Mobile phones in development: Reflections on a workshop series

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Abstract

The global development community has been having a 'love affair' with mobile phones, according to commentator Kentaro Toyama. However, in Papua New Guinea (PNG), the concept of using mobile phones to improve development outcomes is still relatively new. While a small number of projects have been attempted to varying degrees of success, there are many organisations and government agencies for which the path to implementing a project remains a mystery. The authors ran a series of workshops around PNG in order to introduce the concept of 'mobile phones for development' (M4D) and to develop the capacity of attendees to plan and implement successful M4D projects. Workshops included participatory activities and each participant prepared a project action plan and identified their next steps. Attendees were from government departments and agencies, non-government organisations, the private sector and donors. The workshop series culminated in a roundtable for practitioners, at which invited attendees were either implementing M4D projects, or in the advanced stages of planning a new M4D project. The paper contributes to literature on use of mobile phones in Melanesia and provides insights into how they can be used for strategic means. The paper also suggests follow-up research to track impact over time.

Key words: Communication, development, mobile phone, phone, project design, technology, training.

Introduction

This paper will outline a series of workshops that were conducted throughout Papua New Guinea (PNG) to introduce attendees to the concept of 'mobile phones for development' (M4D) and to develop the capacity of attendees to plan and implement successful M4D projects. It is anticipated that the paper would be useful for M4D practitioners in the Pacific and also for those who may wish to offer training in M4D in other localities.

The paper relies primarily on the reflections of practitioners. The authors both have experience implementing M4D projects. They jointly worked to develop and facilitate a series of workshops designed to help attendees learn about how to conduct a project using mobile phones. Learnings from the process form the bulk of the material drawn on for this paper. Where available, course

evaluation forms returned by participants are also used as a source of data for this paper.

The paper will: introduce the theoretical framework, which is based primarily on Heeks' ICT4D 2.0 manifesto (2009) and his more recent work considering the notion of ICT4D 3.0 (2020a; 2020b); discuss global efforts to explain or teach M4D; provide the PNG context regarding mobile technologies, competition and network expansion since 2007; outline the workshop series; present participant feedback; suggest key considerations for organisations embarking upon the design and establishment of M4D projects; present case studies of two workshop participants; and make concluding remarks.

Theoretical framework

In his ICT4D 2.0 manifesto, Heeks (2009) outlines how thinking and practice around the use of information and communication technologies (ICTs) for development (ICT4D) have progressed in recent decades. While initial efforts, from 1950s to 1980s, tended to focus on provision of computers to developing country governments to assist them with administration, the availability of the Internet from 1990s onwards led to a focus on the telecentre model (Heeks, 2009, pp. 2-4). Heeks argues that the work on telecentre projects from 1990s to late 2000s mostly resulted in "failure, restriction, and anecdote" (Heeks, 2009, p. 4). As lessons have been learnt from these mistakes, each of the terms has been replaced in the ICT4D 2.0 period by key words: sustainability, scalability and evaluation, respectively (Heeks, 2009, p. 4).

In the era of ICT4D 2.0, there is: less emphasis on new technology and more focus on what is already in use (for example, radio and mobile phones); less emphasis on technical innovation and more on application of technology; and less emphasis on piloting and more on assessing and scaling (Heeks, 2009, pp. 5-6). It continues to be the case that computer-enabled Internet is not accessible for many people in developing countries, whereas mobile phones have wide reach (Heeks, 2009, p. 7; Kelly & Minges, 2012, p. 3; Watson, 2013). Indeed, mobile telephony is "arguably the most ubiquitous modern technology" (Kelly & Minges, 2012, p. 3), and in some developing countries, such as PNG, "more people have access to a mobile phone than to a bank account, electricity, or even clean water" (Kelly & Minges, 2012, p. 3). It is valuable to explore what benefits can be achieved through use of voice calls and mobile phone text messaging (or SMS, short message service) (Watson, 2014, 2015a, 2015b), "rather than wait for handset and bandwidth upgrades to allow mobile Internet access" (Heeks, 2009, p. 8).

M4D is a key part of ICT4D 2.0, for example through sending reminders via text messaging or through leveraging mobile banking towards beneficial ends (Heeks, 2009, p. 11). In terms of income generation, the spread of mobile phone reception to rural areas of developing nations has made it possible for people to make money through selling accessories, pre-paid cards and air time (Heeks, 2009, p. 12). The typical approach taken by leading donors when thinking about how to commence work in this space is to think of a

development goal, understand the role of ICTs in relation to that goal and then determine which technologies could help (Heeks, 2009, p. 26). Having taken such an approach, an organisation, government agency or donor may then want to know how to implement a project or program of work using the chosen technologies. If mobile phones are to be central to the work, then it may be that the implementer would look for resources or training, in order to find out about how to conduct an M4D project.

More recently, Heeks has pondered whether we are now moving into an era of ICT4D 3.0 (2020a; 2020b). He explains that "ICT4D 1.0 and 2.0 were both significantly shaped by the Millennium Development Goals" (Heeks, 2020a, p. 1), whereas understandings about development have since shifted, with "the greater focus on transformation, inclusion and sustainability arising from the advent of the Sustainable Development Goals" (Heeks, 2020a, p. 11). Similarly, technologies have changed. Whereas mobile phones have been the lead technology for ICT4D 2.0 (Heeks, 2020a, p. 2), "ICTs are increasingly part of all aspects of development processes: gathering data, supporting or making decisions, underpinning actions and communicating results" (Heeks, 2020a, p. 2). The context in which Heeks is deliberating is one in which "most individuals in developing countries have digital mobile phone access" (2020a, p. 3). As will be outlined regarding the PNG context in this paper, access levels in PNG are not where Heeks is envisaging. For instance, Heeks suggests that mobile money "reduces some of the physical barriers to participation in markets" (2020b, p. 4), but in PNG "the adoption and use of mobile money services remains low" (Highet, Nique, Watson & Wilson, 2019, p. 27).

Global efforts to explain M4D implementation

While the use of M4D has increased in recent years, uptake has been inconsistent and often been led by developers, coders or others who have been able to harness technical expertise for the benefit of a specific organisation or group. Efforts to improve the wider ecosystem's efficacy have been limited to one-off projects, as opposed to systemic and grassroots capacity building.

Some efforts have been made to share knowledge of both free and at-cost services for implementing M4D services. For people and organisations willing and able to access online courses, there are introductions to M4D available, including Tech Change's 'TC105: Mobiles for International Development', which offers a guide in how basic mobile technologies can improve development outcomes, introducing several free or low-cost options relevant to non-profits. Digital Frontiers Institute also offers online courses, including 'Digitizing Agriculture - The Last Mile in Smallholder Agriculture', which focuses on digital tools 'being deployed both directly to smallholder farmers and to others in the agricultural value chain'. These courses are both 4 weeks long and cost between USD 250 - 500 each.

In 2014, the mSTAR program under FHI 360, along with OpenRevolution, published a handbook for United States Agency for International Development staff and other development practitioners, 'Integrating Mobiles into

Development Projects', aimed at improving the effectiveness of M4D projects. This handbook is a free, downloadable resource offering an in-depth overview of the M4D ecosystem, and some assistance regarding technical components of the M4D set-up process.

While these efforts offer powerful resources for those with an existing understanding of basic technical terminology, organisational support, and reasonable Internet connection, they are prohibitive to rural organisations with weak Internet connection, a basic technical understanding, or limited budget. In the absence of local skills, these online courses are an alternative. However, they have limited practicability if participants are not 'self-starters' and cannot transfer the theory into implementation.

One of the biggest challenges discovered while delivering the training referred to in this paper was the low familiarity and comfort-levels with basic technical concepts and vocabulary, and significant time was spent explaining both the ideas and language. The participants, at times, appeared unnerved with these new concepts and were dependent on one-on-one explanations. While delivering M4D training through handbooks and online courses is a more cost-efficient means of dissemination, it is less appropriate for low-tech communities.

PNG context

PNG is a developing nation located north of Australia and east of Indonesia. In 2007, competition was introduced into the mobile telecommunication sector (Daniel, 2017, p. 31; Kaski, Mursau & Maybanks, 2014, pp. 139-140; Sagrista & Matbob, 2016, p. 26; Suwamaru, 2015b, p. 1; Suwamaru, 2016, pp. 2-3; Watson, 2010, p. 107), which catalysed the spread of network coverage to rural areas and led to substantial uptake of mobile phones (Watson, 2011, pp. 47-49). The number of mobile phone users increased from 100,000 in 2006 to nearly 2.3 million in 2014 (GSMA, 2014). In 2019, the number of active mobile phones in use had risen slightly to 2.8 million (Highet et al., 2019, p. 24; Watson & Park, 2019), with 2.5 million unique mobile phone users (Highet et al., 2019, p. 18) (the difference between these figures is because some people use more than one mobile phone number).

Affordability and electricity access remain obstacles to adoption (Gibbs, Aiwe, Tia & Wangihama, 2016, p. 6; GSMA, 2014; Highet et al., 2019, p. 8; Thomas, Levy, Vetunawa & Rawstorne, 2017, p. 12; Thomas, Kauli, Levy, & Rawstorne, 2019, p. 14; Watson, 2013; Watson, 2014, p. 2). Some potential users may feel unsure about how to use mobile phones, as it was found in a study of women in PNG with low socio-economic status that over a third of respondents were not comfortable with making a phone call and over half did not know how to send a text message (GSMA, 2014). PNG has low levels of literacy (GSMA, 2014, p. 9; Intermedia, 2012, pp. 10, 19; Rooney, Papoutsaki, & Pamba, 2004, p. 7; Sagrista & Matbob, 2016, p. 25; Vallance, 2008) and therefore difficulties with reading may decrease some people's confidence with use of mobile phones and in particular text messaging.

One commentator has argued that the regulatory environment has done little to encourage price reductions (Suwamaru, 2015a, p. 2). Certainly, consumers in many parts of the country have little choice with regard to provider, as only one operator extends service to the rural areas where most of the people reside (Suwamaru, 2015a; Watson, 2015a; Watson & Fox, 2019). It is argued that phone calls between providers are more costly than phone calls on the same network (Suwamaru, 2015a, p. 1), following a period from 2007 to 2009 when phone calls could not be made across networks (Watson, 2011, pp. 49-50). Another regulatory issue that has been challenging at times for consumers is the PNG government's policy of mandatory registration of SIM cards (a SIM is a Subscriber Identity Module linked to a user's phone number and usually looks like a small computer chip) (Highet et al., 2019, p. 24; Watson, 2019).

Mobile phones and radio are the most readily accessible communication devices available in PNG (Intermedia, 2012, p. 32; Thomas et al., 2017; Thomas et al., 2019), although radio listenership appears to be dropping, possibly due to signal weaknesses and decreasing interest amongst young people (M&C Saatchi World Services, NBC, ABC International Development & Australian Department of Foreign Affairs and Trade, 2014). Mobile phone use also decreased in some provinces between 2012 and 2014, possibly due to financial constraints (M&C Saatchi World Services et al., 2014).

In 2012, there were very few Internet users in PNG (Intermedia, 2012, p. 10; Watson, 2013). Since then, there has been an increase in Internet use, due to installation of third generation (3G) mobile service in urban areas of the country (Watson, 2014, 2015a) and, more recently, some rural areas. Fourth generation (4G) technology commenced in the capital city Port Moresby in 2016 (Highet et al., 2019, p. 21; Watson & Park, 2019). There has also been an increase in use of social media, particularly Facebook, since roughly 2012 (M&C Saatchi World Services et al., 2014, p. 11; Watson, 2015a) and by November 2018 there were "approximately 750,000 people active on Facebook" (Highet et al., 2019, p. 24; see also Siraba, 2019). There are roughly 600,000 smartphones in use (Highet et al., 2019, p. 19), meaning that many of the mobile phones in use around the country are basic handsets with limited capability for accessing the Internet, if any. For instance, recent research in the Autonomous Region of Bougainville found that half of the mobile phones there were basic handsets with no Internet capability (Thomas et al., 2019, p. 15). Internet access remains challenging for many people in PNG (Abady & Namun, 2016, p. 44; Airi, 2019, p. 3; Daniel, 2017, p. 31; Gibbs & Kale, 2017, pp. 60-61; Sagrista & Matbob, 2016, pp. 25-26; Thomas et al., 2019, p. 16).

The workshop series and how it evolved

When GSMA Connected Women first entered PNG in 2013, the primary objective was to determine the level of understanding and application of M4D initiatives by public and private sector partners. Through extensive stakeholder engagement in the capital city Port Moresby, it was evident that while several local and international non-government organisations (NGOs) were aware of

the M4D opportunity, there were only three (Susu Mamas, World Vision Bougainville and Population Services International) known examples of organisations independently introducing mobile phones into their work. Of the organisations which were loosely familiar with M4D, their experience was limited to specific well-known applications such as FrontlineSMS. However, these organisations were not conversant in what these applications involved, with more than one interviewee requesting a 'FrontlineSMS', without realising that this is a free, downloadable service.

GSMA's Connected Women program was well received in PNG, and part of this enthusiasm was likely due to the arrival of an imagined potential funder. However, given the limited base understanding and lack of local champions to inspire and serve as examples, GSMA Connected Women decided to offer training opportunities and non-financial support for NGOs, in place of direct funding for M4D implementation. The rationale for this decision was that by fostering local skill, and bolstering community knowledge, M4D services would be implemented more thoughtfully and sustainably.

During the consultation period, GSMA discovered that the PNG government had undertaken, with funding and support from the Australian government, a series of three coordinated, concurrent trial research projects testing the use of M4D in three different sectors: health, education and justice. From this coordinated program of research, lessons learnt emerged and a set of guiding principles for M4D in PNG was launched in April 2014 (Watson, 2014). To coincide with the launch event, the GSMA held the first training and information session in the same week in Port Moresby. The initial one-day-long workshop had a dual purpose: to understand the interest and capability of the workshop's intended audience in PNG, and to offer a basic overview of M4D with some instruction around service set-up.

In feedback forms collected after the day-long information session, participants requested more interactive and hands-on activities, and an extended workshop. One of the most important topics within the information session focussed on the technical set-up of an SMS service, and many participants requested additional support in this area. Feedback from the day was largely positive, with participants requesting a more comprehensive workshop, with greater support around technical set-up.

To further gain understanding of participants' knowledge levels and training needs, individual consultation sessions were offered on the day after the event, between interested organisations and the facilitators. These individual consultation sessions provided the authors with more detailed understanding of organisations, their past activities, planned activities, strengths and weaknesses. Again, these sessions highlighted the need for further technical help, and time for individual planning within the workshop.

Taking this feedback on board, three further workshops were planned and held (see Table 1) with groups of approximately 20 people, who had applied and been accepted into the training. The two-page application forms asked

applicants to outline their organisational experiences with mobile technology to date, and explain where they saw opportunity to deploy it in their work. Obliging the organisations to do some clear thinking around this ahead of each workshop was beneficial, utilising the in-person time as effectively as possible.

Table 1: **Workshop series**

Event	Date	Length	Location
Information session	April 2014	One day	Port Moresby, National Capital District
Workshop	July 2014	Two days	Buka, Autonomous Region of Bougainville
Workshop	September 2014	Two days	Madang, Madang Province
Workshop	November 2014	Two days	Port Moresby, National Capital District
Roundtable	March 2015	Half day	Port Moresby, National Capital District

Preparing for the second workshop in Bougainville, the facilitators increased the amount of time spent explaining and discussing the different technical elements of M4D. Several activities that focussed on individual service design were also introduced to the training. These activities were largely worksheet and small group-based planning exercises that compelled the participants to engage in a critical thinking process, and consider some challenging implementation realities. The worksheets played an additional important role for the participants, in helping them subsequently explain and advocate for their envisaged M4D service to their organisations. This had been highlighted as a challenge – the high volume of new information introduced in the workshop was difficult for participants to absorb, and it was then a challenge to articulate this to their supervisors and wider team. The worksheets offered participants a tangible resource to assist them in advocating for this service to stakeholders outside the training.

Pre- and post-workshop feedback forms were distributed at each of the following workshops in Madang and Port Moresby, with suggestions and requests around time allocation and further interactive activities taken into consideration. With much of the content unfamiliar to participants, many became withdrawn and shy when they were not able to easily or quickly absorb new concepts. Group work created a comfortable learning environment where participants were able to ask and often answer each other's questions, and seek further explanation and guidance collectively from one of the facilitators. When placed in groups, participants appeared less threatened and were able to

raise concerns and ask questions collectively, while most were uncomfortable individually acknowledging they needed further support.

The final session was a half-day roundtable held in Port Moresby in March 2015, which was by invitation only – those invited had previously attended a workshop, and implemented or attempted to implement a service. This session reverted to the original goal of fostering a community of local champions, and sought to highlight the effort and experiences of those who had forged ahead, differentiating them from those who were merely interested in the prospect of attending a workshop. The participants could then identify each other as 'do-ers' and learn from each other's successes and failures, and potentially work together in the future. While several invitees from other provinces were unable to attend, brief updates about their efforts in strategic use of mobile phones were provided during the roundtable.

Roundtable attendees were from government departments and agencies, NGOs and donors. The roundtable provided a highly valued opportunity for practitioners to share experiences, ideas, challenges and solutions. Projects that were discussed included call centres, toll-free hotlines and SMS quizzes. One participant had established a micro-insurance service, paid for using tiny, daily deductions from the mobile phone credit of members. There were very few PowerPoint slides used during the roundtable, with the majority of the time being allocated to participants sharing their experiences and recommendations.

One final and ongoing activity for this community was the creation of a closed Google group, through which participants of the roundtable session were able to share updates and relevant M4D materials with each other through emails. This group remains active at the time of writing, and provides a platform for ongoing peer support and engagement, with members sharing resources, contacts and solutions.

Feedback from participants

Ramsden suggests "we can improve our teaching by studying our students' learning – by listening to and learning from our students" (2003, p. 6) and thus the facilitators de-briefed each day and reflected upon observations and experiences. At the beginning and end of each workshop, the facilitators also collected feedback from the workshop participants, questioning them on their expectations, ideas and aspirations for both the workshop, and how they might apply mobile phones in their everyday work. The pre-workshop form also questioned them on their perceived knowledge or comfort level around technology – data that helped the facilitators pitch the workshop at the appropriate level.

When asked about their learning expectations, the groups tended to fall into two categories – those who were new to the technology, usually local NGOs who responded with broad lines such as '(learn) the benefits of mobile technology' or 'effectiveness of communication through mobile phones'. The second group were those who were already aware of the possibilities of M4D,

and generally worked for international NGOs or had even worked in other emerging market environments before PNG. This group had much clearer expectations, and gave much more specific and informed feedback, such as 'the effectiveness …of mobile phones in relaying messages to nurses/ patients in rural hospitals and clinics' and 'how to improve the technological work flow of flexible learning centres (and) automate messages for students'.

Feedback following each workshop was positive, with participants appreciative of the time taken to explain concepts and ideas around mobile technology. Suggestions tended to be based around themes, as opposed to specific implementation ideas. Common recurring themes included:

Timing: participants commonly reported that the workshop should have been longer – general feedback indicated that one additional day would have sufficed. There is anecdotal evidence to indicate that this is common feedback on workshops in PNG – participants often feel they should be longer in duration.

Technical Advisory: unsurprisingly, given the non-technical focus of most participants, most felt they wanted and needed more time and support becoming more familiar with the technical components of set-up. This part of the workshop was challenging, with the introduction of new, technical vocabulary for the participants.

Demonstration/ practical experience: as many ideas and concepts introduced were new to participants, concentrated 'hands-on' experience was important in enabling them to truly grasp the technology being explained. While there were components of demonstration through the workshops, it was insufficient in allowing every participant to spend intensive guided time with the platforms. Participants wanted more individual, experiential learning, which while useful, is difficult to manage with a group of 20 people or more.

Despite further refining the workshop with this feedback, not all suggestions were practical. Extending the workshop for a third day would have both increased the costs, and prohibited many participants from attending – two days out of a normal working week is significant, and often the upmost limit for small organisations to manage. The facilitators managed this by offering individual consultancies, and ongoing coaching to participants – which around 10% of participants took advantage of. Increasing the focus on demonstration and practical experience also required significant time, so the facilitators offered post workshop demonstrations in one-on-one sessions. Regarding the participants' request for more technical advice, the workshop evolved to incorporate more in-depth explanation on the different components – platforms, connectivity and content.

At the conclusion of the first day of the workshop in Buka, participants and local partner organisations requested addition of more interactive sessions, games and participatory activities on the second day of the workshop. While every effort was made to take this feedback into account in Buka, it also

influenced the subsequent development of the workshop series and thus the workshops became much more interactive and participatory. For example, the first iterations of the workshops involved a session of roughly an hour in duration in which the details of three concurrent M4D projects were explained in a PowerPoint presentation. Instead, the same amount of time was allocated in the final workshops to activity stations, which participants could move between at their own pace, looking at resources about the projects, absorbing what was of interest to them, discussing them with fellow participants and asking questions of one another and the facilitators as needed. Such an approach worked well because effective teaching encourages adult students to learn "thoughtfully, responsibly and cooperatively" (Ramsden, 2003, p. 87).

Imel (2002) states that adult learners want to connect their real-world experiences and what they already know with the new information they are receiving. Imel also believes that adults view learning as an active process of constructing meaning, rather than simply passive reception of knowledge (2002). Thus, Imel (2002) recommends the use of small-group activities and this technique was employed more and more as the workshop series progressed. The facilitators felt that this worked well, as participants clearly engaged with and enjoyed such activities. The facilitators were also very pleased with the results. For example, one PowerPoint slide used in early workshops presented potential barriers to M4D projects. In later workshops, small groups were asked to develop lists of potential barriers under each of the broad headings in the original slide, such as cost, network coverage and social/cultural issues (see Figure 1). The resulting presentations contained much more detail than the original slide, which was no longer used, and demonstrated high-order thinking and detailed understanding of the local context (see Figure 2).

Figure 1: **Workshop participants discussing potential barriers to implementation in a small group**

Figure 2: Workshop participants presenting the points raised in small-group discussions

Key considerations, when embarking upon the design and establishment of an M4D project

Throughout the workshop series, a consistent challenge for participating organisations was the critical thought process on how their proposed mobile services would be implemented. Much enthusiasm for the technology's introduction and potential positive outcomes existed, but far less cognition around identifying and mitigating risks was apparent. In particular, pinpointing the most pressing communication issue that an M4D service would address, and the audience which would most benefit from this initiative, was often challenging for participants. Equally challenging was creating a basic plan for sustainability – in terms of finances, human resources and content. To support participating organisations in the careful planning of a service, the authors built a framework to question the following themes, and these questions were worked through by participants either individually or in small groups during time allocated in the workshops:

Identifying communication processes and challenges: What are the communication problems being experienced by my organisation? Is there a specific problem or issue I would like to fix? If there is more than one, rank them in order of importance.

Identifying the audience: Which group of people is being affected by this communication issue? How many people are there in the group? Are they literate? Do they have mobile phones? Do they live within mobile network coverage? Do they have electricity access for charging mobile phone batteries? Do they know how to use the basic functions of mobile phones?

This set of questions asked participants to think about the beneficiaries with whom they work.

Considering appropriateness of mobile technology as a means to improve the issue: How do I communicate with this audience at the moment? Do they know how to send an SMS, or make a call? How is the mobile phone perceived? How are mobile operators perceived in this market? Is mobile telephony feasible as a solution?

The questions thus far prompted consideration of the organisational communication already in place, and asked whether mobile phones could address a present need. This activity was designed to shift the attention of attendees away from new technology and towards more focus on the technologies that are already in use and related practices. Such a shift is in line with Heeks' suggested move from ICT4D 1.0 to ICT4D 2.0, in which there is less emphasis on technical innovation and more on application of technology (2009, p. 5). While it was necessary for certain workshop sessions to focus on mobile phones, the facilitators did not necessarily view mobile phones as the solution to all problems. A satisfactory, even positive, outcome of the exercises was if certain participants realised that their communication needs could be met by other means.

Identifying perceived risks and threats: What potential challenges might I face? Can I confirm that all those involved in the project have: a) access to a mobile phone, b) reception, c) access to electricity, and d) reasonable levels of technical literacy? What are the costs involved? Where will I find funds for an M4D project? How will I manage this budget? Do I have the skillset within my team to get this to launch, and manage it post-launch? How will this service be accepted by the local community, churches and other important local stakeholders?

Sustainability planning: What am I hoping to achieve with this project? Who will manage this service? How many months do I plan for this project to run for? What will happen after that time?

The purpose of this exercise was not to demoralise and exhaust participants, but to ensure that they were aware of the importance of critical thought process and the many ways their project could derail. Recent years have seen a 'boom' in the launch of ICT4D projects, but few have prospered. Literature warns of the failure of many projects which utilise communication technologies in development efforts (Dodson, Sterling, & Bennett, 2013; Heeks, 2009; Trucano, 2010) and particularly those projects that are testing prototypes (Dodson et al., 2013, p. 27). Vota (2011) highlights a review of World Bank programs in developing nations, which found that the organisation's contributions towards sector reform had led to increased competition and faster penetration in target countries, but only 30% of their universal access schemes were successful in providing greater access to marginalised, poor and underserved communities.

A robust and well thought out design phase will help any organiser to identify potential challenges and plan for them. Equally, this design phase may prove that mobile technology is not appropriate. In a desire to do something 'new' and 'innovative', mobile technology is often a knee-jerk response, but it is not necessarily the right response. Practitioners need to be analytical when considering addition of mobile telephony to already functioning processes. As the saying goes, 'if it isn't broken, don't fix it'.

The practice of playing devil's advocate and questioning each element of the planned service is a difficult but essential part of good design. It is important for officers to look at the planned service's strengths and weaknesses from the perspectives of the organisation, mobile operator, end user, end user community and any other stakeholders. If officers can identify potential weaknesses or risks ahead of time, they will be able to mitigate or work around them in a much more strategic manner.

As Heeks notes, "the root of a number of ICT4D failures is identified as their techno-centric approach" (2009, p. 21). A focus on technology itself can mean that other dynamics, such as cost, are not given sufficient consideration and planning. Cost is an important factor to consider around sustainability, and many organisations participating in the training found it challenging to differentiate between set-up/ launch costs, and ongoing/ running costs. Running costs can be particularly challenging when there are multiple variable costs to budget for. Therefore, some of the more advanced participants were encouraged to budget for two scenarios: a best-case scenario where the funding required to run a service was in hand, and a low budget scenario where there was very limited financial resource at hand. Considering these scenarios side-by-side allowed participants to think about the cost implications more clearly, and broaden their thinking around implementation possibilities. The facilitators explained that it was advisable to start with a basic service and improve or expand it with time, rather than to start with a more sophisticated service and be forced to reduce, downgrade or suspend it.

In order to help participants to understand and sort the manifold M4D services available, the facilitators introduced three categories of different options. Each M4D service or platform was classified as a Managed, Customised, or Off-the-Shelf solution. The classification offered a basic guide as to what could be expected in each case.

Managed Solution: These are turnkey services, which typically include content management, service strategy, service operation, connectivity and database management. This level of service comes with a high price but requires little input and minimal technical expertise from staff.

Customised Solution: These services are tailored to meet a project's specific needs. In this scenario, the service provider manages the connectivity process, and then trains and hands over the platform, with ongoing technical service. Costs for these solutions are typically medium-to-high, with some staff technical capacity required to manage the ongoing service.

Off-the-shelf Solution: This is a one-size-fits-all approach, where set-up support is limited to online forums or documentation. While usually free or low-cost, the solutions require medium-to-high staff technical capacity and input. Commonly known off-the-shelf solutions include FrontlineSMS, Freedom Fone and RapidSMS.

Case study example of workshop participant

In attendance at one of the workshops was an officer from the communication and public relations section of a large entity. The officer was passionate about the need to disseminate to the general public educational messages specific to the organisation's area of work. Throughout the workshop, the officer participated actively and, by the end of the workshop, had developed a clear plan regarding next steps. It was felt that text messaging would be an effective way of reaching people with brief, informative and impactful messages that could be useful and beneficial for them.

In the weeks after the workshop, the officer maintained regular contact with the two workshop facilitators and developed a detailed proposal for the organisation's senior management team. As part of the process of preparing the proposal, the officer sought quotes from several value-added service providers, based on specific technical requirements. Selection of the preferred supplier was determined regarding factors such as cost and previous experience. Preference was given to companies operating within PNG, due to a requirement for ongoing and timely service support.

Around the time when the officer's proposal was presented to senior management, the entity underwent a cost-cutting exercise, which meant that no new projects were to be undertaken. The head of the organisation acknowledged the potential benefits of the proposed text messaging service, but explained that, although it may be possible at a later date, it could not be implemented at that stage.

Although the proposed project was not going to go ahead, the officer who had attended a workshop and the subsequent roundtable continued to be an active participant in the email group set up for roundtable participants. While the officer involved was disappointed that the project did not come to be, there was acknowledgement that the process had been a valuable learning experience. For the facilitators, the outcome was disappointing, after what had appeared to be a promising start, but it highlighted the necessity of institutional buy-in, in order for M4D projects to be successful.

Case study example of workshop participant

A participant at one of the workshops works with a non-government organisation, based outside the
capital city. Community group members with whom the participant works typically have access to basic mobile phones, but limited options for re-

charging mobile phone batteries. The participant has long-standing relationships with these groups and wanted to collect regular information from them on a specific topic. Mobile phone text messaging seemed a suitable option.

Following the workshop, the co-facilitators held an individual consultation with the participant and subsequently provided feedback on a draft SMS format containing codes and sequenced information. A small sample was chosen for a trial, with volunteers in the field given a training session before commencing to send in SMS reports regularly to a coordinator, who receives a small, monthly honorarium to cover the time involved in transcribing reports received via SMS into an exercise book. Volunteers were not issued with mobile phones, but were given solar mobile phone chargers. They receive monthly mobile phone credits.

Over a year after commencement, the pilot is progressing well, with data coming through regularly from volunteers. The only problem encountered has been that some people's handsets have been lost or stolen. The pilot has been expanded to another geographical area. At least one volunteer is in an area where there is tribal fighting taking place and therefore it is not possible for that person to travel out, or for others to travel in. Therefore, the mobile phone is the only means through which this information can be relayed. The effectiveness of this approach is in the simplicity of the design.
Overall, the pilot is working well and collecting information that would not have been available otherwise. Participation in the M4D training enabled the commencement of this work.

Conclusion

The paper has presented lessons learnt from the training process and the roundtable. It has identified key steps that are useful for officers from a range of organisations to go through, when embarking upon the design and establishment of a project aimed at utilising mobile phones strategically. It is anticipated that the paper will be of interest to M4D practitioners and trainers from around the Pacific region. It provides two insightful case studies and contributes to the literature on ICT4D.

Even though "the international-development community is having a love affair with the mobile phone" (Toyama, 2010), there are few resources available for those wishing to develop skills in the use of mobile phones in remote data collection (Kaski et al., 2014; Watson & Morgan, 2014; Watson, 2015b), rural service delivery and development efforts (Highet et al., 2019; Suwamaru, 2015b; Watson, 2014). While the available online and downloadable resources are valuable for those with an existing understanding of basic technical terminology and reasonable Internet connection, they are prohibitive to rural-based organisations with weak Internet connection, a basic technical understanding, or low budget. The training offered by the authors was designed to assist low-tech communities and included hands-on activities, explanations

of technical terms, and demonstration of the free, popular SMS-sending platform 'FrontlineSMS'.

Based on feedback received at the conclusion of the training workshops, during the subsequent roundtable and through ongoing communication between attendees and facilitators, it seems clear that the training workshops were valuable and of interest to participants. However, follow-up research could include contacting attendees to track impact over time. This would help to determine any long-term impact with regard to the amount and quality of M4D activities taking place across PNG.

Subsequent to the completion of the series of workshops in PNG, similar workshops were run by the second author in Indonesia and Myanmar. Further research could also involve trialling of the training workshops in other developing country contexts, to determine applicability. It may be that the workshops would need to be adapted slightly to fit each new context, but that the fundamentals of the workshops would be of use in most places, if not all.

Heeks discusses the value of using simple technology to achieve ends that can benefit communities, "rather than wait for handset and bandwidth upgrades to allow mobile Internet access" (2009, p. 8). Indeed, M4D is a central component of the ICT4D 2.0 approach that Heeks outlines (2009, pp. 11-12). As Heeks asks, "what can be achieved through calls and SMS?" (2009, p. 8). Along with technologies that have been available globally for longer periods of time, such as radio and television, mobile phones have potential, but projects need to be coupled with rigorous evaluation (Chib, 2013; Heeks, 2009, p. 4) and this point was also conveyed and discussed in workshop sessions. In short, the Heeks manifesto (2009) has been useful as a resource for the facilitators in terms of preparing for and also reflecting upon the workshop series.

The latest work from Heeks indicates that, with ongoing technology adoption, "ICTs are therefore moving from the exotic to the mundane in developing countries" (2020a, p. 3). Nonetheless, this paper provides mobile phone access data for PNG, showing that the majority of the mobile phones in use are not smartphones and that many people in the country do not have access to a mobile phone (Highet et al., 2019). Of interest is "an emerging set of telecommunications technologies that are helping to fill gaps in network coverage or speed" (Heeks, 2020a, p. 4), such as localised mobile phone networks (Heeks, 2020a, p. 4). Although there has been interest in PNG in other novel technologies such as drones and blockchain, Heeks views the impact and practical use of these technologies in development activities to be further into the future, if at all (Heeks, 2020a, p. 4). His writing also suggests that a "ubiquitous computing model of sensors" (Heeks, 2020a, p. 5) is unlikely to have direct impacts in developing countries for the foreseeable future.

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