Ethics in the digital health era

6

ETHICS IN THE DIGITAL HEALTH ERA

Nefti Bempong-Ahun[61]

The right to health is a fundamental human right, yet many lack access to essential medicines and services. The goal to "ensure healthy lives and promote well-being at all ages" remains key in progressing towards the Sustainable Development Goals.[62] The recent proliferation of digital technologies offers great potential in achieving this goal, and improving global health interventions and outcomes. In the more recent years, there has been a growing trend in utilising Artificial Intelligence (AI) in health. The use of technologies is especially evident in infectious disease outbreaks, where technologies have provided more rapid diagnostics, more precise predictions and estimations, increased knowledge transfer, and raised situational awareness through mHealth and social media platforms[63]. Additionally, within the context of the ongoing COVID-19 pandemic, a greater use of telemedicine has been

---

[61] Nefti Bempong-Ahun, Assistant Editor and Communications Assistant, Globethics.net.

[62] The Right to Health factsheet 31. Last accessed 10.12.2020: https://www.ohchr.org/documents/publications/factsheet31.pdf

[63] Bempong, Nefti-Eboni et al. "Precision Global Health - The case of Ebola: a scoping review." *Journal of Global Health* vol. 9,1 (2019): 010404.

observed than never before. [64] Many physicians and health professionals have been conducting consultations and appointments online, to minimize the risk of transmission.[65] Digital technologies have been utilised in many ways, including drones for the delivery of essential medicines to remote areas,[66] and training and capacity building to strengthen community health worker programs. New concepts have also been founded to support the use of digital technologies in health, such as 'Precision Global Health', which,

> "…leverages life sciences, social sciences, and data sciences, augmented (AI), in order to identify transnational problems and deliver targeted and impactful interventions through integrated and participatory approaches".[67]

There is no doubt that digital technologies offer great potential and many opportunities, however one must also ask the question: whom are these technologies serving? Do these technologies respect the fundamental principles of causing no harm? Many have argued that root problems, such as strengthening the social determinants of health, improving health literacy and addressing the inequities within the global heath workforce must first be addressed, [68] before the introduction of

---

[64] Telemedicine: opportunities and developments in member states. Report on the second global survey on eHealth. Last accessed 10.12.2020: https://www.who.int/goe/publications/goe_telemedicine_2010.pdf

[65] Monaghesh, Elham, and Alireza Hajizadeh. "The role of telehealth during COVID-19 outbreak: a systematic review based on current evidence." *BMC public health* vol. 20,1, 1193. 1 Aug. 2020, doi:10.1186/s12889-020-09301-4

[66] ZIpline: how it works. Last accessed 10.12.2020: https://flyzipline.com/how-it-works/

[67] Flahault, Antoine, et al. "Precision global health for real-time action." *The Lancet Digital Health* 2.2 (2020): e58-e59.

[68] Anyangwe, Stella CE, and Chipayeni Mtonga. "Inequities in the global health workforce: the greatest impediment to health in sub-Saharan

new technologies can have a true impact. Beyond health system strengthening, specific challenges associated to the use of digital technologies also exist. Within the current pandemic, the psychological determinants should also be carefully examined, pertaining to the effects of lockdown and state of uncertainty. Key issues such as: access, infrastructure, digital literacy, the widening of the gender gap, and mutual understanding and respect for the data sharing principles still exist and must urgently be addressed.

Digital Divide

According to the Organisation for Economic Cooperation and Development (OECD), the digital divide can be defined as,

> "…the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to both their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities".[69]

The digital divide is not exclusive to health, but has also posed a challenge in the education sector, as many higher education institutions transitioning to online learning in light of the COVID-19 pandemic. The main causes of the digital divide can be attributed to education levels, income, geographical restrictions and digital literacy.[70] The latter refers to the ability of an individual to use digital technologies and platforms.

Africa." *International journal of environmental research and public health* 4.2 (2007): 93-100.

[69] OECD Glossary of Terms. Last accessed 10.12.2020: https://stats.oecd.org/glossary/index.htm

[70] Digital Divide Council. Last accessed 10.12.2020: http://www.digitaldividecouncil.com/what-is-the-digital-divide/

The digital divide can be sub-categorised into two main types, namely: the gender divide and the access divide.[62]

Access Gap

The question of equitable access remains, especially with connectivity to the Internet. Whilst mobile phones had huge success in terms of reach, with Africa growing mobile social users by 17% in 2018,[71] it is in fact 45% of the population that are connected in developing countries, and with only 20% of the population connected in the very least developed countries.[72] Most connectivity in developing countries has been established through mobile phones, most likely due to technological leapfrogging. An exemplary case to describe the phenomena is Ebuddi. The latter is a training programme, which was implemented in Liberia during the Ebola outbreak to facilitate training of local health workers.[55] The prototype was initially launched on personal computers (PCs), however it quickly became apparent users were unfamiliar with the use of computers, and the program was adapted for use of mobile phones.[55] In the Western world, it is common for children to be exposed to the use of computers in school, however in developing regions mobile phones remain the main source of technology. This reflects that the evolution to technological literacy is different between regions, and such considerations must be taken into account during planning and design. The quality of connectivity also varies between urban and rural areas, with Internet usage being three times slower in the latter.[59] Access to connectivity is the first step in ensuring technologies can be harnessed for capacity building. However, access is not limited to connectivity alone of course; access to resources, infrastructure, equipment and knowledge must also be ensured. Actors

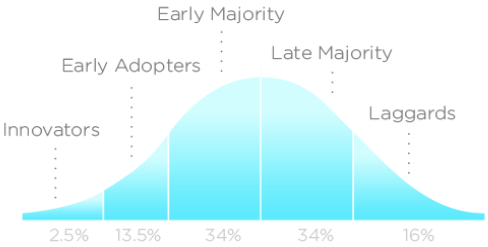
[71] Sheath, Danny, et al. "Precision global health: a roadmap for augmented action." *Journal of Public Health and Emergency* 4.5 (2020): 1-12.

[72] Flahault, Antoine, et al. "Precision global health for real-time action." *The Lancet Digital Health* 2.2 (2020): e58-e59

must come together to achieve this, and a more recent example of this is the COVID19 Clinical Research Coalition. The coalition aims to accelerate research in resource-limited settings, to ensure the most vulnerable communities are not forgotten with regard to treatment, expertise and further development.[73]

Gender Gap

Unfortunately, the gender gap also rears its head in the context of digital technologies, with males in low-income countries being 90% more likely to own a mobile phone than women.[62] One of the main factors underlying this gap, is illiteracy. It has been reported that the proportions of illiterate women is higher when compare to men, which often translates into lack of comfort navigating technologies.[74] Women have been reported to exhibit higher levels of 'technophobia', and have also been described as 'laggards' - slower adopters to newer and more innovative technologies when compared to men.[75]



INNOVATION ADOPTION LIFECYCLE

[73] COVID19 Clinical Research Coalition. Last accessed 10.12.2020: https://covid19crc.org/about-us/

[74] OECD report: Bridging the digital divide. Last accessed 10.12.2020: http://www.oecd.org/digital/bridging-the-digital-gender-divide.pdf

[75] Kotze, Theuns G., O. Anderson, and K. Summerfield. "Technophobia: Gender differences in the adoption of high-technology consumer products." *South African Journal of Business Management* 47.1 (2016): 21-28.

Figure 1: Diffusion of innovation graph [76]

In the context of health emergencies, males reported increased use of digital technologies compared to women during the Ebola outbreak in 2014.[55] This most likely occurred due to socio-cultural condition, referring to the reduced access to education and domestic roles of females, specifically in developing countries. The OECD '*Bridging the Digital Gender Divide*' report found that in India and Egypt, around on-fifth of women believed the internet was not suitable for them, due to cultural reasons.

The digital divide is thus a major obstacle to unleashing the full potential of digital technologies. An international and coordinated response is required, driven by a human rights approach to overcome the existing inequalities with innovative solutions. More recently, Google's sister company launched Loons, which are solar powered balloons providing 4G Internet coverage in rural areas. Loon partnered with Telkom Kenya to provide commercial service, and Kenya has already estimated 39 million out of 48 million people online.[77] The World Health Organization (WHO) is also currently drafting a global strategy on digital health,[78] and it is of most importance that we overcome the challenges, working together.

---

[76] Figure 1: Diffusion of innovation. Source: https://en.wikipedia.org/wiki/File:DiffusionOfInnovation.png

[77] "*4G internet balloons take off over Kenya*" BBC News. Last accessed 10.12.2020: https://www.bbc.com/news/technology-53321007

[78] WHO Global strategy on Digital Health. Last accessed 10.12.2020: https://www.who.int/docs/defaul-tsource/documents/gs4dhdaa2a9f352b0445bafbc79ca799dce4d.pdf?sfvrsn=f112ede5_58

Data Sharing Principles and Open Science

The increased use of digital technologies has created more data, and it is important that data utilisation does not harm individuals or breach patient's privacy. Many hospitals have become targets of cyberattacks, mostly via ransom ware attacks.[79] These attacks are in violation of the Health Insurance Portability and Accountability Act, and can threaten patients' health, especially if attackers are able to control and manipulate health devices. Strict procedures and safeguarded structures must be applied to ensure data remains safe and is not misused.

Data Sharing Principles

Data access and sharing in global health is a frequent challenge, mostly due to ambiguous data ownership and privacy concerns.[59] A way to overcome such issues is to ensure researchers adhere to mechanisms, which promote the data sharing principles. The Australian Government issued the following as data sharing principles in their 'Best practices guide to applying data sharing principles':

- "Projects: Data is shared for an appropriate purpose that delivers a public benefit.
- People: The user has the appropriate authority to access the data.
- Settings: The environment in which the data is shared minimises the risk of unauthorised use or disclosure.
- Data: Appropriate and proportionate protections are applied to the data.

[79] Argaw, Salem T., et al. "The state of research on cyberattacks against hospitals and available best practice recommendations: a scoping review." *BMC medical informatics and decision-making* 19.1 (2019): 1-11.

- Output: The output from the data sharing arrangement is appropriately safeguarded before any further sharing or release".[80]

Open Science

Open Science aims to make scientific research dissemination to all levels of societies, removing obstacles such as pay walls from more traditional academic journals. This year's Open Access Week focused on promoting equity and inclusion, a red thread when considering ethics in the era of digital health.[81] Open Access Week is an important catalyst in prioritising diversity, equity and inclusion in governance structures, as well as encouraging Open Science and promoting practice truly reflective of the data sharing principles. More recently, UNESCO, WHO and the United Nations High Commissioner for Human Rights made a call for action for Open Science. The joint declaration acknowledged "the power of scientific cooperation and diplomacy to unite nations".[82] Globethics.net is a champion of open access, and most resources can be accessed and downloaded for free from its website portal and digital library repository from www.globethics.net.

Conclusion

Whilst digital health brings about many opportunities, it also brings its share of associated challenges. We must overcome the digital divide

[80] Best Practice Guide to Applying Data Sharing Principles, Australian Government. Last accessed 10.12.2020: https://www.datacommissioner.gov.au/sites/default/files/2019-08/data-sharing-principles-best-practice-guide-15-mar-2019.pdf

[81] Open Access week theme blog post. Last accessed 10.12.2020: http://openaccessweek.org/profiles/blogs/2020-theme-announcement-english

[82] UNESCO, WHO and the UN High Commissioner for Human Rights call for "open science". Last accessed 10.12.2020: https://en.unesco.org/news/unesco-who-and-high-commissioner-human-rights-call-open-science

and existing socio-economic disparities, in order to ensure equitable and fair access to digital technologies for all. With regards to data, we should aim for open access and open science, to ensure all members of the population have access to the latest research, and enable and support evidence-based decision-making. The United Nations Institute for Training and Research recently launched a digital health programme, with the primary aim of promoting responsible digital health.[83] This is to ensure that technologies are used to their full potential, that the right beneficiaries benefit and that progress towards achieving the UN Sustainable Development Goal (SDG) 3 is made.[84]

Bibliography

Anyangwe, Stella CE, and Chipayeni Mtonga. "Inequities in the global health workforce: the greatest impediment to health in sub-Saharan Africa." *International journal of environmental research and public health* 4.2 (2007): 93-100.

Argaw, Salem T., et al. "The state of research on cyberattacks against hospitals and available best practice recommendations: a scoping review", *BMC medical informatics and decision-making* 19.1 (2019): 1-11.

Bempong, Nefti-Eboni et al. "Precision Global Health - The case of Ebola: a scoping review." *Journal of Global Health* vol. 9,1 (2019): 010404.

Best Practice Guide to Applying Data Sharing Principles, Australian Government, https://www.datacommissioner.gov.au/sites/

[83] UNITAR Digital health. Last accessed 10.12.2020: https://unitar.org/sustainable-development-goals/people/our-portfolio/digital-health-initiative

[84] Acknowledgments: I would like to thank my husband, Michael Ahun for his encouragement and support.

default/files/2019-08/data-sharing-principles-best-practice-guide-15-mar-2019.pdf

COVID19 Clinical Research Coalition. https://covid19crc.org/about-us/

Digital Divide Council. http://www.digitaldivide council.com/what-is-the-digital-divide/

Flahault, Antoine, et al. "Precision global health for real-time action." *The Lancet Digital Health* 2.2 (2020): e58-e59.

Kotze, Theuns G., O. Anderson, and K. Summerfield. "Technophobia: Gender differences in the adoption of high-technology consumer products." *South African Journal of Business Management* 47.1 (2016): 21-28

Monaghesh, Elham, and Alireza Hajizadeh. "The role of telehealth during COVID-19 outbreak: a systematic review based on current evidence." *BMC public health* vol. 20,1, 1193. 1 Aug. 2020, doi:10.1186/s12889-020-09301-4

OECD Glossary of Terms. https://stats.oecd.org/ glossary/index.htm

OECD report: Bridging the digital divide. Last accessed 10.12.2020: http://www.oecd.org/digital/bridging-the-digital-gender-divide.pdf

Report on the second global survey on eHealth: https://www.who.int/goe/publications/goe_telemedicine_2010.pdf

Right to Health factsheet 31. Last accessed 10.12.2020: https://www.ohchr.org/documents/publications/factsheet31.pdf

Sheath, Danny, et al. "Precision global health: a roadmap for augmented action." *Journal of Public Health and Emergency* 4.5 (2020): 1-12.