Learning from mHealth Success Stories: Effective Interventions for Marginalised Populations

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Abstract
The rapid development of mHealth technologies has the potential to revolutionize many health disciplines, especially in the context of marginalised groups. However, so far health outcomes have not stood up to the high expectations. Moreover, interdisciplinary design and evaluation frameworks are missing. In this workshop, we want to identify success factors of effective mHealth interventions with an interdisciplinary lens, bringing together researchers from HCI, public health and related disciplines. To address issues of health equity, we put our focus on marginalised groups, e.g. low-income populations from rural areas, developing countries or with low digital health literacy. Our central outcome will be a collection of concepts for an integrated, multi-disciplinary development and evaluation framework.

Author Keywords
mHealth; marginalised populations; vulnerable populations; eHealth

CCS Concepts
•Applied computing → Health informatics; •Human-centered computing → Collaborative and social computing design and evaluation methods;
Introduction & Motivation
In many countries, the poorest households are more likely to have access to mobile phones than to toilets or clean water [3]. As mobile phones become more and more affordable, mHealth is a powerful platform to reach out to marginalised populations where mHealth transformation can be most disruptive and beneficial [9]. Whilst the increasing availability of mobile devices [1] has resulted in a growing market for mHealth applications [15], there is mixed evidence of positive health outcomes (e.g. lower mortality, higher quality of life, weight loss) when looking at the general population [20, 5, 11, 21]. However, in the context of marginalised populations, there are a number of success stories. There is a growing evidence base for the efficacy of mHealth interventions in low- and middle income countries, particularly in improving treatment adherence, appointment compliance, data gathering, and developing support networks for health workers [4, 8]. Furthermore, Stowell et al. identified barriers and facilitators of mHealth intervention adoption in marginalised populations, e.g. technology that participants were already familiar with was the most commonly reported facilitator of intervention success [19]. However, the quantity and quality of evidence is still limited [10, 18, 8].

In spite of the potentially wide applicability of digital health strategies and solutions to address the diversity of populations’ needs, governments have found it challenging to assess, scale up and integrate such solutions. There are a number of contributing factors including (1) a multiplicity of pilot projects with no clear plan or process for scale and (2) a lack of interconnection between individual applications and a lack of integration with existing national eHealth strategies and health information architectures [14].

Outcomes of the Workshop
The outcome of the workshop will be a collection of ideas and concepts for a framework for multi-disciplinary mHealth projects targeted at marginalised groups. We want to achieve this by identifying underlying factors that contribute to successful mHealth projects. The workshop will aim to foster collaboration among attendees beyond the workshop through (1) a Slack workspace, (2) the workshop website and (3) future follow-up workshops. We plan to synthesize and publish the results of our workshop for scholars and practitioners from disciplines involved in the development, design and implementation of mHealth interventions for members of marginalised groups, e.g. as a journal paper.

From an HCI point of view, studies suggest that users require consumer-friendly devices and apps that are self-reinforcing and enjoyable to use [17]. Reporting on experiences in the UK’s National Health Service, Greenhalgh et al. highlight ease of use of mHealth apps as a deciding factor in their adoption [2]. Within marginalised populations, the HCI community has been extensively involved with mHealth technologies both on a theoretical level, e.g. by developing frameworks [7, 12], and a practical level, e.g. by developing and evaluating a range of specific medical and healthcare solutions (for a systematic review of mHealth interventions for marginalised populations see [19]). Still, a multidisciplinary design framework for marginalised populations is missing so far.

We follow the definition of medically underserved groups by Huh et al. as those experiencing barriers to basic health needs due to racial/ethnic (e.g., Turkish in Germany, Hispanics and African-Americans in the U.S.), social (e.g., education, literacy, language), economic (e.g., employment, poverty, insurance), or geographic (e.g., rural) barriers [6]. According to this definition, we orient the workshop around the UN Sustainable Development Goals 3 (ensure healthy lives and promote well-being for all at all ages) and 10 (reduce inequality within and among countries) [13].

In summary, (1) a lack of evidence for positive health outcomes, (2) missing design and evaluation frameworks and (3) challenges surrounding the implementation of digital health technologies within national strategies and healthcare systems indicate the need for a multi-disciplinary approach in equitable design and evaluation of mHealth interventions for marginalised groups. In our workshop, we will address these issues and collect ideas and concepts for researchers and practitioners to guide the design and evaluation of effective mHealth interventions.
Goals of the Workshop
Given our shared motivation of considering equity in research outcomes, underserved populations stand at the core of our efforts. The workshop aims to discuss HCI and related topics on how to reach marginalised groups with mHealth interventions. We want to identify success factors in the development of effective mHealth interventions for marginalised groups beyond the scope of single disciplines such as HCI. We explore interdisciplinary working and associated differences in nomenclature and common practices in design, development and evaluation across disciplines; for example, Randomised Controlled Trials are commonly used in health research but not in HCI where the approach is one of explorative, rapid iteration and to ‘fail quickly’ [16]. The primary goal of this workshop is to collect initial ideas and concepts for a framework of multi-disciplinary intervention development.

Agenda:
09:30-10:00: Introduction and workshop overview
10:00-10:30: Lightning talks by organizers and two-minute presentations by the participants
10:30-11:00: Morning coffee break
11:00-11:45: World café session to identify the most relevant discussion points in groups
11:45-12:30: Prepare group presentations
12:30-13:30: Lunch break
13:30-15:00: Group presentations of concepts and scenarios; consolidation of group outcomes
15:00-15:30: Afternoon coffee break
15:30-16:45: Wrap up, next steps and future collaboration

Workshop Structure
The central theme of the day will be to collect ideas and concepts to reach our goal of collection ideas and concepts to draft a design and development framework for effective mHealth interventions in marginalised populations.

Two weeks before the workshop day, the organizers will distribute the accepted papers and invite participants to read them. During the workshop day, we will start with introductions, followed by short provocative lightning talks by the organizers and two-minute presentations by the participants. We will then engage participants in a world café session to identify the most pressing issues. The discussion will be based on the points raised in the position papers to make sure all authors’ perspectives are considered.

After the coffee break, participants will be involved in a hands-on session. We will split the participants in multiple groups and ask them to further develop and operationalize ideas surrounding the issues identified in the morning session. Each table will work to identify the factors contributing to successful mHealth projects, their characteristics and how these factors can be integrated into a framework for multi-disciplinary research and development in marginalised settings.

After the lunch break, participants will present and discuss the concepts and scenarios produced during the day in order to consolidate the group outcomes to a set of common concepts and ideas.

Audience
We will invite researchers from disciplines such as computer science, HCI, social sciences, public health and psychology. We especially want to reach out to potential attendees that represent or are specifically interested in marginalised populations. Due to the expected practical implications of our work, practitioners, designers and developers will be welcome to attend. We aim to have 15-20 participants and 10-12 accepted position papers.

To maximize the outcome of the workshop, we will prepare a website with the workshop papers, further readings and organizational information. The CfP will be disseminated in relevant mailing lists of the disciplines listed above. Participants will be asked to submit an extended abstract of 2-4 pages stating their previous work in the domain or their position in respect to the workshop topic. Ideally, position papers will report experiences with mHealth projects and critically reflect on them. Furthermore, we will ask authors to list their three most critical discussion points as well as biographies to be included for position papers. At least two members of the workshop organizing team will review the papers, mainly with regard to the relevance to the topic.
Organizers
As the organizers come from various disciplines, locations, cultural backgrounds and are at different career stages, we hope to attract a diverse and interesting mix of participants for our workshop.

Daniel Dietheij (corresponding author) is a PhD candidate and researcher at the HCI group at the University of Bremen, Germany. As a member of the Leibniz Science-Campus Digital Public Health he works with digital technologies in medicine and healthcare with a focus on underserved populations.

Julian Wienert is a postdoctoral researcher at the Leibniz Institute for Prevention Research and Epidemiology – BIPS where he is part of the Leibniz-ScienceCampus Digital Public Health. He is working in the field of evaluation, addressing challenges in public health evaluation of digital public health technologies. His research interests lie in developing, evaluating and implementing effective interventions to improve quality of life and healthcare.

Jochen Meyer is director of the Health department at the OFFIS Institute for Information Technology where he is responsible for about 30 researchers working in regional, national and international projects. His research areas include technologies for wellbeing and prevention, ambient assisted living, and personal use of multimedia data. He was co-organizer of numerous workshops related to health and technology, was Programme Chair of PervasiveHealth 2019, and is General Chair of IEEE ICHI 2020.

Shaimaa Lazem is an Associate Research Professor at SRTA-City, Egypt. Her research interests include participatory design, cross-cultural collaborations, post-colonial computing, and decolonizing HCI. Her previous projects included designing low-cost education, mhealth technologies, and heritage documentation technologies for marginalised populations in Egypt.

Aneesa Singh is a Lecturer of Human Computer Interaction at the UCL Interaction Centre. She is interested in the design, adoption and use of personal health and wellbeing technologies in everyday contexts. Her research is interdisciplinary and focuses on digital health, ubiquitous computing, multisensory feedback and wearable technology, especially in sensitive and stigmatised populations.

Andy Bayor is a PhD student at Queensland University of Technology (QUT). His research focuses on designing to support skills learning and social/digital inclusion for people with intellectual disabilities. He co-designed the Talking Book, an audio computer used for supporting health literacy by rural families across Africa. Andrew worked on technologies that support peacebuilding within UN missions in West Africa at the United Nations University in Macao-SAR.

Hajo Zeeb is an experienced epidemiologist and prevention researcher. In his Public Health research he frequently includes or assesses digital interventions. He is a professor of epidemiology at Bremen University, heads the department of prevention and evaluation at the Leibniz Institute for Prevention Research and Epidemiology BIPS and the Leibniz ScienceCampus Digital Public Health Bremen.

Johannes Schöning is a professor for computer science at the University of Bremen, Germany. His research interests lie at the intersection between (HCI), geographic information science and ubiquitous interface technologies. He is a member of the Leibniz ScienceCampus Digital Public Health.

The workshop is supported by the Leibniz ScienceCampus Digital Public Health.
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