ABSTRACT

Dignity, Respect and Grace in Participatory Research
Involving University Teams

Peter K. Kulaba, M.S.I.S.

Co-Mentor: Gina Green, Ph.D.
Co-Mentor: Hope W. Koch, Ph.D.

Higher education institutions are increasingly responding to global development challenges through collaborative interventionist research efforts with organizational partners. By doing so, they increasingly engage in roles previously the purview of international development organizations. This research, through a critical research in information systems (CRIS) lens, evaluates the collaboration between an American university team and India-based hospital team and technology vendors. A participatory design approach is used in the collaboration to develop an mHealth application that addresses the growing challenge of diabetes among a slum population in Bengaluru, India. The study found that when research involves working in distributed teams, despite technological advances, the importance of creating opportunities for physical interaction between research collaborators is important. Secondly, at initiation, communication plans are necessary to ensure cohesiveness and safeguard

documentable history. Lastly, treating each other with respect, dignity and genuine grace was found to be most critical in ensuring a meaningful participatory collaboration.

Dignity, Respect and Grace in Participatory Research Involving University Teams

by

Peter K. Kulaba, M.B.A., MB.ChB, Medicine and Surgery

A Thesis

Approved by the Department of Information Systems

_____
Jonathan Trower, Ph.D., Chairperson

Submitted to the Graduate Faculty of
Baylor University in Partial Fulfillment of the
Requirements for the Degree
of
Master of Science in Information Systems

Approved by the Thesis Committee

_____
Gina Green, Ph.D., Co-Chairperson

_____
Hope Koch, Ph.D., Co-Chairperson

_____
Shelby Garner, Ph.D.

Accepted by the Graduate School
May 2020

_____
J. Larry Lyon, Ph.D., Dean

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS, ACRONYMS AND PSEUDONYMS

NCDs — Non-Communicable Diseases

ICT4D — Information and Communication Technologies for the purposes of promoting sustainable development

USAID — United States Agency for International Development

WHO — World Health Organization

PD — Participator Design research

PA — Participatory Approaches to research

PR — Participatory Research

CRIS — Critical Inquiry in Information Sciences

UniversityCo — Pseudonym for American University (research team) involved in the research project as lead Project Implementor

HospitalCo — Pseudonym for Indian Hospital that was also lead Project Implementor

AppCo — Pseudonym for Indian Application Developer (Vendor)

AnimationCo — Pseudonym for Indian Animation Developer (Vendor)

GovFund — Pseudonym for US-India inter-governmental funding agency

UnivAdmin — Pseudonym for the Administration at UniversityCo

mHealth — mobile based Healthcare technology application

SNA — social network analysis

ACKNOWLEDGMENTS

This thesis would not have been possible without the support, patience, wisdom and love of many others. I would like to begin by acknowledging the loyal and faithful support of my wife Sheila and our three beautiful daughters, Michelle, Danielle, and Gabrielle. Thank you for your patience through the long nights at my computer for a second time in a six-year period as first journeyed through an executive global MBA and now this MSIS.

To my parents (Daddy and Mummy) and my mother-in-law (Mummy Connie), thanks for all your encouragement.

Next, I would like to thank those professors in Baylor's Department of Information Systems who helped me through this adventure. I would like to thank Dr. Green, Dr. Koch, Dr. Garner and the entire India research team (both American and Indian) for their generous time informing this project, and helping shape my wildly imaginative and critical mind into words that can be read and digested by others. Special thanks also go to Dr. Riemenschneider (Dr. R), Prof. Bhojwani and Prof. Sanchez who realized that everyone at a crossroad of change needs help with their compass. Thanks for your interest in helping me configure my compass.

My thanks also to the Baylor's Graduate Writing Centre, and most especially Greg Barnhill, for the time invested and attention to detail you

had in getting my script polished and reader ready. Great ideas without good presentation are not worth much.

To David & Jackie Mann, Brian Okello, George Galiwango, Francis Mayinja, Joshua Mugabi, James & Lorna Magara, James Kalyango, Aisha Sekalala, James & Lillian Mukasa and Natasha …when Gladys Knight, Stevie Wonder and crew sang "*That's what friends are for*" and Michael W. Smith about friendship sang "*A Lifetime's not too long to live as friends*" …Those lines were about you. Thankyou.

To Preacher (Pastor Collier), Brother Joey, David & Kristi Baker, Tim and Jennifer Ransberger, Tim and Lucinda Hess, Jeff and Jessica Webb, Daniel & Jessica Gaddy, Jerry and Judy Goode, the Men of Valor (and your wives) and my entire Parkview Baptist Church Family …thankyou doesn't cover it. You've lived out Matthew 25:35-40 as a big family. I can't wait to witness how Christ shall receive you in glory.

To Alexis Sanchez, Luisa Villafranca, Mark McCleary, James Balagia, Moses Marmolejo and David Shatto, thank you for being great classmates and friends. You truly have been great sparring partners.

And to Jesus Christ ... only in living out a life of faith and purpose can I truly express my gratitude. Thank you that you still love me even when I do not.

DEDICATION

To my wife Sheila and our three wonderful daughters ... Michelle, Danielle, and Gabrielle. Thank you for standing by and with me.

CHAPTER ONE

Introduction

Statement of The Problem

India is the world's largest democracy and home to approximately 17% of the global population. With a population of just over 1.2 billion people according to its World Bank Country profile (https://www.worldbank.org/en/country/india), it is a nation with a diversely rich heritage in which over 352 languages (22 official) are spoken in 1,652 different dialects (Castillo, 2019; New World Encyclopedia, 2018).

According the 2015 UN Habitat Millennium Development Goals (MDG) report, approximately 24% of India's population resides in peri-urban communities that are commonly referred to as slums (India—Population Living in Slums—1990-2014 Data | 2020 Forecast, 2020; UN Habitat, 2015) . These slum communities are officially defined as:

> residential areas where dwellings are unfit for human habitation by reasons of dilapidation, overcrowding, faulty arrangements and design of such buildings, narrowness or faulty arrangement of street, lack of ventilations, light, or sanitation facilities or any combination of these factors which are detrimental to the safety and health (Chandramouli, 2013) of human beings.

In addition, a 1990 – 2016 comprehensive state by state public health study found that Non-Communicable Diseases (NCDs) like cancers, hypertension, diabetes, and respiratory disease had overtaken communicable diseases like malaria, diarrheal diseases, and tuberculosis

as the leading cause of death. Diabetes alone contributed to 3.1% of the total mortality burden and had the fastest growth in prevalence from approximately 28 million in 1990 to 65 million (a 29% rise) in 2016. The disease onset was also found to be on average at approximately 45 years and not 55 years as is the case in most developing countries. Worse still, the impact of these NCDs on the poorer and disadvantaged among the population was found to be disproportionate and exacerbated by factors like inadequate prevention, and diagnosis, both related to a lack of awareness and insufficient health-care access (Arokiasamy, 2018; Institute for Health Metrics and Evaluation (IHME), 2017; Public Health Foundation of India (PHFI), 2018; Upadhyay, 2012).

Figures 1.1 to 1.3, from the aforementioned state by state study, highlight the significance of the changes in disease trends, particularly as related to diabetes. First, diabetes rose from 13th to 9th rank as the leading cause of death in India between 2007 to 2017, a 53% (the highest rate change) rise over a decade. Second, diabetes also had a prevalence rate growth of over 40% as a combined cause of disability and death (a rise only matched by ischemic heart disease). Third, and probably most importantly, the four most modifiable & manageable risk factors related to diabetes ,i.e., dietary risks, high fasting plasma glucose, high body mass index and high Low Density Lipoprotein (LDL), all rose by rates of over 30% to be among the top 10 factors driving death and disability.

2007 ranking			2017 ranking	% change 2007-2017
Ischemic heart disease	1	1	Ischemic heart disease	49.8%
Diarrheal diseases	2	2	COPD	39.4%
COPD	3	3	Stroke	37.1%
Neonatal disorders	4	4	Diarrheal diseases	-11.5%
Lower respiratory infect	5	5	Lower respiratory infect	-12.2%
Stroke	6	6	Tuberculosis	-11.3%
Tuberculosis	7	7	Neonatal disorders	-29.9%
Asthma	8	8	Asthma	6.2%
Road injuries	9	9	Diabetes	53.8%
Self-harm	10	10	Chronic kidney disease	35.9%
Diabetes	13	12	Road injuries	10.7%
Chronic kidney disease	14	14	Self-harm	10.6%

Figure 1.1 What causes the most deaths in India?: Top 10 causes of death in 2017 and percentage change, 2007 – 2017, all ages, number (IHME, 2017)
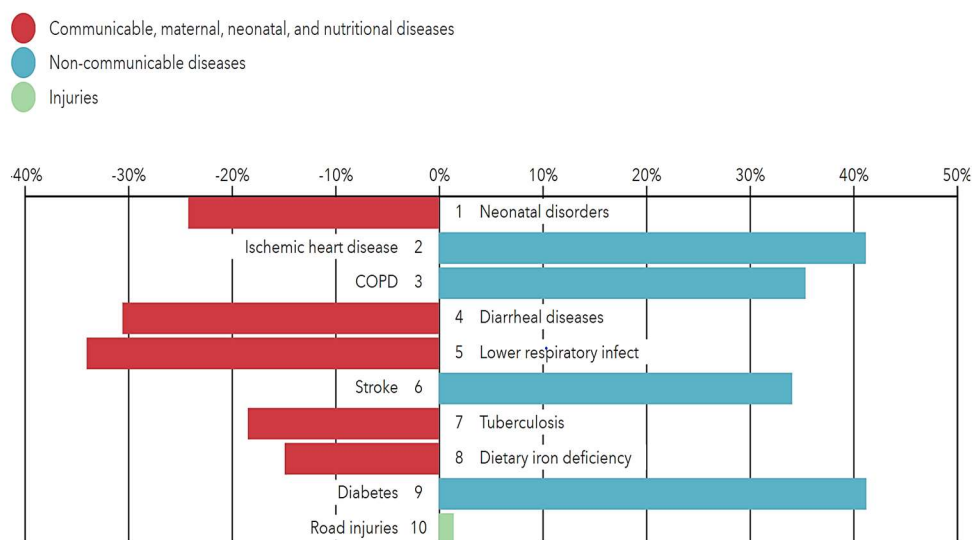
Figure 1.2 What causes the most death and disability combined? : Top 10 causes of disability-adjusted life years (DALYs) in 2017 and percent change, 2007-2017, all ages, number (IHME, 2017)

3

Metabolic risks
Environmental/occupational risks
Behavioral risks

2007 ranking		2017 ranking	% change 2007-2017
Malnutrition	1 — 1	Malnutrition	-35.3%
Air pollution	2	Dietary risks	34.9%
WaSH	3	Air pollution	-2.7%
Dietary risks	4	High blood pressure	40.7%
Tobacco	5 — 5	Tobacco	12.9%
High blood pressure	6	High fasting plasma glucose	39.7%
High fasting plasma glucose	7	WaSH	-33.8%
Alcohol use	8 — 8	Alcohol use	18.9%
High LDL	9	High body-mass index	101.6%
Occupational risks	10	High LDL	44.7%
High body-mass index	11	Occupational risks	4.9%

Figure 1.3 Risk factors driving most death and disability combined: Top 10 risks contributing to daily activity Loss in years (DALYs) in 2017 and percentage change, 2007 -2017, all ages (IHME, 2017)

Universities and other academic institutions, particularly from the Western Hemisphere, are increasingly responding to challenges such as this one in India by participating in participatory collaborations with local institutional and entrepreneurial partners. These collaborative partnerships seek the application of Information and Communication Technologies for the purposes of promoting sustainable development (ICT4D) in education, healthcare, agriculture, sanitation and other areas of social importance in developing countries (Godoy-Ruiz et al., 2016; USAID, 2018; Waas et al., 2010). This trend has created new opportunities for learning and knowledge transfer. Furthermore, through these collaborative research engagements for development, university teams

have also had to take on positions and roles which were previously, principally, the domain of international development agencies.

Background and Need

The application of ICT4D to promote social and economic development in responding to global challenges in cross cultural contexts among some vulnerable communities, however, must be carefully thought through. First, because translating the benefits that ICT has yielded in some more privileged or westernized environments to underprivileged, marginalized, or vulnerable populations has proven to be a major challenge or even resulted in failures in several implementations (Avgerou et al., 2016). A key contributing factor to those challenges or failures have been a lackluster or ignorant consideration of unique or prevailing local conditions, perceptions, preexisting capitals and capabilities (i.e., resources), or power and relationship structures in the target environments for intervention (Andoh-Baidoo, 2016; Chipidza & Leidner, 2017, 2019; Venkatesh and Sykes, 2013; Walsham, 2002).

In addition, care in interventional approaches is needed because much of ICT development and implementation typically involves the use of systems development methodology. This methodology, while effective and efficient in many traditional project settings, can prove rather insufficient in deriving successful outcomes in most ICT4D contexts (Bentley et al., 2017; Qureshi, 2015; Walsham, 2012). Those contexts require a recognition of important need factors of meaningful human interaction like

possessing a sense of dignity and humanity, a recognition and respect for the differences in culture among people in both the way they live and work, plus the application of grace, humility, and emotional intelligence in understanding and overcoming those differences as part of the process of collaboration (Adler & Gundersen, 2008).

Grace, according to one of the definitions in the Merriam-Webster dictionary, is "a disposition to or an act or instance of kindness, courtesy, or clemency (https://www.merriam-webster.com/dictionary/grace)." It is further described as a "charming or attractive trait or characteristic," and one by which the giver "grants exemption" or "reprieve" to its recipients. Probably the most important value of grace, however, is not just in the act of or disposition to give it, but in what results from or by the act to or disposition of giving it.

Immanuel Kant, a social theorist on human dignity, in *Groundwork of the Metaphysics of Morals* outlining what is referred to as his categorical imperative, suggests as a basis for ethical engagement with other human beings, the need for people to act in such a way that the "maxim of one's action could be made into a universal law of nature" (O'Brien, 2014, p.36), i.e., treat people as you would yourself like to be treated. Furthermore, he argues that people should always treat others "never merely as a means to an end," and instead recognize that everyone has "inherent worth" and therefore a need to be treated with some form of reverence and dignity (p.37). In collaborative participatory partnerships, the partners need to be

aware of the humanity of others, with the researchers particularly avoiding the urge to treat recipients or beneficiaries as "examples," "cases" (p.37), datapoints, subjects or objects.

Grace enables people working together to consider the inescapable fact and reality that not just themselves, but also those with whom they are interacting and dealing with, are human beings. Human beings that are imperfect and fallible, and so therefore, despite their best intentions, efforts, and desires, are prone to and will from time to time fail and disappoint. Getting beyond those imperfections and failings, along with treating each other with respect and dignity are important in growing the collaborative partnership and keeping it alive.

By recognizing these and other related ICT4D implementation issues, a major paradigm shift has occurred in recent years regarding the conceptualized use of ICTs in or for development. As a result, university research teams now find themselves operating in an era where there is a shift away from the dominant Modernization perspective of the period between 1950s to the 1980s towards a Participatory perspective to intervention. In the Modernist perspective, the promotion of western ideas and ideals and the bridging of the gap with the west were perceived as being the major goals of development interventions while in a Participatory perspective the trend is towards co-design and co-development (Thapa & Sæbø, 2014, 2016). Within the participatory paradigm, the recipients of development, even though not necessarily at equal parity, are considered

critically important active participants in the process. There is a requirement to take considerable account of their social and cultural context of need plus domain perspectives and experiences (Baelden & Van Audenhove, 2015; Chipidza & Leidner, 2017, 2019; Heeks, 2010; Loudon & Rivett, 2011).

University led, or sponsored research collaborations are also increasingly occurring across communities or nations. These research interventions or collaborations often involve people of diverse interests and cultures working in distributed teams in not just multi-cultural but also multi-dimensional, and multi-local environments. They communicate as virtual teams that need to build effective collaborative social and relational capitals that balance and equitably promote the objectives, passions and needs of their different logics (i.e. academic, industrial, entrepreneurial, or missionary orientations) (Gregory et al., 2013; Owens, 2018; Steinmo, 2015; Waas et al., 2010; Zarowsky, 2011).

The balance to be achieved in distributed work teams needs to occur whilst minimizing conflict, as well as ensuring effective communication across differing organizational structures and processes, departments, and time zones, in addition to the cultures of both work and tradition. Additionally, there must be a bridging of the differing viewpoints regarding both the quality and value of life, in addition to the markers or indicators of both progress and development (Klitmøller & Lauring, 2013; Leidner &

Kayworth, 2006; Nhlapo & Goede, 2010; Suprateek Sarker & Sahay, 2004).

Purpose of the Study

This study adopts a critical research perspective that is based on the framework principles proposed by Myers & Klein (2011) and Walsham (2005) and which have been variously adapted and applied in a few notable studies (Kvasny & Keil, 2006; Levina & Vaast, 2005, 2008; Lin et al., 2015; Maisero, 2018). It does so by taking a praxis–oriented approach to explore the various issues and challenges that university research teams contend with in leading and managing collaborative ICT development projects involving diverse multi-dimensional (i.e., objective or operational logics, department or professional orientation and viewpoints, cultural perspectives, and locations) distributed teams. Through this examination of the gap between theory and practice (i.e., the praxis), this study seeks to explore how these teams are meaningfully balancing the pursuit of academic and benevolent objectives within the theoretical perspectives of participatory approaches to design and development. This is done with a view to inform future research and theory building in participatory approaches to successful ICT4D project lifecycles. Additionally, the study does so in response to the suggestion that critical studies in IS research and interventions in developing environments offer up the opportunity to explore and provide a deeper understanding of the issues that surround

ICT4D (Nyame-Asiamah & Kawalek, 2020, p.54; Stahl, 2008; Stahl & Brooke, 2008; Thompson & Walsham, 2010; Walsham et al., 2007)

Research Question

The overarching research question of this study is: *What are the practical realities for university research teams participating in ICT4D based initiatives in diverse multi-dimensional distributed teams?*

This question is examined, as previously stated, with the purpose of informing participatory approaches to ICT4D research or interventions with greater critical realism (Deˊ et al., 2018; Heeks & Wall, 2018; Walsham, 2017) and also to contribute the body of university research and intervention for sustainable development (Harris, 2016; Waas et al., 2010).

CHAPTER TWO

Review of the Literature

The Changing Role of Universities in Research for Development

In promoting a paradigm shift in the thinking of the roles of universities in both research and development, Crow (2014) states that "Universities must become effective partners for global development." Such a shift involves taking on a pathway of change from "large complex institutions" with a historical "self-indulgent" outlook as "people factories" and instead transitioning or transforming themselves to institutions that view themselves as having a role to play in "advancing global development." This change requires that these academic institutions increasingly become "valuable idea generators with vast influence and the potential to manifest technologies and concepts that change lives (Crow, 2014)."

Crow (2014) further proposes that this shift can be achieved by a reorientation (or right orientation) from the utilization of resources and training of human capital to applications that result in "problem solving" and the advancement of "a culture of academic enterprise and knowledge entrepreneurship." Some universities in recognizing this changing role and positioning within the development discourse, as noted by the University of Uppsala for example, which states on its website:

A university is positioned in the middle of the swirling currents of change of the modern world. In order to follow and understand significant changes, assist teachers in developing and adapting their teaching, and adapt any activities arranged jointly with students, the educational developers employed at Uppsala University both initiate and participate in various development projects. (Sundström & Uppsala University, 2019)

As universities and other academic institutions consider this changing paradigm in how they view their role around the globe, as alluded to in the statement above, they need to do so with an enlightened self-interest. The pursuit of this enlightened self-interest is a concept that has been promoted by notable ICT4D researchers like Heeks (2010) and Walsham (2017). The principle notion proposed is that universities and other institutions of higher education must recognize that these collaborative development research engagements, beyond primarily yielding great dividends in learning, illumination and enlightenment for themselves and their students, also deliver greater dividends particularly in meaningfully addressing the inequities, inequalities and challenges that exist in achieving sustainable development (i.e., the D in ICT4D). Simply put, universities as part of their own and their students' learning and personal advancement, can simultaneously play a critical role in positively transforming their world and should therefore consider engagement in development as being in their core interest.

Government and institutional development agencies such as the United States Agency for International Development (USAID), are

promoting this vital and pivotal role that universities can play in development. The USAID, states:

> A strong higher education system builds human capital and advances scientific and technological knowledge critical to economic, social, and political development. Higher education institutions can be models of good governance [and] beacons of hope for marginalized populations, …
>
> Development organizations like USAID depend heavily on higher education for deep regional and technical expertise, … Mutually responsive and supportive partnerships between USAID and higher education communities in the United States and abroad are vital to achieving broad and ambitious global development objectives.
>
> In recent years, USAID has sought to increase its engagement with institutions of higher education … as part of a renewed commitment to evidence-based programs; an elevated focus on science and technology; … and an interest in developing the next generation of development professionals (USAID, 2018).

This study delves into the nature, effectiveness, challenges, and realities of university collaborative research relationships which are central to these partnerships and are increasingly a reality for many universities participating in ICT4D projects. In this setting, it is argued that university research or project teams cannot simply engage in observatory research and theory-forming roles as they have historically done. They must go beyond those boundaries defined or created within the traditional research narrative, and additionally, both effectively and meaningfully mutate to serve as principal donor or donor supported entities, engaged in project management roles that deal with the realities of development in often constrained subaltern unorthodox environments

(Crow, 2010, 2014; Guimón, 2013; Trowler, 2014; Trowler et al., 2012; USAID, 2018).

Participation in Collaborative Partnerships

Partnerships that meaningfully implement sustainable development initiatives generally require the utility of collaborative participatory partnerships. These partnerships, should inevitably involve stakeholder relationships that must balance power parity, logic incongruencies and objectives, cultural disparities, and even differing views on the meaning of development (Chipidza & Leidner, 2017, 2019; Garner et al., 2018; Leidner & Kayworth, 2006). Furthermore, such partnerships should be complementary and harmoniously create a democratic environment where individuals or organizations have an interaction of their intellectual, human, social, financial, plus other skills, and capitals. Their proper formation, interaction, and execution should result in the co-creation of shared understandings, values, learnings or insights, processes, products, interventions, and even inventions than none could have previously derived on their own (Steel et al., 2019).

Collaborative partnerships have also increasingly become an important globally recognized concept in addressing and responding to both local and global health challenges (Keusch, McAdam, Cuff, Mancher, & Busta, 2017, pg.18; WHO, 2016). Participatory collaborative partnerships have in addition become an essential condition made by funding agencies for financial support of initiatives and interventions. This

conditionality, encourages an "enforced" opportunity to build bridges to a world of learning, capacity building, and experience for both universities and local communities as theory is put to a practical test and application (Godoy-Ruiz et al., 2016; Lutchen, 2018).

In the particular case of health-related community interventions utilizing ICT, the "negotiation of information and capacities" that takes place in good collaborative partnerships results in an important mutually synergistic gain in which:

a) The researchers co-create tools and engage in a transfer of domain knowledge and capacities resulting in a recipient gain of novel or increased capabilities to "analyze conditions and make informed decisions on actions to improve their lives."

b) Recipient stakeholders also "transfer their" undeniably unique context specific domain expertise "and meaning to researchers in pursuit of mutual knowledge and application of that knowledge within their communities." (Wallerstein & Duran, 2008, p.27)

This mutual appreciation of importance in exchange and collaboration, though imperfect, was probably the single most significant turning point in bringing under control, ending, and learning from the debacle and tragedy that was the Ebola epidemic of 2014 in Western Africa (Bell, 2016; Keusch et al., 2017; WHO, 2016).

It should be noted, however, that the overarching and important influence of academic logics often presents a conflicting perspective for university led research teams. The influence of these logics often results in varied imperfections in/of the genuine pursuit of truly democratic collaborative partnerships that achieve the ideological emancipatory perspectives of participatory approach theory, i.e., the principle of relevant research that "strengthens local capacities to identify, analyze and transform the complex conditions that create and sustain inequity" (Zarowsky, 2011, p.1). The logics often include "models that privilege fully pre-determined research questions and instruments, short timelines requiring rapid implementation of interventions, ready attribution of clear outcomes to specific funders, and rapid publication of numerous scientific papers" (p.1). These are principles of interventional research, research related funding, and project interventions favored by most universities, and their tenured systems of evaluation, ranking, peer review, and journal publication (Heeks & Wall, 2018; Loudon & Rivett, 2011) and arguably at odds with meeting the need for sustainable development, the D as part of ICT4D.

The recipient stakeholders however are not devoid of their own logic influences that fuel these imperfections beyond the power disparities that often exist in donor-recipient collaborations (Chipidza & Leidner, 2019). A critical matter for survival and success of interventions is the recognition, acknowledgement and mutual resolution of the impact of these

16

incongruences between the academic oriented researchers and consultants, who often are the *donors* and *outsiders*, and the recipients, or the *locals*. These recipients often consist of, on one hand, the vulnerable beneficiary communities (usually considered *subalterns*) and their facilitator first-responder voicing intermediary agents, and on the other, supporting elements and structures of both a governmental and/or for profit entrepreneurial nature (Chipidza & Leidner, 2017, 2019; Leidner & Kayworth, 2006; Wallerstein & Duran, 2008; Yu, 2011).

Care and attention in achieving a meaningful compromise or balance where recipient stakeholders can genuinely and dignifiedly give and gain, therefore needs to take into consideration the nature, influence and impact of cultures and sensitivities, inherent local power disparities and differentials, existing or non-existent structures, policies and processes, plus often ignored or trivialized historical or cultural factors and determinants. These issues, especially in pro-poor development contexts inevitably influence the nature, quality and quantity of expression, and participation of recipient communities (especially of the ultimate target beneficiaries). An inattentiveness or ignorance to them, can negatively influence the long-term objective success resulting from collaborations. And furthermore, that ignorance or inattentiveness can result in a negative impact on the recipients rights demanded or suppressed in the determination of their mutual and individual objectives in the interventional research collaboration, on its direction, plus the

utility, implementation and dissemination of its design and output artefacts (Bergold & Thomas, 2012; Harris, 2016; Lin et al., 2015; Thapa & Sæbø, 2014; Wallerstein & Duran, 2008).

Reciprocal care, attention, and recognition, however, also needs to be paid to the issue that academic researchers often have superior or instrumental knowledge of funding opportunities, especially grants, and can exercise significant leverage in accessing them. They also have important access to a body of human and intellectual capital, which is an importantly critical source of expertise that informs the planning, analysis, design, development, and implementation process. Lastly, they face their own real challenges for "academic tenure and promotion, outcomes sometimes difficult to achieve in the context of building long term relationships with communities" (Wallerstein & Duran, 2008, p.31; Zarowsky, 2011).

The collaborative participatory approach to research, design, and implementation in ICT4D thus requires a carefully thought out and gracefully determined dignified "(re)negotiation of everything from objectives to governance" (Zarowsky, 2011, p.1). Additionally, there's a need for practically meaningful compromise or balance in attending to the "sensitivity to and respect for the various and at times diverging agendas" (p.1), needs, logics, constraints, personalities, cultures and other power plays within the consortium of actors in the collaboration. Such a dignified, purposeful, agile and both passive, and active commitment

arguably requires a frontend and continuous dialogue. In addition to a retuning and refocusing effort on the agreed norms of engagement, communication, and participation, plus the building and maintenance of trust. And lastly, on the convergence on common vision, "a tolerance for disagreement", an accommodation of misinterpretation and miscommunication, objective participatory involvement, and, an "attention to protocol and the details of who participates in both financial and scientific decision making" (p.1).

Therefore, for the good of the collaborative partnership, university research teams and their backers, as principal actors, must inevitably take into account serious considerations in ICT4D engagement (Keough, 1998). Considerations which can affect and slow down progress and timelines in project implementation or even research publication timeframes from those envisioned or planned at the start. Managerial capital to deal with relational, procedural, cultural, other ethical and unorthodox issues that arise in dealing with diverse, distributed teams is also needed. In addition, compromises as research quality falls below *professional standards* in a trade-off between research and positive development outcomes is another issue to grapple with. And lastly, common good sometimes influences decisions to disclose, omit, delay, release certain findings or even continue with the initial research purposes (Loudon & Rivett, 2011; Zarowsky, 2011)

The Challenge of Distributed Teams

University research teams, as non-traditional development agency teams, engaged within the context of ICT4D, inevitably also interreact through fully or partially distributed teams (i.e., teams that have only one co-local team or are entirely multi-local) (Eubanks et al., 2016; Franssila et al., 2012; Suprateek Sarker & Sahay, 2004). Distributed teams often have collaborative participatory relationships that must trade-off the relational and interactive benefits of traditional physical proximity. For example, they trade-off the physical presence of others with whom they share social settings and the opportunity for face to face and spontaneous communication, for strategic arrangements mediated by technology to leverage scarce distributed resources, opportunities, and relationships in knowledge sharing and project execution (Franssila et al., 2012; Kiesler & Cummings, 2002; Rahshulte, 2011). These trade-offs are inevitable of course, principally because university research teams were never created to be and cannot realistically transform themselves into multinational development entities or agents capable of local presence in all the projects that they pursue. That fact, a complex reality to acknowledge and address, because ICT4D usually requires longer term engagements for meaningful sustainability outcomes to be realized.

Distributed teams are often cross-cultural (both ethnically and organizationally), interdisciplinary, multi-lingual, multi-contextual and geographically dispersed both in space and time. And they have the

fundamental challenge of ensuring that they can efficiently and effectively simultaneously collaborate upon different tasks and transmit work between the different groups with minimal conflict (Eubanks et al., 2016; Franssila et al., 2012; Rahshulte, 2011; Suprateek Sarker & Sahay, 2004). Such conflicts primarily result from misunderstandings or miscommunications occasioned by the loss of physical proximity and related opportunities to appreciate the different worlds of work or the influence of culture.

They are further challenged by the compounding factors arising from the fact that the frequency, spontaneity and nature of communication and information exchange, the ability to monitor progress or appropriately divide labor, and the effort required to effectively collaborate to meet deadlines, and communicate progress or frustrations are all affected by an increase in distance (Rahshulte, 2011; Saonee Sarker & Sarker, 2009; Suprateek Sarker & Sahay, 2004; Schunn et al., 2002). In addition, working across different time zones also requires that meeting and scheduling compromises, a usually uncomfortable but critical issue, be made (Suprateek Sarker & Sahay, 2004).

Distributed teams engaged in a participatory approach to ICT4D must also be able to decisively act upon building resilient social capital by crafting trusting relationships. They need to create a team culture that fosters cohesion, commitment, respect and loyalty that is able to survive the challenges of working at a distance with technology mediated proximity

(Milhauser, 2011a, 2011b; Schunn et al., 2002; Son & Kim, 2011). This bonding action needs to take into consideration diversities in collectivist or individualistic orientations that are important in east-west or north-south multi-country collaborations as these affect perspectives on balancing between individual objectives vs. those of the team. Individualistic orientations are more guilty of a focus on self and having a subordinated view on relationships with the team being viewed as a means to an end, while collectivist orientations are considerably more focused on building, maintaining and relying on strong relationships as critical to effective work delivery, often placing team needs ahead of their own (Milhauser, 2011a, p.53).

Their co-ordination and management also requires effective high-quality transformative leadership, more so in contexts of differing power parity, as does occur in almost all ICT4D, where it is critical to "transcend work goals, purposes, and higher-order intrinsic needs" (Wong & Berntzen, 2019, p.1). And in addition to cultivate and maintain both dignity and trust, plus create and drive a cohesive culture in a technology mediated proximity (Eubanks et al., 2016; Gajendran & Joshi, 2012; Wong & Berntzen, 2019). Good leadership fosters and safeguards a culture, structure and processes that create an environment where all team members can appropriately exercise influence on both team and project goals, priorities, and decisions; hear, experience, and learn from the

valuable input of one another; and be heard, respected, and appreciated (Gajendran & Joshi, 2012; Suprateek Sarker & Sahay, 2004).

Of vital importance in balancing the different cultural, power and logic disparities, good transformative leadership in distributed teams builds a proper participatory framework by ensuring that team members feel less isolated from the *main or principal* co-local team (usually the core research team). This leadership approach provides a collective belief in the ability to succeed in executing upon a shared vision and goals (Wong & Berntzen, 2019). The benefits of working together as opposed to being apart must be tangible despite the participating partners diverse logics, needs and agendas, donor-subaltern realities, power parities or disparities, and contributed assets. Leadership in distributed teams should also respectfully address, and be seen to address status issues that could inhibit collaboration, contribution, expression, and innovation in favor of *obedience and conformity* which would harm any opportunity of sustainability even in *successful* ICT projects (Levina & Vaast, 2008).

Conclusion

In summary, universities seeking to remain practically relevant in the future must transform their research ethos to respond to the development challenges and needs in the local communities and world around them. They should do so not begrudgingly, but instead with an enlightened self-interest that rightly views their engagement as a gain for both themselves and the world around them. Furthermore, this

transformation must recognize the need to lead, build and participate in effective collaborative partnerships in which all parties can effectively participate with mutual learning and gain. And lastly, they must be able to address both the challenges and opportunities of doing so in an increasingly distributed team working environment.

CHAPTER THREE

Theory and Analytical Concepts

Theory: Participatory Research

The Dictionary of Social Research Methods defines Participatory research, "an umbrella term for different methods of participatory inquiry" (Riet, 2008, p.550), including elements like Participatory Design, as

> A form of research in which the boundary between researcher and respondent is broken down. Participation is often planned or structured, but the practitioners of participatory research aim for democratic involvements, giving voice to populations typically silenced through social norms (Elliot et al., 2016).

Participatory Design research (PD), in particular, can be further described as the *doing* of participatory research in which *design*, the function of "producing artifacts, systems, work organizations, and practical or tacit knowledge*"* is as important as the *research* (Spinuzzi, 2005, p.164). Participatory approaches to research, including PD, have three key "interconnected goals" of "research, action and education" (Wallerstein & Duran, 2008, p.26) with a fundamental concern for impacts on social justice, emancipation, and transformation as resulting outputs (Bødker, Kensing, & Simonsen, 2010; Kyoon-Achan et al., 2018; Riet, 2008, p.550; Sarrica, Denison, Stillman, Chakraborty, & Auvi, 2017).

As noted in the definition, the key to Participatory Approaches to Research is that the *recipient* stakeholders are actors that are not just

simply *subjects or objects* of observation and data generation. They are, more importantly, also, (a) co-researchers gaining richer insights into their problem domain through participation in data collection and analysis,(b) co-designers in response initiatives or interventions, and (c) co-shapers of the agenda, planning, design, development, implementation, and dissemination processes involved in interventionist research. Their participation results in both their empowerment in addition to an enrichment of the knowledge capital of both researchers and participants (Baelden & Van Audenhove, 2015; Bergold & Thomas, 2012; Gonsalves et al., 2005; Halabi et al., 2013; Stevens et al., 2014; Thapa & Sæbø, 2016).

Paulo Freire (Schugurensky & Bailey, 2014) was a notable contributor to the core principles of participatory research (Macdonald, 2012; Riet, 2008). His work radically redefined *recipients*, who are the principle subjects of research, as not merely being study objects but also as having an emancipatory role by being active participants in the research inquiry process (Teoh et al., 2018). He also is credited with *decolonizing* the power status of "academics in knowledge creation" (Teoh et al., 2018, p.159).

Talcott Parsons, another social theorist, is credited for adding to the theoretical basis of participatory research through the promotion of the notion of application of social or scientific research to informing real world problems with an emphasis "on practitioners acting as co-equals to researchers in their research process" (Wallerstein & Duran, 2008, p.27).

Kurt Lewin, an action theorist, further added to the body of knowledge by promoting the ethos of the right of recipient stakeholders to active participation in interventions that directly affect them (Macdonald, 2012, p.37).

Jürgen Habermas, the German political and social theorist, in his notions on power in participatory approaches also greatly contributed to the discourse on the nature and quality of participation (Soules, 2007; Wallerstein & Duran, 2008). His core assertion was that for there to be a meaningful participatory approach in transformative or intervention seeking research, one must resolve: (a) the composition (i.e., who and for whom) of the participants, (b) to what ends (i.e., why) they are participating, (c) the spheres (i.e., governance, private, public or counter-public area of activity, interest or expertise) of participation, and (d) the limitations on participation (Cornwall & Jewkes, 1995; Kampourakis, 2016; Soules, 2007; Wallerstein & Duran, 2008). "In other words, where does the power lie" (Wallerstein & Duran, 2008, p.29).

Participatory approaches espouse an intentional emphasis of principles that propose: (a) democratic involvement in decisioning, design and execution, and (b) equity and liberation in the process of development and improvement of the critical consciousness of all stakeholders involved, in addition to the recipient's societal structures, processes, and relationships (Arvidsson et al., 2015; Asby, 2013; Macdonald, 2012). Drawing from the model suggested by Bødker, Kensing, & Simonsen

(2010, p.8-13) in addition to notions proposed by Arvidsson et al., (2015) and Thapa & Sæbø (2016), the researchers and participants who draw from different knowledge domains, contextual influences and perspectives, and even possibly interests, join to collaborate for good in solving a thematic issue(s) of concern within a framework that involves:

a) The development of a distinguishable vision that coherently captures the aspirations, needs and objectives of both researchers and benefactors (i.e. recipients) and has an agreement or idea on common good.

b) The assurance of genuine stakeholder participation in which researchers afford the recipients an adequate and equitable opportunity for self-expression of their ideas, needs, visions, and aspiration for the resultant artifacts from the process of research, design, development, and implementation.

c) An open, contextually specific, domain informed, and first-hand experience that seeks to deliver practical and sustainable outcomes for stakeholders, and a meaningful body of research for the researchers.

d) The requirement that all stakeholders are anchored in their support for the objective goals, transformational aspirations and visions, and the project or research plan. This, process requires inclusive openness in addition to adequate and appropriate communication, progress reporting, and

appraisal to ensure a mutual grasp and understanding of the research intervention by all stakeholders.

e) An experience that delivers meaningful bi-directional gains.

Genuine, active, and influential recipient participation has both pragmatic and political rationales. It is pragmatic in its requirement for the development of contextual and domain specific project knowledge capital between the researchers and recipients if the research outcomes are to result in practically usable and needed sustainable artifacts, along with valuable research. And in addition, recipient participation is political because participatory research is objectively premised upon the rights of recipients, who are the benefactors of the resultant artifacts, to contextually inform and influence the ICT artefacts being designed for transformative or developmental purposes within their own environment (Bødker et al., 2010, p.10).

It is however important to note that the application of participatory approaches for research and development has objectives that "vary significantly among the individuals and organizations that promote" them (Neef et al., 2013, p.9; Rokhaya, 2009). Two main approaches are commonly used, the first is what is described as the efficiency approach. This is an implementation or execution approach which is essentially a top-down engagement in which the emphasis of participatory action is on its use as a tool through which the external actors or researchers achieve better project outcomes usually by retaining decision-making expert

power. The participation of the other stakeholders in this case, is primarily of a contributory nature (Neef et al., 2013, p.9; Stevens et al., 2014, p.23), and to a limited extent collaborative.

The second approach is what is described as the bottom-up inclusion and participation approach which is considered as a primarily democratic, equitably balanced, emancipation and empowerment focused approach, that seeks to address power parity and incongruence between recipient and external stakeholders (Neef et al., 2013; Rokhaya, 2009). In this approach co-creation and/or collaboration in almost all aspects of the project are heavily emphasized (Stevens et al., 2014, p.21) with involvement and engagement at almost all the core management and intervention echelons of the interventionist research.

Table 3.1 Types of participatory approaches in research and development (adapted from Bonney et al., 2009, p.11)

Participatory Approach	Description & Emphasis
Contributory	External actors as principal interventionists (i.e. researchers, consultants, or both) draw contributions (data and opinions) from local community stakeholder participants
Collaborative	External Actors design the research and development project and local community stakeholders involved in refinement, data collection and analysis, and other elements of the outcomes.
Co-creative	External Actors and local community Stakeholders are involved in all project aspects.

However, regardless of approach, i.e., contributory, collaborative or co-creation, the pursuit of participatory approaches for research and development, especially in ICT4D, cultural gulfs and the invading legacy of colonialism on participation are an inescapable challenge (Keough, 1998). Learned relational and cultural biases, stereotypes, and orientations need to be broken, (re)negotiated, and redefined (Keough, 1998, p.188). Furthermore, there is a need for the contextual framing of the *problems*, emancipation, and empowerment of the poor beyond terms of absence, i.e., poverty, powerlessness, helplessness, alienation and deficiency, to include terms and recognitions of self-consciousness, capabilities, capitals, and the achievement of power to effect change (Chipidza & Leidner, 2019; Keough, 1998, p.188; Wallerstein & Bernstein, 1988, p.380).

Distance, cultural difference, and the parity and congruence issues related to a colonial legacy are dilemmas "at the heart of the challenge" (Keough, 1998, p.188). These issues variably challenge the application and nature of participatory approaches for research and development. Inevitably, universities engaged in ICT4D will face these challenges and must overcome them if they are to successfully apply participatory approaches in ICT4D research and development (Harris, 2016; Loudon & Rivett, 2011; Stevens et al., 2014).

Critical Research in Information Systems

Critical research is a method of insight seeking inquiry and critiquing of social systems, interventions and realities with an intentionally thoughtful need to understand their imbalances and deficiencies, with a view to seeking and recommending approaches to their remedy (Nyame-Asiamah & Kawalek, 2020; Walsham, 2012). Critical Research in Information Systems (CRIS), by offering insightful critique and therapeutic remedy in IS research is important in improving practice, especially in the implementation of participatory research for development. CRIS generally draws upon five key themes: (1) emancipation, (2) critique of tradition, (3) critique of technological determinism, (4) reflexivity, and (5) nonperformative intent (Richardson, Tapia, & Kvasny, 2006, p.269). In other words, CRIS; (a) seeks the liberation or freeing of individuals from the effects and influences of domineering power parity and devoicing, (b) tests and challenges prevailing or traditional assumptions, (c) promotes the possibilities of positive change through alternative perspectives to the status quo, (d) encourages the evaluation of technology in use and the non-neutral role of researchers within a broader social and economic context, and (e) involves the application and use of tools to support and assist managerial efficiency (Kvasny & Richardson, 2006; Richardson et al., 2006).

The aim of critical research is not criticism for the sake of it, neither is it for the purpose of finding fault and attributing failure. Instead, it goes

beyond the theoretical description, academic discourse, and superficial application of research, to delve into issues of responsibility, interests, ideology, problematic social constructs, power structure and parity, and opportunity to resolve issues (Wodak & Meyer, 2001, p.1). CRIS, of vital importance, has the responsibility to: (a) seek out and highlight or illuminate restrictive and/or alienating conditions within a project context, (b) highlight value, impact, and variances or disparities between practice and theory (i.e. praxis), in addition to the dissonance or contradictions between theory or knowledge, and practice (Bohman, 2016; Myers & Klein, 2011).

As an analytical tool, its orientation is one that points towards informing and improving practice in regards to the achievement of emancipation or freedom, bridging of power parity, and other social values of importance in the design, development, and use of ICT (Bohman, 2016; Myers & Klein, 2011) in a development context. It has important utility in illuminating, demystifying, rooting out delusion, and enlightening human action in practice (Wodak & Meyer, 2001, p.10).

By definition, critical research needs to meet three main criteria to be useful. It must be able to (1) provide a contextual explanation of the prevailing impact issues within the current social reality, (2) identify the different actors and their ability and need to both influence and change those identified issues, and (3) "provide both clear norms for criticism and achievable practical goals for social transformation" (Bohman, 2016, p.2).

Alvesson & Deetz (2000), in "Doing Critical Management Research,"
suggest that CRIS should involve the following three elements: insight,
critique and transformative redefinition to objectively fulfil the criteria
above. Those three concepts are expounded upon in Table 3.2.

Table 3.2 The three elements of critical research (Myers & Klein, 2011;
Richardson et al., 2006)

Element	Brief Description
Insight	Helps highlight social factors, elements and realities that are usually unobvious or occluded and include the forms and statuses of knowledge, understanding and events that inform and sustain the current situation. Insightful diagnosis should precede therapeutic analyzes and recommendations.
Critique	By questioning, analyzing, and challenging taken for granted or status quo assumptions, beliefs or ideologies, critique causes the researcher to go beyond diagnosis to an analysis of the discourses behind accepted interpretations.
Transformative redefinition	The ultimate objective of CRIS through its expository stance, is the offering of practical redefinitions of critical and relevant knowledge important for addressing the skills and operational gaps that can lead to more rewarding, satisfying, impactful, sustainable, emancipatory and equitable development.

Personal motivation, most notably themes of emancipation, equity,
or participation, plays an integral and important part in CRIS. It has a
pivotal role in influencing the choice of theory and analytical application
(Walsham, 2005). Therefore, in applying CRIS, it is important to avoid the
problem or risk of hyper-critique that can result from personal motivations

clouding the analysis, in which the researcher engages in unfair descriptions and biased negativity (Alvesson & Deetz, 2000). The researcher should instead stick to some guiding principles (Bon & Akkermans, 2019; Myers & Klein, 2011).

The six guiding principles proposed by Myers & Klein (2011) and variably modified and adapted by other authors to suit specific research contexts such as Bon & Akkermans (2019), provide an acceptable framework for the varied needs and applications of critical research in executing upon the three elements of CRIS. Their application in entirety is not required in every instance of CRIS; however proper analysis would involve the utility of most of them. They are:

(1) conceptualization and investigation around core theoretical basis,

(2) framing s value positioning for analysis,

(3) revelation and challenging of the prevailing paradigms of theory in action e.g. participation or collaboration,

(4) examination of praxis through a lens of emancipatory dialogue,

(5) suggestion of transformative improvement or action

(6) reflective impact on social theory and learning (Bon & Akkermans, 2019, p.3; Myers & Klein, 2011, p.25).

The first three principles are essentially elements of Critique while the last three elements of Transformation. Table 3.2 below, principally adapted from the model proposed by Myers & Klein (2011), with some

elements suited to analysis of participatory research proposed by Bon &

Akkermans (2019), expounds on these principles.

Table 3.3 Guiding principles of CRIS (adapted from Bon & Akkermans (2019) and Myers & Klein (2011))

CRIS Element	No.	Principle
Critique	1	Principle of **Critical Investigation** of Concrete Situations under an observation and analytical lens built around **Core Concepts and Ideas** from one or more critical theorists.
	2	Principle of developing/taking a **Value Position** as a key motivational drive for adopting a CRIS stance in analysis e.g. democracy, emancipation, autonomy, social and economic betterment, equitable opportunity, or ethics.
	3	Principle of **Challenging Prevailing Collaboration Paradigm(s)** through a critical identification and revelation of prevailing assumptions, values, (relational, power, social or democratic) structures, discourse narratives, practices, beliefs, goals and interests espoused by the stakeholders with potentially conflicting arguments and evidence.
Transformation	4	Principle of **Emancipatory Dialogue** between the multiple actors /stakeholders involved, in keeping with the CRIS focus on the realization of human freedoms associated with self-transformation.
	5	Principle of **Transformative Action** in keeping a core CRIS belief that societal change and improvement is possible and the objective of CRIS being not only discovery but also offering suggestion on the subsequent realization of positive change.
	6	Principle of **Reflective Impact** on both practice and theory as part of a continuum in the learning and relearning process in action and intervention

Applying CRIS To Participatory Research Analysis

In apply participatory approaches to ICT4D research, the researchers are considered to have a non-neutral orientation in which they are positioned as having a "commitment to critical consciousness, emancipation, and social justice" (Wallerstein & Duran, 2008, p.28). This is an important value upheld in CRIS and by which researchers challenge their own roles in research process within the communities of interest. They operate with the ethos that the poor and oppressed subjects of their interventional study, being self-conscious and endowed with transformative capabilities or assets that can be potentiated, "will progressively transform their environments"(p.28) and livelihoods through practical participation in, and, the application of the research. The researchers therefore act as "catalysts" and "supporters" of transformative process and not as "vanguards of change" (p.28).

This researcher-led agency viewpoint has some key characteristics or presumptions (Couto, 1987, p.84-85) of participatory research that form an important conceptual core and value basis for CRIS in participatory research. The presumptions are:

(1) The problem or issue under study, or for which an intervention is being pursued, originates from, and has been prioritized or proposed by the *recipients*.

(2) The *recipients* (i.e. affected people) have an equitable and democratic opportunity to voice decisioning input into

37

problem definition, research and interventional action, design and implementation.

(3) Both the researchers and the local stakeholders have equitable participation as learners and researchers.

(4) By virtue of problem importance and prioritization, and with an interest in being empowered with tailored sustainable solutions, the *recipient* stakeholders will be interested, self-motivated and enthused to actively participate and monitor research and interventional progress.

(5) By virtue of an interest in sustainably empowering the *recipient* stakeholders, because of their ingrained motivational aspiration for transformation, the researchers will democratically and equitably offer the opportunity for participation and ensure the voicing of the recipient stakeholders

(6) The participatory research artefacts that involve design and development, will not just be co-authored, co-developed and mutually beneficial. They also will be co-owned and open for the benefit and individual use of all the critical stakeholders in pursuit of the related desires for the liberating and transformational objectives of intervention.

CRIS, as an analytical tool to analyze participatory approaches to research and inform the growth in theory, in this study, therefore seeks to understand:

(1) How are university researchers and their departments dealing with multi-year or longer-term projects that require multi-disciplinary, multi-local, often virtual, and multi-cultural team management and engagement?

(2) How are these research teams able to congruently balance their academic institutional logics with the different service, entrepreneurial, and for-profit logics of their immediate local partners with whom they must engage with in co-design, and co-innovation?

(3) How are ownership and intellectual property addressed within the confines of congruence, power parity and participatory research?

(4) How is it realistically possible to evaluate who participates, how they participate, why they participate and why they do not participate (Heeks, 2010)? All this considering that since these factors matter in the contextual circumstances (Andoh-Baidoo, 2017) that inform the analysis they therefore cannot be taken for granted in enabling practice to reversibly influence theory. As Heeks & Wall (2018) insightfully note, "context is represented by the domain of the real" (p.5).

A key forward looking focus of applying CRIS as part of the process of informing or building the body of research, is directed at desiring that the practical application of theory should avoid every attempt to simply replicate historical methods, a couple of which have been fraught with failure, (Harris, 2016; R Heeks, 2006; Leidner & Kayworth, 2006; Sarrica et al., 2017; Sein et al., 2011; Zheng & Walsham, 2008).

CHAPTER FOUR

Case

Historical Background

In 2017, an American University ("UniversityCo" [1]) established a
collaboration with a community not-for-profit Hospital ("HospitalCo") in
Bangalore (Bengalaru), India to develop an mobile health (mHealth)
application aimed at increasing awareness and education on Hypertension
among the peri-urban (slum) communities within the Hospital's catchment
area. The two parties collaborated in design and implementation with two
Indian development firms (AnimationCo and AppCo). Koch et al., (2019,
2018) and Mahid et al., (2018) document the participatory action research
roots of that collaboration and the various benefits and lessons learned in
the initiation and implementation of that mHealth app.

Prior to this collaboration, UniversityCo and HospitalCo had a
longstanding history of partnership in the area of nursing education and
development. This partnership involved UniversityCo, both directly and
through grant sourcing from other agencies and private individuals,
supporting the development of the nurse training facilities and general

---

[1] UniversityCo, HospitalCo, AnimationCo, AppCo, Consultant and GovFund are
pseudonyms for American University, Indian Hospital, Animation Company, Application
Development Company, American research consultant in India and US-India Funding
agency that were involved in the project.

infrastructure at HospitalCo. A mutually beneficial relationship in which HospitalCo, in exchange, afforded UniversityCo's nursing school the opportunity for an international (foreign) locum training experience for its nursing students.

UniversityCo was founded in 1845 and is a large private multi-faculty university in the United States with over 15,000 students from over 80 nationalities. In 2019 it was ranked by US News as one of the 100 best colleges in the US (USNews, 2019). Researchers from its nursing, computer science, art, business, and information sciences department were part of the team that participated in this research initiative.

HospitalCo, based in Bangalore, the capital of India's southern Karnataka state, is a Christian Mission owned hospital founded in 1973. It is a multispecialty care center with over 300 beds that also doubles as a teaching hospital offering undergraduate and postgraduate medical and nursing training. The hospital has as its central operation ethos, the notion that healthcare and health are not welfare issues but human rights issues, even for the most vulnerable among the population. The hospital serves both a rural and urban catchment with a mix of both in-house and community outreach care (i.e., camps and mobile clinics). It runs on what is both a donor funded and robin-hood model to meet the challenges of providing quality care and medical training to the people it serves.

Design and Development of Diabetes Application and Game

Following the development and implementation of the hypertension application, which the collaborating parties and vendors considered a successful project, they elected to embark on a second mHealth intervention starting in mid-2018. This intervention was in response to an expressed need to respond to the scourge of Diabetes, a second NCD that was making huge inroads into the slum communities in the catchment area surrounding HospitalCo. The application and the additional teaching feature of a game are still in-progress having reached the pre-implementation phase of its software development life cycle.

In the *Global Sustainable Development Report 2019*, the United Nations identifies "strengthening human well-being and capabilities" as the first of six key goals requiring collaborative stakeholder action to be addressed if humanity is to achieve "true transformative potential" in addressing global challenges and their impacts (United Nations, 2019, p. XVI-XX). In keeping with the key principles of ICT4D, the report calls for "new scientific and technological research, as well as the adaptation of existing knowledge and technologies to specific local and regional contexts" (p. XXI) as part of a transformative investment in the development and strengthening of vulnerable or lesser developed communities.

The mHealth application is a technological innovation which involves the use of an interactive animated teaching video on Diabetes as

part of a preventative and screening tool. The application, designed to be used in either of English or Hindi and Kannada (both local languages widely used in the target communities), has been designed to be implemented and disseminated by community health workers using android tablet devices. The game, to be played after the viewing of the video application is meant to be an entertaining, interactive testing tool to reinforce learning and evaluate the effectiveness of the educational application.

As an in-progress paper, this study case covers a period of interaction between the parties spanning 18 months from June 2018. During that period, the design and development phases of the application and game were completed, and the project was scheduled to start the testing phase in early 2020. The research intervention employed a participatory research approach i.e., action research and design. Over the study period, UniversityCo served as the principal project implementor operating out of the United States while HospitalCo served as the second principal project implementor serving locally in India.

Communication between the teams and their vendors was mainly virtual, although as part of the requirements of the grant, there were scheduled cultural exchange visits both to India and the United States for the project implementation teams. Funding was sourced from GovFund and is administratively handled by UnivAdmin. UniversityCo, during the second half of the project took on a consultant who has affiliated to their

nursing school but based in India to help aid the communication and implementation process.

CHAPTER FIVE

Design and Methodology

Method: 4-Step Critical Analysis Process

This study applies a Critical Research in Information Sciences (CRIS) perspective to review and analyze data from the research collaboration between the US university, and the Indian hospital plus its vendor partners. CRIS in this case, is applied using a process of both qualitative and quantitative examination to critique and analyze aspects of the participatory approach in this collaboration and to answer the proposed research question. The analysis is applied to project field notes, interviews, and emails that were generated during the 18 months period between June 2018 to November 2019.

Built around the 3 elements of CRIS, i.e., obtaining proper insight accompanied with carrying out a constructive critique of the gap between theory and practice that is then applied to transformative purpose (Alvesson & Deetz, 2000; Richardson et al., 2006), and, in keeping with the proposed six key principles of critical theory (Bon & Akkermans, 2019; Myers & Klein, 2011), this study proposes a 4- step framework with the following tasks:

1. Identify Key Assumptions - *Identify or articulate the specific aspects, elements, or issues that the critical analysis seeks to analyze.*

In this step, it is important to recall that CRIS is concerned with issues of emancipation or freedom, power parity, and other social values that are important in the development and use of ICT (Bohman, 2016; Myers & Klein, 2011). It seeks to illuminate, demystify, root out delusion, and enlighten human action in practice (Wodak & Meyer, 2001, p.10). Therefore, the aspect, element, or issue highlighted is an assumption or presumption of practice that exists in theory or considered to be a natural fact that the analysis seeks to evaluate and/or constructively challenge in keeping with CRIS.

2. Analyze Data for Insights – *By utilizing a reasonably comprehensive and comparative analysis of available data, seek to contextually inform research with valuable insights regarding the aspects, elements or issues identified in the previous step.*

3. Provide Contextual Impact Analysis - *By diagnostic analysis, inform the impact of the identified praxis gaps on the stakeholders and the desired emancipatory outcomes.*

4. Offer Therapeutic Remedy - *Through critical discussion, offer therapeutic remedies to mitigate potential harm and improve theory, practice, or both.*

Step 1, i.e., the identification of the key assumptions in participatory approaches to research has already been covered in chapters three and four. Those assumptions, briefly stated, include : (1) having a democratic intent in research, (2) participatory engagement of the recipients of the research artefacts, (3) bi-directional engagement in decisioning, co-design, co-development, implementation, and research (4) mutual benefit gained by all stakeholders, and (5) emancipatory transformation of the recipients of the research intervention. These assumptions will inform the further stages of this study in responding to the overarching research question, i.e., *What are the practical realities for university research teams in the implementation of participatory approach driven ICT4D research when practice involves multi-local, multi-cultural and multi-logic virtual teams?*

Step 2 will be covered in Chapter six and steps 3 and 4 will be covered in Chapter seven, i.e., the discussion and conclusion.

Participants

The participants analyzed under this study, for purposes of reporting on our research enquiry, were the two principals i.e. UniversityCo and HospitalCo and the two primary vendors AppCo and AnimationCo. As part of the analysis, the interactive effects of the

principles on UnivAdmin, GovFund and the consultant are also reported on.

Measurement Instruments and Procedures

The study involved both a qualitative and quantitative analysis of data gathered over an 18-month period of collaborative interaction between the participants.

The qualitative study principally involved:

(1) The collection and analysis of field notes during a US cultural exchange and project team visit in February of 2019.

(2) Two recorded focus group interviews, one of the UniversityCo team held in September 2019 (*see Appendix A for UniversityCo interview guide*) and a second in October 2019 of the HospitalCo team (*see Appendix B for HospitalCo interview guide*) during their cultural exchange visit to the United States. The UniversityCo focus group team interview lasted 43 minutes and involved five team members from UniversityCo, and two-person interview panel. The HospitalCo team interview, lasted 66 minutes with four participants from HospitalCo, one from UniversityCo and a three-person interview panel.

The quantitative study involved a study of email communications between the different team members over the 18 months analysis period. Both the qualitative and quantitative inquiry process was driven by

scanning through and insightful analysis of the collection of email communications between the team and their vendors to design and build the app. Given the geographic distance, email was the primary means of communication. Table 5.1 below, provides a brief overview of the data types and their study utility.

Table 5.1 Data sources/types used in this study

Attribute	Field Notes	Interviews	Emails
Data Items	30 single spaced pages	Two sets of transcribed focus group interviews of the university and hospital teams. Each had 5 team members, lasted 42 & 66 minutes, and generated 15 & 36 pages of material respectively.	447 emails with 12 distinct subject groups (110 subjects)
Timing	February – March 2019	September – October 2019	June 2018 – August 2019
Description	Notes gathered by a research member of the university during field visit. They were collected as part of an observatory/ anthropological approach in participatory action research. Also includes interviews with field workers and doctors at the hospital. Notes gathered during the university research team's visit to India in February 2019	Independent interviews were carried out with the two principal investigators as focus group discussions using interview guides.	Official Emails exchanged between the American university and the Indian based hospital plus animation and application vendors, i.e., the 4 main participants. Also included email correspondences that these parties had with the intergovernmental funding agency, university admin and US consultant in India.
Reliance on evidence	Medium	High	High

51

Data Analysis

As previously stated, both quantitative and qualitative means of analysis were applied in this study which we shall describe in the sections that follow.

a. Emails Analysis

Email correspondence between the different actors that were collected on an Outlook mail server were first exported into Microsoft Access to create a database file. That file could then be loaded into a Microsoft Excel data model as part of the data preparation process.

Once in MS Excel the data preparation process involved the following steps:

a) Excluding emails that were not related to the core project participants, e.g., emails to transcription specialists in the United States that were transactional conversations.

b) Creation of a Nodes (Vertex) list for all the individual and group actors. There were 44 nodes from 7 groups as shown in the summary of the nodes list in Table 5.2 below

Table 5.2 Summary of groups and nodes from email data

Group Name	Code	ID	No. Nodes
AnimationCo	AnC	1	5
AppCo	ApC	2	2
Consultant	Con	3	1
GovFund	GF	4	4
HospitalCo	HC	5	7
UnivAdmin	UA	6	16
UniversityCo	UC	7	9

c) Creation of two Edge lists, i.e., a record of originator (FROM) – recipient (TO and CC) communications between the different nodes. The first Edge list, referred to as the PRIMARY list was for email communications between the nodes where the recipient was in the main body of the email (i.e., the TO field). The second list, referred to as the ALL list, in addition contained the copied (i.e. CC) recipients also.

d) The email subjects were also thematically analyzed and grouped. 12 groups were formed from the 110 different subject headers/ conversations in the emails. Table 5.3 below shows a summary of the subject groups.

Table 5.3 Summary of email subject groups

Subject Group	ID	No. Subjects	No. Emails	% Emails
Grant Award	1	6	9	2.01%
Cultural Exchange	2	7	19	4.25%
Legal	3	5	8	1.79%
Administrative	4	13	26	5.82%
App Design	5	4	7	1.57%
Academic Research	6	13	21	4.70%
Meeting	7	7	23	5.15%
Vendor Contracts	8	1	1	0.22%
App Development	9	41	294	65.77%
Grant Reports	10	6	13	2.91%
Game Design	11	4	12	2.68%
Game Development	12	3	14	3.13%

A primary analysis of the data was then done in MS Excel using pivot table analysis. The major interest here was to view the volume of emails by subject originating and received by the different groups to gauge participation in the various subject exchanges that occurred during the project duration under analysis.

The secondary/main analysis was done using Influence/Social Network Analysis (SNA) in R and involved viewing network maps and analyzing various measures of centrality to infer influence and participation. The network analysis was done with a Kamada-Kawai

graphing algorithm (Kamada & Kawai, 1989). This algorithm was preferred as opposed to the other algorithms commonly used for directed networks like the Fruchterman Reingold algorithm because of the relatively small size of this network (i.e., fewer than 100 nodes/vertexes) (Gibson et al., 2013; Kobourov, 2013). In generating the visualization layouts, the nodes were weighted based on their edge activity before the force – directed Kamada – Kawai algorithmic analysis was used.

By graphing the interaction between the nodes, SNA helps provide a better sense of inference from the data than would a presentation in tabular from. Graphical Network analysis helps with the detection, identification and visualization of patterns and structures as part of hypothesis testing (Gibson et al., 2013). Centrality measures are also calculated as part of SNA. These centrality measures, by assigning calculated statistical values to nodes based on their edge relationships or edge effect on other nodes, helps infer importance of a node in a participation network (Boudin, 2013; Hanneman & Riddle, 2005; Minoo, 2018).

The presence, strength, quality, and nature of social interactions between team members in a participatory approach to research and design are important. A social or influence network refers to the "articulation of a social relationship, ascribed or achieved" (Bandyopadhyay, Rao, & Sinha, 2010, p.1) between different actors. In SNA, a network with directed relationships (i.e. inbound and outbound communication within members)

is conceptualized as a *digraph*, visually mapping those relationships. The actors are broken into units, each referred to as a *node or a vertex*, and the tie between them referred to as an *arc* (or *edge* if tie is without direction) which can be *weighted* (e.g. total number of communications) or *unweighted* (i.e. individual communication ties) (Bandyopadhyay et al., 2010, p.3).

We employed SNA in this context as part of insight and critique to test the participatory approach concepts of equity, active participation, and collaboration in our case project. In doing this, we follow an approach similar to the application of SNA to test and create paradigms (Grunspan et al., 2014) in scientific collaboration (Newman, 2001; West et al., 2010) and social sciences (Borgatti et al., 2009).

Table 5.4 below highlights and defines the major centrality measures that were of interest in this influence analysis of our actors of interest. Although there are over 44 different centrality measures, our principal interest was in degree, closeness, betweenness, power, eigenvalue, authority, and hub centrality. From these measures and their plotted graphs, we inferred centrality, power, prominence or influence, and dependence of the network on the different actors. These inferences could be used to allude to democracy, equity and co-dependency that are important in a participatory network formed as part of a collaboration effort.

Table 5.4 Description of centrality measures used in the SNA and their utility

Measure/Index	Description	Utility
Degree Centrality (DC)	Measurement of importance of a node based on the number of edges from a node directed at other nodes. Also known as the outdegree centrality.	A measure of influence and activity which when considered along with DP, provides an idea of the degree of concentration or centralization within a network. Actors with more ties are considered to have advantageous positions with less dependence on other actors and able to have alternative ways to satisfy their needs.
Degree Prestige (DP)	Also known as inDegree Centricity is a measure inbound arcs/ties directed to a node (actor) from other nodes.	A measure of popularity, or prominence which when taken together with Degree Centrality are a good measure of equity or inequity.
Closeness Centrality (CC)	Defined as the inverse of farness CC is the sum of the shortest average distances between a node and all the other nodes both directly and indirectly.	Is another good measure of influence. An actor that is closer to other actors, which by inference means that they are a more important *point of reference,* or have a greater reach to other actors, is considered to have greater information influence because they require fewer direct steps to the other actors within the network. They are also likely to be more influential in transmitting information in the network.
Betweenness Centrality (BC)	A measure of the number of times node acts as a bridge i.e. communication conduit between other nodes	Provides an inference measure of brokerage, relational or leverage power or influence of an actor within a network. As a centrality measure provides an idea of the degree of dependence that the network has on a node because of its relational bridging function.

Table 5.5 Description of centrality measures used in the SNA and their utility

Measure/Index	Description	Utility
Eigenvector Centrality (EC)	It is a *global* measure of the relative closeness of a node both within its local cluster (CC) in tandem with its closeness to other adjacent clusters.	Unlike DC, it takes into account the notion that connections to high-scoring nodes (i.e. authorities and hubs) are more important than those to low-scoring ones i.e. centrality is more than just how many nodes you are connected to but also how important those nodes are in terms of their connectedness or closeness to other nodes.
Authority Centrality (AC)	A natural generalization of EC.	A high authority actor receives from many good hubs i.e. receives information from the most important sources within the network.
Hub Centrality (HC)	A natural generalization of EC.	A high hub actor points to many good authorities i.e. has the right connections to the most important authority figures within the network
Power Centrality (PC)	A modification to DC proposed by Phillip Bonacich, which factors the dependence of a network on an actor (node) relative to the connectedness of the actors that they are connected to other actors.	This measure provides the ability to infer the power of an actor based on how dependent the nodes that are connected to it are on it within the network i.e. an actor might have many connections, however, those connections might have other connections that could bypass that actor therefore, even though an actor, by virtue of its DC might have significant influence, they might not be as powerful because the network isn't really dependent on them.

The SNA involved two levels of analysis at the group and individual actor levels of analysis. The purpose of carrying out a multi-level analysis was to evaluate network type, influence, prominence, and participation whilst putting into consideration the influence of the fact that the different groups had different numbers of actors operating at different levels or on different aspects of the project. This distribution and size factor determined their inclusion or exclusion in various emails both as direct and indirect participants. In addition, it was considered important to notice whether the level of analysis could have a biasing effect on any inferences made.

The study however focused on the primary email contacts only for analysis and discussion in this paper because the primary actors were central to the participatory aspect of research that is under study. The visualizations generated for all contacts (i.e., the primary recipients and all copied contacts in the CC section of the emails) were considered unsuitable for most of the inferential analysis, especially regarding their centrality measures. This was a challenge because several contacts (nodes) were copied in emails simply for administrative reference sake and therefore presented a reliability issue in determining those centrality scores as a participation measure. Thus not all the analyses from the ALL emails group are included in the results presented.

b. Qualitative Analysis of Field Notes and Interviews

The qualitative analysis involved an interpretive data analysis (Biaggi & Wa-Mbaleka, 2018; Klein & Myers, 1999; Urquhart, 2016) in which started with a constant comparison line by line analysis (Charmaz, 2006) of both the field notes and the interview transcripts was done. Constant comparison analysis is a method of qualitative data analysis in which the researcher through an enquiry process, thinks about how each line of data is similar to, or dissimilar from the other lines, and then assigs descriptive codes to those lines of the data. This was done using QSR NVivo, a qualitative analysis software. Following this approach, general themes of observed issues and memos were then generated as part of this process of coding.

During coding, ten major themes areas were generated with three of them broken down into nine sub-themes as shown in Table 5.6. Between 57 to 73% of the data analyzed generated useful coding references, as shown, in Table 5.5. The final step in the analysis then involved, by principles of abstraction and generalization applied through a critical lens (Klein & Myers, 1999; Urquhart, 2016), the utilization of those themes and coded references to answer the research question.

Table 5.6 File summary from QSR NVivo for field notes and team interviews

Document	No. Words in File	No. Paragraphs in File	No. References Coded	Coded Percentage
Field Notes February - March 2019	15,145	915	133	0.672
Baylor Team Focus Interview	7,607	618	140	0.738
India Team Focus Interview	11,128	928	151	0.567

Table 5.7 Coding summary from QSR NVivo for field notes and team interviews.

#	Main Theme/Code	Sub-Theme/Code	No. Files	No. Coding References	No. Paragraphs	No. Words
1	Communication Issues or Factors					
		Communication Channel	1	16	46	821
		Cultural Difference	2	10	26	607
		Distance	3	11	23	796
		Exclusion from Conversations	1	6	6	312
		Proximity	3	21	31	1,737
		Aggregated	3	64	132	4,273
2	Cultural & Contextual Appreciation & Learning		3	63	146	5,732
3	Frustrations & Challenges		3	32	73	2,476
4	Grace					
		Grace	3	34	61	3,200
		Delays & Deadlines	2	5	11	260
		Aggregated	3	34	61	3,200
5	Logic Conflict		2	18	19	1,533
6	Logic Congruence		3	22	55	1,830
7	Logic Expression		3	25	45	2,110
8	Participation & Collaboration		3	21	510	4,262
9	Recepient Capability of Asset		3	32	44	2,541
10	Respect and Dignity					
		Respect & Dignity	3	38	54	2,964
		Pre-existing Relationships	3	5	11	281
		Aggregated	3	38	54	2,964

CHAPTER SIX

Results

The analysis of the data, as part of the CRIS study, seeks to inform Step 2 of our framework methodology i.e. the analysis of data for insights that form an integral part of critique in CRIS. This study involved, as already described, both a quantitative analysis of email data and a quantitative analysis of field notes and interview data. The sections below describe the results or insights derived from those analyses that will be utilized to inform the last two steps of the 4-step CRIS framework.

Preliminary Email Analysis in MS Excel

As previously stated, first level analysis of the data involved a pivot analysis in MS Excel of the email data. From that analysis of primary communications, we had the following major findings:

(a) Table 6.1 shows that almost 80% of all email communication originated from UniversityCo and AnimationCo. UniversityCo specifically originated about 56% of conversations while HospitalCo, the second Principal Project Implementor and key *local or recipient* participant originated less than 8%.

(b) Over 65% of the conversations concerned the subject area of Application Development. Application Design, Game Design, and Game Development made up approximately 8% of

communications. It is therefore noted that approximately 73% of all project communication focused on the design and development of project artefacts.

(c) From Tables 6.2 and 6.4, we note that UniversityCo both originated and was a primary recipient in approximately 69% of all email conversations in each subject group. HospitalCo, in the subject groups that it was a primary originator or recipient, originated approximately only 10% of those emails and were included as a primary recipient in approximately 20%.

(d) Both AnimationCo and AppCo originated more conversations than HospitalCo and were copied in almost a similar number of conversations. When this is considered along with the fact that the bulk of conversations that HospitalCo originated involved Academic Research, the Cultural Exchange Program and scheduling Meetings which were almost exclusive conversations between the two *principals,* it can be noted that on core conversations of design and development, HospitalCo was largely an absent communicator.

(e) HospitalCo appears to have been notably excluded as a primary participant from email conversations concerning both grant awarding and grant reporting plus the Game Design which was a new and major feature.

Table 6.1 Percentage of total emails originated for each subject group by actor.

Subject Group	UniversityCo	HospitalCo	AnimationCo	AppCo	UnivAdmin	Consultant	GovFund	Grand Total
App Development	34.45%	5.59%	20.36%	4.25%	0.00%	1.12%	0.00%	65.77%
Administrative	3.13%	0.00%	0.00%	0.00%	2.68%	0.00%	0.00%	5.82%
Meeting	3.13%	0.67%	0.00%	1.34%	0.00%	0.00%	0.00%	5.15%
Academic Research	3.36%	0.67%	0.00%	0.00%	0.67%	0.00%	0.00%	4.70%
Cultural Exchange	2.46%	0.45%	0.45%	0.89%	0.00%	0.00%	0.00%	4.25%
Game Development	0.45%	0.22%	2.24%	0.22%	0.00%	0.00%	0.00%	3.13%
Grant Report	1.79%	0.22%	0.00%	0.00%	0.22%	0.00%	0.67%	2.91%
Game Design	2.01%	0.00%	0.45%	0.22%	0.00%	0.00%	0.00%	2.68%
Grant Award	1.57%	0.00%	0.45%	0.00%	0.00%	0.00%	0.00%	2.01%
Legal	1.79%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.79%
App Design	1.57%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.57%
Vendor Contracts	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.22%
Grand Total	55.93%	7.83%	23.94%	6.94%	3.58%	1.12%	0.67%	100.00%

Table 6.2 Percentage of emails by subject originated by specific actor

Subject Group	UniversityCo	HospitalCo	AnimationCo	AppCo	UnivAdmin	Consultant	GovFund	Grand Total
App Development	52.38%	8.50%	30.95%	6.46%	0.00%	1.70%	0.00%	100.00%
Administrative	53.85%	0.00%	0.00%	0.00%	46.15%	0.00%	0.00%	100.00%
Meeting	60.87%	13.04%	0.00%	26.09%	0.00%	0.00%	0.00%	100.00%
Academic Research	71.43%	14.29%	0.00%	0.00%	14.29%	0.00%	0.00%	100.00%
Cultural Exchange	57.89%	10.53%	10.53%	21.05%	0.00%	0.00%	0.00%	100.00%
Game Development	14.29%	7.14%	71.43%	7.14%	0.00%	0.00%	0.00%	100.00%
Grant Report	61.54%	7.69%	0.00%	0.00%	7.69%	0.00%	23.08%	100.00%
Game Design	75.00%	0.00%	16.67%	8.33%	0.00%	0.00%	0.00%	100.00%
Grant Award	77.78%	0.00%	22.22%	0.00%	0.00%	0.00%	0.00%	100.00%
Legal	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
App Design	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
Vendor Contracts	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
Grand Total	55.93%	7.83%	23.94%	6.94%	3.58%	1.12%	0.67%	100.00%
Average Originated	68.75%	10.20%	30.36%	13.82%	22.71%	1.70%	23.08%	

Table 6.3 Percentage of total email conversations for each subject group in which actor was a primary recipient

Subject Group	UniversityCo	HospitalCo	AnimationCo	AppCo	UnivAdmin	Consultant	GovFund	Grand Total
App Development	38.93%	12.30%	19.69%	7.16%	0.00%	2.68%	0.00%	65.77%
Administrative	4.03%	0.45%	0.45%	0.00%	2.46%	0.22%	0.00%	5.82%
Meeting	2.68%	1.34%	0.45%	1.34%	0.22%	0.22%	0.00%	5.15%
Academic Research	3.13%	2.01%	0.00%	0.00%	0.00%	0.00%	0.00%	4.70%
Cultural Exchange	2.46%	0.67%	0.45%	0.89%	0.00%	0.22%	0.00%	4.25%
Game Development	2.01%	0.67%	1.79%	1.12%	0.00%	0.00%	0.00%	3.13%
Grant Report	1.34%	0.00%	0.00%	0.00%	0.22%	0.00%	1.57%	2.91%
Game Design	2.24%	0.00%	0.22%	0.22%	0.00%	0.00%	0.00%	2.68%
Grant Award	1.34%	0.00%	0.45%	0.00%	0.67%	0.00%	0.00%	2.01%
Legal	1.34%	0.22%	0.00%	0.00%	0.45%	0.00%	0.00%	1.79%
App Design	1.34%	0.22%	0.00%	0.22%	0.00%	0.00%	0.00%	1.57%
Vendor Contracts	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.22%
Grand Total	61.07%	17.90%	23.49%	10.96%	4.03%	3.36%	1.57%	100.00%

Table 6.4 Percentage of email conversations by subject in which actor was a primary recipient

Subject Group	UniversityCo	HospitalCo	AnimationCo	AppCo	UnivAdmin	Consultant	GovFund	Grand Total
App Development	59.18%	18.71%	29.93%	10.88%	0.00%	4.08%	0.00%	100.00%
Administrative	69.23%	7.69%	7.69%	0.00%	42.31%	3.85%	0.00%	100.00%
Meeting	52.17%	26.09%	8.70%	26.09%	4.35%	4.35%	0.00%	100.00%
Academic Research	66.67%	42.86%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
Cultural Exchange	57.89%	15.79%	10.53%	21.05%	0.00%	5.26%	0.00%	100.00%
Game Development	64.29%	21.43%	57.14%	35.71%	0.00%	0.00%	0.00%	100.00%
Grant Report	46.15%	0.00%	0.00%	0.00%	7.69%	0.00%	53.85%	100.00%
Game Design	83.33%	0.00%	8.33%	8.33%	0.00%	0.00%	0.00%	100.00%
Grant Award	66.67%	0.00%	22.22%	0.00%	33.33%	0.00%	0.00%	100.00%
Legal	75.00%	12.50%	0.00%	0.00%	25.00%	0.00%	0.00%	100.00%
App Design	85.71%	14.29%	0.00%	14.29%	0.00%	0.00%	0.00%	100.00%
Vendor Contracts	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
Grand Total	61.07%	17.90%	23.49%	10.96%	4.03%	3.36%	1.57%	100.00%
Average per Subject	68.86%	19.92%	20.65%	19.39%	22.54%	4.38%	53.85%	

a. Inferences from Network Layout Graphs

The first step in the network analysis was generating a layout view of the network. Figures 6.1 and 6.2, which are layouts involving all contacts in the email conversations, are included here mainly as part of an analysis of clustering. From the group level network and flow maps in Figures 6.1 to 6.6 we observe and could infer that:

(a) There were two main clusters in the network when primary actors are considered (Figure 6.4). However, in Figure 6.2, in which all nodes that were included in an email conversation i.e. nodes represented in the FROM, TO and CC fields, a 3-cluster network is generated. This layout suggests the significant impact of the key role played by UniversityCo, in keeping with the suggested theoretical background literature, in grant sourcing and leveraging administrative support.

(b) Figure 6.2, along with the flow maps in figures 6.5 and 6.6, and supported by the email count analysis in MS Excel, also suggests the likelihood that the participatory ethos in this collaboration was one that emphasized an efficiency model. Under this efficiency model, UniversityCo (the researchers) held primary decision making and administrative power, collaborating mainly (or only) on issues regarding design and development of the project artefacts.

(c) We also note from the flow maps (figures 6.5 and 6.6) that UniversityCo had direct communication with all the participant groups. Furthermore, even though it heavily communicated with HospitalCo, these layout maps are suggestive of the possibility that HospitalCo had a very limited directive or conversational role over the vending parties, i.e., with AppCo and AnimationCo who were developing the artefacts which HospitalCo would ultimately be responsible for implementing.
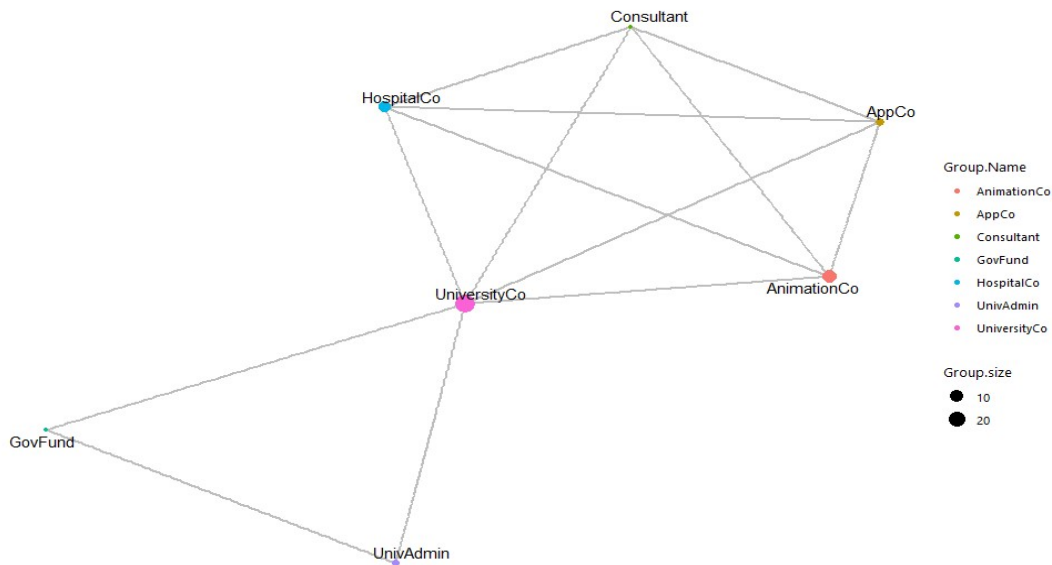
Figure 6.1 Group level network map for all contacts (*note: edge weights not shown though edge strengths applied in mapping*)

	Gp.Name	Code	Community
1	UniversityCo	UC	3
2	GovFund	GF	2
3	UnivAdmin	UA	2
4	AnimationCo	AnC	1
5	AppCo	ApC	1
6	Consultant	Con	1
7	HospitalCo	HC	1
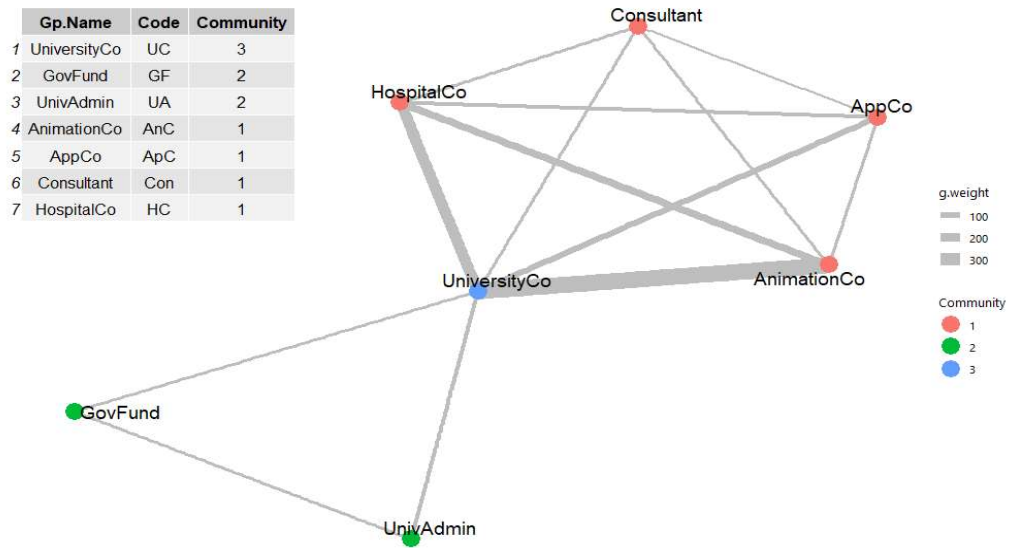
Figure 6.2 Group level network community clustering layout when all contacts considered
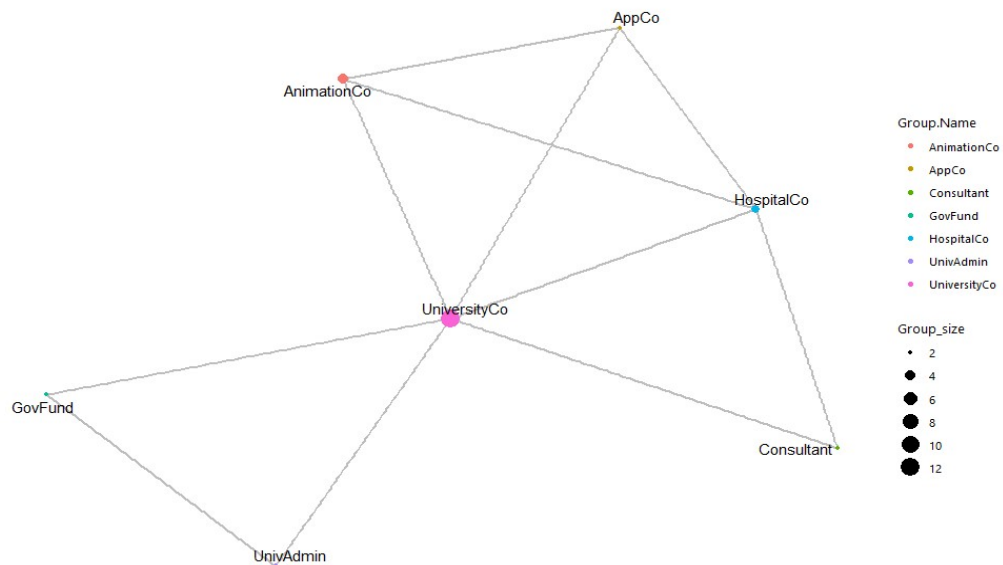
Figure 6.3 Group level network map when only primary contacts in conversations considered.
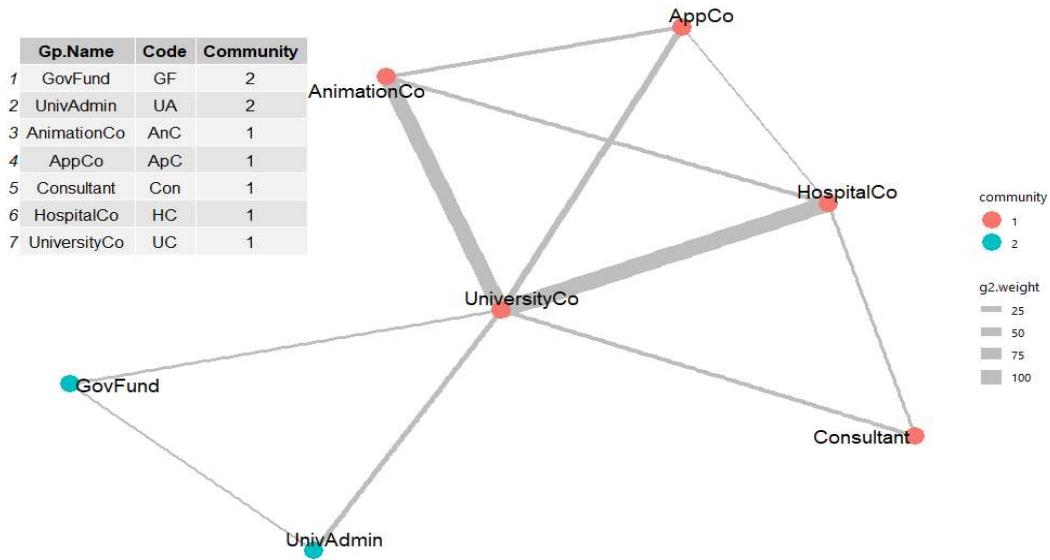
Figure 6.4 Group level network community clustering when only primary contacts in email conversations considered.
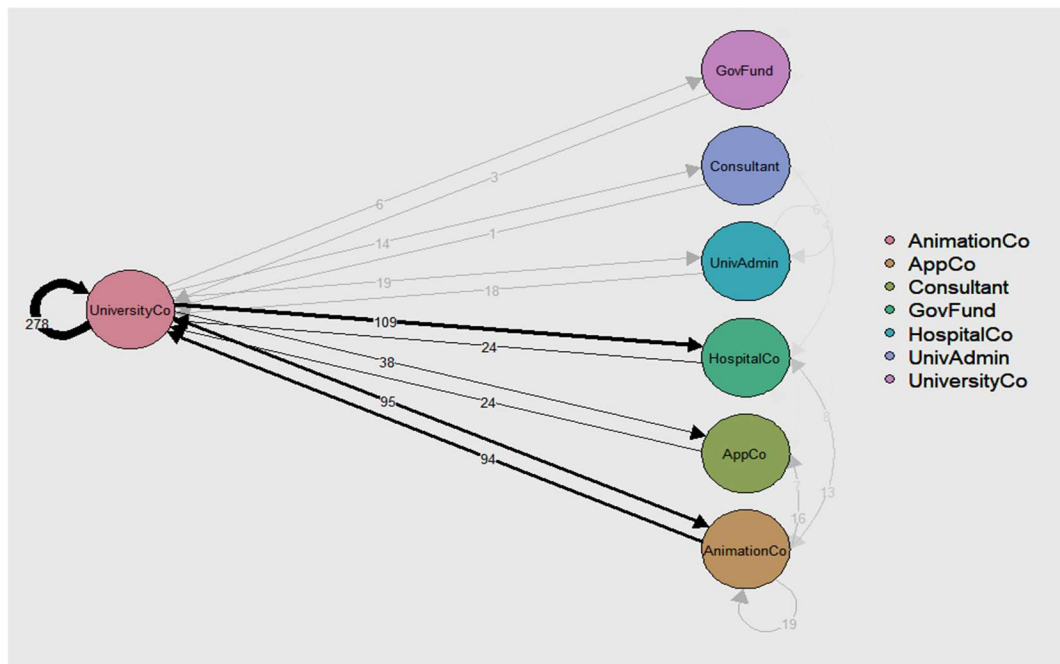
Figure 6.5 Flow map of conversations originating from UniversityCo when only primary conversation contacts included.
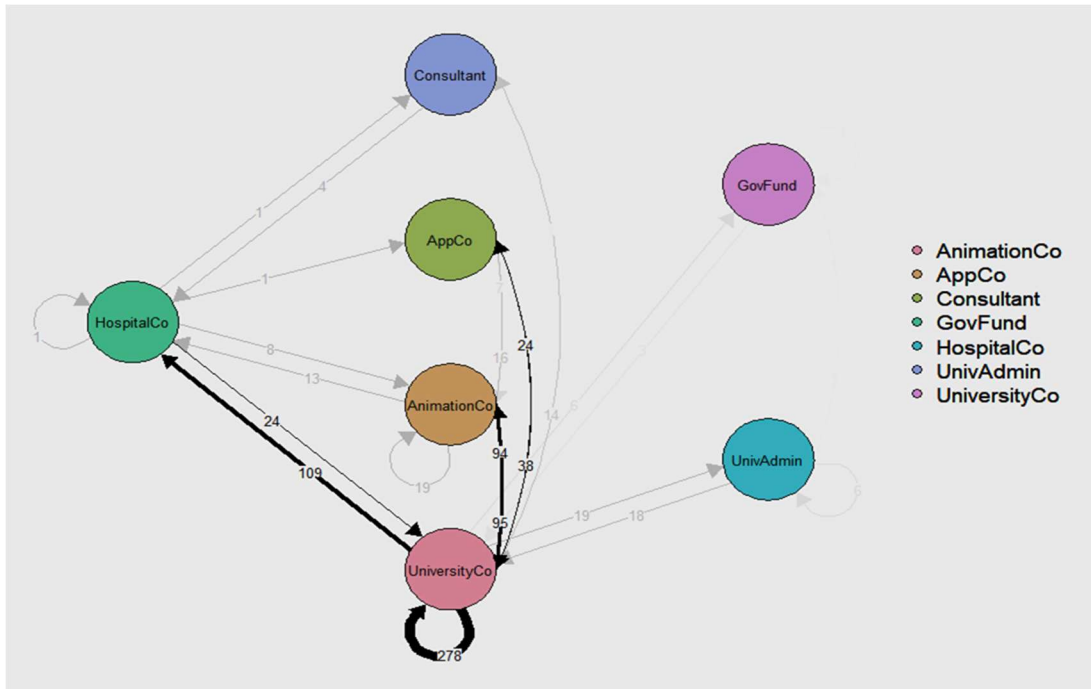
Figure 6.6 Flow map of conversations originating from HospitalCo when only primary conversation contacts included.

Figures 6.7 – 6.11 below, that display network layouts at the individual actor (node) level of analysis, show that:

(a) Key network communication activity, at a broad level when all email contacts are considered, occurred between 15 of the 44 actors involved with the project. 5 of these actors were from UniversityCo (the research team), 2 from HospitalCo, 5 from AnimationCo, 2 from AppCo and then the consultant. However, at a primary communication level, only 9 actors were significant. The consultant was not significant, 4 members of the university research team, 2 from the hospital, 2 from AnimationCo and 1 from AppCo were the core actors.

(b) The network appears to be centralized around node 37, the principal researcher and project lead from UniversityCo. The two other most significant nodes are nodes 40 (a researcher from the business school) and 39 (an artistic director), also from UniversityCo. Nodes 14 (the lead doctor) and 16 (a consulting physician on the project), who were the core participants from HospitalCo, although embedded within the area of significant network activity, lie at the periphery of that activity, suggesting that they had some influence but not at a significant scale.

The network cluster visualization (Figures 6.11), shows that apart from Node 37, the research lead, the design and development team comprised of the 2 actors from HospitalCo (nodes 14 and 16), 2 from AnimationCo (nodes 2 and 4), one from AppCo (node 7), the consultant (node 8) and the three team members from UniversityCo (nodes 36,39 and 40) who were drawn from computer science, industrial art and design and MIS/business were all in one cluster. Node 37 was clustered along with the GovFund and UnivAdmin actors, a reflection of the strong likelihood of an efficiency model, alluded to earlier, in the management of this participatory collaboration.

Furthermore, figures 6.7–6.11 all strongly indicate that the network was a highly centralized, almost star network revolving around Node 37, the principal research lead. It is important to note that node 37 has a historical link to the collaboration between the university and the hospital

(almost 6 years) and so was primary link between all the parties involved in the project. They were also the primary project promoter, handled the grant fund application, drew in the university research collaboration team, and handled administrative matters.

A key question in further analysis, which involves centrality measurement and mapping, as part of the evaluation of participatory praxis in this network is *to what degree did the Indian participants exert influence, prominence, or power?* Thus far, the network layout visualizations suggest that this was rather limited.
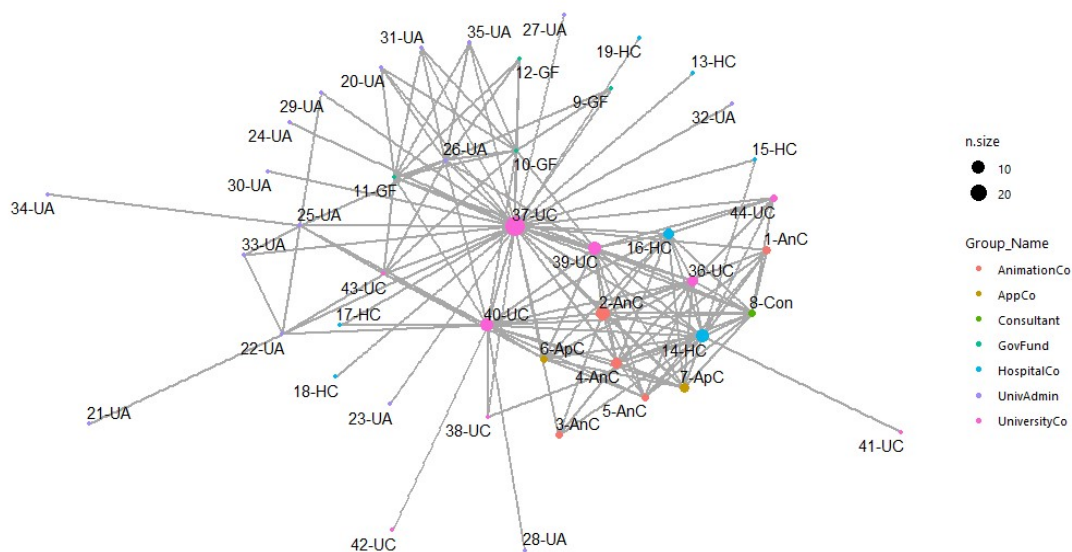
Figure 6.7 Individual level network layout when all contacts in email conversations considered.
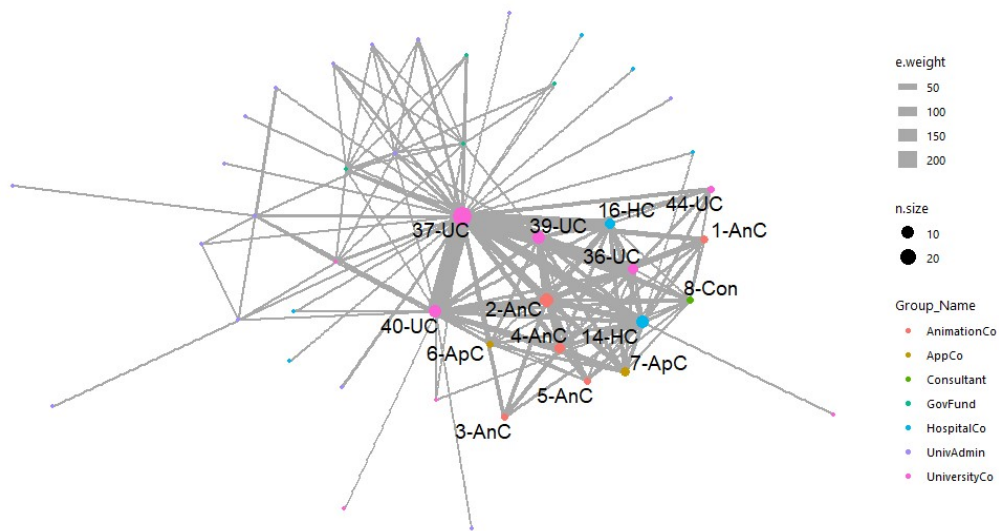
Figure 6.8 Individual level network layout when only primary contacts in email conversations considered with edge weights and label filter applied to display significant nodes (i.e. size factor >3)
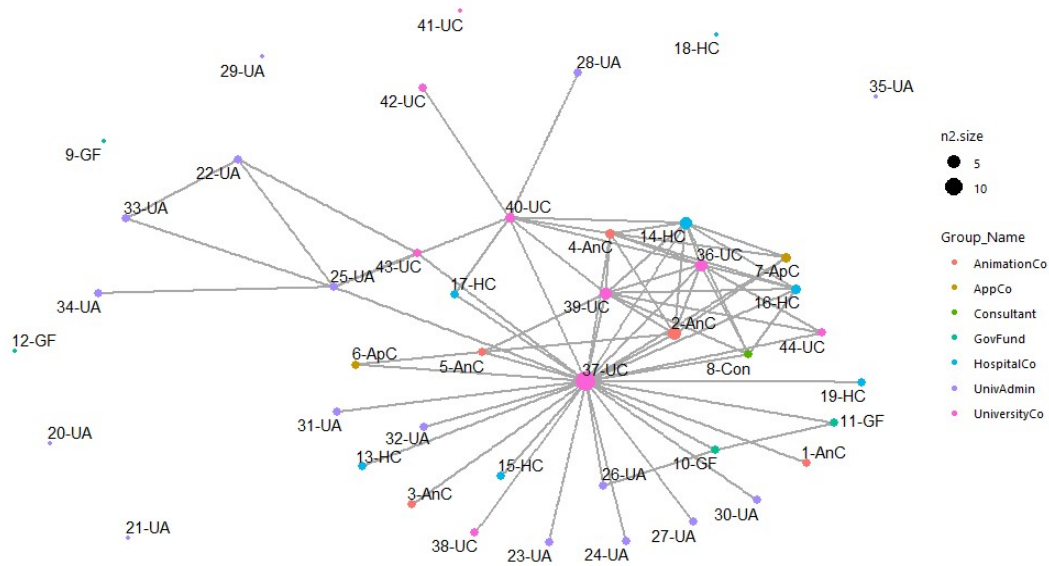
Figure 6.9 Individual level network layout when only primary contacts in email conversations considered.
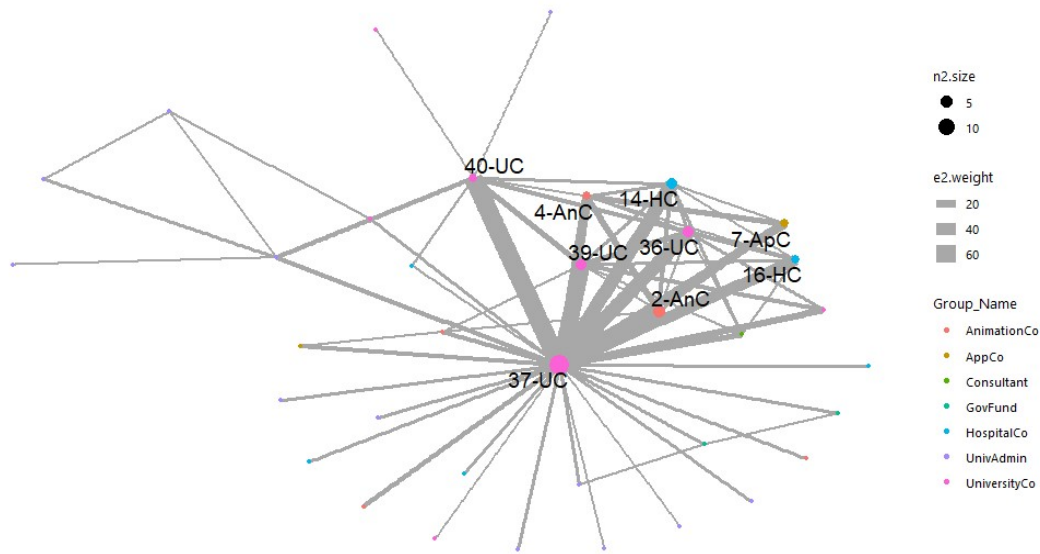
Figure 6.10 Individual level network layout when only primary contacts in email conversations considered with edge weights and label filter applied to display significant nodes (i.e. size factor >3)

	Node	Gp.Name	Community
1	37-UC	UniversityCo	1
2	2-AnC	AnimationCo	2
3	4-AnC	AnimationCo	2
4	7-ApC	AppCo	2
5	14-HC	HospitalCo	2
6	16-HC	HospitalCo	2
7	36-UC	UniversityCo	2
8	39-UC	UniversityCo	2
9	40-UC	UniversityCo	2
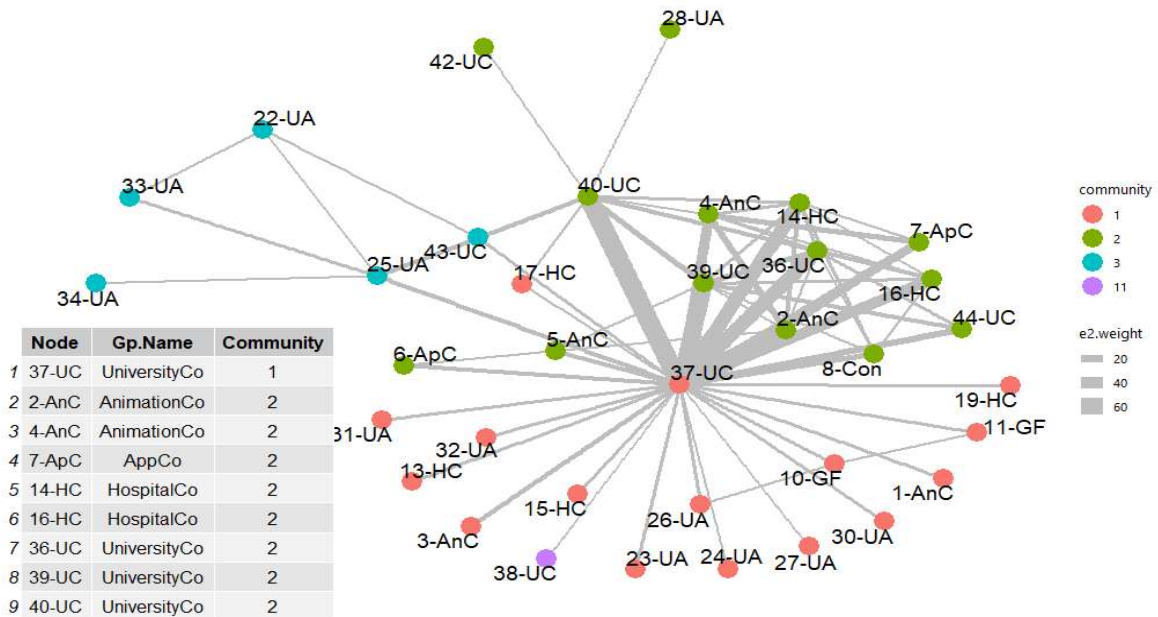
Figure 6.11 Individual level network community clustering layout when only primary contacts in email conversations considered and all undirected links filtered out.

b. Degree Centrality and Prestige

From figures 6.12 and 6.13, which are visualizations at a group level of analysis, we note that UniversityCo has an outdegree (centrality) and indegree (prestige) score of 7 (centrality) and 7 (prestige) respectively. These results point to the strong likelihood that UniversityCo was the most central (or influential) and prominent (or referential) node within the network. HospitalCo, the principal collaborator and implementer from India, on the other hand, had scores of 5 and 4, suggesting that it had noticeably lower influence, and even much lower prominence within the network compared to UniversityCo. These scores particularly suggest that at a group level, HospitalCo was a junior partner in this consortium. Again, these results are most likely related to the fact that it had no direct connections with the UnivAdmin and GovFund teams. AnimationCo and AppCo had scores that are in keeping with their participation levels within the network i.e. with the two project implementors and each other.

At an individual actor level of analysis, figures 6.14 and 6.15, show that the university research team lead (node 37-UC) clearly stands out with an outdegree (centrality) or *influence* score of 30 (i.e. 30 of 44 nodes/actors or an influential connectedness with almost 70% of the network) and indegree (prestige) or *prominence* score of 19 (i.e. referential prominence or importance to over 43% of the network). The 9 other core research team members, i.e., nodes 2-AnC, 4-AnC, 7-ApC, 8-Con, 14-HC,16-HC, 36-UC, 39-UC and 40-UC, who were directly involved with the

design and development of the artefacts related to the project had centrality and prestige scores of 9 and below. These scores, suggestive of influence and prominence roles only within the design and development team, at which level the major interpersonal collaborative/participatory aspects of the research occurred. However, the study notes that the UniversityCo (nodes 36, 39 and 40) and AnimationCo (nodes 2 and 4) nodes had more significant centrality and prestige scores when specifically compared to HospitalCo nodes.

Figures 6.14 and 6.15, show that Node 14-HC, the lead doctor and highest ranked HospitalCo node, had a centrality or *influence* score of 6 i.e. approximately 14% over the entire network and 60% over the design and development project team (i.e. 6/10 team nodes) and prestige or *prominence* score of 7 i.e. 16% over the entire network and 70% of design and development team. Nodes 39-UC (the artistic director) , 4-AnC (lead animator), 2-AnC (animation consultant) and 36-UC (computer scientist) had higher centrality (*influence)* scores and Node 40-UC (researcher from business school), a greater prestige (*prominence)* score.

	Gp.Name	Code	Degree
1	UniversityCo	UC	7
2	HospitalCo	HC	5
3	AnimationCo	AnC	4
4	UnivAdmin	UA	3
5	AppCo	ApC	2
6	Consultant	Con	2
7	GovFund	GF	2
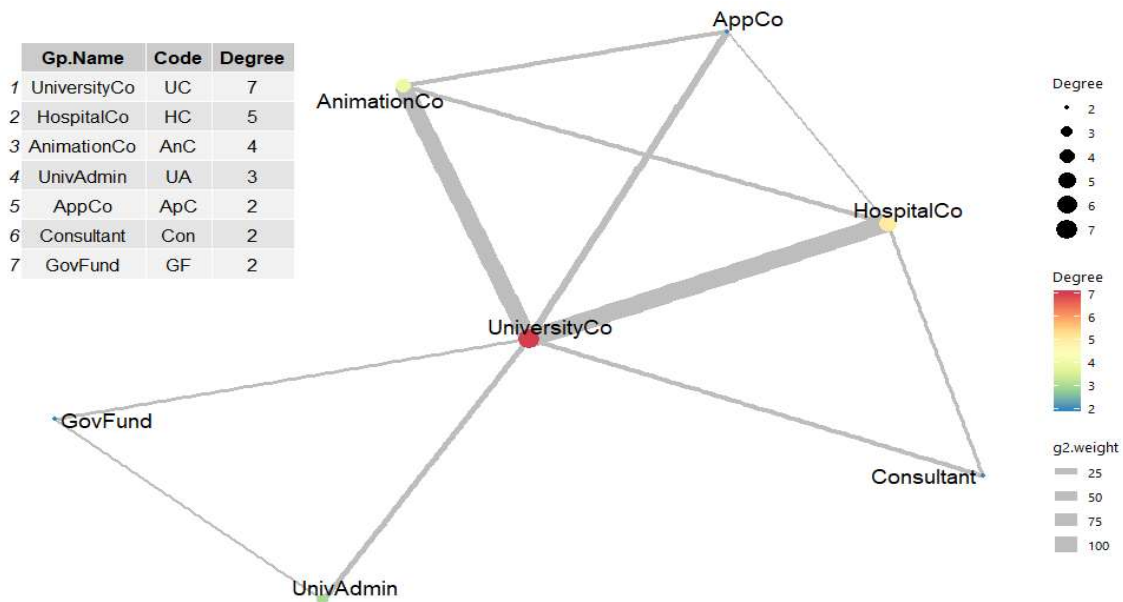
Figure 6.12 Degree centrality (out-degree/ influence) map and values, group level for primary contacts only.

	Gp.Name	Code	Prestige
1	UniversityCo	UC	7
2	AnimationCo	AnC	4
3	HospitalCo	HC	4
4	AppCo	ApC	3
5	GovFund	GF	3
6	Consultant	Con	2
7	UnivAdmin	UA	2
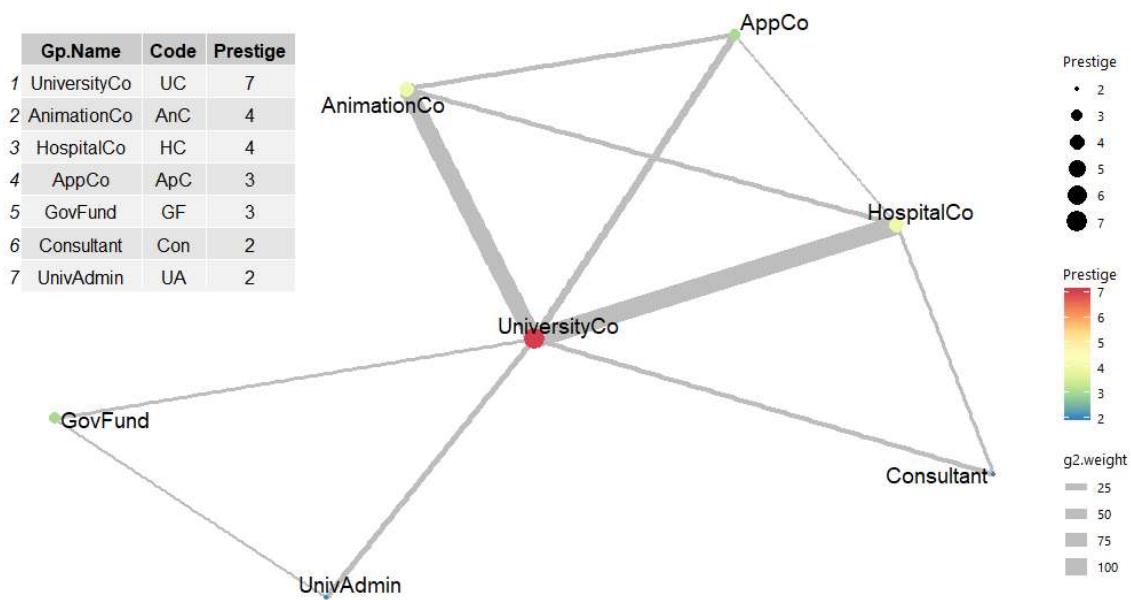
Figure 6.13 Prestige (in-degree/ prominence) centrality map and values, group level for primary contacts only.

	Node	Gp.Name	Degree
1	37-UC	UniversityCo	30
2	39-UC	UniversityCo	9
3	4-AnC	AnimationCo	8
4	2-AnC	AnimationCo	7
5	36-UC	UniversityCo	7
6	14-HC	HospitalCo	6
7	25-UA	UnivAdmin	6
8	7-ApC	AppCo	3
9	8-Con	Consultant	3
10	22-UA	UnivAdmin	3
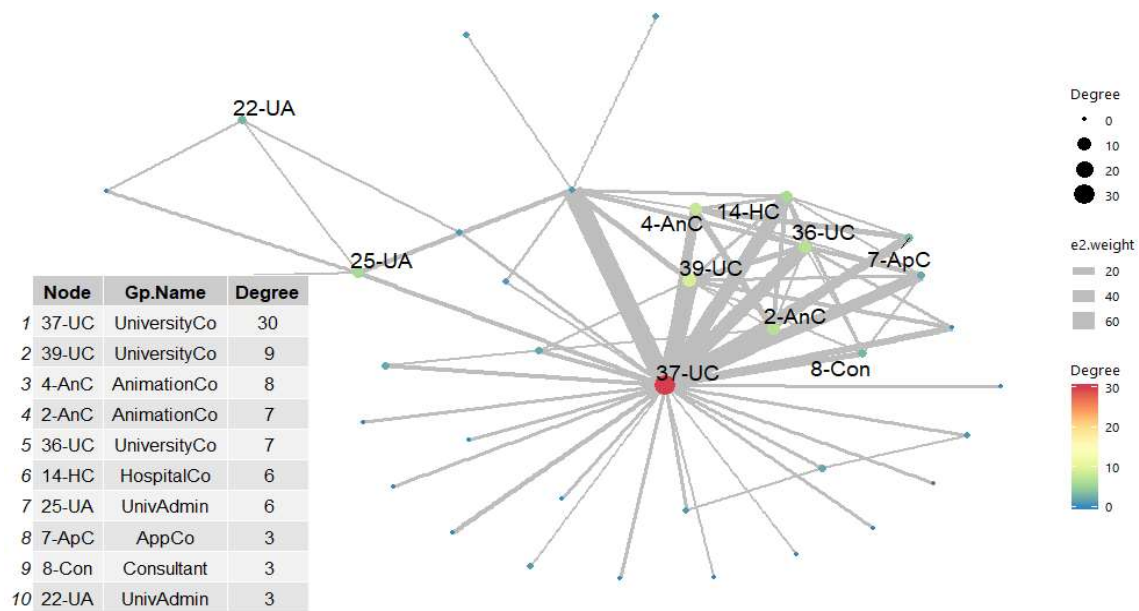
Figure 6.14 Degree centrality map and values, individual actor level for primary contacts only (label filter at centrality ≥ 3)

	Node	Gp.Name	Prestige
1	37-UC	UniversityCo	16
2	40-UC	UniversityCo	9
3	14-HC	HospitalCo	7
4	2-AnC	AnimationCo	5
5	16-HC	HospitalCo	5
6	39-UC	UniversityCo	5
7	5-AnC	AnimationCo	4
8	7-ApC	AppCo	4
9	8-Con	Consultant	4
10	36-UC	UniversityCo	4
11	4-AnC	AnimationCo	3
12	25-UA	UnivAdmin	3
13	43-UC	UniversityCo	3
14	44-UC	UniversityCo	3
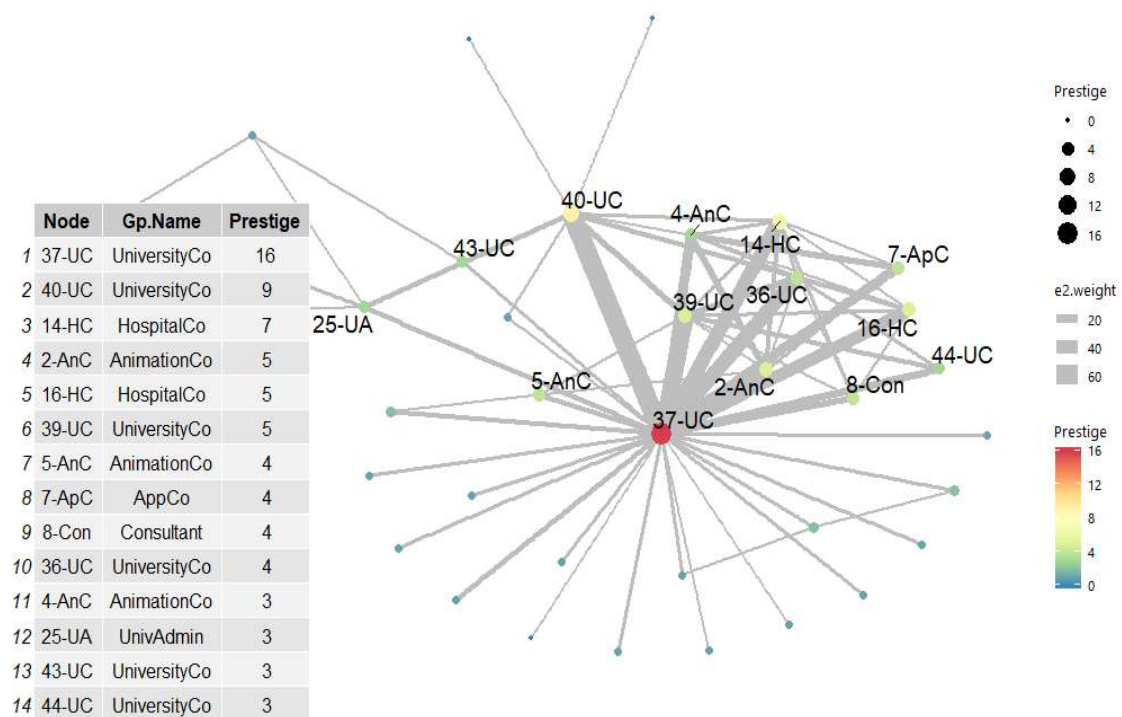
Figure 6.15 Prestige (degree) centrality map and values, individual actor level for primary contacts only (label filter at prestige ≥ 3).

c. Eigenvalue, Authority and Hub Centralities

Eigenvalue centrality is a more "sophisticated" measure or view of influence and prominence centrality (Hansen et al., 2010, p.41) than that derived from out and in-degree centrality measures. It is a measure of node importance based on the concept that important nodes/actors have greater significance in a network based on their importance as a source/ resource of information or knowledge (i.e., authority), as well as in their ability to find or access the right or most important information or knowledge (hubness). Eigenvalue centrality is therefore a measure of quality and not just quantity, suggesting that important nodes are those that are connected to other important nodes.

The group level network layout maps and values for eigenvalue, authority, and hub centralities (figures 6.16 – 6.18) unsurprisingly show that UniversityCo was the most important node within the network. It is however important to note, that in spite of the very low level of response from HospitalCo to emails directed at it, it was ranked second on both eigenvalue and hub centrality pointing to a significant inclusion in the most critical information and relationships as part of the artifact (i.e. application and game) design and development process.

The noted fact that AnimationCo and HospitalCo had the same authority score (Authority = 0.7184) is also significant for HospitalCo. Notable because, AnimationCo had significant importance as a technology vendor in the design and development of the artifacts and shared a much

greater number of bidirectional communications with UniversityCo. Therefore, even though on an analysis of quantity of communication alone, HospitalCo would have appeared to have had a less significant role, these results suggest that in spite of that low communication count, its significance as the lead India project implementor was significantly important to the consortium. It was highly valued as a resource for information and was kept in the loop of the most important artifact related project information. The influential importance of beneficiaries in the important artefact or outcome aspects of interventionist research is a critical element emphasized by participatory theory to research.

	Gp.Name	Code	Eigenvalue
1	UniversityCo	UC	1.0000000
2	HospitalCo	HC	0.7617408
3	AnimationCo	AnC	0.7167893
4	AppCo	ApC	0.5608344
5	Consultant	Con	0.4710225
6	UnivAdmin	UA	0.3649305
7	GovFund	GF	0.3649305
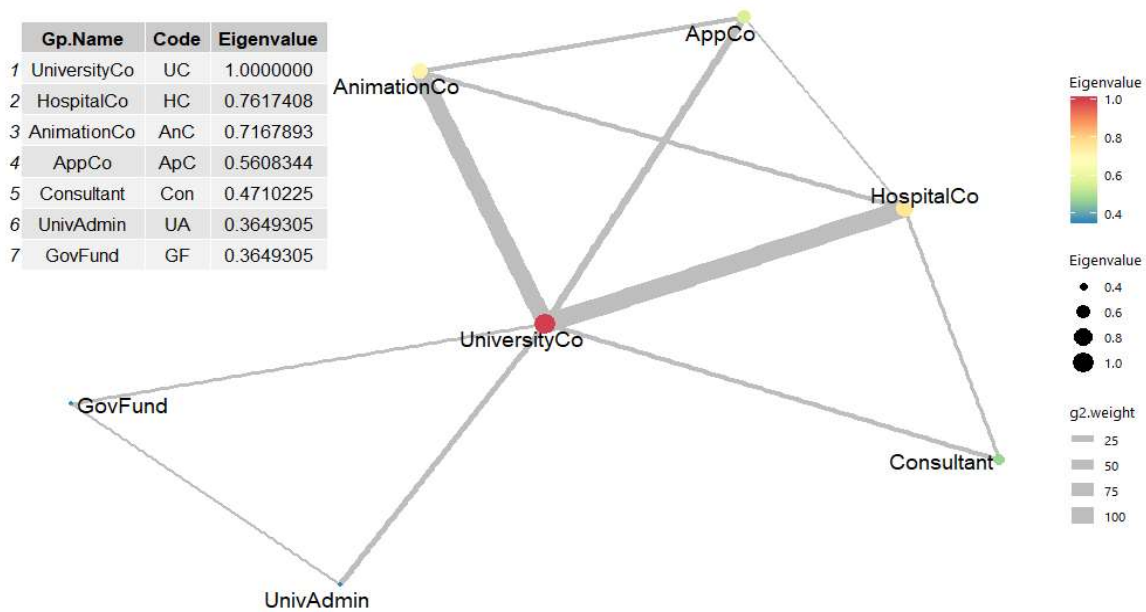
Figure 6.16 Eigenvalue centrality map and values, group level analysis for primary contacts only.

	Gp.Name	Code	Authority
1	UniversityCo	UC	1.0000000
2	AnimationCo	AnC	0.7184065
3	HospitalCo	HC	0.7184065
4	AppCo	ApC	0.6200664
5	Consultant	Con	0.4451290
6	GovFund	GF	0.4279714
7	UnivAdmin	UA	0.3462522
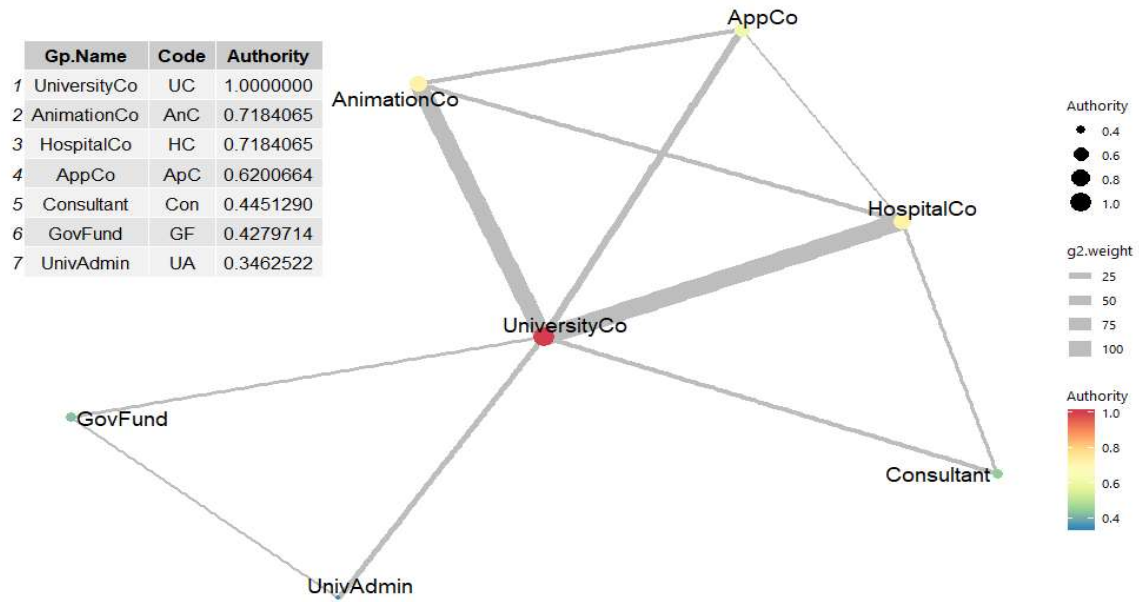
Figure 6.17 Authority centrality map and values, group level analysis for primary contacts only.

	Gp.Name	Code	Hub
1	UniversityCo	UC	1.0000000
2	HospitalCo	HC	0.8189472
3	AnimationCo	AnC	0.7148535
4	UnivAdmin	UA	0.4149035
5	Consultant	Con	0.4018506
6	AppCo	ApC	0.4018506
7	GovFund	GF	0.3339322
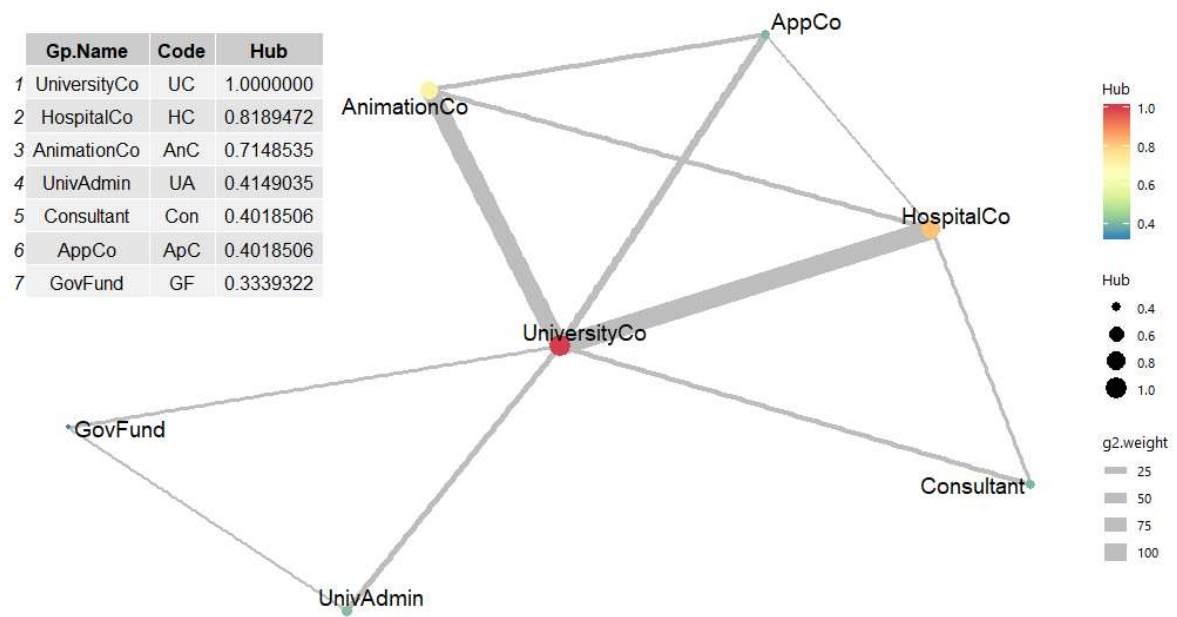
Figure 6.18 Hub centrality map and values, group level analysis for primary contacts only.

At an individual actor level of analysis, the relatively big difference in eigenvalue, authority, and hub centralities shown on figures 6.19 – 6.21 for the university team research lead, node 37-UC, is highly suggestive of a highly centralized or egocentric network around them. The difference is most likely directly related to an efficiency model in use during this participatory research process in which node 37 acts as a centralized link for all administrative and funding contact in addition to research elements. The huge difference in scores between node 37-UC and all the other nodes, including other UniversityCo and UnivAdmin nodes, also alludes to this network being not just highly centralized but also egocentric. This finding in some ways also queries whether some key elements of participatory democracy and co-ownership were absent in this collaborative partnership.

Within the research design and development team, however, we note that the artistic director (node 39-UC), lead doctor (14-HC) , lead animator (4-AnC), and animation consultant (2-AnC), who were the four key actors involved in the artifact design and development process, all had almost similar (or closely related) eigenvalues, authority and hub centrality scores. Suggesting that, as a team, they had the significant *democratic* interaction that participatory approaches to research theory promote. Amongst these nodes, the only major principal concern being the lower rank that 14-HC, the project lead from India had. 14-HC had a lower hub score (Hub = 0.347) compared to 39-UC (Hub = 0.492) and 4-AnC (Hub =

0.465), thus inferring that among the consortium lead participants, they were less significantly informed or kept within the information loop. That is most likely because the bulk of information was related to technical issues of design and development which most likely also resulted in the relatively higher hub scores for nodes the university computer scientist (36-UC) and one of the animators (2-AnC) who were technical participants. Or possibly the difference in scores could have also been related to a likely disengagement on their part in those more technical discussions leading to their being *out of the loop.*

	Node	Gp.Name	Eigenvalue
1	37-UC	UniversityCo	1.0000000
2	39-UC	UniversityCo	0.5632021
3	14-HC	HospitalCo	0.5502031
4	2-AnC	AnimationCo	0.5300998
5	4-AnC	AnimationCo	0.4830091
6	36-UC	UniversityCo	0.4700260
7	7-ApC	AppCo	0.3637870
8	8-Con	Consultant	0.3565376
9	40-UC	UniversityCo	0.3534344
10	16-HC	HospitalCo	0.3515896
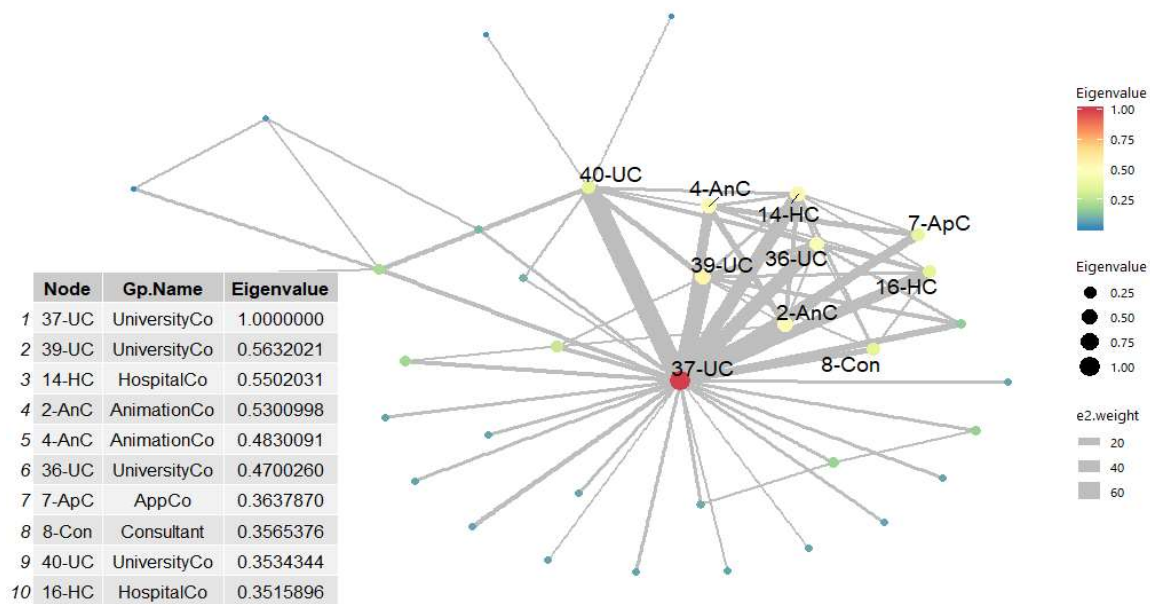
Figure 6.19 Eigenvalue centrality (≥ 0.30) map and values, individual actor level analysis for primary contacts only.

	Node	Gp.Name	Authority
1	37-UC	UniversityCo	1.0000000
2	14-HC	HospitalCo	0.6976946
3	40-UC	UniversityCo	0.6972504
4	39-UC	UniversityCo	0.5838645
5	16-HC	HospitalCo	0.5794731
6	2-AnC	AnimationCo	0.5585537
7	36-UC	UniversityCo	0.5249166
8	8-Con	Consultant	0.5065774
9	7-ApC	AppCo	0.4921883
10	5-AnC	AnimationCo	0.4497454
11	44-UC	UniversityCo	0.4282592
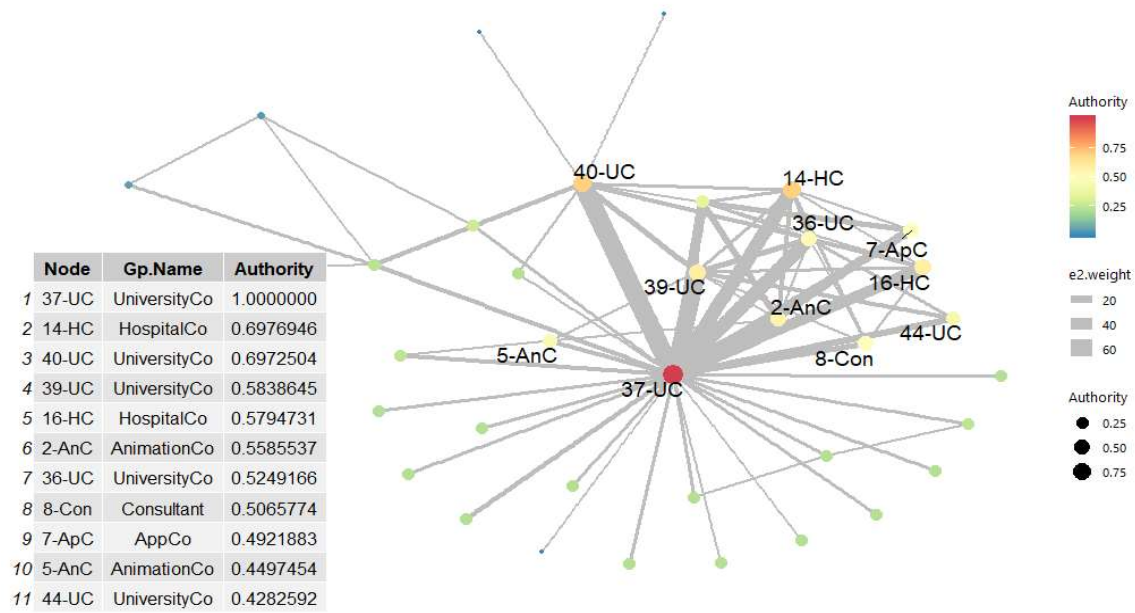
Figure 6.20 Authority centrality (≥ 0.40) map and values, individual actor level analysis for primary contacts only.

	Node	Gp.Name	Hub
1	37-UC	UniversityCo	1.0000000
2	39-UC	UniversityCo	0.4923656
3	4-AnC	AnimationCo	0.4644538
4	36-UC	UniversityCo	0.4064803
5	2-AnC	AnimationCo	0.3705929
6	14-HC	HospitalCo	0.3472528
7	8-Con	Consultant	0.2060092
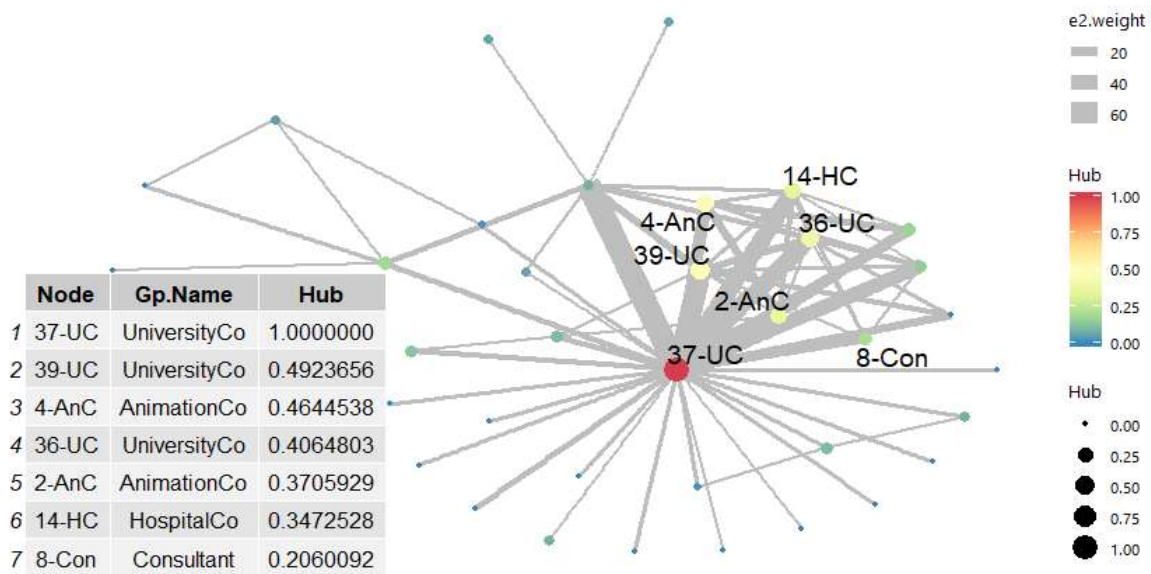
Figure 6.21 Hub centrality (≥ 0.2) map and values, individual actor level analysis for primary contacts only.

87

d. Betweenness and Closeness Centralities

As previously indicated, betweenness centrality is a measure of the bridging or connecting influence of a node derived as from the frequency that a node lies on the shortest path between other nodes. The higher the score, the greater the importance of a node in information flow within a network. Closeness centrality on the other hand is an influence measure that helps infer how favorable a node is positioned to acquire or control vital information and resources within a network. It is calculated based on the lowest average distance between nodes with the nodes with the highest standardized (and inverted) scores being the more significant ones (Disney, 2020; Dodds, 2011; Krebs, 2002).

At a group level of analysis, figures 6.22 and 6.23 show that UniversityCo, HospitalCo, and AnimationCo have the most significant betweenness and closeness centrality scores. Their closeness scores were both relatively similar and low (note: closeness centrality scores range between 0 to 1). Those closeness scores, pointing to a network in which no actor was in a significantly more favorable position to acquire or control information, even though UniversityCo was more dominant than any of the other collaborators.

The betweenness scores on the other hand for UniversityCo were significantly (almost 20 times) higher than those for HospitalCo. A result that was suggestive of a dramatically more significant centralized, and

technically egocentric role, that UniversityCo possibly played in all the communication taking place within the network.

	Gp.Name	Code	Betweenness
1	UniversityCo	UC	20.0
2	HospitalCo	HC	1.5
3	AnimationCo	AnC	0.5
4	AppCo	ApC	0.0
5	Consultant	Con	0.0
6	GovFund	GF	0.0
7	UnivAdmin	UA	0.0
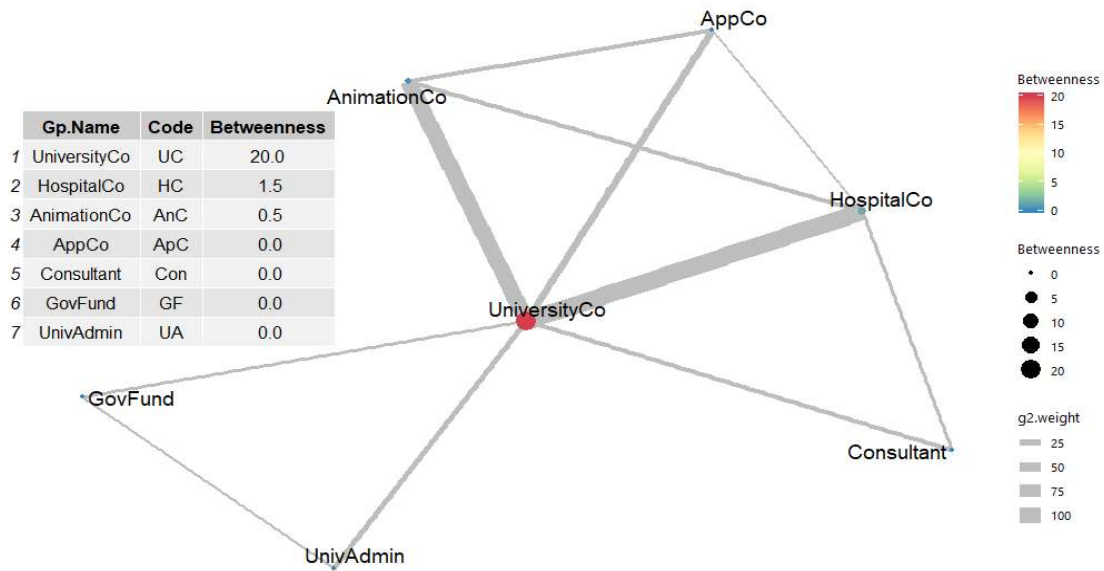
Figure 6.22 Betweenness centrality map and values, group level analysis for primary contacts only.

	Gp.Name	Code	Closeness
1	UniversityCo	UC	0.16666667
2	HospitalCo	HC	0.12500000
3	AnimationCo	AnC	0.11111111
4	AppCo	ApC	0.10000000
5	Consultant	Con	0.10000000
6	UnivAdmin	UA	0.10000000
7	GovFund	GF	0.09090909
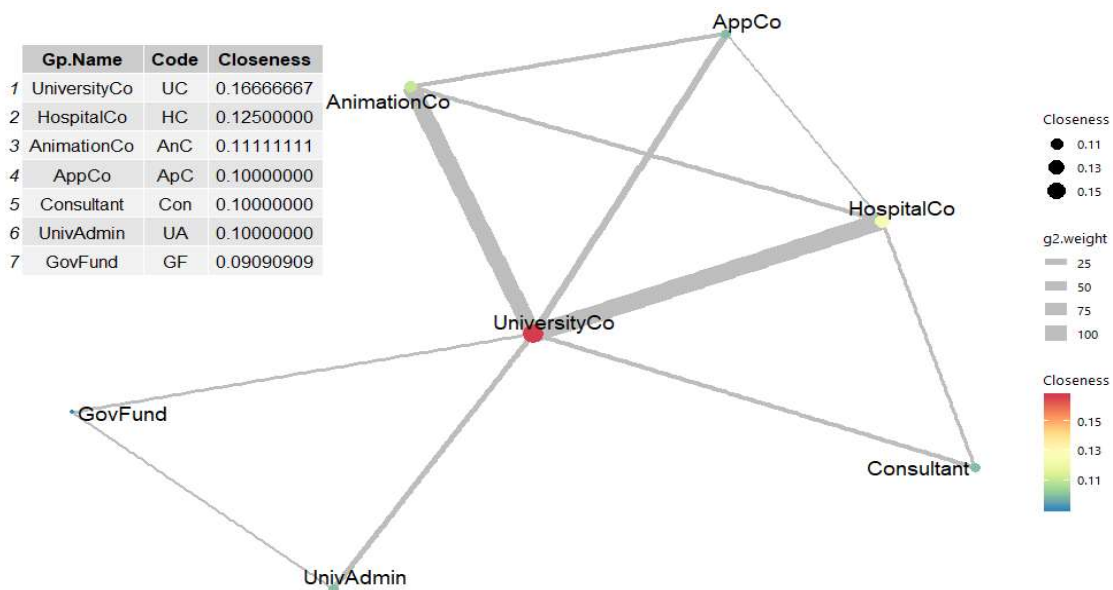
Figure 6.23 Closeness centrality map and values, group level analysis for primary contacts only.

89

At an individual analysis level, figures 6.24 is suggestive an egocentric centrality of node 37-UC (the research team lead). It had a betweenness score of 573, which was four times larger than the second ranked node, 25-UA (betweenness =117). Node 14-HC, the most significant node from HospitalCo, had a score of 6.37, that was suggestive of markedly less importance as an information bridge within the network. It however was the most significant of all the other Indian team members.

We also note that apart from node 40-UC, i.e., the business school researcher, who had a betweenness score of 95 and was also involved in administrative aspects of the project that were similar to but to a lesser extent than the team lead (37-UC), all the other key nodes involved in the artifact design and development process, i.e., nodes 14-HC, 2-AnC, 4-AnC, 36-UC, 39-UC, 7-Apc and 8– Con, all had low, closely related betweenness scores ranging from 1.62 to 6.37. The administrative relationship with node 37-UC probably contributing to those scores. The closely related and almost identical closeness scores for the project team (figure 6.25), when considered relative to the centrality scores for the rest of the network (tables 6.6 – 7) are suggestive of a strong likelihood that within the artefact design and development team, there was a balanced influence or importance structure in their participatory collaboration.

	Node	Gp.Name	Betweenness
1	37-UC	UniversityCo	573.950000
2	25-UA	UnivAdmin	117.000000
3	40-UC	UniversityCo	95.000000
4	10-GF	GovFund	31.000000
5	14-HC	HospitalCo	6.366667
6	39-UC	UniversityCo	4.283333
7	2-AnC	AnimationCo	3.666667
8	4-AnC	AnimationCo	2.450000
9	36-UC	UniversityCo	1.616667
10	5-AnC	AnimationCo	1.000000
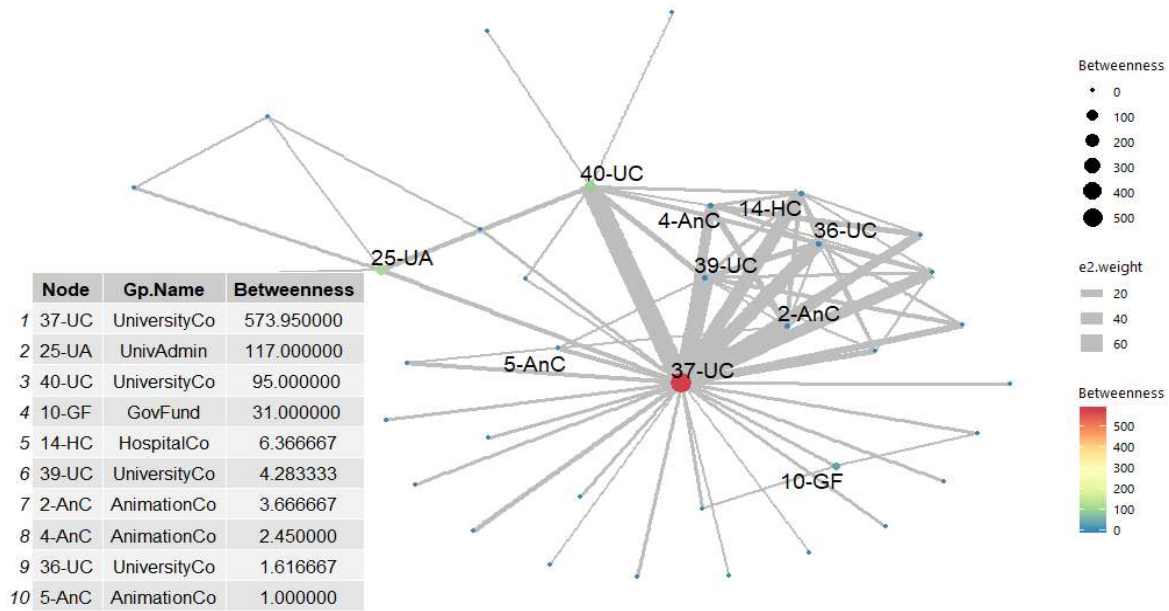
Figure 6.24 Betweenness centrality (≥ 1.0) map and values, individual actor level analysis for primary contacts only

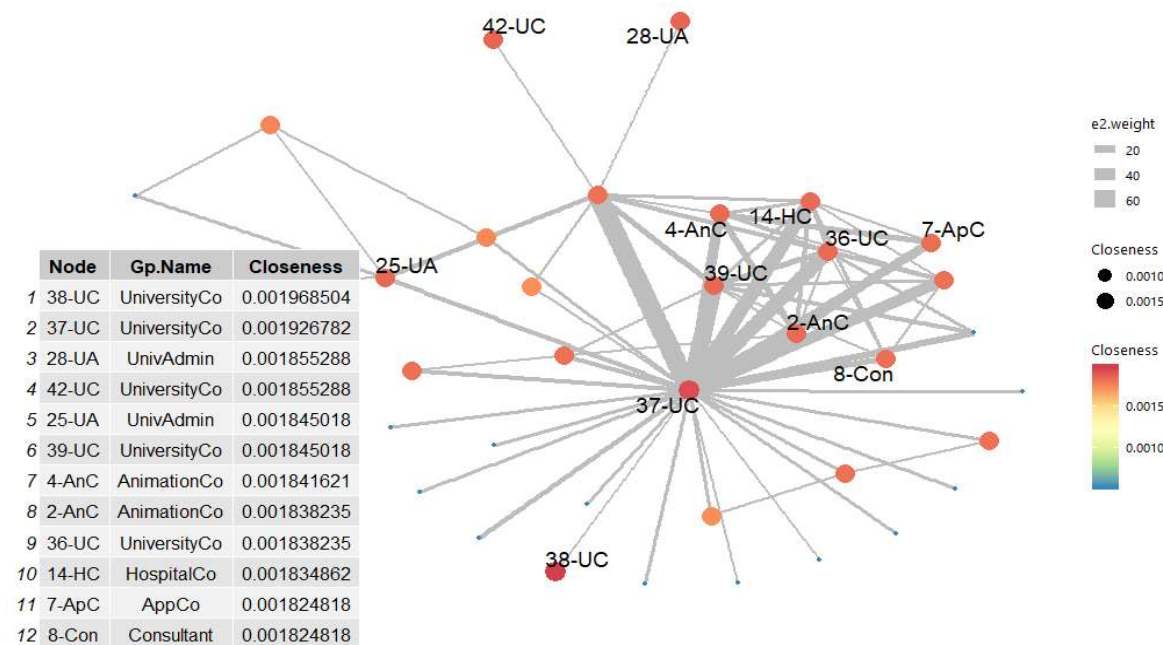|	Node	Gp.Name	Closeness
1	38-UC	UniversityCo	0.001968504
2	37-UC	UniversityCo	0.001926782
3	28-UA	UnivAdmin	0.001855288
4	42-UC	UniversityCo	0.001855288
5	25-UA	UnivAdmin	0.001845018
6	39-UC	UniversityCo	0.001845018
7	4-AnC	AnimationCo	0.001841621
8	2-AnC	AnimationCo	0.001838235
9	36-UC	UniversityCo	0.001838235
10	14-HC	HospitalCo	0.001834862
11	7-ApC	AppCo	0.001824818
12	8-Con	Consultant	0.001824818

Figure 6.25 Closeness centrality (≥ 0.00182) map and values, individual actor level analysis for primary contacts only.

e. Summary of Network Analysis Results

In summary, the SNA network graphs and measures show:

a) At a group level of analysis:

   i.   A network arrangement suggestive that UniversityCo, as principal project implementors and research team, employed an efficiency model to participatory research in which it retained critical control of administrative plus grant relationships and functions. Pure collaborative interpersonal relationships, as defined under participatory theory, therefore occurred only among the 8 or 9 individuals involved at the artifact design and development level.

   ii. HospitalCo played or held the second most important role within the network. It however, along with AnimationCo and AppCo, the other India consortium partners, were junior partners in the participatory collaboration. The centrality scores suggest that HospitalCo's importance or influence and prominence was limited to the application and game design and development i.e. collaboration and co-creation on the artifact elements only.

   iii. HospitalCo, as the second principal project implementor, principally had referential importance and not influential importance, i.e., in SNA terms it was organizationally *popular* but not necessarily *powerful.* This is inferred from the

comparatively weaker or lower prestige, betweenness, and authority centrality scores and much more comparatively significant (in)degree, closeness, and hub centrality scores.

Table 6.5 below summarizes the different centrality scores at a group level of analysis for each actor from which the inferences alluded to above have been derived.

Table 6.5 Summary of centrality measures at a group level of analysis.

Gp.Name	Code	# Nodes	Overall Centrality Rank	Degree	Prestige	Closeness	Betweenness	Eigenvector	Authority	Hub	Power	Information
UniversityCo	UC	9	1	7	7	0.1667	20.0000	1.0000	1.0000	1.0000	(0.8819)	0.2802
HospitalCo	HC	7	2	5	4	0.1250	1.5000	0.7617	0.7184	0.8189	(1.5434)	0.2224
AnimationCo	AnC	5	3	4	4	0.1111	0.5000	0.7168	0.7184	0.7149	(1.3229)	0.2023
UnivAdmin	UA	16	4	3	2	0.1000	-	0.3649	0.3463	0.4149	0.2205	0.1662
GovFund	GF	4	5	2	3	0.0909	-	0.3649	0.4280	0.3339	(0.2205)	0.1170
AppCo	ApC	2	6	2	3	0.1000	-	0.5608	0.6201	0.4019	(0.8819)	0.1673
Consultant	Con	1	7	2	2	0.1000	-	0.4710	0.4451	0.4019	(1.1024)	0.1684

b) At an individual level of analysis:

    i. We have a highly centralized and egocentric network around the university research team lead (node 37-UC), who was the key link between all the project elements i.e. grant making and reporting (GovFund), administrative (UnivAdmin), research (UniversityCo) and the participating recipients (HospitalCo, AnimationCo and AppCo). They significantly stood apart from all the other nodes on almost all centrality measures applied.

    ii. 8 other project core team members, i.e., nodes 39-UC, 36-UC, 14-HC, 16-HC, 4-AnC, 2-AnC, 7-ApC, 8-Con, who were most directly involved in the design and development of the diabetes application and game (the key artifact outcomes of this project), were all part of a clearly distinguishable community cluster. They shared relatively similar centrality scores suggesting that they generally had a balanced or relatively similar influence (or power), and popularity (or prominence), and in addition had a collaboration between themselves that shared a closely linked democratic partnership.

    iii. The UniversityCo actors, however, most likely due to their proximity in relationship to the research team lead (node 37-UC), notably had relatively higher centrality significance

compared to all other nodes. Node 14-HC, the principal project implementor from India and a critical participant, was the only non UniversityCo node with relatively comparable scores for all measures.

Table 6.6 below summarizes the different centrality scores at an individual node (actor) level of analysis from which the inferences alluded to above have been derived. Apart from the relatively higher degree and prestige centrality scores for the UniverityCo nodes within the action research team (i.e., community 2) because of their greater network connectivity and influence, it is noticeable that within the research team the centrality scores were fairly homogenous. Therefore, it would be fair to conclude that there was an adequate level of parity and most likely participatory democracy in knowledge or at the very least information sharing and decisioning within the research team.

Table 6.6 Summary of centrality measures at an individual node (actor) level of analysis showing the top 20 nodes.

Node	Gp.Name	Overall Centrality Rank	Centrality Measures									Community
			Degree	Prestige	Closeness	Betweenness	Eigenvalue	Authority	Hub	Power	Information	
37-UC	UniversityCo	1	30	16	0.0019	573.9500	1.0000	1.0000	1.0000	(0.6258)	0.3775	1
39-UC	UniversityCo	2	9	5	0.0018	4.2833	0.5632	0.5839	0.4924	(1.3247)	0.3198	2
14-HC	HospitalCo	3	6	7	0.0018	6.3667	0.5502	0.6977	0.3473	0.1460	0.3114	2
2-AnC	AnimationCo	4	7	5	0.0018	3.6667	0.5301	0.5586	0.3706	(0.8345)	0.3297	2
4-AnC	AnimationCo	5	8	3	0.0018	2.4500	0.4830	0.3480	0.4645	1.2830	0.4143	2
36-UC	UniversityCo	6	7	4	0.0018	1.6167	0.4700	0.5249	0.4065	0.8240	0.3088	2
25-UA	UnivAdmin	7	6	3	0.0018	117.0000	0.2160	0.2423	0.1917	(1.2517)	-	3
40-UC	UniversityCo	8	1	9	0.0018	95.0000	0.3534	0.6973	0.0905	(0.3129)	0.1844	2
7-ApC	AppCo	9	3	4	0.0018	0.3333	0.3638	0.4922	0.1725	0.7614	0.2194	2
8-Con	Consultant	10	3	4	0.0018	0.3333	0.3565	0.5066	0.2060	0.6050	-	2
16-HC	HospitalCo	11	2	5	0.0018	-	0.3516	0.5795	0.1536	0.1460	0.1803	2
5-AnC	AnimationCo	12	2	4	0.0018	1.0000	0.2782	0.4497	0.1132	(4.0888)	-	2
22-UA	UnivAdmin	13	3	1	0.0018	-	0.0453	0.0432	0.0523	(1.2517)	-	3
10-GF	GovFund	14	2	2	0.0018	31.0000	0.1802	0.2302	0.1132	(0.3129)	-	1
6-ApC	AppCo	15	2	2	0.0018	-	0.2032	0.2511	0.1312	(4.0888)	-	2
43-UC	UniversityCo	16	1	3	0.0017	-	0.1174	0.2806	0.0219	(0.9388)	-	3
11-GF	GovFund	17	1	2	0.0018	-	0.1733	0.2511	0.0905	(0.3129)	-	1
44-UC	UniversityCo	18	0	3	0.0005	-	0.1616	0.4283	-	-	-	2
17-HC	HospitalCo	19	1	1	0.0017	-	0.1076	0.2255	0.0631	0.0000	-	1
26-UA	UnivAdmin	20	1	1	0.0017	-	0.0938	0.2255	0.0208	0.0000	-	1

Table 6.7 Summary of centrality measures at an individual node level of analysis showing the bottom 23 nodes.

Node	Gp.Name	Overall Centrality Rank	Centrality Measures									Community
			Degree	Prestige	Closeness	Betweenness	Eigenvalue	Authority	Hub	Power	Information	
33-UA	UnivAdmin	21	0	2	0.0005	-	0.0208	0.0550	-	(0.0000)	-	3
28-UA	UnivAdmin	22	1	0	0.0019	-	0.0281	0.0000	0.0631	0.0000	-	2
42-UC	UniversityCo	23	1	0	0.0019	-	0.0281	0.0000	0.0631	0.0000	-	2
38-UC	UniversityCo	24	1	0	0.0020	-	0.0795	0.0000	0.0905	(0.3129)	-	11
13-HC	HospitalCo	25	0	1	0.0005	-	0.0795	0.2255	-	-	-	1
1-AnC	AnimationCo	26	0	1	0.0005	-	0.0795	0.2255	-	-	-	1
3-AnC	AnimationCo	27	0	1	0.0005	-	0.0795	0.2255	-	-	-	1
15-HC	HospitalCo	28	0	1	0.0005	-	0.0795	0.2255	-	-	-	1
19-HC	HospitalCo	29	0	1	0.0005	-	0.0795	0.2255	-	-	-	1
23-UA	UnivAdmin	30	0	1	0.0005	-	0.0795	0.2255	-	-	-	1
24-UA	UnivAdmin	31	0	1	0.0005	-	0.0795	0.2255	-	-	-	1
27-UA	UnivAdmin	32	0	1	0.0005	-	0.0795	0.2255	-	-	-	1
30-UA	UnivAdmin	33	0	1	0.0005	-	0.0795	0.2255	-	-	-	1
31-UA	UnivAdmin	34	0	1	0.0005	-	0.0795	0.2255	-	-	-	1
32-UA	UnivAdmin	35	0	1	0.0005	-	0.0795	0.2255	-	-	-	1
34-UA	UnivAdmin	36	0	1	0.0005	-	0.0172	0.0432	-	-	-	3
9-GF	GovFund	37	0	0	0.0005	-	0.0000	0.0000	-	-	-	4
12-GF	GovFund	38	0	0	0.0005	-	0.0000	0.0000	-	-	-	5
18-HC	HospitalCo	39	0	0	0.0005	-	0.0000	0.0000	-	-	-	6
20-UA	UnivAdmin	40	0	0	0.0005	-	0.0000	0.0000	-	-	-	7
21-UA	UnivAdmin	41	0	0	0.0005	-	0.0000	0.0000	-	-	-	8
29-UA	UnivAdmin	42	0	0	0.0005	-	0.0000	0.0000	-	-	-	9
35-UA	UnivAdmin	43	0	0	0.0005	-	0.0000	0.0000	-	-	-	10
41-UC	UniversityCo	44	0	0	0.0005	-	0.0000	0.0000	-	-	-	12

Field Notes and Team Interview Analysis

As previously stated, the field notes and two group interviews were analyzed using QSR NVivo in a line by line analysis method that generated ten major and nine sub-themes. From these and the coded references, by abstraction and generalization we derived the following major discussion topics that we expound in the sections that follow.

a. *Project Viability and Value was Critically Dependent on the Initiating Concepts plus Contextualization and Idea Input from the Recipients*

As previously noted in the introduction, diabetes is a major problem in India. A physician from HospitalCo on commenting about the need for an intervention against diabetes stated:

> I see at least one patient a day in their 20s and 30s with diabetes. The issue is I diagnose them and usually they don't have immediate symptoms as a result they continue with their lifestyle and then in a few years they have serious symptoms. It is especially problematic if it is the husband because then he cannot work. The family will spend what little money they have to try and make him better but at that point they cannot get better. The children by then are 15 or 16 and you have to pay for school. They can't continue with their school...

However, the university team quickly realized that the project, whose core idea was initiated at the request of hospital in recognition of the need for an intervention, was more than just the development of an application. Members of the university team, during their interview, stated that one of their key learning points about the application was the realization that although there were some difficulties and frustrations:

> It is not an American App, like I mean, we're not using it in America, right? It's for, you know, the Indian people.

99

The American research team therefore had to defer to the "*Indian partners*" for both content and cultural context. They noted that they had learned to appreciate that if the app was for "*an American population, the data*" that would be collected and "*the things that would [be] put [into] the video might be different.*" Plus, in addition, the hospital was contextually important because, as noted by the research team lead, even if the university, as a research interventionist,

> had funding to go in and hire a bunch of people in India to go somewhere and trial [the application and game]. If they didn't have an established relationship with the population in the community [as the hospital has], they couldn't even do it.

Furthermore, the university had be careful to consult the Indian team in order to ensure that the application and game complemented rather than duplicated their need, because, for example the hospital:

> had other things they were developing, like how to get an accurate weight on a patient in a slum when you're [in] a place where you can't put a scale on the floor... they were developing these devices like to check weight on an uneven floor, devices to ..., check blood glucose or urinalysis by taking a picture on the phone and scanning it...

Design and development of the artifacts therefore required a relationship in which, as the university research team stated:

> the content was driven by both our interest and their needs.

An approach, in which both viability and value, were guaranteed by matching up to that reality.

b. Mutual Trust, Respect and Dignity Were Vital for A Successful and Rewarding Working Relationship

When the hospital project team was asked what they considered to have been most important in their decision to work with, and continue to engage with the university research team in this project, the medical lead from hospital stated:

> … in the whole project, I never felt that they [were different] because [they were from a] developed country and [we are from a] developing country, people from two [different worlds]. … [because] it's also very important how the dynamics work. We never felt that [we] are without anything, and [they were] giving sort of the [help] – it felt quite equal, and that's our dignity. We have problem[s], but we don't want anybody to solve [them] if it's not on [an] equal basis. That's our dignity. So, that's our respect. So, I think we have that respect, and I think that's great.

A comment, echoed by the second physician from the hospital, who was also a key participant in the project. He stated:

> It's all about mutual understanding, benefit, and respect on how we can proceed. If that is there, I think the collaboration will definitely work. So, [a] mutually beneficial [relationship in which we have] mutual understanding where we want to go and respecting how we   do things. If these three things work out well [then] the collaboration is … a success.

A lead member from the university research team also further acknowledged this by stating that:

> as far as [concerns] our relationship with the Hospital, I always have kind of viewed us as equal partners because there's no way that we could do, uh, we could trial this app. That we could even culturally come up with what [needed to be included].

Noting along with the other team members, that they had to let go of a couple of "*preconceived ideas,*" or biases.

The exercise of that respect and dignified treatment of the Indian team by the university team additionally proved a vital factor in two key areas. Firstly, in the critical and all-important bridging role, acknowledged by both teams, that the lead researcher (noted as node 37-UC in the SNA) played. An Indian team member stated that she (node 37-UC) was a key channel of communication because she brought *balance* between the two teams. That balance because

> … she knew about the people here [America], and knew about the people there [India], and made sure that there was a balance in it [the relationship].

The university team lead particularly played an important role in balancing the impact and frustrations of the "*different dynamic*" that culturally and organizationally existed in how time and deadlines were managed. She helped the university research team develop a "*compassion empathy*" in dealing with deadlines and delays by the hospital and vendor teams. This issue was a key frustration because the India team participants "*weren't just sitting around.*" They instead were actually devoting what was essentially volunteer time, working on the application and game afterhours and without a stipend (note: because of a hospital policy to encourage non commercially driven commitment to projects, common good and teamwork). And furthermore, usually doing so on days which had involved their (i.e., HospitalCo team members) attending to full patient loads, with clinics days having between 200 to 400 visits.

Secondly, a respectful and dignified consideration of the Indian partners played a role in enabling the university to consider the use of the Indian vendors, AnimationCo and AppCo, who were key partners in the design and development of the project artefacts. Both were partners with the Hospital in other projects and were incorporated into the project based on that relationship. Letting go of their preconceptions was invaluable in that relationship because the university team were able to realize the advanced capabilities that these vendors had, plus at a project cost that was hugely beneficial. Remarking on the realized project asset value of the vendors, a member of university team commented:

> I was surprised at the degree of participation in script writing. I understood the content. But I was also very surprised about the script writing. Um… and I guess why I was surprised, because I've never been to India and I hadn't thought about their Indian animations as being so completely aligned with our Disney.

The utility of local capabilities or assets is an important element not just in participatory theories to research in ICT4D but also in development social theories like the sustainable livelihoods theory (Elizondo et al., 2017; Morse & McNamara, 2013) and Sen's capabilities approach (Robeyns, 2016)

c. *The Exercise of Grace Was Important for Keeping the Communication Channels Open and Honest plus The Pursuit of Common Good.*

This research project involved an American, westernized, *developed country* partner (UniversityCo), working with Indian partners from a different cultural and organizational background, as already described.

Both teams acknowledged during their interviews that they did have some challenges, misunderstandings, and frustrations resulting from their different cultural (both social and organizational) backgrounds. A member of the hospital team stated that they were not as "*expressive*" or "*explicit*" as their American counterparts, and a member of the university research team suggested that they were sometimes "*lost in translation.*"

However, it was interesting to note the similar reason that both teams attributed as being an important key to the democratic and meaningful engagement that kept them working together and would keep them working together on further initiatives in the future. They both attributed the bonding or binding glue to a human value or concept they referred to as "*grace.*" The team lead in expressing the freedom that grace accorded to her in navigating a couple of "*cultural*" issues about which she knew very little about, plus project related administrative and protocol issues, states:

> And I still kinda mess it up, sometimes, not knowing what the protocol would be. But like you said, you [i.e., HospitalCo] all have grace with me, too, so I know, usually, whatever I do will get redirected if I've done it wrong.

Considering the fact that India has a Hofstede power distance indicator of 77 compared to the global average of 56.5 and US score of 40 (https://www.hofstede-insights.com/country-comparison/india,the-usa/), getting protocols and hierarchies right is very important in India. Gracefulness in this area, would be immediately noticed and helpful, and was certainly appreciated by the university research team.

The hospital project team noted, on their part, that the university research team had certainly been graceful in dealing with frequently missed deadlines. Their team lead stated that "*all the time – deadlines were gone somewhere.*" And often, they only realized that they had passed up the deadlines when they received an email from the university research team lead, a situation that then often involved "*crisis management.*" Gracefulness displayed by the university team is what kept them going because the hospital project team members didn't have "*dedicated time,*" as already noted. Undue pressure would have certainly led to crisis. And it was due to gracefulness which then, when the university team sent through emails, that the hospital team was able to respond to them openly. The hospital team realized that:

> You might offend somebody, but that's fine – [and] we take it in good [faith] – because we're clear with our intentions... – your intention is not to hurt each other [or show] who is in control. That's not our discussion. [Instead] it is to get ...the best [outcomes].

Grace also played a critical role in a key area of the project. It involved translation of the script into Kannada, a language which was non-native to both the vendors and team leads from hospital, and yet was widely spoken by the slum population they intended to serve. The official transcript that was generated, though correct, was not colloquial, and so therefore inappropriate for the application and game being developed. The university's naïve inability to tell the difference posed a challenge that the hospital team could not easily communicate to them. Worse still, a

105

proposed professional fix would take more than two weeks, couldn't be relied upon to solve the issue, and was a stretch beyond an already passed deadline. The hospital team's project leaders knew that they had "*messed up, big time.*" However, by being confident of the grace and understanding they would receive from the university research team partners, and in spite of the frustrations brought on by the delay and poor quality script, they undertook a personal (i.e., unbudgeted), and painstaking line by line revision of the entire script. The importance of a good quality outcome being paramount, above blame or deadlines.

d. *Face-to-Face Interactions Through the Team Visits Were A Vital Element of Success and Efficiency*

In addressing the challenge of having to work as a distributed team, both university and hospital teams indicated that the inter-country team exchange visits required under the grant were an important "*bonding*" experience for their teams. They were also interestingly invaluable for the hospital and the vendors in another regard. A member of the university research team noted that:

> the digital communication with AppCo [the application developer from India] doesn't go well. You have to have video conference. But [even much] better is the face to face.

The video conferences were a challenge because of time differences at the two locations, and the quality of internet connections that often allowed for only audio connections being possible. The university team, in the recorded field notes, also noted that so much more always got done when

they were together. Rejoicing at the quality and quantity of work done when finalizing icon and script development work with the vendors during the February 2019 team visit to India, a team member stated:

> I am glad we had the time together to work through this in person rather than do it over email.

A project member from the hospital touching on the same issue, i.e., the cultural exchange visits, in highlighting their special importance in drawing out their participation stated:

> So, the thing is face-to-face communication has helped quite a lot. Through the emails, we don't really develop that much of a bond. Like, she [a University team member] expresses her idea on the email. To me, it's okay, and then somebody else's idea comes. So, I can't put a face to it, nor can I really understand what they're really saying from the email. But the trips here, when we sit together, it's so much easier, and what we did over one month of back-and-forth email, we finish it in two hours of whatever we discuss. So, I find face-to-face communication … gives [an] easier perspective of who we are dealing with and [clearer ability to] clarify things.

> Like, if someone gives an idea, I can directly ask instead of thinking in my head, "What is she trying to [say?]" because, when I read an email, I need to assume, okay, is this what she's trying to [say?], or maybe this, or maybe that. Then, I have to put in a clarification question to get it. And it's a process which …, sometimes, bogs you down because [there are] certain details you don't wanna go into and [just end up saying], "It's fine, they're doing it. They know what they are doing. We'll leave it at that." But here in the room, when we sit together, those things are [much] easier [to deal with when we] interact and [it] helps us to understand better what ideas are coming and how we can plug into [them] or take [up].

An explanation perhaps of the noticeable lack of response to a couple of the important emails that were sent to HospitalCo. Their apparent lack of participation was not because of a lack of interest or domain insights to

offer but instead related to the cultural, collectivist need to be able to relate and bond with those with whom you work with.

e. Email Was Not the Major Communication Channel with The Indian Partners. There Was Also Selective Use of WhatsApp

The noticed lack of communication from the hospital project participants, who were principal initiators and interventionists in this development research collaboration was however found to be related to another factor. For whereas when asked, the hospital team members all responded they recognized email communication to be the important communication channel between the teams, WhatsApp was certainly the primary go-to medium to get things done. The research lead from the university who was aware of this, stated that it was "*convenient,*" "*was one of the major forms of communication,*" and "*if I needed something right away, I [could] send WhatsApp.*" Furthermore, WhatsApp had the edge over traditional email "*because you get a notification on your phone … Whereas, with email, you have to wait until you go in, typically, to check*" and "*it would be totally cumbersome… to have email set up [with] notifications.*" But most importantly, almost everyone in India was using it, even the vendors were using it when communicating with the hospital, each other, and the university team lead (node 37-UC). In fact, on many occasions, when emails were sent to the application developer (AppCo) for example, the response was sent back via WhatsApp.

WhatsApp presented great conveniences to the hospital. Firstly, they had a complex system of access to traditional official email, including no outlook access for an extended period of time, thereby being unable to access email on their phones. Secondly, it fit well with their schedules, enabling them to respond to messages late in the evenings when relaxing at home, and which matched up well with the US time zone.

The challenge however, which was a discovery that emerged during the focus group interviews, was that the two key members of the university research team who were most embedded in the design and development process, i.e., the computer scientist (node 36-UC) and artistic director (node 39-UC), were unaware of the use of this side channel of communication. One of them stated that at times he found the engagement experience "*nerve wracking,*" because they would have a skype call or email communication, then hear "*nothing… nothing...nothing*" for a period, and then suddenly, "*it is done.*" They were surprised, even though delighted at the desired good quality outcome, to find out that they had simply been left "*out of the loop.*" The second researcher also felt excluded and "*disconnected*" because there was progress in the project, despite the silence, and figured that "*decisions were being made*" without them. Unfortunately, the team lead (37-UC) had been unaware that this exclusion had occurred, and the hospital project team members none the wiser.

f. Both Sides Benefitted from The Project, Differently and In the Same Ways

At the time of the interviews with the teams, both the application and the game for Diabetes had already been fully developed and were in the various stages of user acceptance testing. Both the hospital and university teams were excited and pleased at the progress made, the quality of the artifacts, and the growth of their collaborative partnership.

Both teams were, however, also aware that they did have some slightly different objectives. A member of the university team stated that the binding agent between the teams, despite their "*different cultures*" and objectives going into the project was:

> ...there was definitely a very people centered ideology, and I think that [in] itself made it very easy for us to transition as a team to say no matter what the differences are in the delivery, [having a similar primary] goal ... caused us to be able to bridge those weird kinds of little gaps.

The emancipation or transformation of the livelihoods of the vulnerable population within the slum communities was the paramount goal and binding glue for both teams. The university team's research objective (or logic) was evident and expressed through the three papers already generated related to the project, this paper and future research collaborations planned. And as already noted in the email analysis, 5% of the total email exchange related to academic research.

HospitalCo was excited about the application and game not necessarily because it was increasing their patient load but instead because of its impact in improving the quantity and quality of

110

conversations around Diabetes (and Hypertension from the previous application). The hospital team lead stated:

> the health workers who use it and the nurses who go out and then use it, … find it [much easier to] convey the message to the people and grab [their] attention. That's the most important thing … [because we have already been seeing a maximum capacity of patients each day and having] to turn away people.

The application was enabling people to "*make baby steps*" in decision making to seek care and change their lifestyles. "*Small conversations*" among the community that were "*positive*" and creating both the hope and opportunity for "*big changes*" in the future.

CHAPTER SEVEN

Discussion and Conclusion

This paper seeks to answer the question: What are the practical realities for university research teams participating in ICT4D based initiatives in multi-local, multi-cultural, and differing logic teams? The approach to answering this question, has been through the application a 4-Step CRIS framework whose first two stages have been covered in chapters three, five, and six.

In this section the study seeks to address the last two steps, i.e., providing a contextual impact analysis and a therapeutic remedy. To do so it fist discusses the significant findings from the data analysis and then make recommendations.

Significant Findings and Implications

a. *Dignity, Respect and Grace Outweigh the Type of Participatory Approach Applied*

As previously described, among proponents, a debate exists on whether the top-down efficiency approach, as was the case in this research intervention, or the bottom-up inclusion approach, which is considered to be more democratic, is better in participatory approaches to research (Neef et al., 2013; Rokhaya, 2009; Stevens et al., 2014). Each approach has its merits and demerits to be considered in practice as universities must be

112

able to leverage their abilities to raise grant and funding support, manage project timeframes and engagements, build suitable intervention teams, manage reporting and achieve emancipatory sustainable outcomes.

This study did not seek to examine which of the two approaches worked better. However, our findings suggest that regardless of approach, universities must first recognize that there will be differing stakeholder logics or objectives that may only be realistically overcome if the binding glue is a "*people centered ideology.*" A collaborative ideology that is at the heart of the emancipatory and transformative objectives of participatory approaches to research.

Related to this, when engaged in differing power relationships as was the case in this study, of fundamental importance is the need for an engagement that is mutually respectful, accords dignity to all parties, and recognizes the need for grace in the achievement of mutual objectives ahead of individual ones. Without this, even if there is mutual agreement on a common people centered ideology, there will most likely be sentiments of inequality and resentment that will compromise both project relationships and outcomes as suggested by Chipidza & Leidner, (2019) and Leidner & Kayworth (2006) among others. As noted from the focus group interviews, success rested in the honoring of "*our dignity*" and "*our respect,*" because that directly spoke to their equality in ownership and participation even though the parties were "*different.*"

This finding is particularly important because the major focus in IS and participatory research has been on either the methodology of design and development (Bentley et al., 2017; Qureshi, 2015; Walsham, 2012), or on a discussion on the democratic intent or nature in approach to research (Neef et al., 2013, p.9; Rokhaya, 2009). The most important elements and drivers of collaboration to the Indian teams, which in a post-colonial sense would be considered the subalterns or recipients in this study, was neither decision making power in every aspect of the research or the pathways applied in design and development. Rather, as a matter of first priority, it was that their rights to respect and dignity were not violated, and that there was gracefulness in mutual engagement. An examination of failures in IS research and project interventions therefore, should take into account the important role played by the basic ingredients of human interaction, bonding, and trust building, in addition to the focus on addressing the traditional issues of methodology, process, or post-colonial theories of bridging technology and social divides.

b. *Intercultural Exchange Visits and Face to Face Exchanges Are Important in Distributed Work Teams*

As Universities increasingly engage in ICT4D, those interventional research engagements, especially where participatory approaches are applied, will most likely have multi-cultural and geo-distributed or virtual teams. An even greater challenge is faced if they involve multi-locality research. This study finds that face to face interactions are of great

importance, despite significant technological advancements in proximity mediation. Putting a face to an email or an idea, is significantly important especially among the collectivist cultures of the east and the south in which most ICT4D research takes place.

Early on, the university's researcher team recognized that the work output was significantly greater when they were in India. And in turn, the hospital team found that they accomplished more in a day of personal interaction, than in a month of emails. This is because the hospital and vendor teams from India culturally struggled to express themselves explicitly to Americans whom they had not met, and the Americans were weary of offending Indian teams whose competencies, roles, and protocols they were unsure of. However once together in the same geo-location, and having established a greater cultural and organizational awareness and bonds in what both teams considered a graceful environment, the teams were better able to express themselves, more adept to address and solve outstanding issues, and give each other meaningful feedback.

This finding is important, especially in IS research because once again, a human social factor of interaction or bonding, in addition to respect, dignity and grace, proved to be more critical than just process or methodology. Furthermore, it is significant because, even though in this project the Indian partners were not technologically deficient, they needed some significant face to face interaction to develop meaningful work bonds and participation in both process and discourse. University research

115

teams would therefore benefit from including face to face cross team exchanges as part of their planning processes in building collaborative research especially when cross cultural contexts are involved.

c. *A Communication Plan Is Important to Consider in Participatory ICT4D Research Interventions involving Cross-Cultural Engagement*

If participatory engagement in this study had been purely based on a quantitative analysis of email counts and topics, as was done with the excel pivot analysis, it would have failed in the CRIS evaluation of participatory democracy, inclusion, and action of and by the hospital. The SNA added some significant value to the analysis. It was able to bring out the fact that the participatory model approach employed in this interventionist research was an efficiency model. It also showed that despite the low frequency of communication found in the pivot analysis, the hospital team had a significant referential, popular, and prominent role. That finding was principally a result of the ability to translate the significance of the hospital team being in copy in the main body of emails even though it did not generate or respond to a significant number of them.

However, the qualitative analysis introduced a significant layer of insight, i.e., the fact that significant communication between the teams occurred through an *unofficial* channel. One that was a more convenient and widely accepted local medium, i.e., WhatsApp. It also highlighted the fact that those team members from the university that were not aware of it, and so thereby not engaged through it, were disconnected, and dropped

116

from important loops of communication for which they were crucial. The creative director from the university, who was important in design decisions, was one of those who dropped out of the loop. Her aesthetic concerns, including one concerning the "*sterile white background*" of the fully developed application, were too late to consider and incorporate once the app was complete. Most participatory research concerns itself with the inclusion or exclusion of recipients and subalterns. This was a case of the exclusion of the resourceful capital of the researchers themselves, a possibility not discussed in any of the literature that was reviewed. It also highlights the important role qualitative analysis can play as a complement to quantitative forms of analysis in building a richer picture of the meaning or significance of our findings.

University research teams therefore need to be careful not to assume that all official written communication will be by email. That might be the norm in their more formalized corporate working environments, but not the case in the less formal intervention focused environments that they will encounter in ICT4D research. A discussion of communication protocols while other legal and administrative matters are being formalized, is therefore important. That discussion of significance, not just for communications research and mapping, but also for purposes of picking appropriate official and social communication tools that will ensure good communication loops are maintained. The communication tools picked should in addition, ensure that the body of institutional or

interventional capital developed as the teams interact is not lost, as is hugely possible with the use of social media in official communication (Badea, 2014).

Limitations

Because there was significant communication that occurred outside of traceable channels that could be used for the SNA in this study, the inferences of centrality significance or influence and prominence could not be conclusive, save for establishing that an efficiency model was employed in this participatory research project. It would have been interesting to evaluate the degree of egocentricity of the network with those additional communications in order to be able to offer some practically meaningful critique as to the risks or advantages of an egocentric network in a multidepartment and multiparty ICT4D project.

Secondly this paper only covers an 18 months period interaction in a project engagement that will most likely stretch over 30 months. Though important findings have occurred, a more conclusive or rewarding analysis, especially in applying SNA would benefit from a consideration of entire period both through a consolidated view of their interactions and time series analysis of the development and progress of the quality of their interactions.

Recommendations for Future Research

In recommending future research, this paper would like to add its voice to a requirement for a greater body of research into the development and impact of alternative, non-business communication channels of convenience that could be utilized in ICT4D project interactions, like WhatsApp was the case in this paper. Universities and other agencies will need to continue to address the growing realities of the impact of social media and the need for mobile friendly, convenient alternatives to traditional email communication. In doing so, not compromising in addressing the need to meet the requirement of official communication that can be mapped, tracked, and documented.

Secondly, theory development and research on the value of human factors of respect, dignity, and grace in ICT4D requires further focus and investigation. These three factors certainly emerged as being critical to the level of engagement and participation in the research project by HospitalCo and appreciation for the genuineness of the intentions of UniversityCo in spite the areas of differing objectives between the parties.

Lastly, the application of both qualitative and quantitative analysis in this study highlighted the deficiencies that a singular approach of analysis could have presented, and the need for holistic approaches in analysis desiring inquiry that seeks to offer insightful critique (and not criticism). The quantitative analysis on its own would have raised a question on the quality of the network and participation of the Hospital

but would have missed the role played by social media interaction that was revealed by the qualitative enquiry. The importance of the human social factors of interaction would also have been skipped or occluded from analysis.

The application of CRIS in this paper was important in providing a perspective of analysis through insightful inquiry and critique that was important in deriving the transformative contributions of this paper to IS research in a development context. The focus of CRIS on improvement in theory and practice to derive greater transformative impact is important for universities and other academic institutions as they pursue a greater role in development. CRIS offers an opportunity to bring greater critical realism to their research and inform the objective of delivering sustainable development though their research interventions.

APPENDICES

APPENDIX A

UniversityCo Team Interview guide

Date: 6th September 2019

Time: 9-10 am

Objective: Perspective on Building the Diabetes App

1.   At the commencement of the Diabetes project with the Indian Hospital and Application Development partners, did the US team envision that it would have any challenges in the participation of its India Stakeholders in the project? If yes, what challenges were anticipated from the different stakeholders?

2.   During the course of the project, were there any participatory challenges or frustrations that occurred? Could they be briefly described? Can the team provide an idea or explanation of why they think those issues arose? What if any, action was taken to remedy the situation?

3.   Our data analysis shows that there was limited engagement by the Hospital in email communications during the project. Did the team view this as problematic? Did it create some frustrations or challenge?

4. Does the team believe it might have benefited from establishing some engagement protocols e.g. meeting structure/ framework, email communication expectations etc. at the beginning of the project?

APPENDIX B

HospitalCo Team Interview guide

Date: 23rd October 2019

Time: 10 - 11am

Objective: Perspective on Building the Diabetes App

1. At the commencement of the application and game development, are there any particular challenges you envisioned you would have with the US team or the India based development team e.g. appreciating cultural issues, language barriers, communication, time scheduling etc.?

2. During the actual design and development process are there any particular problems, challenges or frustrations you experienced? Would you mind giving some specific detail plus an idea of how you handled these issues?

3. How would you describe the nature of the relationship you had with the [UniversityCo]/ US team? Did you feel that you were being treated like an equal partner? Please explain/describe.
    Do you think that there are some things the [UniversityCo] team could have done better and probably should improve upon so that you can have even greater collaboration with you and other teams from India?

4. Do you think that as your team continues to collaborate with the [UniversityCo] team it could benefit from establishing more formal protocols on issues like how you communicate with each other and the roles and responsibilities of the different team members on moving projects forward. Any suggestions?

BIBLIOGRAPHY

Adler, N., & Gundersen, A. (2008). International Dimensions of Organizational Behavior (5th ed.). South-Western, Cengage Learning.

Alvesson, M., & Deetz, S. (2000). Doing Critical Management Research. SAGE Publications. https://doi.org/10.4135/9781849208918

Andoh-Baidoo, F. K. (2017). Context-specific theorizing in ICT4D research. *Information Technology for Development, 23*(2), 195–211. https://doi.org/10.1080/02681102.2017.1356036

Arokiasamy, P. (2018). India's escalating burden of non-communicable diseases. *The Lancet Global Health, 6*(12), e1262–e1263. https://doi.org/10.1016/S2214-109X(18)30448-0

Arvidsson, C., Zambon, F., Östergren, P.-O., & WHO. (2015). *Taking a participatory approach to development and better health: Examples from the Regions for Health Network.* (N. Gravesen, Ed.). WHO Regional Office for Europe.

Asby, J. (2013). Introduction: Uniting Science and Participation in the Process of Innovation—Research for Development. In C. McDougall, B. Pound, A. Braun, & S. Snapp (Eds.), *Managing Natural Resources for Sustainable Livelihoods: Uniting Science and Participation* (1st ed., p. 19). Routledge /Earthscan, London, UK and IDRC. https://www.taylorfrancis.com/books/e/9781849771894/chapters/10.4324/9781849771894-10

Avgerou, C., Hayes, N. and La Rovere, R.L. (2016), "Growth in ICT Uptake in Developing Countries: New Users, New Uses, New Challenges," *Journal of Information Technology*, Vol. 31 No. 4, pp. 329–333.

Badea, M. (2014). Social Media and Organizational Communication. *Procedia - Social and Behavioral Sciences, 149*, 70–75. https://doi.org/10.1016/j.sbspro.2014.08.192

Baelden, D., & Van Audenhove, L. (2015). Participative ICT4D and living lab research: The case study of a mobile social media application in a rural Tanzanian University setting. *Telematics and Informatics, 32*(4), 842–852. https://doi.org/10.1016/j.tele.2015.04.012

Bandyopadhyay, S., Rao, A. R., & Sinha, B. K. (2010). Introduction to Social Network Analysis. In *Models for Social Networks with Statistical Applications* (p. 30). Sage Publications Inc. https://www.sagepub.com/sites/default/files/upm-binaries/35208_Chapter1.pdf

Bell, B. P. (2016). Overview, Control Strategies, and Lessons Learned in the CDC Response to the 2014–2016 Ebola Epidemic. *MMWR Supplements*, *65*. https://doi.org/10.15585/mmwr.su6503a2

Bentley, C.M., Nemer, D. and Vannini, S. (2017), "'When words become unclear': unmasking ICT through visual methodologies in participatory ICT4D," *AI & SOCIETY*, available at: https://doi.org/10.1007/s00146-017-0762-z.

Bergold, J., & Thomas, S. (2012). Participatory Research Methods: A Methodological Approach in Motion. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, *13*(1). https://doi.org/10.17169/fqs-13.1.1801

Biaggi, C., & Wa-Mbaleka, S. (2018). Grounded Theory: A Practical Overview of the Glaserian School. *JPAIR Multidisciplinary Research*, *32*, 1. https://doi.org/10.7719/jpair.v32i1.573

Bødker, K., Kensing, F., & Simonsen, J. (2010). Participatory Design in Information Systems Development. In H. Isomäki & S. Pekkola (Eds.), *Reframing Humans in Information Systems Development* (pp. 115–134). Springer London. https://doi.org/10.1007/978-1-84996-347-3_7

Bohman, J. (2016). Critical Theory. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Fall 2016). Metaphysics Research Lab, Stanford University. https://plato.stanford.edu/archives/fall2016/entries/critical-theory/

Bon, A., & Akkermans, H. (2019). Digital Development: Elements of a Critical ICT4D Theory and Praxis. In P. Nielsen & H. C. Kimaro (Eds.), *Information and Communication Technologies for Development. Strengthening Southern-Driven Cooperation as a Catalyst for ICT4D* (Vol. 552, pp. 26–38). Springer International Publishing. https://doi.org/10.1007/978-3-030-19115-3_3

Bonney, R., Ballard, H., Jordan, R., McCallie, E., Phillips, T., Shirk, J., & Wilderman, C. C. (2009). *Public Participation in Scientific Research: Defining the Field and Assessing Its Potential for Informal Science Education* (p. 58) [A CAISE Inquiry Group Report]. Center for Advancement of Informal Science Education (CAISE). https://files.eric.ed.gov/fulltext/ED519688.pdf

Borgatti, S. P., Mehra, A., Brass, D. J., & Labianca, G. (2009). *Network Analysis in the Social Sciences. 323*, 6.

Boudin, F. (2013). A Comparison of Centrality Measures for Graph-Based Key-phrase Extraction. *Proceedings of the Sixth International Joint Conference on Natural Language Processing*, 834–838. https://www.aclweb.org/anthology/I13-1102

Castillo, V. (2019, February 15). *Which Languages Are Spoken in India?* Babbel Magazine. https://www.babbel.com/en/magazine/what-languages-are-spoken-in-india

Chandramouli, C. (2013). *Census of India 2011: Primary Census Abstract for Slum.* Office of the Registrar General & Census Commissioner, New Delhi. http://www.censusindia.gov.in/2011-Documents/Slum-26-09-13.pdf

Charmaz, K. (2006). *Constructing grounded theory*. Sage Publications.

Chipidza, W., & Leidner, D. (2017). ICT4D Research – Literature Review and Conflict Perspective. *AMCIS 2017 Proceedings*, 10.

Chipidza, W., & Leidner, D. (2019). A review of the ICT-enabled development literature: Towards a power parity theory of ICT4D. *The Journal of Strategic Information Systems*. https://doi.org/10.1016/j.jsis.2019.01.002

Cornwall, A., & Jewkes, R. (1995). What is Participatory Research? *Social Sciene & Medicine, 41*(5), 10. https://doi.org/10.1016/0277-9536(95)00127-S

Couto, R. A. (1987). Participatory Research: Methodology and Critique.

Crow, M. M. (2010). Organizing Teaching and Research to Address the Grand Challenges of Sustainable Development. *BioScience, 60*(7), 488–489. https://doi.org/10.1525/bio.2010.60.7.2

Crow, M. M. (2014, February 10). *What is the role of universities in global development?* World Bank Blogs. https://blogs.worldbank.org/education/what-role-universities-global-development

De´, R., Pal, A., Sethi, R., Reddy, S. K., & Chitre, C. (2018). ICT4D research: A call for a strong critical approach. *Information Technology for Development, 24*(1), 63–94. https://doi.org/10.1080/02681102.2017.1286284

Disney, A. (2020, January 2). *Social network analysis: Centrality measures.* Cambridge Intelligence. https://cambridge-intelligence.com/keylines-faqs-social-network-analysis/

Dodds, P. (2011). *Measures of centrality—Complex Networks.* http://www.uvm.edu/pdodds/teaching/courses/2011-01UVM-303/docs/2011-01UVM-303centrality-flat.pdf

Elizondo, D., Mordt, M., & Muñoz-Blanco, J. (2017). *Application of the Sustainable Livelihoods Framework in Development Projects.* United Nations Development Program.

Elliot, M., Fairweather, I., Olsen, W., & Pampaka, M. (2016). Participatory research. In *A Dictionary of Social Research Methods.* Oxford University Press. http://www.oxfordreference.com/view/10.1093/acref/9780191816826.001.0001/acref-9780191816826-e-0307

Eubanks, D. L., Palanski, M., Olabisi, J., Joinson, A., & Dove, J. (2016). Team dynamics in virtual, partially distributed teams: Optimal role fulfillment. *Computers in Human Behavior, 61,* 556–568. https://doi.org/10.1016/j.chb.2016.03.035

Franssila, H., Okkonen, J., Savolainen, R., & Talja, S. (2012). The formation of coordinative knowledge practices in distributed work: Towards an explanatory model. *Journal of Knowledge Management, 16*(4), 650–665. https://doi.org/10.1108/13673271211246202

Gajendran, R. S., & Joshi, A. (2012). Innovation in globally distributed teams: The role of LMX, communication frequency, and member influence on team decisions. *Journal of Applied Psychology, 97*(6), 1252–1261. https://doi.org/10.1037/a0028958

Garner, S. L., Sudia, T., & Rachaprolu, S. (2018). Smart phone accessibility and mHealth use in a limited resource setting. *International Journal of Nursing Practice, 24*(1). https://doi.org/10.1111/ijn.12609

Gibson, H., Faith, J., & Vickers, P. (2013). A survey of two-dimensional graph layout techniques for information visualization. *Information Visualization, 12*(3–4), 324–357. https://doi.org/10.1177/1473871612455749

Godoy-Ruiz, P., Cole, D. C., Lenters, L., & McKenzie, K. (2016). Developing collaborative approaches to international research: Perspectives of new global health researchers. *Global Public Health, 11*(3), 253–275. https://doi.org/10.1080/17441692.2014.999814

Gonsalves, J., Becker, T., Braun, A., Campilan, D., Fajber, E., Kapirir, M., Rivaca-Caminade, J., & Vernooy, R. (2005). *Participatory Research and Development for Sustainable Agriculture and Natural Resource Management*. International Development Research Centre.

Gregory, R. W., Beck, R., & Keil, M. (2013). Control Balancing in Information Systems Development Offshoring Projects. *MIS Quarterly, 37*(4), 1211–1232. https://doi.org/10.25300/MISQ/2013/37.4.10

Grunspan, D. Z., Wiggins, B. L., & Goodreau, S. M. (2014). Understanding Classrooms through Social Network Analysis: A Primer for Social Network Analysis in Education Research. *CBE Life Sciences Education, 13*(2), 167–178. https://doi.org/10.1187/cbe.13-08-0162

Guimón, J. (2013). *Promoting University Industry Collaboration In Developing Countries*. World Bank. http://innovationpolicyplatform.org/sites/default/files/rdf_import ed_documents/PromotingUniversityIndustryCollaborationInDevelo pingCountries.pdf

Halabi, A., Zimmermann, B., & Courant, M. (2013). Participate, collaborate, and decide: Defining design problems in a Syrian community. *Proceedings of the Sixth International Conference on Information and Communications Technologies and Development Notes - ICTD '13 - Volume 2*, 49–52. https://doi.org/10.1145/2517899.2517901

Hanneman, R. A., & Riddle, M. (2005). *Introduction to social network methods: Chapter 10: Centrality and power*. https://faculty.ucr.edu/~hanneman/nettext/C10_Centrality.html

Hansen, D. L., Shneiderman, B., Smith, M. A., & Himelboim, I. (2010). Social network analysis: Measuring, mapping, and modeling collections of connections. In *Analyzing Social Media Networks with NodeXL* (pp. 31–51). Elsevier. https://doi.org/10.1016/B978-0-12-817756-3.00003-0

Harris, R. W. (2016). How ICT4D Research Fails the Poor. *Information Technology for Development*, *22*(1), 177–192. https://doi.org/10.1080/02681102.2015.1018115

Heeks, R. (2006). Health information systems: Failure, success and improvisation. *International Journal of Medical Informatics*, *75*(2), 125–137. https://doi.org/10.1016/j.ijmedinf.2005.07.024

Heeks, Richard. (2010). Where Next for ICTs and International Development? *Manchester Centre for Development Informatics*, *Working Paper 42*. https://doi.org/10.1787/9789264077409-4-en

Heeks, Richard, & Wall, P. J. (2018). Critical realism and ICT4D research. *The Electronic Journal of Information Systems in Developing Countries*, *84*(6), e12051. https://doi.org/10.1002/isd2.12051

IHME. (2017, September 15). *India.* Institute for Health Metrics and Evaluation. http://www.healthdata.org/india

Institute for Health Metrics and Evaluation (IHME). (2017, November 13). *Comprehensive Health Study in India Finds Rise of Non-Communicable Diseases.* Institute for Health Metrics and Evaluation. http://www.healthdata.org/news-release/comprehensive-health-study-india-finds-rise-non-communicable-diseases

India—Population Living in Slums—1990-2014 Data | 2020 Forecast. (2020, March 16). India - Population Living in Slums (% Of Urban Population) - 1990-2014 Data | 2020 Forecast. https://tradingeconomics.com/india/population-living-in-slums-percent-of-urban-population-wb-data.html

Kamada, T., & Kawai, S. (1989). An Algorithm for Drawing General Undirected Graphs. *INFORMATION PROCESSING LETTERS, 31*(1), 9.

Kampourakis, L. (2016, November 6). *Nancy Fraser: Subaltern Counterpublics.* Critical Legal Thinking. http://criticallegalthinking.com/2016/11/06/nancy-fraser-subaltern-counterpublics/

131

Keough, N. (1998). Participatory development principles and practice: Reflections of a western development worker. *Community Development Journal*, *33*(3), 187–196. https://doi.org/10.1093/cdj/33.3.187

Keusch, G., McAdam, K., Cuff, P., Mancher, M., & Busta, E. R. (Eds.). (2017). *Integrating Clinical Research into Epidemic Response: The Ebola Experience*. National Academies Press. https://doi.org/10.17226/24739

Kiesler, S., & Cummings, J. N. (2002). What Do We Know about Proximity and Distance in Work Groups? A Legacy of Research. In *Distributed Work* (p. 26). MIT Press.

Klein, H. K., & Myers, M. D. (1999). A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems. *MIS Quarterly*, *23*(1), 67. https://doi.org/10.2307/249410

Klitmøller, A., & Lauring, J. (2013). When global virtual teams share knowledge: Media richness, cultural difference and language commonality. *Journal of World Business*, *48*(3), 398–406. https://doi.org/10.1016/j.jwb.2012.07.023

Kobourov, S. G. (2013). Force-Directed Drawing Algorithms. In R. Tamassia (Ed.), *Handbook of Graph Drawing and Visualization* (p. 26). CRC Press. http://cs.brown.edu/people/rtamassi/gdhandbook/chapters/force-directed.pdf

Koch, H., Green, G., Mahid, Z., Garner, S. L., Hitchcock, J., George, C. E., Young, P., Koch, H., (2019). mHealth Collaboration for Social Good: Lessons on Adaptability. In *Impacts of Information Technology on Patient Care and Empowerment, Roger W. McHaney, Iris Reychav, Joseph Azuri, Mark E. McHaney, Rami Moshonov, (eds.).* (pp. 322–341). IGI Global. https://www.igi-global.com/gateway/chapter/235967

Koch, H., Mahid, Z., Green, G., Garner, S., Hitchcock, J., & Young, P. (2018). Collaborating for the Good: Improving Health in India's Slums with Mobile Technology. *Proceedings of the International Conference on Information Systems - Bridging the Internet of People, Data, and Things, ICIS 2018, San Francisco, CA, USA, December 13-16, 2018.* https://aisel.aisnet.org/icis2018/practice/Presentations/6

Krebs, V. E. (2002). Mapping Networks of Terrorist Cells. *CONNECTIONS*, *24*(3), 10. http://www.orgnet.com/MappingTerroristNetworks.pdf

Kvasny, L., & Keil, M. (2006). The challenges of redressing the digital divide: A tale of two US cities. *Information Systems Journal, 16*(1), 23–53. https://doi.org/10.1111/j.1365-2575.2006.00207.x

Kvasny, L., & Richardson, H. (2006). Critical research in information systems: Looking forward, looking back. *Information Technology & People, 19*(3), 196–202. https://doi.org/10.1108/09593840610689813

Kyoon-Achan, G., Lavoie, J., Avery Kinew, K., Phillips-Beck, W., Ibrahim, N., Sinclair, S., & Katz, A. (2018). Innovating for Transformation in First Nations Health Using Community-Based Participatory Research. *Qualitative Health Research, 28*(7), 1036–1049. https://doi.org/10.1177/1049732318756056

Leidner, D. E., & Kayworth, T. (2006). Review: A Review of Culture in Information Systems Research: Toward a Theory of Information Technology Culture Conflict. *MIS Quarterly, 30*(2), 357–399. JSTOR. https://doi.org/10.2307/25148735

Levina, N., & Vaast, E. (2005). The Emergence of Boundary Spanning Competence in Practice: Implications for Implementation and Use of Information Systems. *MIS Quarterly, 29*(2), 335–363. https://doi.org/10.2307/25148682

Levina, N., & Vaast, E. (2008). Innovating or Doing as Told? Status Differences and Overlapping Boundaries in Offshore Collaboration. *MIS Quarterly, 32*(2), 47. http://web.mit.edu/is08/pdf/Levina_Vaast.pdf

Lin, C. I. C., Kuo, F.-Y., & Myers, M. D. (2015). Extending ICT4D Studies: The Value of Critical Research. *MIS Quarterly, 39*(3), 697–712. https://doi.org/10.25300/MISQ/2015/39.3.09

Loudon, M., & Rivett, U. (2011). Enacting Openness in ICT4D Research. *Information Technologies & International Development, 7*(1), 33–46.

Lutchen, K. R. (2018, January 24). Why Companies and Universities Should Forge Long-Term Collaborations. *Harvard Business Review.* https://hbr.org/2018/01/why-companies-and-universities-should-forge-long-term-collaborations

Macdonald, C. (2012). Understanding Participatory Action Research: A Qualitative Research Methodology Option.

Mahid, Z., Green, G., Koch, H., Garner, S., Hitchcock, J., & Young, P. (2018). mHeath Technology: Collaborating for Good. *24th Americas Conference on Information Systems, AMCIS 2018, New Orleans, LA, USA, August 16-18, 2018.* https://aisel.aisnet.org/amcis2018/TREOsPDS/Presentations/37

Maisero, S. (2018, June 28). *Subaltern Studies: Advancing Critical Theory in ICT4D.* European Conference on information Systems (ECIS) 2018, Portsmouth, UK. https://dspace.lboro.ac.uk/dspace-jspui/bitstream/2134/33858/4/Masiero_ECIS%202018.pdf

Milhauser, K. L. (2011a). *Distributed Team Collaboration in Organizations: Emerging Tools and Practices.* IGI Global. http://ebookcentral.proquest.com/lib/bayloru/detail.action?docID=3310934

Milhauser, K. L. (2011b). Sustaining Organizational Culture in the Globally Distributed Environment. In K. L. Milhauser (Ed.), *Distributed Team Collaboration in Organizations: Emerging Tools and Practices* (pp. 51-63 (13)). IGI Global. https://doi.org/10.4018/978-1-60960-533-9

Minoo, A. (2018, April 17). *R Network Analysis: Centrality Measures.* DataCamp Community. https://www.datacamp.com/community/tutorials/centrality-network-analysis-R

Morse, S., & McNamara, N. (2013). *Sustainable Livelihood Approach: A Critique of Theory and Practice.* Springer. http://ebookcentral.proquest.com/lib/bayloru/detail.action?docID=1206415

Myers, & Klein. (2011). A Set of Principles for Conducting Critical Research in Information Systems. *MIS Quarterly, 35*(1), 17. https://doi.org/10.2307/23043487

Neef, A., Ekasingh, B., Friederichsen, R., Becu, N., Lippe, M., Sangkapitux, C., Frör, O., Punyawadee, V., Schad, I., Williams, P. M., Schreinemachers, P., Neubert, D., Heidhues, F., Cadisch, G., The Dang, N., Gypmantasiri, P., & Hoffmann, V. (2013). Participatory Approaches to Research and Development in the Southeast Asian Uplands: Potential and Challenges. In H. L. Fröhlich, P. Schreinemachers, K. Stahr, & G. Clemens (Eds.), *Sustainable Land Use and Rural Development in Southeast Asia: Innovations and Policies for Mountainous Areas* (pp. 321–365). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-33377-4_9

New World Encyclopedia. (2018, September 26). *Languages of India—New World Encyclopedia.* New World Encyclopedia. https://www.newworldencyclopedia.org/entry/Languages_of_India

Newman, M. E. J. (2001). The structure of scientific collaboration networks. *Proceedings of the National Academy of Sciences of the United States of America, 98*(2), 404–409. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC14598/

Nhlapo, E., & Goede, R. (2010). Intercultural communication in Information System Development Teams. *International Conference on Information Management and Evaluation,* 273–XIII.

Nixon, S. A., Yeung, E., Shaw, J. A., Kuper, A., & Gibson, B. E. (2017). Seven-Step Framework for Critical Analysis and Its Application in the Field of Physical Therapy. *Physical Therapy, 97*(2), 249–257. https://doi.org/10.2522/ptj.20160149

Nyame-Asiamah, F., & Kawalek, P. (2020). Participating in Critical Discourse: A Critical Research Study of Clinicians' Concerns for A Ghanaian Hospital E-mail System. Journal of Global Information Technology Management, 23(1), 53–75. https://doi.org/10.1080/1097198X.2019.1701356

O'Brien, T. (2014). Human Dignity in a Technological Age. In Good Business: Catholic Social Teaching at Work in the Marketplace (pp. 33–60). Anslem Academic.

Owens, B. (2018, November 7). The benefits and challenges of international research collaboration. *University Affairs.* https://www.universityaffairs.ca/features/feature-article/the-benefits-and-challenges-of-international-research-collaboration/

Public Health Foundation of India (PHFI). (2018, September). *Trends of Non-Communicable Diseases and Suicide.* https://phfi.org/wp-content/uploads/2018/09/trends-of-non-communicable-diseases-and-suicide.pdf

Qureshi, S. (2015), "Are we making a Better World with Information and Communication Technology for Development (ICT4D) Research? Findings from the Field and Theory Building," *Information Technology for Development,* Vol. 21 No. 4, pp. 511–522.

Rahshulte, T. (2011). The Evolution of Collaborative Work. In K. L. Milhauser (Ed.), *Distributed Team Collaboration in Organizations: Emerging Tools and Practices* (p. pp.15-31 (17)). IGI Global. https://doi.org/10.4018/978-1-60960-533-9

135

Richardson, H., Tapia, A., & Kvasny, L. (2006). Introduction: Applying Critical Theory to the Study of ICT. *Social Science Computer Review*, *24*(3), 267–273. https://doi.org/10.1177/0894439306287971

Riet, M. V. D. (2008). Beyond the Moral Imperative. In *Participatory Research and the Philosophy of Social Science* (4th ed., Vol. 14, pp. 546-565 (20)). Sage Publications. http://qix.sagepub.com

Robeyns, I. (2016). The Capability Approach. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Winter 2016). Metaphysics Research Lab, Stanford University. https://plato.stanford.edu/archives/win2016/entries/capability-approach/

Rokhaya, N. (2009). The world bank participatory development approach in the country assistance strategy (CAS) paper for the republic of senegal: Rhetoric or reality? ProQuest Dissertations Publishing. http://ezproxy.baylor.edu/login?url=https://search.proquest.com/docview/304911617?accountid=7014

Sarker, Saonee, & Sarker, S. (2009). Exploring Agility in Distributed Information Systems Development Teams: An Interpretive Study in an Offshoring Context. *Information Systems Research*, *20*(3), 440–461. https://www.jstor.org/stable/23015474

Sarker, Suprateek, & Sahay, S. (2004). Implications of Space and Time for Distributed Work: An Interpretive Study of US-Norwegian Systems Development Teams. *European Journal of Information Systems*, *13*(1), 3–20. https://doi.org/10.1057/palgrave.ejis.3000485

Sarrica, M., Denison, T., Stillman, L., Chakraborty, T., & Auvi, P. (2017). "What do others think?" An emic approach to participatory action research in Bangladesh. *AI & SOCIETY*. https://doi.org/10.1007/s00146-017-0765-9

Schugurensky, D., & Bailey, R. (2014). *Paulo Freire*. Bloomsbury Publishing Plc. http://ebookcentral.proquest.com/lib/bayloru/detail.action?docID=716156

Schunn, C., Crowley, K., & Okada, T. (2002). What Makes Collaborations Across a Distance Succeed? The Case of the Cognitive Science Community. In *Distributed Work* (p. 26). MIT Press.

Sein, Henfridsson, Purao, Rossi, & Lindgren. (2011). Action Design Research. *MIS Quarterly, 35*(1), 37. https://doi.org/10.2307/23043488

Son, S. J., & Kim, E. J. (2011). Re-Examining Trust Development and Knowledge Sharing in Virtual Teams. In K. L. Milhauser (Ed.), *Distributed Team Collaboration in Organizations: Emerging Tools and Practices* (p. pp.82-97 (16)). IGI Global. https://doi.org/10.4018/978-1-60960-533-9

Soules, Ma. (2007). *Jürgen Habermas and the Public Sphere.* https://www.media-studies.ca/articles/habermas.htm

Spinuzzi, C. (2005). The Methodology of Participatory Design. *Technical Communication, 52(2)*, pp.167-174 (13).

Stahl, B. C. (2008). Empowerment through ICT: A critical discourse analysis of the Egyptian ICT policy. In C. Avgerou, M. L. Smith, & P. van der Besselaar (Eds.), Social Dimensions Of Information And Communication Technology Policy (Vol. 282, pp. 161–177). Springer US. https://doi.org/10.1007/978-0-387-84822-8_11

Stahl, B. C., & Brooke, C. (2008). The contribution of critical IS research. Communications of the ACM, 51(3), 51–55. https://doi.org/10.1145/1325555.1325566

Steel, K. M., Thompson, H., & Wright, W. (2019). Opportunities for intra-university collaborations in the new research environment. *Higher Education Research & Development, 38*(3), 638–652. https://doi.org/10.1080/07294360.2018.1549537

Steinmo, M. (2015). Collaboration for Innovation: A Case Study on How Social Capital Mitigates Collaborative Challenges in University–Industry Research Alliances. *Industry and Innovation, 22*(7), 597–624. https://doi.org/10.1080/13662716.2015.1105127

Stevens, M., Vitos, M., Altenbuchner, J., Conquest, G., Lewis, J., & Haklay, M. (2014). Taking Participatory Citizen Science to Extremes. *IEEE Pervasive Computing, 13*(2), 20–29. https://doi.org/10.1109/MPRV.2014.37

Sundström, C., & Uppsala University. (2019). *Development project—Uppsala University, Sweden.* https://www.uu.se/en/about-uu/quality/learning/educational-development/development-project/

Teoh, G. K., Tan, M. P., Tan, J. S., & Chong, M. C. (2018). Conducting community-based participatory research in an urban Malaysian community: Lessons learned and challenges in establishing partnerships. *Journal of Community & Applied Social Psychology*, *28*(3), 156–168. https://doi.org/10.1002/casp.2348

Thapa, D., & Sæbø, Ø. (2014). Exploring the Link between ICT and Development in the Context of Developing Countries: A Literature Review. *The Electronic Journal of Information Systems in Developing Countries, 64*(1), 1–15. https://doi.org/10.1002/j.1681-4835.2014.tb00454.x

Thapa, D., & Sæbø, Ø. (2016). Participation in ICT Development Interventions: Who and How? *The Electronic Journal of Information Systems in Developing Countries, 75*(1), 1–10. https://doi.org/10.1002/j.1681-4835.2016.tb00545.x

Thompson, M., & Walsham, G. (2010). ICT Research in Africa: Need for a Strategic Developmental Focus. Information Technology for Development, 16(2), 112–127. https://doi.org/10.1080/02681101003737390

Trowler, P. (2014). Academic Tribes and Territories: The theoretical trajectory. 8.

Trowler, P., Saunder, M., & Bamber, V. (2012). Tribes and Territories in Higher Education: Practices in the 21st Century: Rethinking the significance of disciplines in higher education (1st Edition). Routledge.

UN Habitat. (2015, August). MDG Country Progress Snapshot: India. http://mdgs.un.org/unsd/mdg/Resources/Static/Products/Progress2015/Snapshots/IND.pdf

Upadhyay, R. P. (2012). An Overview of the Burden of Non-Communicable Diseases in India. *Iranian Journal of Public Health*, *41*(3), 1–8. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3481705/

Urquhart, C. (2016). Grounded Theory. In *The International Encyclopedia of Communication Theory and Philosophy* (pp. 1–13). American Cancer Society. https://doi.org/10.1002/9781118766804.wbiect181

USAID, (United States Agency for International Development). (2018, March 21). *Universities Work With USAID (U.S. Agency for International Development)*. https://www.usaid.gov/partnership-opportunities/universities

USNews. (2019). *The Best Colleges in America, Ranked*. https://premium.usnews.com/best-colleges

Venkatesh, V. and Sykes, T.A. (2013), "Digital Divide Initiative Success in Developing Countries: A Longitudinal Field Study in a Village in India," *Information Systems Research*, Vol. 24 No. 2, pp. 239–260.

Waas, T., Verbruggen, A., & Wright, T. (2010). University research for sustainable development: Definition and characteristics explored. *Journal of Cleaner Production*, *18*(7), 629–636. https://doi.org/10.1016/j.jclepro.2009.09.017

Wallerstein, N., & Bernstein, E. (1988). Empowerment Education: Freire's Ideas Adapted to Health Education. *Health Education Quarterly*, *15*(4), 379–394. https://doi.org/10.1177/109019818801500402

Wallerstein, N., & Duran, B. (2008). *The theoretical, historical, and practice roots of CBPR* (pp. 25–46). https://doi.org/10.13140/RG.2.2.34282.72648

Walsham, G. (2002), "Cross-Cultural Software Production and Use: A Structurational Analysis," *MIS Quarterly*, Vol. 26 No. 4, p. 359.

Walsham, G. (2005). Learning about being critical. *Information Systems Journal*, *15*(2), 111–117. https://doi.org/10.1111/j.1365-2575.2004.00189.x

Walsham, G., Robey, D., & Sahay, S. (2007). Foreword: Special Issue on Information Systems in Developing Countries. MIS Quarterly, 31(2), 317–326. https://doi.org/10.2307/25148793

Walsham, G. (2012), "Are We Making a Better World with ICTs? Reflections on a Future Agenda for the IS Field," *Journal of Information Technology*, Vol. 27 No. 2, pp. 87–93.

Walsham, G. (2017). ICT4D research: Reflections on history and future agenda. *Information Technology for Development*, *23*(1), 18–41. https://doi.org/10.1080/02681102.2016.1246406

West, J. D., Bergstrom, T. C., & Bergstrom, C. T. (2010). The Eigenfactor MetricsTM: A Network Approach to Assessing Scholarly Journals. *College & Research Libraries*, *71*(3), 236–244. https://doi.org/10.5860/0710236

WHO, (World Health Organization). (2016, April 24). *WHO Partners in the Ebola response*. http://www.who.int/csr/disease/ebola/partnerships/en/

Wodak, R., & Meyer, M. (Eds.). (2001). *Methods of critical discourse analysis*. SAGE.

Wong, S. I., & Berntzen, M. N. (2019). Transformational leadership and leader–member exchange in distributed teams: The roles of electronic dependence and team task interdependence. *Computers in Human Behavior*, *92*, 381–392. https://doi.org/10.1016/j.chb.2018.11.032

Yu, K. (2011). Exploring the nature of the researcher–practitioner relationship in qualitative educational research publications. *International Journal of Qualitative Studies in Education*, *24*(7), 785–804. https://doi.org/10.1080/09518398.2010.529838

Zarowsky, C. (2011). Global health research, partnership, and equity: No more business-as-usual. *BMC International Health and Human Rights*, *11*(Suppl 2), S1. https://doi.org/10.1186/1472-698X-11-S2-S1

Zheng, Y., & Walsham, G. (2008). Inequality of what? Social exclusion in the e-society as capability deprivation. *Information Technology & People*, *21*(3), 222–243. https://doi.org/10.1108/09593840810896000