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Summary

We are truly living in revolutionary times for healthcare. But no matter how scary the future might seem at the moment, we cannot stop technological development; and sooner or later we will find out that all of areas of our lives have been transformed through various digital technologies. Thus, our task at the moment is to face our fears about the future with courage; to turn to technology with an open mind, and to prepare for the changing world with as much knowledge as possible particularly in the healthcare sector.

The digital revolution is profoundly changing how healthcare processes are managed, making them more efficient while delivering better quality and reducing response times for patients. In the United States, for example, the length of the average hospital stay has decreased by 33% thanks to the introduction of clinical process management. (*Michele Quintano*, 18 October 2019) This research paper evaluates the use of technology, digital tools and techniques to improve efficiency in the healthcare with focus on the use of contemporary technology in healthcare (diagnostic, administrative and care support), technology during covid-19, digital well -being and safety, digital literacy and finally the relevance of technical proficiency for information, data handling.

Introduction

Nearly every company, from a software design firm, to the biggest manufacturing, to the smallest “mom & pop” store needs information technology to be efficient. Technology makes us think of the very complex of ideas, like a something from a Sci-fi show, or something that runs on electricity. Technology is the use of scientific knowledge for a practical purpose or application, whether in the industry or in our everyday lives, So basically whenever we use our scientific knowledge to achieve some specific purpose, we’re using technology (Study.com, March 2016).

Technology is also defined as the application of scientific knowledge of the practical aims of human life or, as it is sometimes phrased, to change and manipulation of the human environment. (Encyclopaedia Britannica, 2 Feb. 2021).

Today, hospitals are where people go for diagnoses for their sickness and wellness. Physicians, with the aid of pricey machinery and medical techniques, provide consultations for patients. Likewise, people go for surgery and medical interventions such as chemotherapy in much the same manner, for monitoring and care.

In the near future; however, advances in artificial intelligence (AI), information technologies, high-speed internet, remote-monitoring technology, and developments in 3D-printing and robotics will change all that.

A revolution in diagnosis and care provision will take place, In the near future; most of these task and monitoring and care could be moved elsewhere. The technological revolution and medical advances made by combining vast amounts of available data, cloud computing services, and machine learning are creating AI-based solutions to provide expert insight and analysis on a mass scale and at a relatively low cost.

Major alterations have already been made in the way the healthcare industry works by connected medical devices.

Over the next few years, with the adaptation of technology-enabled healthcare, in medicine and healthcare, digital technology could help transform unsustainable healthcare systems into sustainable ones, equalize the relationship between medical professionals and patients, provide cheaper, faster and more effective solutions for diseases.

Contemporary Technology (Diagnostics, Administration & Care support)

Advances in Artificial Intelligence (AI) have been made farther and faster than anyone could have anticipated. Much effort has been made recently by scientists and researchers to apply AI in diagnosis, treatment, and healthcare. It seems that AI will soon change the landscape of healthcare completely. Medical physics predicts that AI will improve overall healthcare extensively. Some scientists believe that AI will impact medical physics research and practice, while others consider these expectations as unrealistic because of the technical validation and practical limitations of AI. (Xing L, Krupinski EA, Cai J.,2018) AI is able to diagnose diseases by employing complex algorithms provided through the use of millions of patients' imaging results, hundreds of biomarkers, data extracted from electronic health records (EHRs), and clinical research results published in PubMed. (Krittanawong C.,2018)

Although AI is still at the very first stages of development, it is as capable as (if not more capable than) physicians in diagnosing illness. According to Ibragimov, Wang, and Xing, AI can be applied in radiology and radiation therapy for image classification, object detection, image reconstruction and analysis, image guidance, tumor detection and characterization, therapeutic response and toxicity prediction, treatment decision-making, and related tasks. Wang, a university professor and researcher at the Biomedical Imaging Center of New York, reports there is optimism that “machine learning will have a major impact on medical physics and radiology within the next five years.” He further states, “I have little doubt that machine intelligence will reshape medical physics and radiology and we should immediately make major efforts towards this direction.” At John Radcliffe Hospital in Oxford, England, researchers developed a diagnostics system based on AI. Based on the reported results, this system is able to diagnosis heart disease 80% of the time; that is more accurate than a specialist’s results. (Hippisley-Cox J, Coupland C, Vinogradova Y, et al.,2008)

The transition from a paper record system to a digital one in a complex industry is not easy. Privacy and patient access must both be protected always. However, the latest software and newest technologies helped hospitals and clinics streamline their offices and administrations. Every doctor’s office dedicates at least one computer to process business information.

These machine unlike the traditional healthcare administration are for recording and storing business data. Each patients medical history including previous treatments, test, diagnosis, symptoms and more is readily available.

While information once stayed in folders filled with handwritten notes, health information technology makes it available in a matter of moment on more than one device. Healthcare administrator can also keep better track of the time employees spend in hospital, their vacation time and other data pertinent to human resources.

Technology also helps with care support services by providing healthcare professional with patient-specific information. This information helps enhance the decision of healthcare providers and is rationally filtered and present to the healthcare professional at the appropriate time. These tools include notifications, alerts and reminders to care providers and patient, clinical

guidelines, condition-specific summaries, documentation templates, investigation and diagnostic support among other tools.

USE OF TECHNOLOGY DURING COVID

Pandemics like Ebola, SARS and more have been threatening the human race on very many occasion; repeatedly. Technology cannot prevent the onset of pandemics; however, it can help prevent spread through education, warnings, and empower those on the ground to be vigilant of the situation at hand and noticeably lessen the impact. Today with emergence of technologies like mobile phones, cloud, analytics, robotics, AI and high speed internet, it has been possible to test several innovative approaches to pandemic response. In this report I have listed some of the technology that play a vital role in the fight against the Covid-19 pandemic.

i. Fighting Misinformation

There are a lot of conspiracy theories around the covid-19 pandemic that has create more panic and anxiety among the population. This resulted in widespread chaos, panic buying, hoarding of essential commodities, price rise, violence on the street, discrimination and so on.

In order to reduce false or misinformation, Facebook and Google partner with NHS (National Health Service) in the fight against fake Coronavirus news. Official NHS guidance will be displayed at the top of the internet search result as part of measures to stop the spread of fake news around Covid-19.

The health service has highlighted a fake account it has suspended on Twitter after it posted as a hospital and posted inaccurate information about coronavirus cases. (Paul Gallagher, 2020)

ii. Technology Supported Temperature Monitoring

The wireless thermometer guns and other similar infrared body temperature measuring devices have become the most important medical equipment that are being used at checkpoints of airports, hotels, offices, stores, and other public places. These technology has helped in measuring body temperature from a distance and has turn out to be very

effective in pinpointing individual who might need further investigation. Automated thermal monitoring and facial recognition is making the process faster and more effective.

- iii. Remote working technologies to support social distance and maintaining business continuity.

As the pandemic keeps threatening the business world, working from home became the order of the day to ensure business continuity as well as facilitating social distancing. In such situation, technologies that ensure secure access to data, enterprise application, virtual meetings, cloud conferencing and virtual/mixed/augmented reality are the forefront leaders to ensure deliverables are not impacted. Remote working is possible due to technology and is one of the greatest solution that helps us in social distancing.

- iv. Tracking people with facial recognition and big data

Pandemic management, big data analytics can help in quickly identifying infected Individual, connect with them, track who they have come in contact with and so on. Facial recognition technologies along with data can accurately identify people even if they are masked.

These technologies can help in monitoring movement of people who are in quarantined. It can help keep tab on people and ascertained whether or not they have been in contact with an infected person. Facial recognition technologies along with CCTV cameras can help in identifying infected people who break the rules and step out despite being quarantined. In January, 2021, a US Department of Homeland Security “controlled-scenario test” found one with 96% success rate-although the result “varied greatly between systems. (James Clayton, 2021) Based on the result the department said, “organization that need to perform photo ID checks could potentially allow individual to keep their masks on thereby reducing risk of Covid-19 infections.

- v. Increasing Traceability and Transparency by sharing data

Sending clear message to the populace is critical to make sure they are informed and reminded of the use of appropriate precaution. For example, in Sierra Leone, telecom operators like Orange and Africell are using the caller tunes to help spread awareness about how to take the necessary precaution about the pandemic. Microsoft Bing launched a web portal for tracking Covid-19 infections worldwide. The website

accessible at bing.com/covid, provide up-to-date infections statistics for each country. Taiwan CDC central epidemic command centre (CECC) is combining health data with travel data to build a monitoring system and provide real-time alerts. For example, sending automatic alerts during a clinical visit if they have travelled to infected vicinity. There are number of studies that have consider the outcome of implementing an electronic medical record on healthcare quality and patient studies favorable. Campanella et al published Meta analysis on the impart of electronic health records on healthcare quality of patient safety, which included 47 studies. The result favored the use of electronic medical records. The meta analysis showed that organization which implemented electronic health record had a 30% higher guideline adherence, a reduction in medication errors by 54% and a reduction in adverse drug reaction by 36%. The meta-analysis did not find the impart on overall mortality.

DIGITAL IDENTITY, Well-being AND SAFETY

Hospital and healthcare facilities must create digital identities of patient, doctors, and other employees, to store all sensitive information. This is particularly helpful in the case of patients.

Digital identity can store all medical history that can be made readily available anywhere and at any time, (Megha,2020), According to WhatIs.com, digital wellbeing is a term used by health professional, researchers and device manufacturers to describe the concept that when human interact with technology, the experience should support mental and/or physical health in a measurable way.

The goal of improving digital wellbeing is to design technology in such a way that it promotes healthy use and proactively assists the user to maintain a healthy lifestyle. Our digital wellbeing can be influenced by the choices we make online, the technological tools we used, the content we see, the interactions we have with others and even the time we spend engaging with technology and the internet. Report have found those who spend extended amounts of time online are more likely to see upsetting content, received abusive comments or send abuse to others (Professor Andy Phippen, 2018)

DIGITAL LITERACY FOR PROFESSIONAL CAREER DEVELOPMENT

Digital literacy has been defined by HEE (2016), as those capabilities that fit someone for living, learning, working, participating and thriving in a digital society. The healthcare sector is changing in the light of innovation technology to enhance patient care. The health and social care workforce increasing need digital skills and digital capability in a range of contexts. Technology enhanced learning (TEL) can increase flexibilities, and accessibility in its delivery. It can also promote team work, innovation and more effective communication and participation.

TEL can be related to all aspect of education and training in the health and higher education including the development of digital capabilities in all learners. Productive development of digital competence is essential to personal and professional development, participation and wellbeing in the delivery of contemporary health and social care.

THE RELEVANCE OF TECHNICAL PROFICIENCY FOR INFORMATION AND DATA HANDLING

As data becomes an increasingly important resource in the health sector, demand for professionals who can efficiently and effectively work with this information is also on the rise. The importance of technical proficiency for information and data handling in the health sector is to provide better care of patients and help achieve health equity. This will also improve the quality of health delivery, increase patient safety, decrease medical errors and strengthens the interaction between patient and healthcare providers.

CONCLUSION

We can concluded that Technology plays a big part in our society, where different fields in the same sector, gather input and resources with information that better us, and improve our data, health care and research.

REFERENCES

1. Published in Business Process Management Journal, by Michele Quintano, 18 October 2019. This article is based on joint research by Esade and researchers Elena Laurenza and Francesco Schiavone of Parthenope University and Demetris Vrontis of the University of Nicosi
2. Britannica, The Editors of Encyclopaedia. "Technology". Encyclopaedia Britannica, 2 Feb. 2021, <https://www.britannica.com/technology/technology>. Accessed 27 April 2021.
3. "What is Technology? -Definition & Types." Study.com, 25 March 2016, study.com/academy/lesson/what-is-technology-definition-types.html
4. Xing L, Krupinski EA, Cai J. Artificial intelligence will soon change the landscape of medical physics research and practice. *Med Phys*. 2018;45(5):1791-1793. doi:10.1002/mp.12831.
5. Patel VL, Shortliffe EH, Stefanelli M, et al. The coming of age of artificial intelligence in medicine. *Artif Intell Med*. 2009;46(1):5-17. doi: 10.1016/j.artmed.2008.07.017.
6. Bennett CC, Hauser K. Artificial intelligence framework for simulating clinical decision-making: a Markov decision process approach. *Artif Intell Med*. 2013;57(1):9-19. doi:10.1016/j.artmed.2012.12.003.
7. Krittanawong C. The rise of artificial intelligence and the uncertain future for physicians. *Eur J Intern Med*. 2018;48: e13-e14. doi: 10.1016/j.ejim.2017.06.017
8. Kononenko I. Machine learning for medical diagnosis: history, state of the art and perspective. *Artif Intell Med*. 2001;23(1):89-109. doi:10.1016/S0933-3657(01)00077-X.

9. Suzuki K. Pixel-based machine learning in medical imaging. Int J Biomed Imaging. 2012;2012: 792079.doi:10.1155/2012/792079.
10. Ibragimov B, Xing L. Segmentation of organs-at-risks in head and neck CT images using convolutional neural networks. Med Phys. 2017;44(2):547-557. doi:10.1002/mp.12045.
11. Wang G, Kalra M, Orton CG. Machine learning will transform radiology significantly within the next 5 years. Med Phys.2017;44(6):2041-2044. doi:10.1002/mp.12204.
12. Mesko B. The role of artificial intelligence in precision medicine. Expert Rev Precis Med Drug Dev. 2017;2(5):239-241. doi:10.1080/23808993.2017.1380516
13. Hippisley-Cox J, Coupland C, Vinogradova Y, et al. Predicting cardiovascular risk in England and Wales: prospective derivation and validation of QRISK2. BMJ. 2008;336(7659): 1475-1482.doi:10.1136/bmj.39609.449676.25.
14. Coronavirus: NHS teams up with Facebook and Google to combat fake news. By Paul Gallagher, Health Correspondent, March 10, 2020, 12:01 am, <https://inews.co.uk/news/coronavirus-conspiracy-theories-nhs-facebook-google-fake-news-406568>
15. Facial Recognition beats the Covid-mask challenge. By James Clayton,North America Technology reporter, 25 March 2021. <http://www.google.com/amp/s/www.bbc.com/news/technology-56517033.amp>
16. Clinical Decision Support (CDS) (internet) Office of the National Coordinator for Health Information Technology. <https://www.healthit.gov/policy-researchers-implementers/clinical-decision-support-cds>
17. FOMO causes Young People to Spend too much time online. By Professor Andy Phippen, Plymouth University, 22nd March 2018. <https://swgfl.org.uk/magazine/fomo-causes-young-people-to-spend-too-much-time-on/>
18. What is Digital Identity and How Does it work. By Megha Shah. June 17,2020. <https://www.techfunnel.com/information-technology/what-is-digital-identity/>
19. HEE papers relating to Digital Literacy : <http://tinyurl.com/kg69zp>
20. HEE's TEL programme: <http://tinyurl.com/jmx1s56>