**[Mathematics and science](https://www.dawn.com/news/1796055/mathematics-and-science)**

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OVER recent years, a lot of organisations have come up — private and mostly in the not-for-profit sector — that are working for the larger awareness of mathematics and science and the joys of understanding and pursuing them. There are lots of astronomy societies one hears of; science melas keep happening across the country; there are mathematics and science competitions going on, as well as science fairs that take place regularly in schools. Mathematics circles have become a well-known phenomenon and there are various STEM (science, technology, engineering and mathematics) projects being carried out that not only raise mathematics and science awareness amongst students, but also engage teachers through teacher training as well as coaching and mentoring initiatives. A science museum has also been set up by a private sector entity.

A number of vlogs, blogs, audio and video channels have also sprung up around mathematics and science learning. Some of these have hundreds of thousands of subscribers and some of the videos have been watched millions of times. Education technology (ED-Tech) companies have also been focusing on mathematics and science teaching more than languages or other subjects, and their subscribers number in the hundreds of thousands too. These are all extremely welcome changes, and it is wonderful to see young minds engage with mathematics and science.

But this interest will need to be nurtured and developed as well. The societies, museums, fairs, melas, and contests can improve students’ understanding of mathematics and science to an extent. They can awaken the curiosity and interest of children and tell students of avenues, other than engineering and medicine, that they can pursue if so inclined, but we need educational programmes that will then allow them to follow through. We need many more undergraduate and graduate programmes of good quality that allow young people to read mathematics and science subjects in more detail and at a high enough level to then be able to move towards good quality graduate programmes, here and abroad, and make career choices based on availability. This cannot happen without the government. Science education is expensive. University science education is quite expensive. Though some private universities have come up with science programmes, it is the more lucrative engineering and computer science programmes that are more often offered and heavily subscribed to. Basic science education, the backbone of any applied work that needs to be done later, will require state support and patronage. This, for the moment, is almost completely missing.

Most public-sector universities are short of resources. But it is not just the issue of resources. Even if they had the money, the governance mechanisms of public-sector universities are very broken. From the way we appoint vice chancellors, to the way faculty recruitment is carried out, to how we set work incentives and promotion rules for faculty, and how faculty-student interaction is managed, to incentives for teaching, most of the governance system needs a major overhaul. Universities and faculty need a lot more autonomy to think and perform. Yes, they should be held accountable for the results, but there is a difference between setting up effective accountability mechanisms that get you the desired outcomes and paralysing the system with rules and regulations that leads to intellectual death.

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Another trend that needs to be bucked, and strongly, is the takeover of science and technology domain by the military. Pakistan’s nuclear mission started a long time ago, and the Atomic Energy Commission, whether or not one has reservations about atomic bombs, contributed a lot to the development of science and technology in the country. For a long time, it employed some of the brightest people amongst scientists, provided early training ground for new graduates, encouraged many to go for advanced degrees in the sciences abroad, and gave job opportunities for many on their return. It used to be governed by some of the leading scientists and engineers of the time.

At some point though, the self-governance models of scientists were undermined and governance taken over by the security establishment. The security lens came to dominate the area and continues to do so. Any large research in any advanced area of physics and/or engineering now cannot happen in the country without approval and control of the security apparatus, which also controls large-scale funding. Unlike work in philosophy or history or most other subjects, science requires a lot of resources for equipment and experimentation. Large-scale funding is now largely controlled by the security apparatus. So, a scientist might be able to take on small projects without large-scale funding and be able to write a few papers too, but if he/she wants to do significant work in any area in science, he/she has to have the funding needed. In Pakistan, this is only available for projects that get approved by the security establishment or are blessed by them. This does not bode well for the development of mathematics and science learning.

The story is not very different for Suparco, where, too, the security lens dominates. If as a scientist you want to fly drones for, say, land-mapping, you have to get permission from Suparco. And permission is not easy to get. The governance of Suparco moved from scientists to military personnel long ago.

Science and technology cannot develop unless there is freedom — freedom of thought and freedom of work. Science and technology can also not develop unless the state is able to play its role effectively. There is definitely a lot of movement at the grassroots level that is making many young people aware of the possibilities and wonders of science and mathematics learning. But this ‘movement’ cannot lead to a system-wide transformation unless we overhaul university governance and funding mechanisms and open up the area of science and technology and look at it through multiple lenses instead of looking at it just through the lens of security.

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