

Wanted: Graduates able to see the connections in a chaotic world

Universities are pushing for interdisciplinary curricula to better equip their students for a future of increasingly complex challenges



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In the past, most arts students would bank at data presented to them, while science students would shy away from writing history essays.

But today, the arts and sciences may not be the polar opposites they seem to be – in fact, there are points where they cross each other's paths.

This is happening amid a growing awareness worldwide that to truly appreciate the challenges posed by the likes of climate change, public health and artificial intelligence, an understanding of different disciplines is needed to find solutions to what are, by their very nature, multifaceted problems.

In response, across the world, universities, which traditionally separate the study of humanities and sciences, are experimenting with more flexible ways of learning, to prepare their graduates for this new world.

BRIDGING DIVIDES

In Singapore, the National University of Singapore (NUS) plans to bring together its Faculty of Arts and Social Sciences and Faculty of Science to form a College of Humanities and Sciences.

If its plans are approved by the authorities, the college could begin accepting students next August, for the next academic year.

As part of a foundational common curriculum, students will take modules in different disciplines across the humanities, social sciences, science and mathematics.

Students in this college will also have greater flexibility and more choices offered by the wide range of subjects across both faculties.

Professor Ho Teck Hua, NUS' senior deputy president and provost, said these plans build on the university's experience in interdisciplinary learning in the past 20 years.

In the earlier years, it had a Talent Development Programme that exposed small cohorts of students to "knowledge, skills and habits of thought" beyond their academic specialisations.

This has since evolved into a range of offerings such as the University Scholars Programme (USP) and the University Town

College Programme, which emphasise multidisciplinary learning, with students from different disciplines.

Similarly, other universities in Singapore have encouraged undergraduates to broaden their perspectives and draw connections between fields.

Singapore Management University (SMU) provost Timothy Clark said its core curriculum is not a "random assortment of useful modules, but stands on three inter-related pillars of development – capabilities, communities and civilisations".

"Each (is) further organised into baskets of focal areas, to help students understand why these skills and knowledge are important to them and how they are inter-related," he added.

This set of modules forms 33 per cent of SMU's undergraduate curriculum.

Postgraduate students from different schools and programmes will also, from the next academic year, be able to take common courses across SMU, in areas such as sustainable impact and design thinking.

Yale-NUS College, whose parent institution is NUS, also has a common curriculum that allows students to explore the humanities, social sciences and natural sciences in the form of modules such as scientific inquiry and modern social thought.

Professor Joanne Roberts, Yale-NUS' executive vice-president of academic affairs, said students learn to uncover links between different fields and connect these discoveries to topics and problems in society.

In the third year, students select a major. Among Yale-NUS' most recent batch of graduates, about 70 per cent of science majors with a minor chose a humanities or social sciences minor, and 20 per cent of non-science majors with a minor took a science minor.

JOINING THE DOTS

An interdisciplinary education does not mean that undergraduates are expected to be all-knowing and equally proficient in multiple areas of knowledge.

It is not about pumping more knowledge and content into graduates so they can take on more jobs. Rather, it is about exposing them to various intellectual approaches early in their undergraduate years and helping them join the dots between the soft and hard sciences.

Students will still eventually pursue their interest in one or two areas, but even the specialist must know that problems are seldom



one-dimensional.

Through their years of study, students must be able to at least understand how issues often overlap in the real world.

To that end, Prof Ho said the proposed NUS college's core curriculum will include "specially designed interdisciplinary modules integrating knowledge and methods from different disciplines".

He said this is different from multidisciplinary learning, which involves the study of various fields. "In short, the interdisciplinary whole is greater than the sum of its parts," he said.

Students said having the breadth and flexibility to explore topics outside their specialisations enable them to draw connections between seemingly contrasting subjects.

For instance, NUS third-year English literature major Jen Chik, 21, has taken modules from various disciplines – humanities and social sciences, and sciences and technologies – as part of the USP.

One such module was on data analysis, which exposed her to different techniques of studying data.

Eager to try out her newly learnt skill, she embarked on a project to measure the general sentiment in the text of Charlotte Brontë's *Jane Eyre*, using software.

"It was a different way of visualising a literary text, with bar charts and graphs, and I could correlate the results with my interpretation of the text," said Ms Chik.

"It felt foreign and inaccessible to me at first, but in the USP, we have a culture of trying new things and asking our peers and professors for help," she added.

Yale-NUS third-year student Amirul Hakim, 23, is majoring in philosophy, but has decided to pursue a career in medicine. "After four years at the liberal arts college, he will spend another four years at Duke-NUS Medical School as part of a pathway offered by both institutions.

"If you look at medicine, it's not just a professional practice of science, but making good and ethical decisions," he said.

Modules in modern social thought and anthropology helped him gain a deeper understanding of ethics and the human condition.

Medical anthropology, he added, studies how people perceive healthcare systems, diseases and pharmaceutical drugs.

AN UNDISCIPLINED WORLD

NUS senior economics lecturer Kelvin Seah said graduates who are well versed in contrasting or complementary subjects have the potential to fill a wide variety of jobs.

"For instance, a graduate who is trained in both data science and communications and new media... would be well placed for jobs involving data analysis, media and journalism, as well as jobs that cut across these two disciplines, like those in business consultancy," he said, giving his comments as an independent academic.

Besides having more job options, graduates who can see connections can better understand the world's increasingly unruly problems and appreciate the trade-offs and complexities in designing solutions for them. Take, for example, efforts to tackle the multiple problems posed by climate change.

"An engineer can build a better air-conditioning system, lowering our carbon footprint. A behavioural

scientist can tackle consumption patterns. A scientist can develop models to predict the effectiveness of interventions," said Prof Ho.

But in isolation, the specific expertise of these individuals would not be able to fix the problem.

And that is why marrying the soft and hard sciences is key to ensuring that graduates have a broader, more balanced perspective on issues of the day and are sensitive to the nuances of real-world problems.

National Institute of Education (NIE) don Jason Tan brought up social media as another multidimensional issue.

"From an IT (information technology) point of view, you can impose tighter controls on what people can put up online, but you must also consider the psychological and social part of social media – why people post online, and how does it affect relationships," he said.

The Covid-19 crisis has further highlighted the need to look at a problem from different angles, said Associate Professor Tan.

"It's not a purely medical solution of looking for a vaccine and simply social distancing. Even medical professionals realise it's necessary to look at other aspects – public trust of government, spread of false information, and resolving economic damage."

Education consultant Ho Boon Tiong, an adjunct professor at NIE, said: "The world is moving at a much faster pace and in a more unpredictable way. We don't even know the names of jobs in the future."

The future economy will need workers who have internalised skills like critical thinking, creativity and being able to draw links between fields, Dr Ho added.

"It's not just about content, but having values like open-mindedness, resilience and a healthy sense of scepticism," he said.

Mr Daniel Soh, managing partner of executive headhunting firm Leadership Advisory, said employers are looking for soft skills in candidates, not just domain knowledge.

"A potential employee's ability in digital savviness, problem-solving skills, creativity, strong social skills, being able to collaborate, adapt and be resilient are equally paramount."

These are the traits that make employees versatile across industries, he said.

Such attributes, along with the ability to keep learning and find connections in an untidy world, are the true mark of an interdisciplinary education.

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