UNIVERSITY STUDENTS CAN NO LONGER AFFORD TO BE ISOLATED FROM OTHER DISCIPLINES

Policymakers now have to be scientists, too

PETER EDWARDS AND DANIEL HASTINGS

Two Cultures was an essay published 60 years ago by the novelist and scientist, CP Snow. In it, Snow claimed that the "intellectual life of the whole of Western society is increasingly split into two polar groups": Scientists and literary intellectuals who are separated by a "gulf of mutual incomprehension". This split, he maintained, had become a major hindrance to solving the world's problems, partly because the politicians and decision-makers were drawn almost exclusively from the group of literary intellectuals.

It could be argued that the problem identified by Snow has become more acute since 1956, due to the growing impact of human activities on the environment and our greatly increased dependence upon technology. Globally, the increasing complexity of the environment we live in and the emergence of disruptive technology means that Snow's observation is no longer solely confined to Western society.

Many of the issues faced by Singapore and other societies today are social-technical in nature. Having policymakers equipped with a knowledge in science and technology will be essential to meeting Singapore's ambitions, like its Smart Nation agenda.

At a recent symposium in Singapore on combating the urban heat island effect, one speaker concluded by saying, "I can't emphasise too strongly the urgent need to bring science and policy together". This remark reflected a growing opinion that policies developed to tackle complex problems — in this case, that of cities becoming hotter — can never be effective unless based on a detailed understanding of the underlying science.

Against this background, we must ask whether our universities are equipping our future political leaders, policymakers, scientists, engineers and business leaders with the knowledge and experience they will need to tackle complex societal problems.

As socio-technical systems that affect society become more complex, do scientists and engineers have an adequate knowledge of the social, economic and political processes that affect public decision-making? And have future planners and decision-makers acquired an adequate understanding of how complex systems function, or the possible consequences of introducing new technologies?

In an increasingly interconnected world, new developments, whether in technology or economic activity, usually have far-reaching social and environmental outcomes. Being able to develop policies that achieve desirable outcomes of sustainability and resilience therefore requires a systems' understanding that takes account of such things as risk, resilience, rebound effects, technological lock-in, unintended consequences and consumer behaviour.

Universities face significant challenge in attempting to provide this understanding. Already, with the burgeoning growth of knowledge, it is difficult to provide students with an adequate knowledge of even their chosen discipline. And it would, indeed, be unrealistic to expect an engineering student, say, to become an expert in the political sciences. However, it is more important than ever that students learn enough about the wider context of their discipline so that they can work together with experts from other fields.

With this in mind, several universities have developed interdisciplinary programmes aimed specifically at improving the ways that scientific and engineering expertise and knowledge are engaged in public decision-making.

One of the pioneers was Carnegie

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Prof Peter Edwards is the Director of the Singapore-ETH Centre.
Prof Dr Daniel Hastings is the director of the Singapore-MIT Alliance for Research and Technology (SMART). The two centres are engaging students from ETH Zurich, the Massachusetts Institute of Technology, National University of Singapore and Singapore and the Singapore University of Technology and Design at a five-day seminar in Singapore this week on how science, technology and policy interfaces in Singapore can be strengthened.

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"Asian" economic paradigms. Vastly impressed by Chinese progress and methods, he talked often of turning Gujarat into "India's Guangdong".

Yet such attitudes only make India weaker, not stronger. Western companies are less embedded in state structure and policy than Chinese ones, and are thus a much safer bet for a big infrastructure build-out. Time and again, big-ticket Chinese investments in developing nations have gone sour, leading to difficult renegotiations and, often, a heightened tension in bilateral relations. Chinese leaders have also shown little compunction about pressuring other governments in an effort to protect investments abroad. A strategy of wooing Chinese investment while isolating China geopolitically seems too incoherent to succeed.

More importantly, pressure from Western investors and governments is crucial to the Indian economic reform process. Updated intellectual-property laws, greater transparency on infrastructure regulations, more open trade with less red tape — all these would benefit Indian entrepreneurs even more than US companies. To get foreign investment up to the scale he wants, Mr Modi will have to do more to reduce regulatory and judicial risk. That would improve economic efficiency more broadly.

A closer and less prickly economic relationship with the US is as much in India's interest as is enhanced defence cooperation, perhaps even more so. Mr Modi has successfully whipped the Indian bureaucracy into line on the latter. He needs to do more to make the former a reality. **BLOOMBERG**

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Mellon University, which has run a programme in Engineering and Public Policy since 1973. The Massachusetts Institute of Technology also has a long-established programme in Technology and Public Policy since 1975, which aims "to mobilise science and engineering to inform intelligent, responsible strategies and policies to benefit communities from local to global".

The Woodrow Wilson School at Princeton runs the Science Technology and Environment Programme, which seeks to develop a deeper understanding of current scientific, technological and environmental issues and potential local, national and international policy responses. And last year, the university ETH Zurich established the Institute of Science Technology and Policy, which aims "to contribute to evidence-based and effective policymaking with regard to key societal challenges, such as urbanisation, the energy transition, digital society, and sustainable use of natural resources and the environment".

In Singapore, also, there is growing interest in the interfaces between science, technology and policy. Through its CREATE (Campus for Research Excellence and Technological Enterprise) programme, the National Research Foundation is funding several large projects in areas related to transport, energy efficiency, climate change and urban sustainability and resilience.

Work undertaken at the interface of technology and policy is one of the areas for growth in systems engineering at the National University of Singapore. The Lee Kuan Yew School of Public Policy runs a master's course on water policy. Finally, at the Singapore University of Technology and Design, there is a growing interest in teaching and research at the interface of technology and policy in the Engineering Systems and Design pillar.

Academic institutions have a crucial role in helping societies develop sustainably, more so in today's complex environment with fast-changing technology. To fulfil this role, however, they must improve their ability to identify questions that policymakers really need answered by providing an institutional setting where scientists from many disciplines can work closely with policymakers and other societal stakeholders.

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