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Why are Pakistani students science-phobic?

There is a solution: good science books exist. So use them!

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School syllabi demand it, but even then few young Pakistanis want to study science subjects and still fewer want to become scientists. Many generations have found science so odiously dull that they are now indifferent — even hostile — to a subject that stands at the very pinnacle of human understanding and progress. While some of our better students will be reasonably successful in science-related professions such as engineering, medicine, and information technology, their poor science backgrounds will leave them ill-equipped for pushing the frontiers of these rapidly evolving fields.

Contrast this with India. Surveys show that school students see science as the most prestigious and glamorous career to pursue. For them Einstein, Stephen Hawking, black holes, genes, etc. is the way to go. Although most students eventually opt for more 'normal' professions, yet sufficient numbers persist and some eventually rank among the world's better scientists. This has been key to India's emergence as a world power.

Why the difference? A good part of the answer comes from looking at our locally-authored science textbooks. Although a dysfunctional examination system and bad science teachers are also blameworthy, poor textbooks are especially debilitating in a culture where the written word is considered virtually unchallengeable.

Over the years, I have collected many titles, both Urdu and English. The Urdu ones are even more unattractive than their English counterparts. All were produced by the Punjab and Sindh textbook boards. The number of printed books must now run into many hundreds of millions.

The books reflect an attitude that science is to be taught no differently from geography or history. A stern looking Quaid-i-Azam on the inside of every front cover admonishes students to study else 'we may be wiped out altogether'. But threats — or exhortations that learning is a holy duty for improving our chances in the Hereafter — are useless. They cannot create interest in a subject that springs from human curiosity.

Local books seem designed to kill curiosity rather than nurture it. Mathematics is reduced to a set of drills shorn of relevance and meaning while physics, chemistry and biology are just about remembering formulae and diagrams. Whether written from scratch, or with bits cut and pasted from here or there, these books give no hint that knowledge is being continuously created by human endeavor and intelligence.

Bad pedagogy is all over. For example, a terrible way of teaching about surface tension is to begin with "surface tension comes because a skin is created on the surface of a liquid by attraction of molecules". Now, no one has ever seen a molecule with a naked eye, much less seen one attracting the other. A student who learns it this way has not learnt anything at all.

On the other hand, a good approach would be to ask the student to gently place a razor blade on the still surface of water. Why does it float? The student is then allowed to deduce that there is some kind of invisible skin; a drop of liquid soap thins it further and the blade sinks. In this manner the student could be led towards meaningful comprehension of phenomena through a logical process.

The weakest parts of the books I have browsed through are the chapter-end questions and exercises. This is useless memory-recall drill. The authors do not know that the essence of science is problem-solving, and that good scientific training builds a student's capacity to internalise newly-learned principles by applying them to problems whose answers are yet unknown. In contrast, foreign-authored O-level books — used only by a tiny sliver of upscale Pakistani schools — usually do have good questions.

There is only a little good news. Compared to earlier textbooks, newer ones have fewer conceptual and spelling mistakes. Also, with time, better printing and use of colour illustrations are more common. But, as before, a jumble of facts bundled together cannot spark the imagination of young minds.

Some say that money lies at the root of the problem. Indeed, authoring textbooks is a lucrative business because of the sheer volume of books sold. The pressure to include incompetent authors – and to share profits – is enormous. This is probably why the current Class X mathematics book of the Punjab Textbook Board, has six authors and the slim 187-page Class X chemistry book has eight authors! So, while every individual gets a cut from the sales, the blame can be easily passed on to others.

I doubt that stricter regulations can help. Local textbooks are such poor pedagogical instruments for a very good reason: science is not part of Pakistan's national culture. There is endless political entertainment on TV but no locally-produced science programmes. I know of no science museums except for one in Lahore. So great is the public's ignorance of science that the path-breaking work of Abdus Salam is considered inferior to the copycat reverse engineering that led Pakistan to the bomb.

There is a solution: good science books exist. So use them! Elite O-level schools use books chosen from the most successful ones published internationally. Surely matric-level schools can be made to do the same after the books are properly adapted/translated. Should a Pakistani be the author (or among the authors), so much the better! But quality alone should matter, not where the author comes from.

Unfortunately, nationalist bravado kicks in whenever this is proposed. The rhetoric is that Pakistanis can author science textbooks just as well as anyone else. The conclusion is that we should not rely upon foreign educational materials. But an inflated national ego, together with small scientific accomplishment, is hardly helpful.

Firm resolve is needed to turn the situation around. Pakistanis must admit locally written textbooks are nowhere as good as foreign ones, and decide to use the very best ones available anywhere. The argument against importation is senseless because we use medicines and computers invented by outsiders, fly in their planes, and use their mobile phones. False pride and misplaced beliefs must be set aside. Eating humble pie is never easy, but surely this is a small price to pay for having scientifically smart Pakistanis in the future.

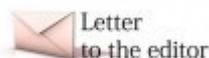
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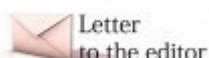
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