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RESEARCH ARTICLE

Imagining the Future of Learning in Healthcare: The GAME 2019 #FuturistForum

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ABSTRACT

The GAME 2019 #FuturistForum involved an exchange of ideas and perspectives on the future of learning in healthcare and necessary evolutions to sustain future health systems. This event allowed for reflection and discourse around a) what medical learning or learning in healthcare may look like 10–15 years from now, b) how technology would impact that evolution, and c) what collaborative roles distinct stakeholders would play. Seventy-five (75) key stakeholders, experts from various fields, participated in the two-day event. Four multifaceted themes were uncovered from the qualitative analysis, which are: learning will be lifelong and outcome-based, the health system will follow a preventive care model, technology will be an enabler of evolution in education and health systems, and that multi-level collaboration will support and sustain future progress. Future implications, exacerbated by the ongoing COVID-19 pandemic, and study limitations are described.

Introduction

Medical education has continued to evolve from the first medical schools, documented in ancient Greece, to institutions well-known today. In 1910, the Flexner Report served as a cornerstone in medical education, calling for increased standards and focus on science-based and empirical approaches to medicine [1]. In 2010, the Lancet established the *Education of Health Professions for the 21st Century Commission* that highlighted challenges of "fragmented, outdated and static curricula" and called for redesigns of professional health education by leveraging opportunities generated by changes observed since the beginning of the 21st century, such as acceleration of knowledge, integration of technologies in healthcare, and migration of both health professionals and patients across borders[2]. Each of these forces of change furnished a critical rationale to rethink and redefine learning in healthcare [2,3]. Increased focus has also been devoted to the accountability of medical schools to review their approaches to learning and assessment. Specifically, approaches to learning and assessment are evaluated in terms of their response to population needs and their ability to ensure the development of health professionals with relevant competencies to support the

evolutions in health systems [4–6]. Today, scholars and educationalists see medical education as a continuum increasingly referred to as *lifelong learning*, from undergraduate medical education (UME) to graduate medical education (GME) and continuing medical education (CME) or continuing professional development (CPD) [7,8]. Thus, an adequately trained and competent healthcare workforce is not solely the responsibility of medical schools. The issue of healthcare education should be a shared societal concern. However, to plan appropriately, a clear understanding of what capabilities are expected of a future workforce is essential to guide the future of medical learning [7,9,10].

The Global Alliance for Medical Education (GAME) is an international not-for-profit organisation created in 1995 as a forum for the exchange of ideas between organisations involved in the development, marketing, and delivery of health education programmes, continuing medical education (CME), and continuing professional development (CPD). Today, GAME is dedicated to "facilitating best practices and collaboration in lifelong learning translation into improved healthcare" [11]. The GAME 2019 #FuturistForum was a two-day event held in Budapest, Hungary, on October 18th and

19th, 2019, which brought together influential leaders and visionary stakeholders from medicine, technology, learning sciences, education (medical and health), the pharmaceutical industry, continuing professional development, performance improvement, patient safety, and population health [11]. This event aimed to engage participants in an exchange, dialogue, and exploration process that could promote lifelong learning translation in healthcare over the next 10 years. This article reports on the event by presenting a summary of the discussions that reflected on the future of lifelong learning in healthcare.

Materials and Methods

Participants and Procedures

Seventy-five key stakeholders, including experts from academic centres, health systems, accreditors, medical speciality societies, governments, medical education companies, and several distinct industries participated in the two-day event. On day one, a group of ten invited experts participated in a structured and facilitated session that explored three questions: 1) "What will medical learning look like in 10–15 years?", 2) "How will technology impact planning, defining, execution, and evaluation of medical learning?" and 3) "Can you describe what a collaborative model in medical learning should look like in 10 to 15 years (which stakeholders will be involved and why)?" To ensure complex, future-oriented challenges were discussed openly, the Chatham House Rule was applied, allowing participants to share their personal opinions (which might be different of those of their organisations) knowing these opinions would not be publicly associated to their names or affiliation by other participants, and that only aggregated data would be shared in any reports [12]. Outcomes from discussions were recorded via participants' handwritten cue-cards, flipcharts (used by facilitators), and observation grids (completed by three independent on-site notetakers). Notetakers were briefed and trained by the facilitators to ensure the notetaking process was standardised (e.g. notetakers were instructed not to add personal interpretations of participants' comments. Instead, they were tasked to take verbatim notes). Day one discussions were also video recorded so that they could be transcribed verbatim by unaffiliated transcriptionists. On day two, a summary of outcomes derived from day one was shared with forum attendees to stimulate reflection on key issues related to the future of healthcare education and professional development, and to generate potential solutions. During the

afternoon session of day two, each topic (overarching question) was further discussed in smaller groups (of approximately 10 participants). Small group discussions, each led by a day one participant, were documented on flipcharts and observational grids (one notetaker per group) and summaries of these discussions were reported to all attendees.

Sampling

Purposive sampling, a non-random sampling approach used to select participants as data sources to inform on topics and research questions of interest, was utilised for day one [13]. Participants were selected to ensure representation of a wide variety of stakeholder groups (government, academic, speciality societies, industry), and had extensive expertise in different domains contributing to the field of medical education (i.e. information technology, epidemiology, medicine, healthcare, business). Day two participants self-selected in the GAME 2019 #FuturistForum by registering, attending, and participating in discussions.

Qualitative Analysis

An analysis, drawing from the principles of both content and thematic analyses, was conducted (day one and day two) to uncover patterns in the experiences, meanings, and realities of participants, and to determine how such patterns are an authentic reflection of discussions within the field of medical learning [14,15]. Any data collected not associated with discussions relating to the main three questions (listed above) on either day one or day two, were excluded from analysis. A coding scheme was initially developed based upon significant topics discussed during day one (e.g. "technology-based solutions") to provide a top-down starting structure. A bottom-up approach was then utilised to permit the discovery of idiosyncratic and nuanced patterns that did not fall within the overarching predetermined areas (e.g. "addressing language and culture-related barriers", a sub-code of "technology-based solutions"). The former approach allowed coders a framework within which they could initiate the qualitative coding process, while the latter approach allowed data-derived patterns to reform coding schemes. Transcripts were coded by two independent researchers using NVivo (QSR International Pty Ltd, Version 12, 2018). An evaluation of intercoder reliability was performed to assess coding agreement [16]. Intercoder reliability results revealed high agreement overall. Coders discussed areas of the coding scheme where coding divergence was present until consensus

regarding the final analysis was reached. Further, to ensure trustworthiness of results obtained from qualitative analyses, findings from day one were triangulated with discussion-based data from day two and presented to day one participants during group discussions to ensure patterns reflected exchanges from the two-day event. These approaches, in turn, allowed for identification of robust key trends, sub-themes, and areas for future research. Since the GAME 2019 #FuturistForum took place in October 2019, participants' opinions reflect world paradigms prior to the COVID-19 pandemic.

Ethical Considerations

The project was submitted for ethical consideration to an international and independent ethics review board (Veritas IRB). The board exempted the data collection process used during the GAME 2019 #FuturistForum since it qualified as a quality improvement activity under Article 2.5 of the Tri-Council Policy Statement 2: Ethical Conduct for Research Involving Humans [17]. The data management and analysis processes were reviewed and approved by the ethics board.

Results

Seventy-five participants took part in discussions during the GAME 2019 #FuturistForum. Of those who responded (63/75) to a demographic question concerning career background, 29% indicated they are from the medical education field, 35% from the business and technology fields, and the remainder indicated "other" (as well, 30% have a medical degree, PharmD, and/or Ph.D.). Four multifaceted themes emerged from the qualitative analysis, which focused on topics within education, health, technology, and global collaboration. Each theme represents participants' thoughts, ideas, and interpretations.

Learning Will Be Lifelong and Outcome-based

Evolutions in health education systems are regarded as necessary to empower healthcare workforces to remain attuned and responsive to needs of future healthcare systems. To meet increasingly complex healthcare needs, education systems are expected to evolve to further support lifelong and outcome-based learning processes. According to forum participants, this evolution will be enabled by involving stakeholders that have not been as systematically involved in the development of learning curriculum in health education (e.g. educationalists, instructional designers, and behavioural experts) to help redesign curricula in alignment with the latest evidence in the learning sciences. These curricula will involve developing skills and competencies that are expected to increase in demand, such as those in communication, collaboration, emotional intelligence, humanism, and the optimal use of artificial intelligence.

To achieve these changes in education systems successfully, participants reported a need for an environment that facilitates *adaptive* learning (with a focus on incremental rather than fixed learning strategies) and learning curricula that emphasise the development of *adaptive learners*. This evolution will require changes in faculty[1] development programmes to support faculty in developing the right skills and competencies to move from a *teacher* role to a role as a *facilitator of learning*.

These shifts could be supported by the implementation of emergent learning methodologies (collaborative learning, outcome-based education), and increased use of emerging technologies to support learning (e.g. online learning platforms that facilitate collective transfers of knowledge and personalisation of learning based on assessment results). On-the-job or point of care workplace-based learning is expected to continue to increase, as will interprofessional learning opportunities.

However, participants also reported foreseen barriers that might pose resistance to these changes, which include the current models of medical training (which often emphasise trainer-trainee or professor-student mentalities), and the time needed to develop relevant competencies (e.g. self-assessment, intellectual flexibility, tolerance to ambiguity, etc.), both of which are not directly addressed as part of the current health or medical education curricula.

The Health System Will Change to a Preventive Care Model

Participants described a shift in the global health ecosystem that involves de-emphasising current curative care models and moving towards collectively encouraging public health and prevention. In this revised system, larger proportions of healthcare resources will be allocated towards personalised medicine, which will place genetic profiling in a prominent position when supporting health promotion and illness prevention. Patients will play a more central role in their health and become an integral part of the interprofessional

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[1]Both academic-based faculty and faculty for continuing professional development programmes

team. Given the increasing life expectancy of the global population, participants discussed the need for care environments to move to patients' homes and virtual spaces, except when hospital stay is required (secondary and tertiary care). In this context, telehealth and personal health sensors are expected to become more valuable to clinicians (for patient planning, evaluation, and assessment, without the need to travel to hospitals).

Participants proposed that a prerequisite to these changes is training healthcare workforces with different sets of competencies and developing specific roles within those workforces (e.g. health coaches, preventionists, public health practitioners, etc.). These conditions will allow current and new healthcare professionals to become lifelong learners, and patients to become proactively involved in their own education and healthcare.

Such an evolution hinges on strategic public sector engagement, which will require national and international regulatory changes that might take time to implement. Barriers discussed by participants include: a) current system-level incentive models in many countries that resist the move from *illness care* to *health care* (i.e. preventative health care), b) lack of digital and health literacy on a global scale, c) lack of access to adequate, patient-oriented platforms where patients may access their data to collaborate with their healthcare teams towards shared goals, and d) lack of available professionals with the skills necessary to support patients consistently. Most participants agreed that this future healthcare model is essential to ensure a sustainable future for healthcare systems. However, participants also debated whether this future is realistic, as it depends on a collective willingness to change on multiple levels (i.e. individual, team, system, and society).

Technology Will Be an Enabler of Evolution in Education and Health Systems

Technology is anticipated to be an enabler of evolution in both education and health systems. Central to this evolution is the role of artificial intelligence (AI) in supporting data-driven decisions. Participants reported this would require increased interdisciplinary collaboration between various stakeholder groups (discussed further under theme four) and development of specific professional roles in healthcare (e.g. roles that utilise AI towards medical imaging, resulting in a major shift in, or even the disappearance of, current medical-imaging related roles). Participants foresaw that a broader implementation of electronic health

records (EHR) and incorporation of data collected from personal wearables (into patient medical files) were potential integration strategies that could facilitate patients' and caregivers' engagement, which in turn, would foster better interprofessional collaboration and increase opportunities for informed and shared decision-making. The advent of the *Digital Colleague* was discussed as a support to clinical decision-making which will allow healthcare professionals to access all relevant clinical data at critical points-of-care. The digital colleague is a new concept that has been defined as non-human colleague powered by AI, machine learning, robotics, and/or intelligent process automation [18]. AI is expected to become increasingly essential in dialogues with major stakeholders (e.g. insurance corporations), especially to demonstrate the importance of preventative healthcare. Participants consider technological advancements in communication will bring forth greater global interconnectivity, and in turn, solutions towards language barriers and access to educational resources. Forecasted barriers include severe international socioeconomic disparities, technological security risks (data breaches) involved in the process of digitalising and archiving medical and academic reports, and societal resistance given public-related challenges involved in data privacy. Finally, participants acknowledged that the speed at which technology will be implemented would vary greatly between different parts of the world and need to be adjusted to local needs.

Multi-level Collaboration Will Support and Sustain Progress

Participants described different forms of collaboration that will be essential for an optimal evolution of future education and health systems. Many stakeholders are expected to be involved, including patients, patient advocacy groups, caregivers, citizens, healthcare providers, educators, and academics. Furthermore, there will be a role for industry leaders such as those in pharmaceutical companies, medical device companies, information technology, and GAFA, (i.e. Google, Apple, Facebook, Amazon. Forum participants also highlighted the importance of micro-level collaborations with small-scale projects planned and deployed locally, so that changes can be incremental and best practices from small initiatives can be scaled up once feasibility and impact have been proven. Combining these two approaches and facilitating the exchange of ideas and free access to innovation, will accelerate anticipated and required changes.

Discussion

The GAME 2019 #FuturistForum offered an opportunity to exchange ideas and perspectives on the future of learning in healthcare and the required evolution to sustain health systems of the future. It allowed for reflection around what medical learning or learning in healthcare may look like in 10–15 years, how technology would impact that evolution, and what collaborative roles distinct stakeholders would play. The analysis and reporting of data collected during the event aimed at providing perspectives on these questions, to foster further dialogue and provide direction to future activities of the Global Alliance for Medical Education and other key stakeholders in lifelong learning-specifically in healthcare. The structured approach used to analyse discussions allowed identification of key trends. According to the unique perspectives of the forum's participants, leaders within fields of health and medical education, these trends are expected to influence the next 10–15 years.

Participants of the GAME 2019 #FuturistForum identified a need for education systems to focus on the development of new competencies for future healthcare professionals. This resonates with what the Lancet Commission called the establishment of *transformative learning* opportunities within and beyond medical schools [2]. Transformative learning is focused on the development of leadership competencies, as opposed to informative learning, which is focused on the acquisition of knowledge and skills, and formative learning, which is centred in the development of social values [2]. Transformative learning aims to achieve effective teamwork in health systems [2]. This notion of transformative learning, we would argue, requires an education system that focuses on learning as a lifelong journey so that healthcare professionals can embrace a holistic approach that contributes to the ongoing improvement of healthcare systems [4]. Key to this transition is the participation of patients from the beginning, in all learning in healthcare [19].

The health system of the future, as it was envisioned by participants during the GAME 2019 #FuturistForum, fosters a greater focus on prevention and health optimisation. The nature of curative care models has also been identified by other scholars and national governments as a gap in current health systems that needs to be addressed to ensure sustainability of these systems [20]. Current learning curricula of health professions throughout the education continuum (from undergraduate to continuing professional development), have been pointed out, as they usually do not prepare healthcare workforce for continuous

and integrated care necessary in preventative care models [2].

Shortly after the #FuturistForum, the first cases of the new coronavirus SARS-CoV-2 (or COVID-19) were identified in China [21]. The disease rapidly spread worldwide, and a series of public health measures were implemented (e.g. lockdown, reduction in services, and healthcare resource reallocation), significantly impacting both education and healthcare systems in many countries [22,23]. The COVID-19 pandemic accelerated the solidification of some of the trends discussed during the GAME 2019 #FuturistForum in ways that could not have been anticipated. For example, virtual modes of learning became necessary to limit spread of the virus, leading medical schools and continuing professional development programmes to rapidly shift their instructional design and educational offerings [24]. At that point in time, many educators were not formally trained in instructional design and learning sciences to ensure optimal construction and delivery of courses in a fully virtual environment [25]. However, as the situation lasted throughout 2020 and continues into 2021, a larger number of institutions have been able to reorganise and incorporate more interactive and advanced technological forms of virtual learning. These advances included virtual simulation to ensure continued skill acquisitions (even for surgical skills), thereby facilitating student engagement and limiting student isolation [26].

Forecasted barriers to achieving described evolutions in health and education systems were, to some degree, overcome during the pandemic (in certain areas of the world), due to the implementation of national and international emergency response strategies and other novel solutions [27]. Faced with a great need to transfer new knowledge and offer opportunities for healthcare providers to acquire new skills to treat COVID-19 infections, CME/CPD accreditors endorsed changes to facilitate the development of online programmes, which may contribute to healthcare professionals' continuing professional development in a very short timeframe [2]. From a health system and patient standpoint, several regulatory changes were required to allow telehealth to increase access to care and maintain patient safety during the COVID-19 pandemic [28]. Now that these changes have been implemented and the experiences of healthcare professionals and patients using telehealth have grown, novel means of accessing care may be maintained even when needs for social distancing decrease.

COVID-19 has reactivated discourses around public health and prevention in healthcare, making them more relevant than ever. As it stands, it is likely that the pandemic will have a profound and long-lasting

impact on many aspects of healthcare delivery through increased use of technology (from telehealth consultation to remote diagnostic testing, use of AI, and big data for predictive analytics) [29]. The ability to capture key health vital signs (chemistry panels, blood pressure [BP] measurements, electrocardiograms [EKG]) outside of the health system already exists, but utilisation and transmission of sensor data to patient EHR for interpretation will be critical to continued increases in effectiveness and utility of telehealth consultations [20]. As the use of AI is likely to become even more readily integrated into our health systems, so will the need for healthcare professionals to gain knowledge on the functionality and limitations of different types and forms of AI (e.g. general AI versus narrow AI) and develop skills and competencies to use AI in ways that facilitate clinical decision-making and optimise care delivered to patients. These changes are expected across disciplines but may happen rapidly in specific specialities (e.g. nuclear cardiology, pathology, radiology) [30]. In parallel, research will continue to be conducted on the multiple potential uses of machine learning in medicine [31–33].

As we move forward, much remains to be achieved to ensure our education and health systems continue to evolve together to ensure better quality care. For these transformations to occur, a culture of learning must be developed based upon providing safe environments for learners to speak up, make mistakes (fail forward), and learn from their mistakes in an iterative process [4]. In this way, everyone has a role to play, and everyone becomes a learner, whether we are taking on the role of patient, caregiver, educator, or student.

Limitations

The authors acknowledge that a limitation of the event is the short duration (2 days), which did not allow for participants to spend enough time in facilitated discussions to collectively identify solutions to challenges or barriers discussed. However, the sharing of thoughts and opinions of participants with leaders in education and health, and to the greater scientific community, is a crucial step to facilitate further discussion and strategic action in different global contexts. It is also widely acknowledged that trends presented in this article are not likely to be implemented to the same extent and at the same speed globally, due to ongoing disparities, differing contexts, and realities, which will be exacerbated by burdens of the ongoing COVID-19 pandemic.

Significance

The GAME 2019 #FuturistForum provided an opportunity for participants to engage in *futurist thinking* [34]. This ability to imagine, project, or predict trends is another relevant competency that the authors believe will be much needed to develop in current and future generations of educators, healthcare workers, and in other professions, so that we continue to nurture our capacity to be agile so we can best respond to evolving societal needs [35].

Conclusion

In many ways, societies today are closer to the future than participants had envisioned in 2019. This leads to significant opportunities for educators and learning professionals and great responsibilities to ensure the development of professionals equipped to support much-needed evolutions and accelerations required to achieve more fruitful educational and health outcomes.

Disclosure statement

Werner Bill, Eric Bonnefoy, Susanna Price, Olaf Wokenhauer and Nabil Zary have no relevant financial or non-financial competing interests to report that may be affected by the research reported in the enclosed paper. Jur Koksma and Dale Kummerle serve on the Board of the Global Alliance for Medical Education. Suzanne Murray serves on the Board of JECME and the Global Alliance for Medical Education. Aviad Haramati serves on the Board of Directors of the

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