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The Ethical Limits of Bungee Research in ICTD

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Abstract—Research on Information and Communication Technologies and/for Development (ICTD) is difficult because engineers and technology designers come from very different backgrounds from the people whose challenges that they are trying to address. They are separated by large physical distances and significant social differences. To overcome these challenges, much research involves occasional short visits by external researchers from rich and privileged situations to developing regions to investigate problems and generate ideas. These may be further developed back at the engineers' home base before return visits for deployment and evaluation. This paper examines some of the ethical limitations of this 'bungee research' model. It reflects on our experiences in evolving more fruitful research practices. We argue that relying on bungee research as a primary model of research engagement is unethical, and we suggest some minimal conditions that are necessary, but not sufficient, for such visits to be ethically defensible in ICTD research.

Keywords—ICTD, research ethics, bungee research

I. INTRODUCTION

The global spread of mobile communications has been accompanied by a growing interest in how information and communication technologies (ICTs) might contribute to social and economic development. Within the community of research and practice that is ICTD, the acronym is variously discussed as either: Information and Communication Technologies and Development or to Information and Communication Technologies for Development. The former construction 'and Development' is more easily associated with social scientific studies of the processes and consequences of technology adoption, whereas the 'for Development' formulation is often more appealing for engineering practice and research that sets itself the higher goal of devising technologies and establishing socio-technical interventions to contribute toward Development [1]. Dearden [2] makes a distinction between "interventionist" and "non-interventionist" stances in ICTD.

ICTD is a difficult challenge for Engineering, since the nominal outcome (Development) is a social, rather than a technical phenomenon, and it lacks a universally accepted definition. Given the difficulty of designing appropriate interventions in complex social situations, the field of human computer interaction has long argued the importance for engineers and researchers to develop an understanding of the contexts where they are working.

It is commonplace for researchers and engineers from 'developed' countries to engage in a variety of field study visits to locations and communities in developing regions to inform their research. Such research activities are not, however, ethically neutral exchanges of information, and the arrangements, structures and relationships that surround these communicative

This paper is concerned with the ethical issues that surround the design and conduct of this type of research activity.

II. BACKGROUND

Introducing new technologies into social settings can often generate surprises, even where designers and engineers are familiar with those settings. A classic example has been the adoption of SMS which was initially conceived as an internal service for employees of a mobile phone operator to communicate. "At the time it didn't seem like a big deal" according to Neil Papworth who sent the very first message [3]. In unfamiliar situations the potential for surprising responses is higher. Initially promising interventions are later understood to generate unforeseen and undesirable

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consequences due to hidden social complexities. A project in Bangladesh explored the use of smart cards to pay bus fares to speed up waiting times and reduce fraud. However, inflating fares was so commonplace and accepted, and drivers' wages were so low, that they could not cope with the reduction in their income from the cashless system. (For comparison, consider the social norm in North America that waiting staff in restaurants receive very low basic pay, and leaving a significant tip is regarded as a general social obligation on diners). Hence, what seemed like a simple technical change gave rise to significant industrial relations issues [4]. At times, technology can be a 'double-edged sword' for the same individuals. Wakanuma [5] reports on the mixed benefits for women using mobile phones in rural Zambia, describing how husbands used the phones' call logs to monitor and track women's contacts. The difficulty of predicting social consequences is also apparent in the story of the YayNay app. YayNay was developed as a social tool for teenagers to use when shopping getting feedback from friends about clothes that they were trying on. Early adopters were very enthusiastic and the developer was negotiating for major investment, until he discovered that the app was being used by adult stalkers to collect pictures of semi-naked children! [6].

Unpredictable and undesirable outcomes are also possible from the practice of conducting research in ICTD. Dearden [2] describes a (fictionalised) encounter where a visiting professor from a European University is unwittingly recruited to provide symbolic endorsement of a local politician with a risk of undermining efforts by a partner non-governmental organisation to avoid political associations. Because of huge economic disparities in the world, overseas researchers visiting deprived and marginalised communities, even those such as students who might regard themselves as 'low status' in their home setting, are seen as important visitors and can leave a significant 'footprint' in the communities with which they interact.

Furthermore when research is led by people who are not familiar with a social and cultural setting, and may not even speak the local language, the reliability of research data and decisions based on the data should be questioned. Heeks [8, 9] highlights the frequency of "design-reality gaps" in ICTD.

III. Ethical debates in ICTD Research

Awareness of these concerns has led to a growing debate about research ethics in ICTD. Anokwa et al. [10] self-identifying as PhD students, raise concerns that ICTD research embeds "a central conflict" between research goals and development goals. Sterling & Rangaswamy [1] discuss the complexity of informed consent when researchers and participants communicate via translators, and participants may have no relevant experience to help them distinguish between a foreign aid project and a project that is restricted to research. Tucker [11] argues that informed participation is required in addition to informed consent, so that research agendas are not hidden from participants. Dearden [2] provides a review of research ethics in ICTD and examines relevant discourses in related research disciplines (engineering, psychology, sociology, anthropology, human-computer interaction, development studies and health). The detail of that review is beyond the scope of this paper but the short summary below illustrates some points relevant to the discussion in this paper.

A starting point is to recognise that interventionist ICTD research shares characteristics with research in healthcare, since it involves active intervention in people's lives, rather than merely studying the world as it is. In health research, there has been extensive debate specifically about the ethics of research in developing countries [12–15]. In part, this was driven by a perception that powerful research actors might be 'exporting' activities to locations where research governance was weaker. There was also a concern that research in developing regions might exploit vulnerable participants by generating benefit for the researchers and others without providing any benefit to the participants themselves.

In guidelines developed by the United States National Institute of Health, Emmanuel et al. [16] argue that research activities that do not have the potential to generate reliable and useful knowledge are unethical because they waste resources that could be deployed elsewhere. Given the persistence of 'design-reality' gaps in interventionist ICTD research [8, 9, 17], such waste would include talented and well motivated researchers spending time on processes that do not result in the kinds of outcome that they imagine; as well as the cost of multiple intercontinental flights to conduct field work and present at international conferences.

Emanuel et al. [16] recommend that health research in developing countries should always be constructed as a partnership which includes building local capacity in both research and research governance. In this debate, Costello and Zumla [18] criticise "parachute research" where foreign domination of research agendas and processes results in failure to build and engage local research capacity. They argue that local capacity is ultimately essential to translate results into policy changes, practical

implementation and scaling, and that such factors usually outweigh the supposed benefits of research quality claimed by external researchers. In the case of ICTD research, the challenges related to local capacity are easy to observe when externally sourced hardware needs to be repaired, or software systems require maintenance and support.

Brydon-Miller [19] uses a stronger simile speaking of "bungee research" in community development. In bungee research for ICTD, engineers from a foreign country (or from a privileged group within a country) visit a field site for a short time to study a problem, rapidly return to their 'home base' to develop 'solutions', and trial and evaluate these on subsequent trips. On returning to base, the researchers report on their technology and the results of trials in international conferences and journals that are typically not accessible for the people who took part in the studies. At the same time, by delivering a technical 'solution' sourced from outside, such research could increase dependency on external support, rather than building local capacity for people to create relevant and sustainable responses to their own challenges. The director of an Non-Governmental Organisation (NGO) used the term "hit and run researchers" to refer to one group that she encountered [2].

In a perfect world, people facing social and economic marginalisation would have the expertise to design and develop innovations to address their own issues. However, creative technical innovation increasingly draws upon distributed networks of expertise and those who are marginalised economically and socially are also disconnected from these networks. Hence, the situation in ICTD where some of the technology innovation takes place outside of the local context, and where researchers and engineers spend only a part of their time at field sites, is bound to continue. It is therefore critical to explore different models for such remote interactions and assess their potential strengths and weaknesses.

In the remainder of this paper, we discuss two projects in South Africa and how our research relationships and working approach have evolved through experiences in those projects. We use these as a basis to explore how awareness of bungee research, and reflection on its use and abuse, plays out in the ethics of conducting ICTD research in developing regions.

IV. Case Studies

One of the authors (Tucker) has been involved with two community-based ICTD projects for more than ten years each. Both projects have involved degrees of bungee research, and the approach to planning and managing visits and interactions with the communities has evolved differently over the life of the two projects. Yet there are similarities. For example, both projects have evolved to include some form of consistent, long-term research presence. Also, in both cases, we have developed an increased awareness of the implications of bungee research, to the extent of now making deliberate choices about when to be present and when to be absent from a field site.

A. The Deaf Community of Cape Town

The first project focuses on designing assistive technology to support a Deaf community in Cape Town [20, 21]. In the early work, starting around 2001, contact was sporadic being restricted to visits to conduct initial design studies, to test out various technologies with one or more Deaf users, and to collect feedback. This mode of working, in hindsight, was adopted based primarily on ignorance in the strict sense of being uneducated, unaware or uninformed about the participatory critiques of the positivist training we had absorbed as Human Computer Interaction (HCI) researchers.

In 2004, we began work on a longer-term community intervention by establishing a computer lab in the Deaf community centre. To support the facility, a senior researcher and one or more postgraduate students visited the centre on Wednesday every week to try out various technical research ideas and to solve technical problems of the lab. The weekly visit pattern established in 2004 has been maintained to this day and has had a lasting impact in building and maintaining trust between a revolving cast of researchers (as students graduate and new ones are recruited) and the Deaf community.

There have been several constants over the past 15 years. Firstly, the main players at the Deaf Person's Organisation (DPO) are still in place. Secondly, the academic who initially introduced us to the community is still working with the DPO, and with us, and can act as an advisor and mediator trusted on both sides if any aspects of the relationship become strained. Thirdly, two of the academic supervisors still manage postgraduates on the project at their respective local universities. This long-term collaboration has resulted in mutual trust and genuine friendships. Thus, although weekly visits can be seen as localised instances of bungee research, the relationships underpin tolerance and willingness to find solutions, especially on the part of the DPO, towards the inevitable hiccups caused by bringing Computer Science students with limited, yet developing, social skills into a disadvantaged community.

As the relationships have developed, the nature of the weekly visit has also changed. After a couple of years the Wednesday morning session came to be recognised as the time that researchers visited the lab, and Deaf people started to avoid the lab at that time. Now, instead of testing new technologies on Wednesdays, we schedule other times for participant engagement and research sessions. Instead, we attend weekly to support accredited computer literacy training, and to assist the Deaf technical support staff (see below).

We also had thought that a monthly social gathering would be an ideal opportunity to conduct surveys with larger numbers of Deaf people, only to find out that the Deaf people did not want to compromise the social nature of that event. They preferred that we arrange other times that did not overlap with those monthly sessions. Thus, the research visits were divorced from the weekly visits and from Deaf social gatherings.

We also hired a small number of Deaf support staff for the lab so that it could be opened 5 or 6 days per week, rather than only when researchers were available. As one of the support staff began to assume more complex system administration duties, we deliberately avoided being on site too often. If we were present, then we would simply fix problems as he watched. Instead, we provided email, SMS and instant messaging support for him during the week, and would only visit on Wednesdays or to help solve catastrophic problems such as losing connectivity with the service provider. This approach avoided the risk of diminishing his role as system administrator. We also hired two Deaf people to assist that lab manager, (only one of whom has continued) who also collect statistics on what people are doing with the computers, e.g. job hunting, watching videos, email, etc. We want to learn about Deaf needs and uses of the machines, and this process also informs the DPO management. They developed their own system for recording behaviour in the lab, including using a spreadsheet to relay the information to us. This established regular communication also represents a consistency in the project operating in parallel with bungee research visits, helping to mitigate risks from the bungee aspects.

Perhaps the biggest evolution over the years is that the academic supervisor overseeing the whole project (Tucker) has chosen to appear less often. In the early days, he attended each week; now it is monthly or less. The main reason for the supervisor to 'back off' has been to hand-over more responsibility and ownership to the Deaf community, and to the now more experienced students working on the project.

B. Rural communication services in the Eastern Cape

Whereas the Deaf community centre is only a half hour drive from our campus, the second project is a 16-hour drive or even longer by bus. In this remote area, we are exploring affordable voice and Internet services in a rural community located in the Eastern Cape. Over the years, we have significantly modified the way in which we visit the site, with a trend towards fewer yet longer visits.

We initially began with very short visits following the operating procedure of the organisation that originally invited us to the site to explore potential applications in telehealth. They would stay in a guest house 2-3 hours drive from the site, visit daily and return to the guest house in the evening. Initially, we adopted a similar model for visits primarily by emulation of that existing relationship. We soon started staying out on site, and spent social time with participants, deepening the relationship beyond the working day. By 2004, we relocated our work to another community in the same province, still looking at telehealth.

At this new location, we stayed on site from the start. We were fortunate in that there was a backpackers' hostel in the area and the length of our visits increased so that 7 days or longer became typical. Instead of depositing a new prototype and rushing through a one-day training exercise, we could install new technology, conduct training and stay longer to catch problems and collect feedback. We also befriended collaborators and often stayed with participants at the hospital, about 1 hour drive from the backpackers' hostel on a rocky dirt road. Visits increased to last two and three weeks, and while we mostly stayed at the backpackers' hostel, we often spent 2-3 days at a time at the hospital.

By 2012, we were only visiting twice a year, and had someone living and working on site for up to several months at a time. Again, collaborators influenced us. This time the collaborator was an ethnographic technologist who became associated with the project in 2008. She lived in one of the outlying villages for months at a time, and later moved semi-permanently to the main village and got involved with a series of related ICTD interventions and studies. These included learning how local inhabitants use

mobile phones [22], an audio repository to help village leaders record meetings [23] and a moveable solar solution for phone charging [24]. Influenced by these ethnographic methods and engagement with the tribal community leadership, as opposed to working only with NGOs, we now have a PhD student semi-resident in the village (not at the backpackers) and while bungee jumping has mostly ceased for him, we still send other postgraduate students to the site on a periodic basis.

Various factors influenced this move away from relying on bungee jumping as the primary mode of interactions with the community. Most importantly, as our relationships with the community developed, we were more able to respond to community needs and allow community interests to drive a shared research agenda. Our focus has moved from rural telehealth [25] to a community-driven wireless mesh network [26]. As a result of this long-term engagement, members of the community have now formed a co-operative and we have supported them through the legal process of establishing the co-op as a licensed telecoms provider for the area. With a long-term team member in the field, we can also send out new team members for several weeks at a time and the new team members can be mentored on site, and accepted by the community as part of the research project umbrella. A point we have noticed is that those students who have come from similar cultural backgrounds to the community and speak the language, gain acceptance in the community more rapidly and are sometimes able to uncover the root of issues more quickly than even the long term resident researchers.

The shift from bungee jumping to a more semi-permanent presence has provided numerous benefits regarding ethnographic understanding, training for researchers, data collection, capacity building and troubleshooting. However, it is not without perils. One risk is that local support can become too reliant on outsiders and this can detract from community ownership of the project ("why should we use the white man's network?"). Reflecting our approach in the Deaf project, we are striving for a similar position with the rural community. When we are completely absent from the field, we provide remote advice and support and encourage the local support team to solve problems on their own. Recently, when we discovered that the antennae purchased for the rural network were not powerful enough for 5km links, we bought new antennae and shipped them out to the site. We encouraged the local support team to do the replacement themselves, and in doing so, they devised their own solutions for protecting the equipment from rainwater and high winds. The researchers choosing not to bungee jump thus created an empowering learning experience for the local team.

For this case study, the primary supervisor (same person) has also reduced the number of visits from 4-5 per year to one or even none per year. This is because the local community has been more active, and the resident PhD student has also taken on more ownership and mentoring. The supervisor's role now is merely representing the university within the community; drawing on the long-term relationships to smooth over the infrequent bungee jumping. Also email, phone and on-line contact with community members makes this possible.

V. DISCUSSION

Our experiences and reflections on our projects lead to a number of ethical questions for the ICTD research community, and the broader engineering research community, to consider:

1. Is it possible for bungee jumping to play a part in research that delivers useful, reliable and usable ICT knowledge for development?
2. In what different ways can physical distances between engineering researchers and development challenges (whether 16 hour drives or 16 hour flights), be overcome and leveraged to develop more ethical and effective research practice?
3. How can social distances between engineering researchers and development contexts be addressed?
4. How can research projects be structured to build local technical, research and innovation capacity?
5. How are research agendas for ICTD being shaped and how can those who are supposed to benefit be heard in that discussion?

In considering these questions, it is important to recognise that the role of ethical debate is not simply one of regulation and control of questionable practice. Rather ethical debate can support the articulation of shared values and aspirations to underpin methodological perspectives that help to promote more effective research and practice [27, 28].

In relation to question 1, we suggest that an existence proof could provide an adequate response. We have not yet seen an example of a sustainable ICTD intervention that has been generated primarily through a bungee jumping research model. We hypothesise that bungee research is an important factor in the frequency of design-reality gaps in ICTD [9]. If such a mode of research is planned, we contend that the proposers should face a burden of proof to identify a successful example that has been generated in this way. In the absence of such an example, we argue that relying on bungee research as a primary mode of working is unethical. The lack of the potential for sustainable benefits combined with the risks of harm to vulnerable stakeholders [2], mean that bungee led or bungee centred inquiries typically will be worse than no research at all. On the other hand, our experience with the two case studies demonstrates that bungee jumping into a research site can sometimes be justified, for example when:

- there is a parallel consistent presence and relationship associated with the research team and mentorship is available to help novice researchers develop their social awareness in the new setting;
- the visiting plans form part of a gradual, planned and open transfer of responsibilities and project ownership towards other actors including local community members or other researchers (e.g. senior students); and
- when occasional visits are made by senior research leaders to demonstrate the commitment of partners to the work and maintain long term relationships.

The consistency factor plays an important role here, as research leaders have remained constant over the years, while a rotating cast of students and research assistants might flow through a given project. Critical here is the long term commitment of projects, engaging with communities as partners rather than research subjects, and negotiating shared agendas for research and action. In our case, our growing awareness and reflection on the role of bungee research has helped us to question, and change, our manner of interaction with research stakeholders in the respective communities.

For question 2, we have argued elsewhere [29, 30] for approaches to ICTD that involve people working in two distinct but complementary roles. One actor is charged with leading local organisational change, spending extended periods working on site and being "situation focused, but technology aware". Adapting agile models, this person works with local partners to act as the customer (or product owner) specifying priorities to a second actor leading a team that is 'technology focused but situationally aware' [30], which is charged with designing and delivering against the customers' expectations. In this model, situation awareness may require that, at some points, software developers need to make one or more bungee visits to the site. However, this takes place in a context where one member of the team is already embedded in a longer-term relationship. Our rural case study follows a similar model, where technical researchers who are long-term residents have been able to send back detailed specifications to developers who have only conducted short visits.

For question 3, a variety of ideas in our case studies share some commonalities. In all cases, one or more people act as primary linkers and boundary spanners mediating connections between the community and the research group. With the DPO, the initial boundary spanner who introduced us to the group is still present, and is still actively involved. She remains part of the reflective dialogue about how the project operates, most recently debating the closeness of supervision that the primary research leader should be providing for the different students who are visiting the site. With the rural community, the role of primary linker has shifted, initially being the research team leader (Tucker), then the ethnographic technologist, to the current situation of it being a senior (technical) PhD student. These linking researchers can provide mentorship and assist in overcoming social distances. However, it is important to remember that such researchers do not offer a panacea for misunderstandings. Research groups must cultivate vigilance and reflexivity, on both an individual and a collective level. As we argue in [2] reflexivity should be treated as an essential skill for ethical ICTD research. Research leaders need to explicitly consider whether new researchers and students are 'ready' to enter the field.

For question 4, we suggest that ICTD research projects working with marginalised communities should seek to include some component that is explicitly concerned with addressing inclusion goals of the community. This may be embedded into the research goals of the project, or it might be that the research activities and the inclusion activities are managed as parallel activities. We have done the former with the rural project, where the research is concerned with ways of supporting rural communications and the work includes training and encouraging the local support team to install and maintain systems. Indeed, the community cooperative has gone so far as allocating internal revenues toward supporting this maintenance team. For the Deaf project, we opted for the latter, instituting an accredited computer literacy training course alongside the research on mobile assistive technology. These efforts should not be interpreted as charitable donations by the research team; rather they provide opportunities for working together where researchers and community members can develop mutual understandings culture and capacities.

Finally, in answer to question 5, if ICTD research is conceived as research for Development, then we would argue that it is essential that those on the ground in any research setting must be given the opportunity to set and drive the research agenda. As Sahay et al. [31] observe, the major challenges for ICTD research lie not in achieving huge technical leaps but on building the capacity of individuals and organisations to understand and articulate the problem situations that they face and to explore and evaluate technological responses. In order for marginalised communities to have a voice, they must be provided with opportunities to develop an appreciation of technologies, just as the researchers must develop an appreciation of the community. To bungee jump in and out of a community with a 'killer app', a 'killer network' or even a 'killer designer' does not support that appreciation, in either direction.

In presenting responses to these questions based on our case studies, we do not wish to suggest that these are the only possible ethical solutions and responses. Other projects have articulated their own resolutions to these issues, e.g. Braa & Nielsen's description of the Networks of Action approach adopted in the Health Information Systems Project [32] and Loudon & Rivett's [33] description of the approach adopted by Cell Life in developing the iDART system may suggest some other tactics and strategies that research teams could apply to build ethical and effective ICTD research.

VI. CONCLUSION

ICTD research will remain a geographically distributed activity that is likely to include some occasions where researchers from privileged and well-connected locations make short-term visits to places and communities who are more marginalised. We contend that it is unethical for such bungee jumping to be the primary mode of interaction in an ICTD research project. Such an approach is unlikely to generate results that are meaningful and useful for development and carries risks for vulnerable stakeholders that researchers are ill equipped to recognise. Consequently, placing this method at the heart of an enquiry will typically be worse than no research at all. On the other hand, we would argue that the short 'bungee' visits by external researchers conducted within our own work are ethically defensible. From our experience, we suggest some minimal conditions that are necessary, but not sufficient, to justify 'bungee' visits as part of an ICTD research program.

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