EDITORIAL

DIGITAL TECHNOLOGY, ARTIFICIAL INTELLIGENCE AND FUTURE OF MEDICAL EDUCATION

One of the major challenges, which COVID-19 pandemic has presented to medical teachers, is to either readapt and transform their usual clinical teaching on real patients in such a way that there is a zero risk of transmission of SARS CoV-2 to any of the participants i.e. the patient, the students and the teacher or use alternate methods to teach clinical medicine. Consequently, the situation has led to the increased use of digital technology (DT) and an assortment of gadgets and tools along with artificial intelligence (AI) are being used increasingly to enhance teaching and learning activities.

It is apparent that the DT and AI are also going to play a progressively substantial role in the examination, diagnosis and management of patients. This will have major implications to the field of medical education globally.

Medical teachers are facing two vital challenges: how to use digital technologies in medical education, and how to be a medical teacher in a digital age. These challenges have become even more crucial as we are currently training the last generation of doctors who can remember a time before the Internet, the first who will learn in an environment dominated by digital technologies and the first who will practice in a predominantly e-health environment [1].

The educational goals of using technology in medical education include facilitating basic knowledge acquisition, improving decision making, enhancement of perceptual variation, improving skill coordination, practicing for rare or critical events, learning team training, and improving psychomotor skills. Different technologies can address these goals. The task of medical educators is to use these new technologies effectively to transform learning into a more collaborative, personalized, and empowering experience [2].

Digital technologies encompass the computing devices, software and network infrastructures. AI uses large data sets and identifies interaction patterns among variables. These techniques can discover previously unknown associations, generate novel hypotheses, and drive researchers and resources toward most fruitful directions [3].

Technologies such as podcasts and videos with flipped classrooms, mobile devices with apps, video games, simulations and wearable devices are some of the applications that are currently playing crucial roles in changing the educational environment [2].

Most of the physical examination is being replaced by technology and even positive findings on physical examination are re-confirmed by use of technology. Ultrasonography has become a routine examination in Obstetrics & Gynaecology, echocardiography is a must in every child with suspected congenital heart disease and there is no need to use physical examination skills to locate the site of lesion in CNS as CT scan and MRI will do it for you.

AI is contributing momentously in making diagnoses by comparing patient data/photos with those stored in the massive data bank. Use of AI in making diagnosis of syndromes and skin diseases by

using Facial Recognition Software [4] and AI-based Dermatology Consult [5] are the obvious examples. Combing DT with AI will replace most of the clinical work e.g. Bluetooth enabled stethoscope with AI capability for making clinical diagnosis of cardiac conditions. The pen-sized ultrasound gadget will be used for clinical examination of e.g. abdomen and joint spaces making traditional surgical and orthopaedic examinations thing of the past. It has implications in the management of patients as well, such as remote robotic surgeries and the use of virtual reality in rehabilitation. Individualised specific treatments based on genomic information is no more a far-fetched idea. This future advancements and expectations in health care will have a bearing on the way we train medical doctors.

The learning outcomes and the expected competencies at different levels of training of medical students will change. The first level of Bloom's taxonomy is already becoming irrelevant because the students do not need to memorise any more as information is readily available on their hand-held gadgets. However, understanding and comprehension will always be needed to understand the disruption of body functions and to counsel the patients. This aspect would be learned better through animation and augmented or virtual reality which will be new normal in medical education [6].

Teaching and acquiring of the soft skills will be an overwhelming challenge in these "modern" medical schools. The major role of medical teachers would be to train an emphatic doctor with the ability to empathise and remain compassionate, despite having to deal with the creative technologies. This cannot be done through virtual means and is only possible by smelling the environment, touching the sick and feeling their pain, going into communities, helping the needy, working in the calamities-stricken areas and populations. Exposing students to intensive care units in the hospital and letting them observe the suffering of the people and talking to family members of these patients, in the earlier part of their training may strike these young minds in a positive manner. Training for effective communication will be of paramount importance.

As research, by providing new insights into pathophysiology of diseases and offering new treatment options, and technical inventions, by developing new gadgets, revolutionise the management of patients, the curriculum of medical schools and medical education has no option but to follow the suit and transform themselves.

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