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# Revival and Resurgence of Science Education in India: Lessons from the Hoshangabad Science Teaching Programme

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## Abstract

Education, particularly science education, aims to encourage people to think, learn, solve problems, and make sound decisions. Science Education, as a discipline, focuses on disseminating and expanding scientific content as knowledge that produced in and through science. There have been very few social pedagogical interventions, in which learners are forced to 'do' science. The Hoshangabad Science Teaching Programme (HSTP) was launched in the 1970s, in the Indian hinterland by some zealous and concerted educators. It is demonstrated and believed that people generally have the capacity and capability to do science. The scientific method could be used to construct knowledge if learners are assisted and guided to think and reflect in procedural steps to construct observation, data collection, categorisation, and analysis. The HSTP operated for three decades before being abruptly shut down in 2003. This article attempts to highlight the lessons that can be drawn from running a progressive science education programme in a populist democracy. It is also important to consider why progressive science education harms the nation ideology. The final goal of this article is to explain why such programmes are still considered "alternative" education and why they cannot be integrated into "mainstream" education. Finally, we want to emphasise that if science education in India is going to change the discourse about how people should critically reflect on and construct their 'justified true beliefs.' Furthermore, this issue needs to revive and resurrect science teaching and learning in India by following and emulating the HSTP.

**Keywords:** Education, Science, Science Education, Scientific method, Pedagogy of science.

## Introduction

Science and its method do not come naturally to us, but it does shape our understanding of the world and actions thereof. Intriguing questions, such as why the sun emits heat, why there are days and nights, or why the sky is blue may have different answers for different socio-cultural backgrounds of individuals. Furthermore, there are also answers and explanations to these questions that are provided by science. The obvious question that immediately comes to mind is, 'Why should we prioritise the answers offered by science over mythical and cultural narratives?'

The discipline of science is marked by hegemony and paradigmatic constraints that define the acceptable theories, methods, and approaches of the field while rejecting any alteration and change within the already established models used within the scientific community (Rogers, 2006, p.5). However, while proclaiming universality, reliability, and precision, the method of science emphasis that every individual has the potential and ability to reach an accurate and justifiable knowledge if a specific path of knowledge construction is followed.

Science learning and learning how to learn science that challenges the conventional

and normal process of learning in schools must be learned by heart because it is predetermined and rigid. Meaningful science learning is contrasted to rote memorisation, which is practiced by many students, encouraged by instructional, and evaluation practices (Edmondson & Novak, 1993, p.547). Conventional learning discourages learners' curiosity and creativity as the act of wondering, contemplating, and uncovering knowledge is impeded by predefined curricula, teacher-centred pedagogy, and deterministic evaluation. The tightly defined and heavily standardised curricula is failing students and teachers as they are robbed of their professional agency and creative capacity in such educational settings (McCabe, 2017).

The process of engaging in science or conducting scientific inquiry, adheres to a constructivist teaching approach. While this approach may not be difficult to fathom, it can be challenging to follow as it disrupts the traditional hierarchy of knowledge production and acquisition. This approach to science and knowledge led to the start of the Hoshangabad Science Teaching Programme (HSTP) in 1973, with the joint efforts of two organisations: Friends Rural Center and Kishore Bharti (Mukherjee et al., 1999). These organisations and their volunteers 'somehow' managed to persuade the education department of the then government of Madhya Pradesh to allow them to run a science education programme for classes VI to VIII, centred on experiential learning and learning by doing. The 'progressive' attitude of the said government has been lauded multiple times by the founders of the HSTP, which allowed these organisations to conduct their 'pedagogical experiments' in 16 government middle schools in and around Rasulia and Bankheri, rural hinterlands within the Hoshangabad district. This programme was developed to response to the traditional education system's shortcomings and aimed to provide a more holistic and practical approach to teaching science to rural and underprivileged children. The curriculum of the HSTP was designed with a focus on local relevance and integrated traditional knowledge with modern scientific concepts to make learning more engaging and relatable for students. A key component of the HSTP was the training of teachers in innovative pedagogical techniques to effectively implement the programme's teaching methods in their classrooms. The assessment system of this programme went beyond traditional exams. It focused on continuous evaluation through an open-book examination system, practical skills test, critical thinking abilities, and scientific concepts understanding among learners.

The HSTP was initially launched as an experiment by some collective individuals; for instances, young scientists, researchers, and students from prestigious scientific institutions. They aimed to transform and reform science education in rural areas. Within a decade, its scope expanded significantly. By 1978, it had made substantial contributions to reshaping science education in 200 schools within the Hoshangabad region and subsequently extended its reach to other areas of the country, encompassing over 450 schools by 1990 (Mukherjee et al., 1999). The programme was designed to be compatible with the government school system, albeit it believed in the freedom and autonomy of learners and emphasised the role of teachers as a facilitator in knowledge construction. This programme had specific 'commitments' with the most importantly being "a commitment to teaching science through experiments that children themselves perform in the classrooms. This was eventually elevated to a guiding principle, which said nothing that could not be demonstrated by such experiments would form part of the curricula" (Mukherjee et al., 1999).

The programme commenced by reorienting science teachers as the role of teachers holds utmost significance in any teaching and learning process. Teachers were made to unlearn the notion that science is esoteric and exclusive that all scientific

theories originate in sophisticated laboratories only. As an alternative, the methods of science can be applied in one's daily construction of knowledge. The HSTP sought to demystify science and show that science is not confined to textbooks and laboratories. Instead, it is a tool for understanding and improving the world around us, an approach that encourages students to view science as an integral part of their everyday lives, and their day-to-day quest for knowledge.

Nonetheless, following this view can be challenging. The perception that science learning has no relevance in everyday life, except as a means to pursue financially rewarding careers such as engineering and medicine, is a complicated challenge disposition. This challenge is further compounded by the absence of 'accountability' within the teaching system, rewards for work well done. and no penalties for non-performance. This significant demotivator for numerous teachers has been consistently highlighted to all stakeholders associated with the HSTP program (Mukherjee et al., 1999). Encouraging teachers to engage in additional work without offering any extra benefits, whether monetary or otherwise, presented a challenging task. However, "the younger schoolteachers in Hoshangabad district who are the products of HSTP accept that experiments and inquiry are the main ingredients of good science teaching" (Mukherjee et al., 1999). These teachers were receptive to 'change.'

In 1972, this intervention was, and is still, critically necessary because science education in particular, and education in general, remained predominantly authoritarian. In the absence of infrastructure, laboratories, and equipment, science was predominantly validated and legitimised solely through the authority of textbooks and teachers. It was often perceived as a body of pre-established and received knowledge. The conventional depiction of a science classroom is vividly illustrated in the satirical novel 'Raag Darbari' by Shrilal Shukla. In this novel, the teacher, Master Motiram, attempts to explain the concept of 'relative density' with a parallel example of 'comparable higher profits from a flour mill.' He leaves in the middle of the class, exclaiming, "Do read the chapter on relative density; it is important" [This is important because there will be a question on relative density in the examination]. This narrative simultaneously emphasizes the notion that proficiency in English is necessary to acquire the scientific knowledge and science cannot be learned without (knowing) English. Unfortunately, this description of science classrooms and science education sounds realistic even today.

When the HSTP was abruptly and arbitrarily terminated in 2003, the primary justification provided was that the students of Hoshangabad were not performing as per the standards in class 10th (Board) exams, even though HSTP explicitly clarified that its focus was on middle school students, ranging from grades VI to VIII (Joshi, 2022). Nevertheless, these comparisons were fundamentally flawed as "the present examinations at Class X level are largely confined to information recall testing with little or no emphasis on testing a student for problem-solving, experimental or analytical skills, or conceptual understanding" (Kamal Mahendroo, 2002). The HSTP prioritises the cultivation of these skills (in alignment with the National Curricular Framework) and actively discourages rote learning; evaluating the effectiveness solely based on the results of these examinations would be unfair. In addition, the nature of the data was inadequate to support such a hypothesis (Mahendroo, 2002). The differing effectiveness of the high school system across various districts must be accounted for through a research design that examines samples with comparable conditions in high schools. The two variables –the percentage of students scoring above 60% marks in science and the overall pass percentage –as indicators to conclude whether the HSTP had minimal or no impact on high school performance,

reveal a notable absence of correlation. This implies that an entirely different set of variables could potentially yield a contrasting perspective. For example, consider the case of Chhindwara, which secures the second position in overall pass percentage but is absent from the top 15 districts in terms of students scoring 60 percent and above in science. Conversely, 7 districts ranked within the top 15 for overall pass percentage do not appear in the top 15 of the lists of students achieving 60 percent and above in science.

Notwithstanding these inconsistencies in the claims made, the HSTP was suddenly and unexpectedly terminated. But before delving deeper into the investigation of the factors behind the abrupt closure of the program, it is imperative to trace the evolution of the HSTP, acknowledge its accomplishments, and the lessons derived from the program, for which the distinguished physicist Yashpal observed that "such efforts come only once or twice in a century" (Ramachandran 2002).

**The Rule of Thumb: Eklavya and Self-learning**

The HSTP originated with a group of enthusiastic science practitioners and educators who held specific assumptions and beliefs. Primarily amongst them were that a) interventions can bring in innovations and fruitful changes in education systems by bringing together professionals, teachers, and children, b) education can be a process rather than a product by altering the way government schools function, which is both possible and necessary, and c) science is not an exclusivist domain of knowledge but can be rooted in people's 'rational' understanding, to be people's science and lead to 'scientific temper' (Kidwai K., 1999; Sharma *et al.*, 2020). These assumptions and the initial groundwork by the HSTP led to the envisioning and establishment of a non-profit voluntary organisation in October 1982, known as Eklavya. Thus, Eklavya emerged as an extension of HSTP's vision and aims to transform the learning landscape of India. It advocates for an experiential and activity-based approach to education and develops teaching-learning materials that encourage students to explore, experiment, and understand concepts through practical engagement. It aims to bridge the educational divide by ensuring that quality education is accessible to students across diverse socio-economic backgrounds.

This organisation drew inspiration from the legendary archer Eklavya, a prominent figure in the epic Mahabharata, who hailed from the Bheel tribe. This tribe represents one of the largest tribal communities in India, with a substantial presence in the state of Madhya Pradesh. As the meta-narrative of the epic Mahabharata emphasises that only a chosen few can have access to knowledge, an inquisitive learner can surpass all the obstructions and barriers to acquire knowledge. The monopoly over knowledge and consequential hegemonising of knowledge was challenged by this legendary character—Eklavya. There could not have been a better name than this, as this mythical character eulogises that a) anyone and everyone can know and has a right to know, b) self-learning, discovery-based learning, or guided learning can equally and efficiently help a learner to know, and c) those who have 'controlled' knowledge production and consumption cannot bear with its subalternation. This is the reason why the legend Eklavya had to give away his thumb as guru-dakshina (a requirement for archery; from that myth onwards, Bheels and Bhilals do not use the thumb in archery anymore) and "the Government of Madhya Pradesh [could] shut down the HSTP without assigning any reason for its abrupt decision" (Rozario, 2004-2005, p.7).

However, Eklavya, besides evolving innovative curriculum, learner-centric pedagogy, and learning material for science, social science, and primary education, has also engaged with issues and concerns of rural health, technology, and planning and development of panchayats as resource centres for the above. This article will concentrate on the endeavours of Eklavya in education in rural areas and specifically its

school science programme- the HSTP. However, it will also discuss science-society issues to comprehend and understand the lessons and learning from the HSTP and its closure.

Therefore, when he discovered how malaria was transmitted and spread into the tropics through a microscope, he would have realized that his discovery would safeguard the British soldiers and authorities from this disease. Eventually, this would empower Britain to extend and affiliate its colonial control. They guaranteed that science was something other than a handy or ideological instrument when it came to the realm. Since its introduction to the world around a similar time as Europeans started vanquishing different pieces of the world, present-day Western science was inseparably trapped with expansionism, particularly the British government. Furthermore, the inheritance of that imperialism affects science today. This kind of argument based on the pretext of imperialism sounds illogical when delving into the details of the malaria pandemic in terms of diminishing mortality rates globally and especially in the colonised countries. Malaria researchers have won numerous prizes along with Ross's Nobel Prize for their accomplishments, even though the ailment keeps on harassing around 200 million patients every year, killing more than 600,000. Artemisinin from the Qinghao plant (Artemisia annua L, China, 4th century) and Quinine from the Cinchona tree (South America, 17th century) are two widely used anti-malarial medications extracted from plants whose medicinal properties have been known for generations (CDC website 2005: Arrow 2004: Roser & Ritchie 2019: Byrne 2008). Along with these two medicines, Quinine and Artemisinin, DDT was also used as a weapon in WHO's global programme for malaria eradication (Pearce, 2007). With this advent, there may also be “continuous decrements in the mortality rates, especially in the countries of Africa and Asia” (Nigera *et al.*, 2011), which were previously colonized by the imperialists. This punctures the imperialist science argument completely. Therefore, this demonstrates how science and scientific endeavours help people to come out from miseries; consequently, science is a universal phenomenon, and there is no merit in the 'imperialist sciences’ in argument and framework.

The above example elucidates how the content of science has to be universal to be science. The method followed, and the conclusions arrived, have to follow precision, universality, replicability, and clarity. Thus, the process will be two-fold for decolonising science learning, wherein pedagogy and evaluation need to be reworked for both the learner and the decolonized state. First decolonisation “seeks to counteract the de-humanisation that colonization, slavery, settler colonialism, imperialism, and their vestiges have instilled within communities; on the other, it seeks to reconstitute systems and processes in ways that unearth and advance subjugated knowledge through Indigenous and collective forms of learning that are radically humanising for all” (Bajaj, 2022). HSTP as an experiment and interaction in science pedagogy was also a process for decolonising science learning.

**HSTP and Decolonisation of Science Education**

It sounds bizarre that Newton observed an apple falling from a tree, invented gravity, set down some equations, and now that logical truth has been imposed on the world forever. In order to comprehend the position taken by the 'decolonisation' researchers, some individuals may accept the milk miracle – an incident that happened in September 1995, in which statues of the deity Ganesha were believed to drink milk offerings (Subramaniam & Mitra, 1995). However, because this is not testable_by "Western" science, this might be considered as native knowledge, and along these lines is a case of Western imperialism stifling indigenous insight. To sustain colonisation, Europeans used "firearms, germs, and steel," along with a deeply bigoted worldview, to do some unnatural and abnormal things to indigenous communities. This includes imprinting

colonised people with Western culture. Reclaiming indigenous culture is not problematic, and this can be considered an attempt at decolonisation. Science is essentially unique in comparison to art, religion, and music, regardless of what extreme postmodernism one would have accepted.

The utter manifestation of science is to seek the prospective truth that is not dependent on the premises of any particular culture. Science has the purpose of breaking social stigmas, ousting authority and custom, and utilising a straightforward and libertarian procedure to make sense of what is truly valid. On the off chance that science is working accurately, at that point, a laboratory in India ought to get a similar outcome as a laboratory in Sweden. There is a worldwide network of researchers teaming up and cooperating to push aggregate information forward. Science, in this way, has a place with humankind, not with any one culture. The historical backdrop of science is brimming with disappointments to accomplish this perfection, as science is a human endeavour. The method of science has been overturned to seek after social and ideological finishes, with the attempts to show that one race, one social group, one caste, or one sex is better than another. For example, science is subverted when it is utilised, trying to demonstrate that a strict conviction is authentic or to construct history in a manner that is pleasing to one social group. It is not interested in a white man thrusting his beliefs on the rest of the world through Western imperialism. Comprehending the concept of gravity and mechanics was the aftereffect of a procedure of revelation and experimentation. Not just that, Newton was later challenged (as it were) by Einstein (Bolejko, 2015). His depiction of gravity was right, however fragmented, and must be modified by the theory of general relativity. Our comprehension of gravity is not forced by power, yet it is addressed, tried, and tested. It is temporarily acknowledged now since it has withstood committed endeavours to discredit it. The discrepancy is, that by pushing for the nullification of "Western" science for "Indian" science, they are advancing a social and frontier perspective on science. They contend that science does not have a place with humankind and that Indian researchers would concoct unexpected replies in comparison to different researchers. What they truly need is for science to validate their social convictions, so they are committing a similar error as creationists, deniers, and revisionists. This would be a gigantic injury to India and Indians. This would, again, amusingly, amplify the mischief that expansionism did to the mainland by propelling them to isolate themselves from the collective human excursion of science, to dismiss the standards of science itself, and to oppress themselves to the conventions of their past. Some portion of bigotry is to deny indigenous individuals the chance to partake in science. Contending that India ought to free itself of science is along these lines, giving way to the schemes of frightful conventions. The 'pseudoscience' that they need to protect from the segregating eye of science is anything but something to be thankful for. Confidence in a portion of some Indian traditions may legitimise discrimination against individuals from different social groups, genders, or sexual orientations. It might likewise deny Indians successful clinical consideration and is enormously chickenpox endemic, which was considered before as 'Mata' (a goddess) in this part of the world. This issue of seeing science as Western expansionism and supporting indigenous science is not exceptional in India. Disappointingly, it has critical ideological help from benevolent individuals who are fittingly alarmed by prejudice and misuse. Assaulting science is simply misinformed and will accomplish the specific inverse of what its advocates trust. In any case, such exposure to destructive "cultural constructs" is extremely popular in the scholarly world. Of late, consideration has gone to science, assaulted by Andrew Ross, Sandra Harding, and others as a Western "cultural construct" whose guarantee to a substantial all-around

discernment is close to a feeble spread of colonialism and racism (Keith Parsons, 2003; Nanda, 2006). These scholars assume they are doing great service to the Third World, yet they accidentally open a scholarly entryway for strict fundamentalists. In India, narrow Indian nationalists have reacted to the required "decolonizing the science" campaign by forcefully advancing "Indian methods of knowing." They demand in their ongoing Humanistic Approach to Economic Development that "the social ethos of the so-called ancient pride culture" must be re-established. They have the last authority over what parts of 'remote' science and innovation are conceded into schools and different establishments" (Nanda, 1997). Some time back in 1992, in the Indian province of Uttar Pradesh, "Vedic arithmetic" was made mandatory for secondary school studies. In government-prescribed courses, books, standard algebra, and math were supplanted with 16 Sanskrit stanzas that just give equations for quick calculation. History reading material in India has likewise been utilisation of science as a method for social upheaval. Those included tried to utilise relevant information to challenge the predominant, to a great extent, Indian world perspectives on different social groups and ladies. However, when compellingly savvy people contend that logical discernment itself is a "pioneer build," just the interests of Indian nationalism are served.

There is nothing like Western science, Indian science, African science, Native American science, or any other customary science; such sciences do not exist. It is science only when it strives to overstep power and authority, beyond the beliefs and presumptions of one single culture, and when it is non-exclusive and accessible. Okere (2005) argues that "no one can deny the overwhelming contribution of the West to science so understood. But it would be absurd to suggest that such overwhelming dominance amounted to a monopoly or to discount the contribution of other civilizations or other branches of the human family to science." Furthermore, "The notion that there is only one science, western science is pure dogma, a dogmatic belief supported by purely ideological positions, some stated, and others not." this argument can be extrapolated to Indian, African, and American sciences. In science, ideas should be judged purely based on their merits, their logic, and their proof. Hence, those who seek to fight racism, colonialism, or any other evil must work within the fundamentals of science. The attempt at cultural undermining of science is principally detrimental for those who espouse such beliefs while amplifying the ills of racism and colonialism.

Science is a universal subject; however, the strategy to teach science would not be global. It may be different for the residents of separate geographical areas, economic strata, and social milieus. We may include the genotypic details of populations living in a specific geographic area. Therefore, how we think and what we comprehend and learn through formal education and training may generate a population-specific response. Thus, the strategy to teach kids in Western countries may not be apt to apply in underdeveloped or developing countries, which were the colonies of these Western countries in the past. The implementation and learning of science should be locally customised based on the socio-economic conditions of the local milieu. Bajah (1984) argues that the "tragedy of science education in Africa which adults and children have shared is that it has not always paid attention to the culture of the African". Furthermore, "the teaching of science should also provide an introduction to the application of science in everyday life, but to the socio-economic, cultural and environmental implications of scientific and technological development."

In this regard, the strategy adopted by the HSTP programme could serve in the best way as it is a tailor-made pedagogy of science targeting the indigenous population. This programme was designed by educationists, academics, researchers, scientists, engineers, and activists who aimed to create a school

science teaching programme based on the ideal envisioned in various policies focusing on the indigenous population. The HSTP project had the objective to investigate the scope of innovative and progressive changes that may be brought into the government school system. For this purpose, the HSTP project set out to see if it is possible to implement the 'discovery' approach in the teaching and learning of science in village schools rather than the traditional textbook and rote-memorization-centric approach. HSTP was a singular and only of its kind experiment in the Indian education system and an inspiration for other initiatives in science education. HSTP had begun focused micro-level educational experiments, starting pilot projects, developing teacher training packages, co-curricular packages, and administrative reforms. Eklavya also devised various educational programmes for left-out or drop-out children for this purpose; the basket activities included bal-melas, poster exhibitions, street plays, jathas, public campaigns, and touring exhibitions that covered several villages in campaign mode; also, creative activity workshops to train children to teach others.

Therefore, environment-based education, based on observation and analysis, was started as a fundamental component of science education. The fundamental perception behind this effort was that learning science via methods like observation, experimentation, and field studies would help children develop a questioning and analytical mindset. This programme encouraged learning rightly from the local and neighbourhood environment, and it was hoped that through this, the children would sooner or later start questioning the conventional social structure of society. As this envisaged learning from the local environment, it could be a copycat of the Western science school teaching strategy. Therefore, a programme like the HSTP would decolonize science teaching in India. However, it is not exactly how the so-called nationalists would like to decolonize science. In conclusion, science is a universal concept, and it can be decolonized. Still, the strategy to teach should be decolonized, and as Patrick Geddes, a contributor in the area of urban planning who inspired the transformation of some of the worst urban areas in Scotland, has said rightly, 'think globally, act locally', therefore, in this regard, the HTSP-like strategy seeks global knowledge. Nevertheless, the implementation and learning of that information remained locally customised based on home conditions.

## Conclusion

Science education refers to the teaching and learning of content, theories, methods, processes, implications, and applications of science. Science education deals with the system of knowledge about the natural and physical world and its phenomena. Along with knowledge, science education is also concerned with the method of establishing that knowledge. The purpose of science education is to cultivate and nurture the curiosity of the children about the world around them. Curiosity will encourage them to develop scientific knowledge by inquiring, exploring, and investigating. It involves the active engagement of the child with methods like prediction, observation, experimentation, categorization, classification, and inference. Science and its methods do not come naturally to us, as it requires the efforts of systematic teaching and learning. However, once learned, science education does shape our understanding of the world and actions thereof. Children start to acknowledge more and more that the world and its phenomena are shaped and defined by science. The government should promote science education and interventions like HSTP to fulfil the goals of the constitution regarding the promotion of scientific temper in our country. This intervention acknowledges that the prevailing non-scientific temper in people's attitudes may lead to devastating catastrophes for future generations and is also an attempt to decolonize science and science education in the country whilst emphasising indigenous

knowledge and methods of doing science. Learning science by rote and routine will not only dissuade the curiosity for and about human learning endeavours, but rather it may develop a disdain for science and scientific temper. In contrast, scientific temper in people and learners may produce extraordinary science, when they become professionals in their chosen fields. Kuhn distinguishes extraordinary or revolutionary science from normal science, and as per Kuhn, the growth of science is not linear and uniform; rather, it has changing 'normal' and 'revolutionary' periods. The revolutionary periods are not just phases of advanced developments; but there is a qualitative difference between normal and revolutionary science. Normal science is not dramatic; to explain this, Kuhn presents an example of solving a puzzle, for instance, in a chess game, a crossword, or a jigsaw.

The puzzle solver hopes to have a rational prospect of resolving it because the puzzle and its resolution are both well-known, and the puzzle solver is not venturing into an uncharted field. Since the puzzles and their answers are comparatively known and simple, normal science can assume to amass an increasing share of puzzle solutions. Nevertheless, revolutionary science is not accumulative as all the revolutions of scientific, include a reconsideration of prevailing scientific notions and their applications.

Not all the achievements attained in the former era of normal science can be protected through a revolution. In the ensuing phase of science, there might be certain phenomena that do not have an appropriate explanation but were convincingly explained in earlier times. This characteristic of scientific revolutions is called 'Kuhn-loss'. Popper also highlights the detrimental consequences of the lack of scientific or non-scientific temper. The lack of scientific temper leads to the inculcation of conservative orthodoxy, and people believe in the things they have been told to find without proper reasoning. They do not remain open to challenging the existing dogmas their previous generations have established; there is no revision possible in the existing ideas. The nature of science contrasts with this as according to Popper, all scientific theories are conjectures and always remain open for better refutation (Popper 1963). This encourages people to innovate and come up with better theories, which can explain an existing phenomenon in better ways. Therefore, these people, who will be trained in compliance with Popper and Kuhn's thesis by the HSTP-like programme, will be more prone to make innovations and discoveries in comparison to the people trained by conservative orthodoxy. So, it is required to revive and resurge science education in India; not only to help the state strive for the directive principle of scientific temper, but also to bolster the spirit to argue, question, and test every piece of information and knowledge before believing it–a hallmark of science, decolonized pedagogy, and a democratic society.

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