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Tapping into Futuristic Imagination: Are We Ready for Digital Medical Education in Malaysia?

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ABSTRACT

In recent years, the Fourth Industrial Revolution (4IR) has been the new buzzword in Malaysia following governmental policies for integrating digital technologies into the administrative and socio-economic aspects of life. With the enrolment of new generations of digitally endowed students, the waves of the digital revolution will soon hit the shore of medical education. This commentary proposes the concept of a medical education system that fully adopts the 4IR agenda in teaching and learning basic medical and clinical sciences. The deliberation in this article offers novel avenues for medical teachers to reflect on their roles and preparedness in steering Malaysian medical education towards the foreseeable digitalised future.

Keywords: *Digital technology, Education, Medical, Industrial development*

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INTRODUCTION

In this commentary, I seek to adopt a provocative stance by advocating the Malaysian Fourth Industrial Revolution (4IR) philosophy of "fusing the physical, digital and biological worlds, impacting all disciplines, industries and the economy" (1, p. 12). I base my arguments upon current governmental policies related to outcome-based medical education (2) and science, technology and innovation (1, 3–4). A discussion on the broader political context is crucial because the medical curriculum is pervaded by a dominant ideology, managerial influence and planning (5). In doing so, I invite Malaysian medical educators to reflect on the digitalisation of our professional practice and to devise development plans for pedagogical innovation.

BACKGROUND AND CONTEXT

Since its independence, Malaysia has experienced rapid economic growth, mainly through its transformation from an agricultural to an industrial and service economy. Recent governmental initiatives have tapped into digital technology developments to ensure that Malaysia remains competitive with high value-added activities in a globalised world (6). The aim

of this grand plan is for artificial intelligence, the Internet of things (IoT), automation, cloud, big data and virtual reality to penetrate all aspects of life (1). Specific to education, all students and teachers must be 4IR-ready to become digital technology innovators instead of passive users.

This educational climate implies that medical programmes for this newer generation of learners will need to be based on high-level 4IR-enriched teaching and learning (T&L) methodologies. At present, the arbitrarily set undergraduate medical education duration of five to seven years can be considered to represent the antithesis of outcome-based education (OBE). If we truly embraced OBE as originally proposed by Spady, education would not be time-bound but "clearly focusing and organising everything in an educational system around what is essential for all students to be able to do successfully at the end of their learning experience" (7, p. 12). In Spady's view, "OBE defines student achievement as the highest level of performance at any given point in time" (7, p. 18).

IMPLICATIONS FOR PRECLINICAL EDUCATION

What, then, is the relationship between 4IR and OBE in medical education? The answer lies in the prospect of medical teachers using digital technologies to realise the purest form of OBE. Teachers could use artificial intelligence systems to manage T&L and assessments with greater efficiency for authentic outcomes. For example, educators could package relevant T&L resources and well-aligned assessments *of* and *for* learning (8) into discrete course modules to which learners could subscribe on an online platform. Students would be free to choose the packages with which to start and end. They might proceed to the next learning phase at different time points after demonstrating proficiency in compulsory learning packages. Moreover, an open online learning platform implies that students could access medical education from any place equipped with a stable Internet connection and electronic devices, universal access to both of which is the aim of governmental policies. With the implementation of these development strategies, less privileged learners from rural and remote areas will have equal access to and greater participation in higher education.

After years of conforming to a structurally rigid teaching schedule, medical educators may feel uncomfortable with and bewildered at managing and monitoring T&L and assessing students progressing at different paces. Digital technologies entail self-directed learning, and social constructivism theoretical frameworks are potential solutions (9–11). For example, an intelligent chatbot with a deep learning feature could be used to provide students with formative feedback when they have queries. Additionally, learning analytics could monitor students' engagement with the course material and automatically send reminders or warnings about unsatisfactory performance. Artificial intelligence might do a better job marking and mapping students' assessment outcomes against programme learning outcomes, even offering personalised suggestions for academic improvement.

IMPLICATIONS FOR CLINICAL EDUCATION

What about clinical learning? It must surely be organised within the clinic or hospital. Or must it? Advancements in simulation technologies offer the opportunity to emulate realistic patient encounters to bring clinical learning to students (12). Before bedside learning, students may immerse themselves in serious games with common clinical scenarios to learn essential aspects of the actual practice, such as task prioritisation, clinical reasoning and professional values (13–14). With these games, students could gain embodied

experience in a virtual clinical setting (15) by probing choices and learning from their actions' outcomes. This could prevent an abrupt, stressful transition to clinical practice while minimising the risks for patients. Students would progress to clinical postings upon completion of all the game modules. Comparable to the mechanics of video games, learning through gaming could take place not only in single-player but also in multiplayer mode to reflect the genuine ward experience of being organised into a community of practice. Thus, students could learn to interact with digital interfaces and content materials and engage in virtual interpersonal communication.

Medical teachers, on the other hand, could use digital technologies to train students in psychomotor skills (16). By embracing extended reality, educators can truly realise the notion of combining the physical, digital and biological realms of T&L. Using extended reality, basic clinical competencies, such as history taking, physical examinations and simple procedures, could be taught up to the "show how" level of Miller's pyramid (17). Students could reach the "does" level when they apply their skills to patients in the ward. Extended reality could also resolve the issue of large crowds of undergraduate and postgraduate students in the ward, which may be uncomfortable for patients and unconducive to learning. Furthermore, it could provide students with equal opportunities to access clinical learning remotely, some of whom might otherwise be left behind (18). Equally, students could expand their digital literacy to prepare themselves for conducting effective teleconsultation within this future-ready curriculum. The COVID-19 pandemic has resulted in increased demand for telemedicine, and this momentum is expected to continue after the pandemic, offering more career opportunities.

After the virtual ward round, students could resume bedside learning at their own pace and seek timely feedback from clinical teachers who may be in different localities using teleconferencing. Digital technologies provide solutions to overcome the (perceived or actual) obstacles related to allocating protected T&L time for students and educators to meet face-to-face. Furthermore, students might use electronic portfolios, logbooks, multi-source feedback and patients' ratings to document their learning progress, which could then be assessed by analytics for outcome attainment. Only students whose performance was deemed satisfactory in these formative assessments would progress to the final assessment for graduation. Then, tutors would administer barrier exams remotely using the IoT, preparing the necessary setup and proctoring mechanism beforehand to ensure assessment integrity. We could thus avoid the burden of coordinating the presence of multiple staff members in the same place at the same time.

CONCLUDING REMARKS AND FUTURE CHALLENGES

Malaysia is currently in the interim of the National Fiberisation and Connectivity Plan (NFCP) 2019–2023 (6), which is aimed at enhancing the accessibility and quality of broadband coverage across all layers of society. The NFCP is unmistakably relevant to supporting the fundamental shift in our way of living as the ongoing pandemic plagues the world. Through subsidised Internet service provision and telecommunication devices, the NFCP counteracts the disruption caused by the public health crisis, which disproportionately affects lower-income families. In terms of education, the lack of economic capital among disadvantaged students, which may prevent them from attending online teaching, learning and assessment due to inadequate technological amenities, limits the benefits and opportunities offered by advanced digitalisation. These initiatives and incentives promote virtual participation and increase compliance with stay-at-home recommendations. Moreover, the NFCP strategic developmental framework implies

universal access to high-speed broadband Internet, which can support highly digitalised medical education. Accordingly, medical educators should remain agile and respond vigilantly to progress beyond the medical and education sectors that may impact our professional routine.

Some may question the validity, reliability, feasibility, acceptability and educational value (19) of radical digitalisation in medical education. However, given the autonomy of institutions in designing and implementing the undergraduate medical programme outlined by the Malaysian Medical Council (2), the current socio-economic pressure for nationwide transition to 4IR and emerging evidence of the benefits of digital education, I ask rhetorically, "Why not?". We can simultaneously promote the institutional agenda for quality assurance through digitalisation and shift T&L to a more student-centred OBE. Furthermore, if Malaysian medical education achieves this level of digitalisation, I expect our innovative e-curriculum to be marketable, realising another governmental aspiration: to increase the commercialisation of intellectual products. While clinical medicine's fundamental purpose of catering to human health remains regardless of digitalisation, service delivery will change dramatically. Digital culture places doctors' roles, the duty of care and bioethical principles in new perspectives, inviting dialogue and research to devise up-to-date codes of professional practice.

The question is how well medical academics prepare to take this bold step to train the digital-ready doctors of tomorrow. How do leaderships cooperate to influence the institutional culture at the macro and micro levels to increase the acceptance of digitalisation in medical education? Have we anticipated a further shift from doctors' current roles and identities towards digitalised medicine, analogous to the decline of paternalistic doctoring through an emphasis on clinical communication in the last decades? How strong is the political will to recruit academic staff with diverse talents and international connections to enhance T&L with the best digital education practices (2, p. 14)? Are we comfortable collaborating with computer science, software engineering, digital sociology and information technology experts, who do not necessarily have a medical or biomedical education background? How do we ensure equal access to necessary resources, especially digital devices and optimal Internet connectivity, to absorb the influx of digital technologies? Complacency is no longer a choice. I end my commentary by quoting Henry Ward Beecher: "The philosophy of one century is the common sense of the next" (20, p. 24).

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