate ATL into the curricula of school boards. ● More published recognitions about the achievements of ATL at the national level could positively influence the perception of parents towards ATL. Promote Parents' Day in ATL and plan contests and events for the Parents' Day. 	<ul style="list-style-type: none"> ● More published recognitions about the achievements of ATL at the national level could positively influence the perception of parents towards ATL.
Steps to be taken at ATL	<ul style="list-style-type: none"> ● Expose parents to the ATL and the projects of students. 	<ul style="list-style-type: none"> ● Commend ATL accomplishments at school and community levels. ● Strive to attain AIM's recognition through more participation and wins in ATL events. ● Promote recognition of ATL achievements during school annual day or PTA meetings.

Source: Athena Infonomics Private Ltd.

Recommendation 8: Inclusiveness

Responsible Organisations: AIM and Schools

The findings of the assessment highlight that the fixed timetable for ATL is among 55% of the schools. On average, students are exposed to 2 ATL sessions per week with an average session duration of 45 minutes. Discussion with school authorities revealed that academic performance of students is considered as a criterion to involve them

in ATL. Further, community engagement is taken up by 40% of ATLs. Such engagement is also limited in terms of frequency of students' exposure to the facility (monthly engagement by 43% of ATLs). Consequently, the following are the action points to make ATLs more inclusive.

Table 43: Recommended Action Points to Make ATLs Inclusive

	Inclusive Learning within ATL	Extend the community involvement in the ATL
Steps to be taken at AIM	<ul style="list-style-type: none"> ● Integrate a full inclusion model to facilitate learning opportunities for students with special needs. ● Engage with school boards to integrate ATL in the school academic ecosystem. 	<ul style="list-style-type: none"> ● Make community engagement mandatory requirement at the application stage itself. ● Develop specific protocol on the modality of community engagement to ensure that the initiative is not a mere compliance requirement.
Steps to be taken at ATL	<ul style="list-style-type: none"> ● Include ATL as part of the school timetable to enable universal access ● Engage more teachers for the operation of ATL to facilitate ATL IC and to ensure more opportunities for students to access the facilities ● Include ATL as part of the school timetable. ● Ensure universal access to ATL for all students. ● Ensure proper attendance register for ATL. ● Engage more teachers for the operation of ATL to facilitate ATL IC and to ensure more opportunities for students to access the facilities. 	<ul style="list-style-type: none"> ● Include at least 2 nearby schools in the ATL ecosystem, ensure frequent exposure ● ATL by other schools and conduct events and competitions for the community schools.

Source: Athena Infonomics Private Ltd.

Recommendation 9: Strive for sustainability of the intervention

Responsible Organisations: AIM and Schools

No proactive engagement with industry from the ATLs (only 11% of schools with AAC included industry representative in it). Further, ATLs are mostly dependent on the funding of AIM with limited exploration for external funding (26% of ATLs received funding outside AIM and almost all got it from their own school fund). The interviews with school authorities also revealed that they

have not considered any strategies for sustaining the ATL beyond the AIM funding years. Sustainability is one of the crucial elements that need to be taken into consideration when expanding the ATL intervention across India. A few action points for sustainability are given below.

Table 44: Recommended Action Points for ATL Sustainability

	Engage with industry/institutions
Steps to be taken at AIM	<ul style="list-style-type: none"> ● Engage with industry associations, academic and sectoral bodies and pitch for adoption of ATLs (CII, ACMA, FICCI, ASSOCHAM AICTE, ECI, INAE, etc.) ● Communicate the success stories to further encourage other ATL
Steps to be taken at ATL	<ul style="list-style-type: none"> ● Explore potential engagement at local level ● Utilise the school alumni association and PTA for funding and learning resources

Source: Athena Infonomics Private Ltd.

Recommendation 10: Empower the human resources at ATLs

Responsible Organisations: AIM and Schools

The findings highlight that on average 1.7 teachers, that includes ATL IC, are engaged in ATL related activities. 75% of ATL ICs wear a dual hat, juggling responsibilities as both ATL IC and teacher. Consequently, they are only able to allocate approximately 28% of their time spent in the school to ATL-related tasks. Further, the lesser the number of teachers engaged with the initiative, the

lesser the frequency of exposure for the students. Hence, taking into account the human resources strapped ATLs, it is pertinent to empower the existing human resources (of ATLs and schools), so that ATLs can function smoothly, fulfilling its purpose of exposing students to innovations etc. given below are the actions points to empower the human resources in the ATLs.

Table 45: Recommended Action Points to Empower the Human Resources

	Engage more teacher with ATL	Training of teachers
Steps to be taken at AIM	<ul style="list-style-type: none"> ● Revise the protocol to have one ATL IC with overall responsibility and involvement of other teachers. 	<ul style="list-style-type: none"> ● Teachers to be trained on ‘what to do’ and ‘how to do’ aspects. ● Engage MoCs and partner institutions for continuous training of teachers. ● Expand the compendium of self-learning materials for teachers. ● Introduce online/remote training sessions.
Steps to be taken at ATL	<ul style="list-style-type: none"> ● Include more teachers in the operational aspect of ATL, thereby extending operational hours of ATLs to increase the accessibility to its students. 	<ul style="list-style-type: none"> ● Ensure ATL IC’s participation in training and create an internal mechanism for inter-learning.

Source: Athena Infonomics Private Ltd.

Recommendation 11: Enabling environment to foster organic demand for ATLs

Responsible Organisations: AIM, Empaneled Private Organization in the Field of STEM, Schools, MoCs

The unique branding offered by ATL is the primary motivator to set up ATL (Standout among schools (88%) Vs Promote tinkering (50%). Schools face challenges in setting up the ATL due to lack of procedural knowledge (31%). School authorities are the key decisionmakers on setting up ATL with lesser involvement or demand from the parents or students (Principal 76%, Management 72%, Parents 20%, Students 29%). Discussions with

school authorities and students revealed that parents don’t perceive any associated academic incentive or grade, and mostly view involvement in ATL as a hindrance to their children’s studies. The data given above highlights the gaps in the enabling environment for the ATLs. To address these gaps, we recommend coordinating with school education boards.

Action Point 1: Engage with school education boards

Table 46: Recommended Action Points to Collaborate with School Education Boards

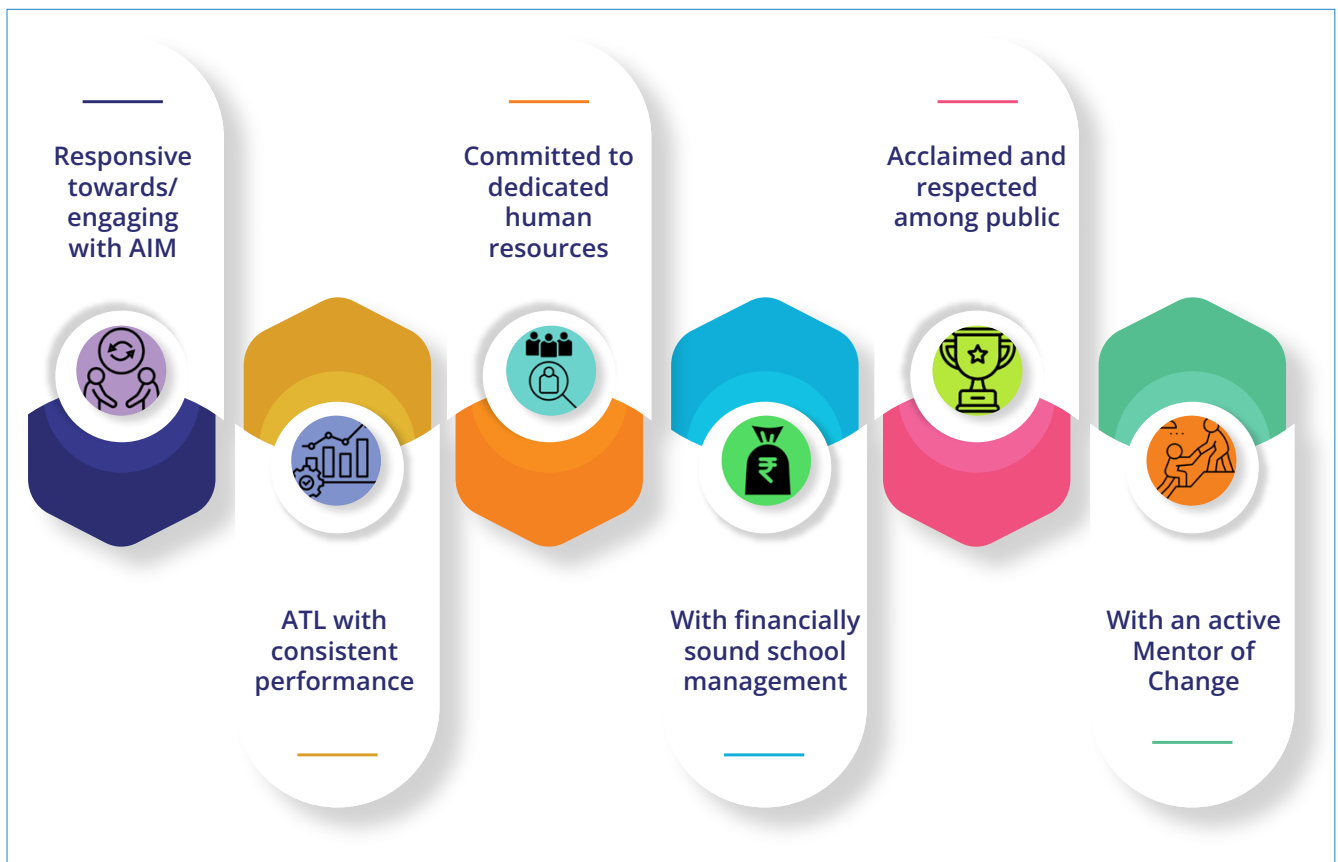
	Engage with school education boards
<p>Steps to be taken at AIM</p>	<ul style="list-style-type: none"> • AIM to engage directly with education boards at national and state levels to explore the integration of ATL as a platform for adopting the new NEP directives towards enhancement of critical thinking and experimental learning. • Currently AIM is the key promoter of the initiative and engagement with education boards could be a catalyst for a decentralised promotion. Further such engagement would also help them to perceive the initiative as their own. • Engagement at high levels would ensure promotion as well as adoption of the initiatives leading to the generation of organic demand for ATL

Source: Athena Infonomics Private Ltd.

Further recommendation to foster an enabling environment for ATLs:-

Action Point 2:- Creation of Model ATLs

Figure 69: Model ATL



Source: Athena Infonomics Private Ltd.

Table 47: Role of Model ATLs

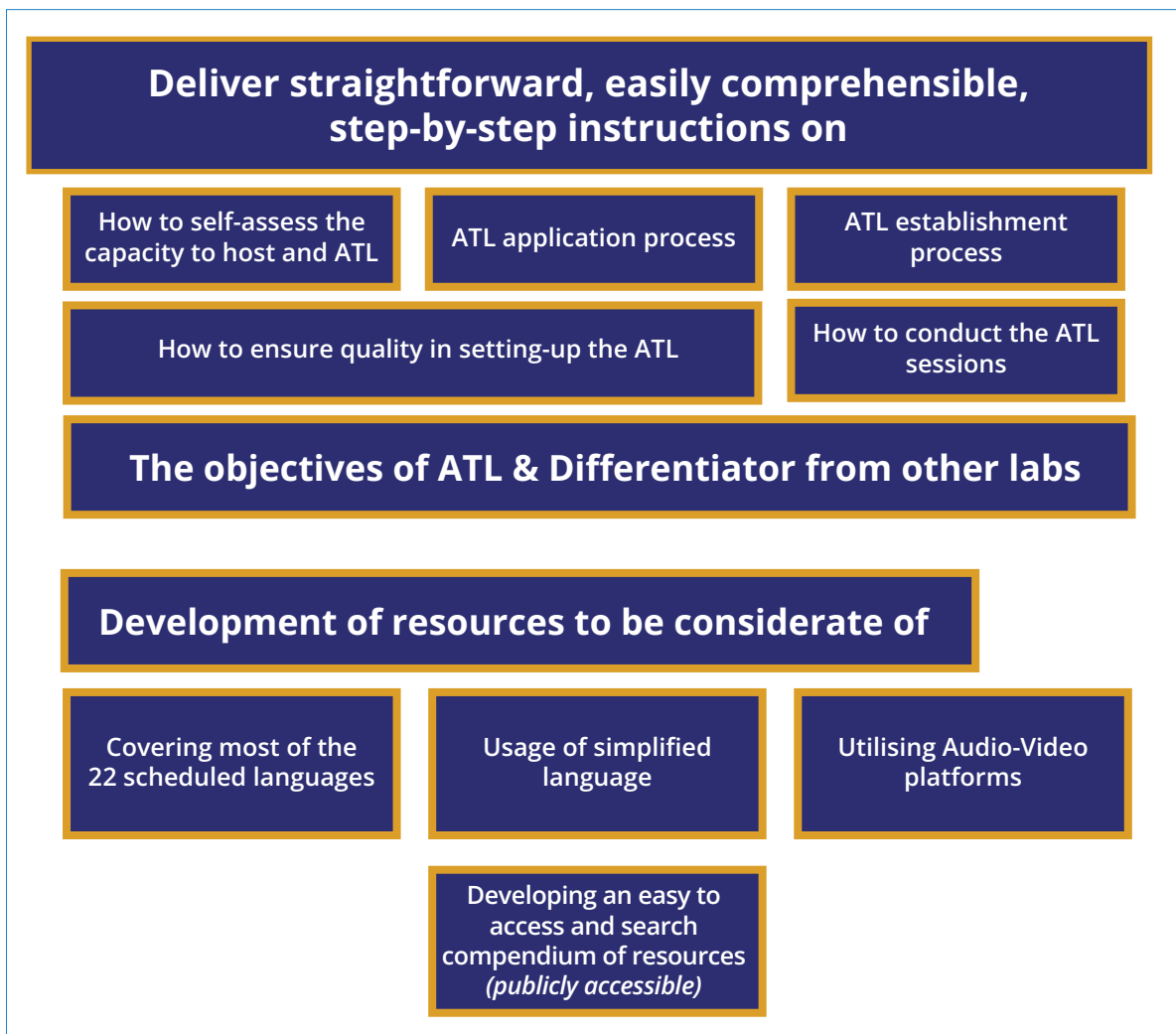
Role of Model ATLs
Serve as the demonstration ATL
Guide other schools for ATL adoption
Support other ATLs to improve
Be the local hub to inform/communicate/follow-up with other ATLs
Identify onboard potential local partner organizations
Promote ATL among parents and students
Conduct local events
Identify occasions for MoC engagement

Source: Athena Infonomics Private Ltd.

Action Point 3:- Clarity and Precision in Communication

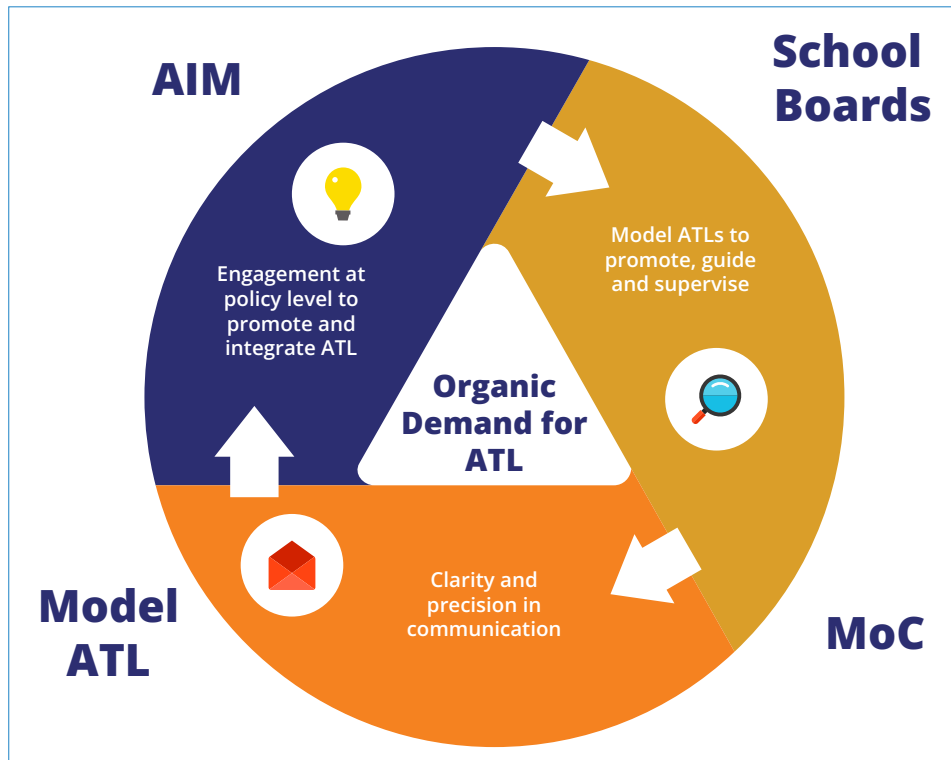
In addition to the comprehensive communication strategy including social media and monthly newsletter, it is also recommended that easy-to-understand instructions are developed on every aspect of the ATL, taking into consideration the language differences across the country.

Figure 70: Developing Instructional Material for the ATL Functioning



Source: Athena Infonomics Private Ltd.

Figure 71: Enabling Environment for ATLs



Source: Athena Infonomics Private Ltd.

Recommendation 12: Career Guidance

Responsible Organisations: AIM and Schools

As per principals of schools, ATL has improved the interest of the students in science and technology (74%) and leading to more uptake of science subjects for higher studies (69%). Qualitative discussions revealed that foundation provided by the ATL has generated positive

outcomes (cost optimisation, confidence, enhanced scientific temperament, brought technology in rural schools, exposure for tribal students). ATLs engagement with industry is limited (industrial representation in the AAC is at 11%)

Advance learnings, guide the students and facilitate industry linkage	
Steps to be taken at AIM	<ul style="list-style-type: none"> Offer intermediate and advanced courses to equip the students with advanced innovation and entrepreneurship skills. Leverage existing course platforms such as SWAYAM, GUVI, NSDC's e-skills India Portal
Steps to be taken at ATL	<ul style="list-style-type: none"> Explore the prospect for local industry engagement.

Source: Athena Infonomics Private Ltd.

05 Conclusion

Atal Tinkering Labs (ATLs) have illuminated the profound impact these innovative spaces have had on the educational landscape. ATLs have emerged as vibrant hubs of creativity, fostering a culture of innovation and problem-solving among students. It is evident through the evaluation that ATLs have effectively encouraged students to explore, experiment, and apply their knowledge in practical ways. They have empowered young minds to think critically, collaborate, and tackle real-world challenges, aligning with the vision of nurturing a skilled and innovative workforce for the future. Moreover, ATLs have facilitated holistic development by encouraging interdisciplinary learning, creativity, and entrepreneurial thinking. They have bridged the gap between theoretical knowledge and practical application, preparing students for the dynamic demands of the modern world. While ATLs have demonstrated significant success, there is room for continued improvement. Strategies to enhance mentorship, curriculum integration, and career guidance should be pursued to further amplify the impact of ATLs on students' learning and skill development. In essence, the assessment of ATLs underscores their invaluable contribution to education and innovation. These labs serve as beacons of inspiration, equipping students with the tools, mindset, and skills necessary to thrive in an ever-evolving global landscape. The future holds great promise as ATLs continue to pave the way for India's young talents to shine on the global stage.

