**Education emergency**

Atta-ur-Rahman

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For Pakistan to emerge from the quagmire of poverty, ignorance and deprivation, there is one – and only one – way forward: to divert its resources to education, science, technology, innovation and entrepreneurship.

The authorities should declare a national education emergency, which will involve several steps to change the strategic directions of Pakistan from the present low value-added economy to a strong knowledge-based economy. The key to progress now lies in the ability of nations to manufacture and export high-value high-tech goods. To do that, we must focus on strengthening the entire pyramidal structure of our education system by moving away from rote learning and encouraging problem-solving skills as well as innovation and entrepreneurship so that our students transition from being job seekers to becoming job givers.

A national education emergency will focus not only on promotion of equitable high-quality education but also on industrial research and development through university-industry linkages and on new start-ups through innovation and entrepreneurship. A serious hurdle in imparting quality education is the quality of our faculty members in schools, colleges and universities. The advent of massive open online courses has partly addressed this issue. Almost 20 years ago when I was the federal minister for science and technology, I realised the significance of these courses, and we then established a mirror website of MIT open courses in Pakistan. As a result, the country took a significant leap forward at that time by downloading all the relevant courses and making them available to colleges and universities. For instance, the computer science courses of MIT were downloaded, copied on 10,000 CDs and distributed to faculty members and students of all computer science departments in universities of Pakistan.

The Latif Ebrahim Jamal National Science Information Centre located in the International Centre for Chemical and Biological Sciences (ICCBS) at the University of Karachi has played a key role in this important initiative by launching ‘The Higher Education Network’ (THEN) that has two major components. One component involves enrolling eminent faculty members from the US, the UK, Germany, Japan and other advanced countries to deliver complete courses and lectures to undergraduate and postgraduate students across Pakistan. These interactive courses allow Pakistani students to ask questions from foreign faculty members in real time and benefit from their wisdom.

A second component comprises an integrated version of massive open online courses (MOOCs). These tens of thousands of recorded lectures from MIT, Stanford, Yale, the University of California, and Khan Academy are available from the school to university levels for free. They have been integrated and rearranged and comes with a built-in meta search engine to allow keyword searches.

There are many lessons that our policymakers can learn from China’s strategy for socio-economic development. Today, the Asian giant spends more than any other country on industrial research and development. Its growth in the field of high-tech manufactured goods hinges on the production and export of automobiles, industrial machinery, engineering goods, electronics, biopharmaceuticals, alloys, nanomaterials, defence products, automobiles and advanced transportation items such as bullet trains.

To provide high-quality education to over 160 million eligible population is a gigantic task. This huge challenge can best be addressed by using technology to leap frog. To reach out to the remote areas of Pakistan with high-quality distance education programmes, we need to empower our young people so that they can have access to excellent educational materials via the internet. In this connection, there are four key challenges to be addressed. First, we need to improve connectivity so that fibre cables can be laid across the country and bandwidth can be made available at affordable rates.

Second, high-quality content needs to be made available for free. In this connection, the Knowledge Economy Task Force has already initiated a number of projects through Virtual University, Lahore, and some 3,000 Khan Academy courses are being translated from English to Urdu to boost school-level education. Universities in Pakistan will soon be permitted to start distance learning programmes, subject to meeting the certain minimum Quality Assurance yardstick. Third, there would be a need for proper mentoring and assessment to ensure that students are benefitting properly from the course materials provided to them and are developing the required problem-solving skills.

Fourth, students must develop the entrepreneurial skills needed to establish their own businesses; an ecosystem also needs to be developed to foster innovation and entrepreneurship. This will require the establishment of technology parks integrated within universities, liberal access to venture capital funds, tax holidays for industrial investments in technology ventures and appropriate protective laws to protect intellectual capital. It will also require the government to change its policies and outsource all its needs to locally manufactured goods and software.

The Fourth Industrial Revolution has created many exciting opportunities, particularly in the new and emerging fields such as artificial intelligence (AI), industrial biotechnology, synthetic biology, regenerative medicine, new materials, nanotechnology, energy storage systems and others. It is predicted that AI is likely to have an impact of about $16 trillion by 2025, according to a McKinsey Global report. If we could capture just one percent of this market, it would amount to about $160 billion of revenue annually. An excellent project in this field prepared by the Knowledge Economy Task Force, with the help of the world’s top experts, and submitted to the Ministry of Planning some three years ago still awaits approval. Programmes such as this one can transform the landscape of Pakistan. Our dynamic planning minister Asad Umar needs to focus on such projects for rapid socio-economic development.

With over 60 percent of our population below the age of 30, we are fortunate to have this huge demographic advantage over countries such as Japan, Korea, and Western European nations. However, to benefit from this advantageous position, we need to invest in this valuable human resource and transition to a technology-driven knowledge-based economy.

In my capacity as the chairperson of the PM Task Force on Science and Technology, I have made several presentations to the prime minister regarding the urgent need to declare a national education emergency. This would require significant additional investments in primary, secondary, technical and higher education.

My proposals are being given serious consideration by the present government, and a detailed proposal is under development involving our Task Force members and Ministry of Education experts. After decades of wasted time and resources, there is finally some light at the end of the tunnel.

The writer is chairman PM National Task Force on Science and Technology, former minister, and former founding chairman of the HEC.

Email: ibne\_sina@hotmail.com