

INJECTING 'SOUL' INTO STEM

AKADEMI Sains Malaysia co-organised the recent Global Research and Development (R&D) Leaders and CEOs Forum themed Injecting Soul into R&D with the Ministry of Science, Technology and Innovation and Higher Education Ministry. It was a timely event as the promotion of Science and Technology (S&T) as envisaged in the country's education policy has taken on new dimensions. Innovation has come into the picture, and S&T has become STL.

More recently, Science, Technology, Engineering and Mathematics (STEM) is being popularised. While it was initially known as SMET — a different permutation of the same disciplines — it did not gain popularity because it has negative connotations in some cultures. Notwithstanding this, the expanded cluster of disciplines as defined by STEM is reportedly more relevant to workforce development and for improving competitiveness over a broader spread as demanded by the market. But to some, given the emerging demands of lifelong learning, and lately, life-wide learning, STEM is still not broad enough as a meaningful knowledge base. It is said to be metaphorically

devoid of its roots, for example, without being well-grounded in the philosophy and history of science. The tendency is to interpret STEM merely as a utilitarian tool governed by the laws of economics, mainly for wealth creation. The intellectual and academic ramifications, especially in the realm of ethics, are virtually neglected, therefore the need for a "soul" so that the study of STEM is not narrowly conceived and goes beyond the



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mechanistic aspects of science alone. There is a need to break down the wall between the sciences and non-sciences (especially management, arts, humanities and social sciences).

In this regard, it is imperative that STEM be enlarged to STEAM as the former is said to not only mirror more of the previous century's disciplinary cluster with a bias towards the mathematical-physics construct but it is also devoid of biological-based contributions. Oxford University, for example, prefers STEMM to STEM, where the additional M is for Medical sciences — opening a small window to the biological world of 21st century learning.

On the other hand, STEAM takes into consideration not only the disciplinarity of Science and Technology (covering the

various sub-disciplines), but also that of Environment, Ethics and Economics vital to the learning and practices of S&T today. It also takes Aesthetics (including art, culture and nature, i.e. biologically-based) and Management (including policy and governance) into consideration. Such an interdisciplinary approach will further enrich the study of science and its role in nation-building.

It is clear that STEM is too narrow and compartmentalised to match what STEAM has to offer. Viewed in a different way, STEAM is a more balanced and knowledge-based in meeting the complex demands of the 21st century.

It is still not considered sufficiently diverse and interdisciplinary in the context of injecting the "soul". The cry of "education without a soul" has reached a crescendo lately so much so that it has even captured the interest of the Ministry of Science, Technology and Innovation as evident in the forum which highlighted that R&D should not be motivated by economic and commercial gains, without paying adequate attention to seeking sustainable solutions to the issues faced by the "bottom billion".

The urgency to find a "soul" in R&D cannot be underestimated as it is high time to create a platform for enlightened change-makers and stakeholders to pave the way forward. This raises the stakes in rethinking STEM for reasons argued above.

Indeed, even STEAM may not be

enough to build a case in search of a "soul", without taking into account a space for it to be embraced, namely of religio-ethical dimension. This can be represented by inserting "R" to create the acronym — STREAM — where religio-ethical features prominently in line with the notion of ethics and spirituality spelt out as one of six student aspirations in the Malaysia Education Blueprint. This will give the big picture where S&T denotes aspirations that focus on knowledge in general; R&E stands for ethics and spirituality; and A&M for leadership and bilingualism as well as national identity with Higher Order Thinking Skills cutting across the board. With this interdisciplinary approach, a more wholesome education could be designed that could be translated into R&D as an ethos for more impactful actions towards achieving socio-economic transformation and sustainable development goals with a clear "conscience". After all, the human conscience is generally regarded as the voice of a soul with humility. Lao Tzu said: "All streams flow to the ocean because it is lower than they are. Humility gives ocean its power." That ocean could be the well-integrated STREAM powered by humility.

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