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Creativity, innovation, and cross-cultural collaboration in atal innovation mission

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Abstract
Developing a sensitivity to the sensory and experiential characteristics of materials is more crucial. Material Tinkering is a practical and creative technique to developing this sensitivity through experiential learning, which we suggest. It leads to deeper and more comprehensive undertakings when combined with visualizing and abstract thinking. A case study is used in the paper. This is an instructional exercise that uses the tinkering method to self-produced materials, such as DIY materials. This method encourages students' creativity while also teaching them how to recognize, analyze, and design materials' experiential, expressive, and sensory properties, i.e. the Materials Experience, Tactual Experience, and Expressive-sensorial dimension. Finally, we propose techniques to make Material Tinkering easier. STEM has been proposed as a solution to many of the world's problems in various forms (STEAM, STEMM). Nowadays, a method to teaching tinkering that goes beyond content and process has gained importance, since it is required for intelligently solving problems in real-life settings. Curriculum planners are attempting to revise the school curriculum on a regular basis using an activity-oriented and problem-solving approach in order for tinkering learning to become more engaging for students and for them to achieve the goals of tinkering education in particular and overall development in general, generating an interest in continuing their education in tinkering for their future career and to meet current needs

Keywords: creativity, innovation, cross-cultural, atal innovation

Introduction

Genesis of the Atal Tinkering Lab

Connecting tinkering, technology, and innovation to societal results would propel India forward economically and socially. To put India on the global map of innovation, a slew of structural reforms are being implemented. Strong ties are being established between academia, government, and industry in order to create an enabling environment that not only breeds scientific aptitude that leads to innovation, but also nurtures a creative and innovative mindset in children at an early age, in order to accelerate growth for a New India. The old Indian education system had failed to meet the industry's rapidly changing needs, thus it was critical that school education in India be reinvented with innovation. This book tells the story of India's first and largest government-led initiative, launched to disrupt the Indian education system and equip young students with 21st-century skills such as creativity, innovation, critical thinking, social and cross-cultural collaboration, ethical leadership, and so on, in order to build a New India.

NITI Aayog

On January 1, 2015, the Union Cabinet passed a resolution creating the National Institution for Transforming India, better known as NITI Aayog. NITI Aayog is the Government of India's top policy "Think Tank," providing both directional and policy suggestions. NITI Aayog gives relevant technical assistance to the Centre and States in designing strategic and long-term policies and programmes for the Government of India.

In keeping with its reform objective, the Indian government established the NITI Aayog to replace the Planning Commission, which was established in 1950. This was done in order to better serve the people of India's needs and ambitions. NITI Aayog, a significant departure from the past, serves as the Government of India's central platform for bringing states together in the national interest, fostering cooperative federalism.

Atal Innovation Mission

The Atal Innovation Mission (AIM) is the Government of India's flagship programme, based at the NITI Aayog, to foster innovation and entrepreneurship across the country.

By incentivizing the promotion of an ecosystem of innovation and entrepreneurship at various levels - higher secondary schools, higher educational and research institutions, and SME/MSME industry, corporate, and government ministerial level - AIM under NITI Aayog is envisioned as an umbrella innovation organisation that would play an instrumental role in aligning innovation policies between central, state, and pectoral ministries.

The primary goal was to establish an institutional structure that would foster innovation and an entrepreneurial mindset. AIM fosters innovation at the school level through the Atal Tinkering Labs (ATL), where students may experience design thinking and broaden their intellectual horizons while seeking solutions to everyday challenges and showcasing their creations on recognised platforms. Another citizen-led national initiative spearheaded by AIM is the Mentor of Change (MoC) Program, in which trained professionals provide pro-bono mentoring to young ATL innovators with a strong sense of country building. The Atal Incubation Centres (AICs) of AIM are building world-class ecosystems for start-ups to thrive, including the necessary handholding such as mentoring and investor networks. AIM recognised the need of turning invention into a national movement in which citizens felt responsible for making an effect and contributed to it.

Successfully Managing the Atal Tinkering Lab

Once the school has begun their ATL innovation journey, they must focus on creating the ATL space, identifying the appropriate people resources, and other factors in order to successfully launch the ATL in the school. These factors will be critical in ensuring that the facility achieves its goals.

Building a Vibrant Atal Tinkering Lab Ecosystem

For the benefit of the students, it is critical that the ATL organises and participates in tinkering activities. These activities not only allow ATL students to tinker and show off their creations, but they also help to raise community awareness by engaging with parents and kids from non-ATL 8 schools, transforming the ATL into a community hub of creativity. The supportive environment established by such intra-school tinkering and innovation activities also enables kids to go out and advocate for their innovations on external platforms, providing them with the recognition they deserve. A few nationwide events developed by AIM and organised by ATL schools are covered in this chapter, as well as a method for continual communication with ATL schools. However, these principles are merely indicative in nature, and schools might develop and implement additional activities to ensure the Program's success. Furthermore, schools will have the freedom to adapt the various concepts and activities while making appropriate efforts to publicise them in order to increase community engagement.

Objectives of the Study

1. To study on Genesis of the Atal Tinkering Lab
2. To study on Building a Vibrant Atal Tinkering Lab Ecosystem

Research Methodology

Method of Study

It is vital to explain the study approach in order to compare the use of tinkering lab laboratories in public and private schools by rural and urban students and teachers. The method chosen is determined on the nature of the problem. Descriptive research aids in the investigation and description of occurrences in their natural environment. It is concerned with previous occurrences as well as the current situation. As a result, this research is descriptive in character. Children, school organization, supervision, and administration, curriculum, teaching methods, and evaluation all benefit greatly from such analyses.

Population and Sample

The participants in this study were drawn from one of Maharashtra's fourteen districts. Maharashtra State was established in 1957 and has made considerable progress in education, with a 100% literacy rate. (Wikipedia-online source) According to the education directorate, the district has 142 educational institutions under the department of education, with 61 public, 61 private rural, and 20 private urban schools following the STATE syllabus and 55 senior secondary schools affiliated with the central board of secondary education, with two public schools and the rest private urban schools. The list of schools can be found on the Maharashtra State Education Department's official website. Public and private schools were chosen at random for this study based on the kind of school, location, and curriculum followed by the school (CBSE board /STATE state board).

Sample for the Study

The dependability gained is determined by the sample chosen. "A good sample of a population is one that accurately reproduces the characteristics of the population" (Cornell, 1960).

Because stratified random sampling is a method or device that ensures representativeness in selecting a sample from a population composed of subgroups or strata of varying sizes, a representative sample contains individuals drawn from each category or stratum according to the size of the subgroups, it was chosen for the study.

The population of this study was classified as school pupils and teachers from public and private rural and urban schools, with the nature of the sample to be drawn determined by them. All public schools were placed on one list, all private schools were placed on another list, and all private urban schools were separated and placed on a third list from the private school list. The school list was then divided into rural and urban categories, with a sample of schools chosen at random from each category.

Research Tools

Students' and teachers' questionnaires, as well as a scientific knowledge and aptitude test, were the primary data gathering tools in this study.

Appendix I has a student questionnaire (Constructed by the researcher)

Teacher questionnaire (Appendix II) (Constructed by the researcher)

S. Chatterji and Manjula Mukerjee devised the Scientific Knowledge and Aptitude Test (Appendix III) in 1970. Form 1064, Examiners Manual Scientific Knowledge and Aptitude Test Appendix IV: The researcher's observations (Observation Schedule)

Data Analysis

Comparison between students' schedule, evaluation procedure and lab. Oriented activities

Percentage Analysis

The percentage of the following items from the questionnaire are assessed to determine the student's schedule, practical work evaluation system, and students' lab. The following table 1 lists activities that are oriented.

Table 1: Responses of students on their schedule, evaluation procedure of practical work and lab. Oriented activities.

Q.n o		Public.				private rural				private urban			
		N= 314				N=314				N=288			
		yes	%	No	%	Yes	%	No	%	Yes	%	No	%
16	schedule	186	59.23	128	40.76	231	73.56	83	26.4	228	79.16	60	20.83
q.20a	Update records	266	84.71	48	15.28	265	84.39	49	15.6	41	14.23	247	85.76
b	writing all experime nt at one stretch	48	15.28	266	84.71	49	15.6	265	84.39	247	85.76	41	14.23
q.2 1	evaluated by Teacher	308	98.08	6	1.91	313	99.68	1	0.31	288	100	0	0
q.23	Lab. oriented work	218	69.42	96	30.57	208	66.24	106	33.75	209	72.56	79	27.43

(Source: primary data)

Table 1 shows that (186/314) 59.2 percent of public school students, (231/314) 73.5 percent of rural students, and (228/288) 79.16 percent of urban school students are conducting practical work on time. However, 40.76 percent of public students, 26.4 percent of private rural students, and 20.83 percent of private urban students admitted to not conducting practical work according to their schedule. Teachers review nearly all students' records, according to nearly all students. Students from Public., p. rural, and p. urban schools reported that they update their records after each lab experiment with 84.71 percent, 84.39 percent, and 14.23 percent, respectively. Similarly, 85.76 percent of private urban school students said they write all of their experiments at one sitting at the end of the session or at the start of the session. Public students (69.42 percent) and private rural students (66.24 percent) had lower percentage scores for lab-oriented outdoor activities than private urban students (72.56 percent). As a result, it can be concluded that p. urban school students do better in lab-oriented outdoor activities than Public. and p. rural kids.

The following are the disparities in the extent to which different sorts of school students use laboratories:

When compared to public and private urban students, private rural students have more organized laboratories. In the organizational lab, public students outperform private urban pupils.

When compared to public and private rural students, private urban students conduct more laboratory-oriented work and hence obtain greater advantages.

In comparison to public and private students, private urban students use greater laboratory resources.

As a result, it is established that there is a considerable disparity in the amount to which students in public and private higher secondary schools use laboratories.

Comparison of different types of school students and the challenges they face when it comes to using Tinkering labs.

Comparison between the types of school students and the difficulties confronted with their extent of utilization of Tinkering laboratories by using ANOVA

The details of data and test significance (ANOVA) and post hoc test are given in the table 2

Table 2: Comparison Between The Types of School Students and The Difficulties Confronted With Their Extent of Utilization of Tinkering Laboratories (ANOVA)

Variable	Group	N	Mean	SD	F	P	Significance at 0.05 level
Difficulties	Public	314	40.04[a]	27.59	8.011	.000	**Significant**
	Private rural	314	43.71[b]	28.10			
	Private urban	288	34.46[c]	29.64			

Using CD, the superscript alphabet reveals a large pair wise difference (critical difference method)

Primary data source P-Value-Based Inference

According to table 2, the P-value of challenges encountered by students while completing practical work is (.000). Because the P-value is smaller than.05, the P-value is significant at the 5% level. Thus, the null hypothesis is ruled out. The following are the differences in the mean score of the problems faced by pupils in public and private schools: Students in p. urban schools (34.46) faced less challenges than students in public (40.04) and p. rural (43.71) schools, according to the mean score. As a result, it may be concluded that private rural students faced greater challenges than public and private urban students.

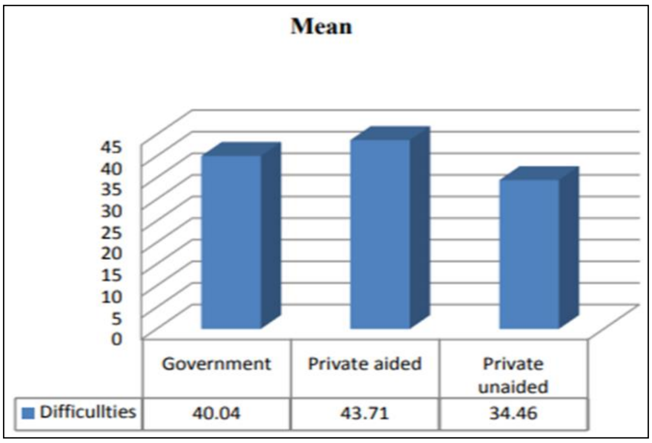

Fig 1: Types of School Students and the Difficulties Confronted by Them in Utilization of Science Laboratories

Conclusion

According on the students' data, the following major conclusions resulted from the current study.

1. Students have appropriate laboratory facilities in the majority of government and private higher secondary institutions. Private urban school pupils had access to superior amenities than government and private rural school students.
2. In comparison to private urban higher secondary schools, private rural and government schools have more independent laboratory facilities for physics, chemistry, botany, and zoology. Botany and zoology laboratories for private Urban school students were not found.
3. Private rural school students were found to organise laboratory activities better and more frequently than government and private urban school students, and they also acknowledged more difficulty in doing so.
4. Private urban schools had more laboratory assistants than government and private rural schools. Their performance was observed to be better in government and private urban schools than in private rural schools.
5. There were no differences in time availability for practical work amongst different school students.
6. The majority of private urban school students agreed that they were used to writing their records at a stretch for all experiments, either at the start of the academic session or at the end.

Adequacy of Prevailing Facilities

The study discovered that all of the higher secondary schools in the sample had acceptable laboratory facilities, despite differences in space and infrastructure. Separate labs are found in more than 75 percent of private rural and government schools. 98 percent of government schools have separate physics and chemistry laboratories for botany and zoology, while 100% of private urban schools have distinct physics, chemistry, and biology laboratories. This finding is consistent with the findings of the All India School Education Survey (7th AIESs) 2002, which found that tinkering laboratories are becoming more readily available at upper secondary levels as compared to the 6th AIESs survey.

References

1. Ango ML, Sila MD. Teaching and Learning of Biology Practical: The Experience of some Nigerian Secondary Schools, Journal of tinkering Teachers Association of Nigeria,1986:124(1&2):33-47.
2. Anil Kumar KP. Institutionalized Student Evaluation Practices, Practicability and Expected Effects, School of Pedagogical Tinkering, Published PhD Thesis, Mahatma Gandhi University, Kottayam, 2003.
3. Babu Surendranath. A study of existing facilities for teaching tinkering in high schools of East Godavari district in Andhra Pradesh, Unpublished M.Ed dissertation, RIE, Mysore, 1998.
4. Bajracharya RK. Study of Tinkering Education in the Secondary schools of Nepal with a view to evolving a functional model for improving the tinkering education. An unpublished Ph.D Thesis. Delhi University, In Buch, M.B (Ed, 1991) Fourth Survey of Research in Education .New Delhi: NCERT, 1986.
5. Battler FA. The Improvement of Teaching in Secondary School, the University of Chicago, Press Chicago Illinois, 1946, 399,
6. Campbell N. What is Tinkering? (An introduction to the Nature and Methods of Scientific Thought), Dover Publications Inc. New York, 1952.
7. CBSE**.** Improving Tinkering Practical, New Delhi, Central Board of Secondary Education, 1991, 90.
8. Farombi JG. Resource Concentration, Utilization and Management as correlates of students learning outcomes; A study in school quality in Oyo State, Unpublished Ph.D thesis, University of Ibadan, 1998.
9. Frederic Fitzpatrick. Policies for Tinkering Education, New York, Bureau of Publication Teachers College Columbia University, 1960.
10. Ganguli B, Vashita UC. Research in Tinkering Education Trend Report, In Buch, M.B(Ed. 1991) Fourth Survey of Research in Education NCERT, 1991.
11. Hofstein A, Lunetta VN. The Laboratory in Tinkering Education: Foundation for the Twenty First Century, Department of tinkering teaching, 2002. www.gpquae.iqm.unicamp.br..gtexperimentacao.pdf
12. Joshua RLD. Online Social Networking – based health education: Effect of student "Awareness and Practice of Laboratory Safety. TOIET: The Turkish Online Journal of Educational Technology,2013:12(4).