Chapter 1

How Can Digital Health Be Best Leveraged to Provide Optimal Support During Pandemics Like the COVID-19 Crisis?

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ABSTRACT

The novel coronavirus (SARS-CoV-2) first identified in Wuhan, China in late December 2019 was identified as a pandemic by the World Health Organization (WHO) in March 2020 and has caused tremendous disruption to economies around the world and significant loss of life and serious illness. The current outbreak which has been thought to have originated in an animal wet market in late 2019, being transferred from the horse shoe bat to the pangolin, is well adapted to human cell receptors. This enables it to easily infect people with an R0 of approximately 2.2 causing a respiratory illness (COVID-19) which can develop into pneumonia in moderate to severe cases. Older adults and people with underlying medical conditions are at higher risk. The following outlines a responsible digital health solution.

INTRODUCTION

In the first three months of 2020, we have witnessed country after country enforcing lock downs of various degrees of severity in an attempt to flatten the curve and reduce the spread of COVID-19; a severe respiratory illness that has been deemed a pandemic by the WHO in March 2020 and has led to the death of thousands of people and the serious illness of many more. Current medications appear to have little impact in controlling and/or curing this disease and while we wait for the identification and

deployment of an appropriate vaccine, it is useful to identify suitable measures that can be taken to contain and slow down the spread of this deadly virus. We contend that digital health can offer us several solutions that can provide timely and facilitate the rapid containment and development of prevention strategies. The following serves to identify critical factors that must be considered in the design and development of such digital health solutions to enable maximum benefit and minis potentially negative unintended consequences.

BACKGROUND

Digital health, a relatively new and developing domain which lies at the confluence of medicine, computer science and business management is characterized by key sub-streams as follows (Wickramasinghe, 2019): 1) analytics, 2) augmented and virtual reality (AR/VR), 3) 3D printing, 4) sensors and 5) mobile and wireless solutions. Clearly, there are opportunities for all these areas to assist in the containment and prevention of COVID-19. For example: i) analytic techniques can be harnessed and applied to the multi-spectral data currently being generated around the world to develop surveillance networks or prediction models, ii) AR/VR solutions can be developed to support people from a distance and replace much face-to-face health interactions around many issues such as mental health and more especially anxiety or depression mood states, iii) 3D-printing can be harnessed to rapidly produce more equipment such as masks and ventilators and sensors can assist in particular older or disabled members of a community to manage more effectively while iv) telemedicine is effective to provide at a distance necessary and required healthcare advice and support. However, one area that has been seen to be particularly powerful during the initial months of the COVID-19 pandemic is the rapid development of mobile solutions and/or apps.

Mobile Apps

Currently, there are over 300,000 mobile apps both android and iOS available to support diet and exercise needs (Jimenez et al., 2019). This, in itself, highlights the appeal of such apps to the general population and the fact that there is a relatively low learning curve today for large sections of the community to adopt and use such apps. Moreover, such solutions provide anywhere, anytime support and advice which is particularly beneficial. However, it is important to note that while there are several thousands of apps available that focus on what can loosely be identified as wellness or prevention aspects, when it comes to healthcare or medical focus the uptake of such apps typically rapidly falls away. The major reason for this is around the high requirements in many (in particular) western countries for specific data privacy and security features (Trepte, et al., 2017). We acknowledge that security and privacy concerns are necessary and important but we question the impact such a focus has in terms of reducing the rapid development and deployment of appropriate solutions because of what might be considered "over regulation" around security and privacy. Hence, the research question guiding this inquiry is *How can we rapidly design, develop and deploy suitable digital health solutions for emergency and disaster situations?*

Fit Viability

From theory, it is possible to try to unpack the potential poor sustained use of mobile solutions in terms of poor fit. Proffer the fit-viability morel as a suitable analysis lens which combines the dimensions of

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