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A Newsletter of NHG Education

MARCH/APRIL 2025

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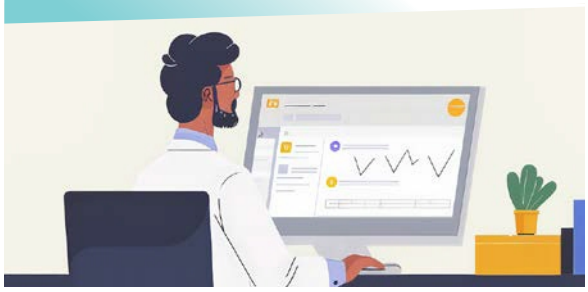

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NHGEducation

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INSPIRING Professionals
IMAGINING Tomorrow
Re INVENTING Healthcare
NHG EDUCATION

Working Smarter with Tech:

Transforming Health Professions Education Through Digital Innovation

The emergence of powerful technological tools such as generative AI (Artificial Intelligence), VBA (Visual Basic for Applications), and Robotic Process Automation (RPA) has transformed operations across industries. Recognising this potential, Group Clinical Education (GCE) from the National Healthcare Group (NHG) embraced these technologies in a bid to automate and digitise its existing processes.

Two flagship projects – MATA and LNA- utilising digital tools have demonstrated significant success, achieving reduction in funding clawbacks, improving the tracking accuracy of attendances, and maintaining data integrity across large datasets. These innovations have earned various GCE teams awards and recognition.

Project MATA, MATA: Tech-ing a Good Look at Data

Monitoring & Analysing of Teaching Attendance, or MATA – inspired by the Singaporean colloquial term which refers to the police, or literally "eyes" in Malay, is a digital attendance tracking system created by the NHG Residency team in GCE to capture real-time attendance and monitoring of resident (specialist doctors in training) teachings.

Initiated by then NHG Residency Designated Institutional Official, Associate Professor Faith Chia, the intent of MATA was to address the inefficiencies of the old (and manual) system, which resulted in a substantial amount of training funds being adjusted (clawback) by the Ministry of Health in FY2023.

The realisation of MATA hinges on the synergy of a diverse pool of professional expertise including education technology, financial stewardship, and residency programme management expertise, coupled with a combination of various technological tools such as R Programming, Microsoft Excel, and FormSG.

Phase 1 of MATA was launched in July 2023 with the introduction of the MATA FormSG. This online form replaced the manual attendance tracking of some 600 residents, which helped streamlined operations, evaluate the data for duplicates and discrepancies, and human errors. The overall reduction and streamlining of manual processes saw a 75 per cent reduction in clawback, improved administrative efficiency, and effectiveness in solving identified challenges.

From left: Ms Sharlene Loh reviewing the MATA dashboard under the technical guidance of Ms Sharon Choo

Phase 2, which was rolled out in March 2024, saw the introduction of interactive dashboards for the real-time tracking of teaching attendance, and funding clawback across all levels e.g. cluster-wide, institution, department, etc., all the way to the residents.

And most recently at the start of 2025, MATA adopted Robotic Process Automation (RPA) as part of its latest slew of enhancements. This enhancement automated the downloading of FormSG attendances before generating a final report. Previously, manual intervention by residency programme coordinators were required to complete this task, shared MATA lead, Ms Sharlene Loh, programme coordinator (NHG Residency).

"Even though the inclusion of RPA is a small enhancement, its impact is huge," said Ms Loh.

She shared that while MATA's implementation had been successful overall, the team continues to refine the system and address initial challenges to enhance its performance.

"Our goal is to capture the accurate data of our 600 residents teaching attendance as they move across the cluster, while ensuring that resources are optimally allocated," said Ms Loh.

Project LNA: Tech-ing Faculty Development to the Next Level

The NHG Learning Needs Analysis (LNA) Self-Assessment Tool was developed by the Faculty Management & Recognition Team (FMRT) and Education Technology & Analytics (ETA) at the GCE office to help NHG faculty plan their learning journey in clinical education.

The LNA tool was designed to support clinical educators in planning and advancing their educational roles by offering a comprehensive assessment of educational competencies and aspirations. It not only identifies learning needs but also recommends targeted courses, enabling users to enhance their teaching skills and systematically track their growth as educators.

LNA Tool's Implementation and Impact

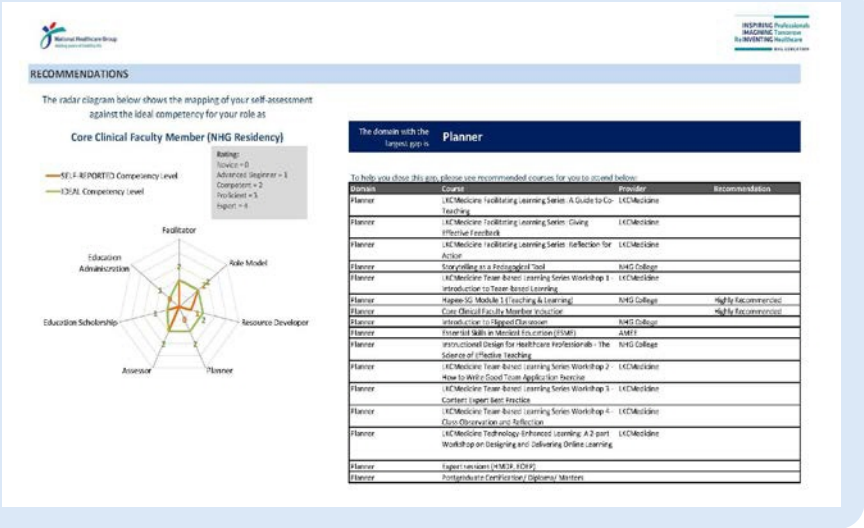
Launched to some 1,500 NHG residency faculty in the second half of last year, the tool utilises UiPath - a Robotic Process Automation (RPA) software – to help automate the generation of individualised reports for faculty on clinical education-related data. UiPath's speed, power, and precision to process multi and high-volume data, enabled data to be generated within two minutes – from the previous 30 minutes - with little to no human errors. Since its launch, the tool has helped GCE save 196-man hours and approximately $10,000 annually, in addition to enhancing professional development for the end-user.

LNA Tool 2.0 and Beyond

NHG College has taken over the custodianship of the LNA tool from GCE's FMRT, with Dr Tracy Tan, a senior consultant and Associate Designated Institutional Official for NHG Residency at Tan Tock Seng Hospital (TTSH), overseeing its ongoing and future developments.

"NHG College aims to broaden its impact by first piloting its use with other professional groups such as allied health, nursing and pharmacy within TTSH, and eventually extending it to other NHG institutions," shared Dr Tan, who has been appointed to lead and oversee faculty development programmes and interventions at NHG College.

"We are committed to refining the effectiveness of the LNA tool through continuous feedback from users. This will not only enhance the tool but also inform the development of existing courses and ensure that our programmes remain responsive to evolving professional needs across different roles."



A sample report generated by the LNA tool showing the radar diagram which maps the faculty's ideal competencies in his/her appointed role

From right: Ms Sharon Choo and Ms Lavinia Lim receiving the RPA Champion award

The NHG Learning Needs Analysis team comprising Ms Lavinia Lim (Assistant Director, FMRT), Ms Suthashini D/O Vijayan (Assistant Manager, ETA), and Ms Sharon Choo (Executive, ETA) was honoured with the 2024 RPA Champion award by the Centre for Healthcare Innovation Automation Centre of Excellence on 13 December 2024 for their dedication in developing impactful solutions to enhance operational efficiency and service delivery within NHG.

SHBC 2024

Adopting a HuMe-AiNE Approach - Part 3

At the 2024 Singapore Health and Biomedical Congress (SHBC), thought leaders from the National Healthcare Group (NHG) Clinical Education explored and discussed how technology, and artificial intelligence (AI) in particular, has enabled astonishing transformations in healthcare delivery. These advances also raise intriguing questions about the role of healthcare professionals in a healthcare landscape where AI is poised to take over many of the healthcare professionals' tasks by enhancing diagnostic accuracy, optimising treatment planning and thereby improving patient outcomes.

In this three-part series, we hear from Assistant Professor Chow Minyang, Associate Professor Aaron Ang, and Associate Professor Michelle Jong, as they delved into what mindsets, knowledge and skills our healthcare professionals will require in order to navigate and adapt to this AI wave. They also explored the implications of AI integration on healthcare delivery and education, where they suggested ways in which educators, learners and systems can leverage on technological advancements to meet the demands of the future.

In the last of a three-part series, A/Prof Jong (Group Chief Clinical Education Officer, NHG) shared her views on healthcare and medical practice in this era of AI, and how NHG Group Clinical Education's HuMe-AiNE framework may be a good start to help clinicians navigate AI whilst retaining the humanistic aspect of medicine.

Reject or embrace IT?

"So the question is, will AI replace clinicians?" said A/Prof Jong.

One camp agrees that AI will replace them, and are afraid of what AI can do (to them or their livelihood), while the other camp believes that AI's role is to free individuals from mundane and routine tasks, she elaborated.

"But the reality is that jobs have become obsolete with time, from time immemorial," argued A/Prof Jong, citing how occupations such as switchboard operators, tram drivers, and most recently tennis line judges are replaced with another new occupation, or by technological advancements.

Jobs in medicine are not spared too, she noted, citing leech and toad collectors of the past (where leeches and toads were used for medicinal purposes) have disappeared with time, and most recently, in the last 10 to 20 years, how peptic ulcer disease treatments have shifted from performing gastrectomies to the prescription of proton pump inhibitors.

"In my lifetime, the gastric surgeon has shrunk his practice," said A/Prof Jong.

At the heart of this AI versus human debate is "really about change", she said, elaborating that there are three aspects of change: functional, identity, and emotionally.

Functionally, there is the lack of understanding and clarity about the technology (especially new technologies) that is being introduced, and its purpose.

For identity, there is a threat to job security as jobs undergo shifts, and may become obsolete or redefined due to technology.

And emotionally, there is a general fear of the unknown (especially something new or untested), and a loss of control.

Like humans, technology is not perfect. However, there is a need to acknowledge that certain aspects of technology surpass humans, such as its reach, processing power and speed.

A/Prof Jong cited using the GPS (Global Positioning Satellite) when driving as an example. While determining which (GPS versus human) is the better way to travel from point A to B is subjective – without factoring traffic conditions, the GPS will always "win" in real-time scenarios as it has the advantage of having the traffic data factored into its recommended route(s).

So, Who is the Clinician of Tomorrow?

"Technology (AI) is here to stay, and it will change the face of medicine and healthcare," she said.

"The question to ask really is not whether AI will replace the clinicians, but who is the clinician of tomorrow?"

The clinician of tomorrow can be briefly defined as an individual who embraces the changes that this new technology (especially AI) brings, has a good understanding of this new technology, is skilled in harnessing its power to improve patient care, and most importantly, be able to retain the human touch.

"Humanistic skills are more important than ever," stressed A/Prof Jong.

She acknowledged that the way forward is not without challenges and uncertainty with the ever-changing nature of AI.

"The problem is that we really don't know what is the ideal (standard for the use of AI in healthcare and education) because the technology keeps changing, moving, and it's difficult to know what needs to be taught or caught," said A/Prof Jong.

"I posit that we need to start somewhere, we need some standardisation and individualisation of some AI-related competences... we need to integrate AI in tools throughout the curriculum... (and) we need to stay curious and open, fostering habits of inquiry and improvement."

She urged for clinicians to be the driver of this change, and not leaving it to chance (or others) to determine the direction of AI in healthcare, or worse, opting for the status quo.

Citing philosopher Plato in her call to action, A/Prof Jong said: "The chief penalty is to be governed by someone worse, if man will not himself hold office and rule." She elaborated that if clinicians do not actively engage with AI and technology, they risk having someone less capable or unfit for the job at the helm.

The HuMe-AiNE Way

A/Prof Jong went on to share that Group Clinical Education has already started taking steps to include humanistic medicine as well as AI-enabled education as part of its health professional education efforts to remain relevant in this AI-driven era, with the soft launch of HuMe-AiNE (or Humanistic Medicine-AI-enabled Education) at SHBC 2024.

The HuMe-AiNE framework was developed by A/Prof Aaron Ang (Senior Consultant, Psychiatry, Tan Tock Seng Hospital), Asst Prof Chow Minyang (Consultant, General Medicine, Tan Tock Seng Hospital), and Dr Winnie Teo (Deputy Director, NHG Group Clinical Education), to provide current and future learners with a well-rounded education that integrates AI with humanistic patient care, focusing in four key areas:

1. Standardisation and individualisation of AI competencies;
2. Integration of AI tools through the curriculum;
3. Fostering critical thinking skills in integrating technological solutions with a humanistic approach to patient care; and
4. Developing a professional identity that encompasses both technology-related and humanistic capabilities.

A/Prof Jong believes that HuMe-AiNE will help ensure that current and future clinicians are equipped with necessary technical skill to better navigate a professional space that is increasingly permeated by AI and new technologies, whilst being able to retain the human qualities that lie in the heart of medicine.

"We need to reimagine medical education and envision a healthcare that harnesses technology to amplify our humanity," she concluded.

> **"The question to ask really is not whether AI will replace the clinicians, but who is the clinician of tomorrow?"**
>
> A/Prof Michelle Jong

Read more on HuMe-AiNE here:

- Revisit part 1 as Asst Prof Chow shared his views on how AI Is changing healthcare deliver and health professions education. (https://for.sg/learninhg54ai)
- Revisit part 2 as A/Prof Ang shared what AI should not change in healthcare (https://for.sg/learninhg55ai)
- A/Prof Michelle Jong's commentary in Annals Singapore about transforming medical education in the AI era - Transforming medical education in the AI era: Balancing technological expertise with humanistic care in tomorrow's doctors - Annals Singapore
- A/Prof Aaron Ang, Asst Prof Chow Minyang, and Dr Winnie Teo shared their insights on AI and healthcare, navigating the challenges that AI brings, and the road ahead in Lifewise (https://for.sg/lifewiseai)

Medical Humanities:

Looking Beyond Art

Medical humanities (MH) is sometimes viewed as a peripheral, non-clinically relevant, perhaps even arts-centric addition to the medicine's core curriculum. It is often seen as logistically burdensome and potentially interfering with the acquisition of crucial technical knowledge.

Professor Simon Kitto, speaker at the November 2024 edition of the Tan Tock Seng Hospital Conference, however, shared how MH can help augment Nanyang Technological University Lee Kong Chian School of Medicine (LKCMedicine) students' training experience. He envisions MH as an intervention designed to help both students and practicing clinicians retain humanistic aspects of the practice and themselves as individuals, whilst remaining clinically effective in the dynamic and complex environment of the hospital.

Incorporating Medical Humanities into the Medical Curriculum

As Assistant Dean (Humanities) at LKCMedicine, Prof Kitto shared that the school has started taking steps to incorporate MH into its MBBS curriculum. The aim? To provide students with a deeper understanding of the lived experience of health and illness amongst providers, themselves (students) and patients, building personal resilience, and developing the capacity to provide compassionate, and most importantly clinically effective care, he said.

"Medical Humanities needs to be in service of that endpoint (clinically effective care)".

Prof Kitto shared that the school is adopting a "curator approach" to incorporate MH into its MBBS curriculum. This approach strategically selects and places certain themes (e.g. arts, humanities, social sciences, etc.) into the curriculum to ensure minimal disruption, whilst enhancing the biomedical and clinical training experience. He elaborated that the MH integration will span across the 5-year MBBS curriculum, in order to better link towards postgraduate medical education, and eventually into continuing professional development.

"It goes across the whole medical education continuum," he said.

Prof Kitto highlighted the following areas of focus in this MH integration. These include:

A

Placing clinical uncertainty at the core – Regardless of the phase of the medical careers they are in or experiences they have gained, doctors will always need to deal with clinical uncertainty. The intrinsic nature of medical knowledge is uncertain. It's constantly moving. Diagnosis and process prognosis are similarly uncertain because of that. And then treatment concomitantly can become uncertain as well.

"Students coming from science-based backgrounds, where they are taught to look for the correct answer, may struggle when they're in a medical environment where there are many possible answers to some of these questions around diagnosis, prognosis and treatment, and we need to equip them with normalising this uncertainty... getting comfortable with being uncomfortable about these things and being able to work through and process these issues," he said.

Prof Kitto elaborated that there will always be issues to be processed or dealt with in a medical environment. It is important for the students to learn how to deal and process these uncertainties so that they do not get paralysed by its complexities. The aim of the programme is to show the students that they can "deal with it, move forward, and most importantly, get the work done", he added.

B

The hidden curriculum - These are the processes, pressures and constraints which fall outside of, and are often embedded within the formal curriculum. It can also be present within the organisational structure and culture.

C

Liminality or the transition between stages, is also an important issue that Prof Kitto believes that MH is able to address. Identity becomes ambiguous at transition points. From student, to PGY1 (Postgraduate Year 1), resident, and eventually into independent practitioner.

"From one part of your training to another, they are also identity-related. And identity again is tied to performance," Prof Kitto said.

"When there's confusion about identity, performance can get confusing too about what aspects of what you're doing you should be focused on. It's about understanding the constraints of an organisation and professional structures, the limits to your individual agency, and your ability to act. This can be a real source of burnout, a threat to well-being for students and healthcare professionals."

D

Addressing the "Cloak of Competence", i.e. projecting an image of competency when one has yet to achieve. According to his research, Prof Kitto cautioned that the cloak of competence is especially evident in residency training, and the danger is that it can inhibit calls for help in a clinical emergency.

"It (Cloak of Competence) can also inhibit things like rapid response teams, where medical students or residents don't want to call the rapid response team because they might be seen as not being able to cope with complicated patients who are in a critical or deteriorating state when they're in this training phase of demonstrating growing competence. This can make things like creating psychologically safe spaces very, very difficult," Prof Kitto said.

By reframing medical humanities as a healthcare intervention and adopting a rigorous, evidence-based approach to its implementation, would enable LKCMedicine's curriculum to develop not just technically proficient doctors, but well-rounded, empathetic, and resilient healthcare professionals who are capable of navigating the complex human aspects of medicine, shared Prof Kitto.

Integrating Medical Humanities into the Workplace

While incorporating MH into the medical curriculum is a crucial first step, Prof Kitto stressed that the real challenge lies in translating these interventions into practical applications within healthcare settings. As the students move from the classroom to the workplace, they face a new set of challenges in implementing and maintaining the MH principles.

He highlighted that "healthcare organisations are built for clinical practice... that's what they do", and everything else apart from that falls under the "hierarchy of value", where he cited the advancement of clinical knowledge, clinical education, research, and clinical teaching in the order of priority.

Prof Kitto suggests adopting the implementation science approach to introduce and incorporate MH into the workplace. Implementation science is the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practice into routine practice, which aims to improve the quality and effectiveness of healthcare services.

From left: Moderator Dr Tay Woo Chiao, and Guest Speaker Prof Simon Kitto

"It is not a silver bullet, it's an open hand. It's showing the situation for what it is, and then helping individuals... **to be ambitious, aspirational, to be excellent teachers, excellent clinicians.** That's what we're looking for."

- Prof Simon Kitto

He shared that while implementation science provides a structure to implement new changes or innovations, it is also important to account for cultural factors. Culture here refers to professional cultures such as the organisational culture, department culture, team culture, etc. The influential role that culture plays in areas such as power relationships, belief systems, values, and customs determine how things are done, accepted, or rejected.

"You all know that culture can eat structure any day of the week," said Prof Kitto.

"So when we're thinking about medical humanities, we're thinking about professions working together.

"When two different professions interact, for example a surgeon and a nurse, it is not just an interpersonal interaction, it is an intercultural one."

Hence, when putting in place any form of medical humanities intervention, it is advisable to adopt a more nuanced approach that customises the intervention based on circumstances, and have an evaluation process that builds the evidence.

"Not every medical humanities intervention will work for all healthcare professionals," cautioned Prof Kitto.

"There's no standardised approach. There has to be awareness first through the concepts in medical humanities and then processes by working, coaching, mentoring, particularly in transition points throughout someone's career with the individuals to help them develop their own tactics.

"It is not a silver bullet, it's an open hand. It's showing the situation for what it is, and then helping individuals to work with tactics to thrive in the workplace, not just survive, not just be well enough, but to be ambitious, aspirational, to be excellent teachers, excellent clinicians. That's what we're looking for."

What is Medical Humanities?

Medical Humanities can be broadly defined as an interdisciplinary field that integrates elements from humanities (e.g. literature, philosophy, ethics, etc.), social sciences (e.g. psychology, sociology, etc.), and the arts (e.g. visual arts, film, etc.) with medical education and clinical practice.

Prof Kitto stressed that MH should not be a "passive educational exercise", but a "healthcare intervention" that focuses on behavioural outcomes, both at the individual and professional level.

"Medical humanities is a form of social engineering," he said, elaborating that MH has the potential to provide physicians with a better sense of clarity to their identities and performance as medical practitioners.

"It is about trying to help with that struggle... to get a better sense of clarity over the physician or the surgeon that might be struggling with their professional performance or training to become the full-fledged independent practitioner," said Prof Kitto.

"(But) The most important aspect of medical humanities that I want to emphasise is that it's about complementing and expanding upon the biomedical dimensions of clinical knowledge and skill acquisition."

Bridging The Healthcare Gap with Migrant Workers Through First-Aid Training

Continuing with tradition, the National Healthcare Group (NHG) Orthopaedic Surgery Residency Programme kicked off 2025 with its annual Community Engagement Day (CED) - this time focusing on empowering migrant workers with essential first-aid skills.

Partnering with ItsRainingRaincoats, this event brought together migrant workers and healthcare professionals for an interactive session of practical first-aid training. 27 residents and faculty, alongside three nurses and four medical officers from various orthopaedic surgery departments across NHG, shared basic first-aid skills such as wound care skills, casting techniques, and immobilisation methods to 30 migrant workers.

Dr Shaam Achudan, Chief Resident of NHG Orthopaedic Surgery Residency Programme, who initiated this year's CED shared that the idea to engage migrant workers through imparting basic first-aid skills came from his experience in orthopaedic surgery.

"In our daily practice as orthopaedic surgeons, we treat a large number of migrant workers who present with multiple-related musculoskeletal injuries due to the nature of the work. From bad workplace injuries to late presentations of fractures, recurrent admissions for pain, or suboptimal wound care/cast care," he said.

"That's why I think the skills (taught) will come in handy for our migrant brothers, who work in a high-risk environment."

It was not just a day of serious learning, as the residents and faculty joined the migrant workers in a spirited game of Captain's Ball and shared a meal together. Singapore Ecommerce Centre Pte Ltd, F&N Foods, Santen Singapore, and Eagle Brand supported the initiative through the sponsorship of items in gift bags to the migrant workers.

"It was an incredibly valuable experience for the residents to share their knowledge and experiences with the migrant workers," shared Dr Remesh Kunnasegaran, Programme Director, NHG Orthopaedic Surgery Residency Programme.

"In the clinic, they (residents and faculty) are accustomed to treating these workers as patients. Community day provided both residents and faculty the chance to see these essential individuals, who contribute significantly to Singapore's development, as more than just workers. This allowed for personal conversations, fostering empathy and understanding."

Dr Kunnasegaran added that engaging with migrant workers in a relaxed, non-hospital setting helps humanise healthcare professionals and dispels the misconception that doctors lack empathy for their patients.

More hands-on practice for migrant workers moving injured personnel

Ending the day with a group photo to remember to commemorate a fruitful community engagement day