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, espe-
cially in the context of marginalised groups. However, so
far health outcomes have not stood up to the high expec-
tations. Moreover, interdisciplinary design and evaluation
frameworks are missing. In this workshop, we want to iden-
tify success factors of effective mHealth interventions with
an interdisciplinary lens, bringing together researchers from
HCI, public health and related disciplines. To address is-
sues of health equity, we put our focus on marginalised
groups, e.g. low-income populations from rural areas, de-
veloping countries or with low digital health literacy. Our
central outcome will be a collection of concepts for an in-
tegrated, 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;*

Outcomes of the Workshop
The outcome of the workshop will be a **collection of ideas and concepts for a framework for multidisciplinary 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.

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 interconnectedness between individual applications and a lack of integration with existing national eHealth strategies and health information architectures [14].

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 re-
search 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 fac-
tors in the development of effective mHealth interventions
for marginalised groups beyond the scope of single disci-
plines 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.

Audience

We will invite researchers from disciplines such as com-
puter science, HCI, social sciences, public health and psy-
chology. We especially want to reach out to potential atten-
dees 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. Par-
ticipants 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.

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 dis-
tribute the accepted papers and invite participants to read
them. During the workshop day, we will start with introduc-
tions, followed by short provocative lightning talks by the or-
ganizers 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 ses-
sion. 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 or-
der to consolidate the group outcomes to a set of common
concepts and ideas.

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 Diethei (corresponding author) is a PhD candidate and researcher at the HCI group at the University of Bremen, Germany. As a member of 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.

Aneesha 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.

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