"The Spark Came from That Experience": Career Aspirations and Internet Information Access in Two Nigerian Universities

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Abstract

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In this exploratory project I investigate the relationship between access and usage of Internet information resources and career aspirations among students at two universities in Abuja, Nigeria. This investigation includes both online and offline resources, including the eGranary, an extensive intranet-based collection of resources taken from the Internet. I develop a working theory of how Internet information access influences aspirations both through informational and parainformational channels. Based on empirical data collected through interviews, a focus group, and observation in January, 2017 in Abuja, key findings emerge: Interpersonal connections were immensely important to understanding the relationship between Internet information access and participants' career aspirations; participants' perceptions of Nigerian society and culture shaped how they perceived the career exploration process; and the eGranary was not in widespread use for career-related exploration, in part because of the limitations of an offline resource but also because student awareness of the resource was quite low at one site. This project is exploratory in nature, so I emphasize discussion of ways future research can draw on this work.

TABLE OF CONTENTS

LIST OF TABLES

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DEDICATION

To the glory of God; to my beloved wife, Mara; to my parents, Ken and Bettye; and to the benefit of those who participated and of others who can enjoy the fruits of their participation.

Chapter 1
INTRODUCTION

When he entered the cinema as a teenager, Chetachukwu[1] could hardly have expected to find a transformative experience that would influence the course of his life three decades later. But a seed was planted:

> I've always had fascination for lawyers. Especially Gandhi. Mahatma Gandhi was a young lawyer. So when he was thrown out of the train in South Africa, I watched that movie as a young person. And how he reacted, the mental process he went through became something that I found interesting. So I started looking at lawyers that I met in my life, I had a few that I started admiring. The spark came from that experience.

He encouraged his wife to become a lawyer, then his daughter. But his own aspiration persisted, and in his late forties he entered university to study law. He told me this story in January, 2017, in an interview at his university in Abuja, Nigeria. His story resonates: A young man emerges from the movie theater with a new perception of lawyers, one that would influence his career aspirations–stories like this is are at the heart of the motivation for this research.

This is a dissertation about information changing aspirations.

1.1 Motivation and Impact of this Project

I embarked on this project in the belief that poverty worldwide is a problem that should drive research agendas, that aspirations are an important but understudied area that can give us

[1]Participants' names are pseudonyms except as noted.

ideas how to ameliorate poverty, and that understanding the interaction between poverty and aspirations could help society find clues about how to more effectively fight poverty. This section explores the motivation for the project as a contribution to scholarly understanding of these issues, but also as an effort to contribute to practical understanding in an area that helps the marginalized determine the course of their own lives. Research alone will not solve the problem of poverty. However, each incremental advance of knowledge in international development, even with a narrowly circumscribed scope, helps to fill out the picture of why poverty occurs and what societies can do about it.

Poverty

For decades poverty has been recognized as an acute international social problem, so naturally a substantial amount of research has sought to understand its root causes. Traditional definitions of poverty have focused on tangible material outcomes such a paucity of financial income or wealth; this definition can be in absolute terms or, more often, relative to national or international points of reference (Ravallion & Chen, 2010, 2012; Smith, 1910, book V, part 2).

New conceptual perspectives on the nature of poverty have greatly broadened the scope of scholarly inquiry, promoting much more nuanced ideas about what it means to be poor, what it means to help someone to emerge from poverty, and what we mean by *development*. One Nobel laureate economist's work has encouraged scholars to see "development as freedom" (Sen, 1999); the corollary is that poverty is a lack of freedom, a deficit of options by which an individual can help determine his or her life course. Because the problem is multidimensional, promoting human development involves mindfulness of more than just improving measurable financial prospects.

This view both complicates the quest for understanding and underscores the high stakes. If human development is more nuanced than we thought, if simply increasing income or material wealth is insufficient to drive development, then it becomes all the more important to understand the role that technology plays in this story. The review of literature on

information and communication technologies (ICT) for development (ICTD, also sometimes called ICT4D) in the next chapter will examine this relationship in more depth. A key point is that there is no universal concrete understanding of *development*; any scholarly work that engages with these questions in hopes of yielding practical impact must take a wide variety of perspectives into account.

Information and communication technology and development

The present period of history affords the prospect of unprecedented resources to alleviate poverty. Whether we focus on its purely material aspects or expand our view of poverty to consider its more subtle dimensions, ICTs have tantalized with the possibility of rapidly increasing human capabilities since the middle of the 20th century. These technologies have often been hailed as an important tool toward addressing issues of world poverty, and an understandable optimism has characterized the public discourse. Yet somehow the reality of ICT for poverty alleviation never seems to live up to the promise.

No project better symbolizes both this wave of enthusiasm and the jaded fatigue that can follow than One Laptop per Child (OLPC), established in 2005 with the stated goal of delivering seven million inexpensive computers to children. United Nations General Secretary Kofi Annan characterized his project as "not just a matter of giving a laptop to each child," but of evoking "magic... within" each child, allowing society to benefit from the realization of human potential that had been stifled from lack of educational opportunity (United Nations, 2005). But six years into the OLPC project, with less than one-third of its target met, the founder dismissed his own projections as a "knowingly hyperbolic" effort to sell his idea to governments (Rawsthorn, 2011). More recently, Facebook's CEO Mark Zuckerberg has expressed an intention to find a comprehensive solution to poverty through the provision of affordable Internet access. One criticism of this effort is that it does not "take into account how BOP [bottom of the pyramid] populations actually use social media" and that projects like these "are flawed because they tend to prioritize technological innovation over understanding the antecedent conditions" needed for these interventions to be effective (Wyche,

2015).

These are only a couple of projects, and citing them as examples is not to single out these or any other particular interventions. Any number of other projects could stand in their place, since this dynamic is familiar one in the recent history of technology and development (see, e.g., Heeks, 2009; Toyama, 2015, ch. 1). Yet one could also cite a substantial number of successful development projects involving technological interventions, with a wide variety of positive outcomes, not always the most obvious ones. For example, parents and schoolchildren in India have seen computers as a "near magical device - one that offers the possibility not only of individual ascent, but also of overall social uplift" (Pal, 2012). Preferable to viewing information technology as an inherent benefit or an inherent danger, a more nuanced approach is to view the effect of ICT in general as highly dependent on the social and institutional context in which it is deployed (Toyama, 2011, 2015). Thus, for very practical reasons, it behooves society to better understand the situations in which technology is, or is not, capable of contributing to the amelioration of poverty. If ICT can play a beneficial role, then organizations invested in this social cause—both governments and non-governmental organizations—have an interest in promoting this sort of solution. To the contrary, if technology's role is only marginally positive, neutral, or even negative, then resources invested in that area may be better deployed elsewhere. In situations where the prerequisite societal changes for technology to be effective are within reach, then it only makes sense to bring about those changes first, rather than defaulting to a technological solution. But first, we need a deeper understanding of these dynamics than we have now.

Impact of the project

The social and intellectual impact of this topic are closely intertwined. Contemporary ICTD research has recently been criticized as "fail[ing] the poor" because scholarly researchers do not adopt practices that lead their greater engagement with practitioners who could use research to social benefit (Harris, 2016). Choosing relevant research topics is not, by itself, a solution to this problem, but choice of topic certainly contributes. My intent is that this

work draws its relevance from reporting what matters to the individuals who participated; if the topic turns out less relevant than planned, then that data too can help our scholarly community plan and execute more relevant research in the future. The topic of ICT and aspirations is a very practical one with the potential to improve people's lives as well as contributing to a growing interdisciplinary body of research on development and aspirations. But to achieve this relevance, we all must listen to participants in their own words, not as we might expect them to be.

1.2 Research Questions

The last section presented a case for both the practical and scholarly value of research on the intersection between ICT and aspirations, within the context of international development research. To embark on this effort, then, it was necessary to narrow down such a broad topic to one or more research questions. These questions created a target for this project, giving it a purpose while also drawing boundaries around its scope. This last consideration is critical to the process called concatenation (Stebbins, 2001); for knowledge to move forward from an exploratory project such as this one, it is important to be clear about what is or is not within the scope of the exploratory project. Here I briefly document the rationale for these decisions to narrow scope: why to focus on Internet information resources (as defined below in this chapter) specifically in contrast to other ICTs; why offline Internet resources are an interesting subset of those resources; and why Nigerian university students are a helpful population to study these phenomena. Each of these factors is explored in more detail in future chapters.

The decision to focus on Internet information resources rather than other ICTs is fairly intuitive, but further narrowing that to offline Internet resources in a second research question may not be. At present a large proportion of ICTD research deals with either mobile telephones or Internet access (or both). The interest in telephony is hardly surprising, given its remarkably fast penetration into resource-poor areas (Etzo & Collender, 2010). For this project, though, the Internet and associated resources are a more attractive technology fo-

cus; whereas mobile devices (without the Internet) usually facilitate communication between known parties, the Internet is a means for conveying information from outside sources. Regarding aspirations, it is precisely this potential to expand users' horizons outside the status quo that makes Internet usage a compelling object of study.

However, if the Internet at large is an obvious object of study, the inclusion of an offline Internet resource merits more explanation. The obvious difference is that an offline resource will lack the timeliness of the actual Internet itself. Consequently, if technology usage related to career aspirations is largely taking advantage of the Internet, then an offline resource will be a poor substitute for the Internet. On the other hand, if aspirations-related usage involves the sort of content available on an offline resource—Wikipedia or Khan Academy would be two examples of this content—then such offline resources may have a relationship to aspirations similar to that of the Internet itself. This project explores career aspirations' relationship both with Internet resources in general and with a specific offline resource, so it can help assess the extent to which of either of these two cases corresponds to reality. There is some past research showing that receiving training in one offline resource, the eGranary, led secondary students to adopt a new identity as tutors (Norton & Williams, 2012). This project also involves the eGranary, so this empirical result lends credibility to the possibility of a relationship between career aspirations and this particular offline resource, although the changes in context and population caution against inferring too much from any single precedent. In any case, studying both online and offline resources in this project helps to shed some light on this question of their relative value for career exploration and other aspirations-related usages.

Finally, the research questions concern Nigerian university students because this is a population well-suited for exploration of the larger issues of technology, aspirations, and development. Nigeria is the most populous nation on a continent that virtually in its entirety confronts chronic poverty in some form or other, but its population approaching 200 million and its relative wealth derived from natural resources give Nigeria the potential to be in the vanguard of ICTD in Africa. As the capital, and Africa's fastest growing city, Abuja enjoys

a particular role within Nigeria that gives it more access to technology. More specifically to this project, the preponderance of eGranary installations in the Abuja area facilitated data collection. Not every aspect of research in Abuja can be generalized to all of sub-Saharan Africa, of course, much less the entire developing world, but the city and country are a sensible place to undertake exploration of this topic.

Meanwhile, university students are a good population for study of career aspirations within Nigerian society for two reasons. First, for those who attend university, it is a stage in their lifespan where choice of career often takes place, and hence an optimal stage at which to discuss career aspirations. Second, universities are one sort of institution that invests in technology, in particular in an offline Internet resource, which provides a good opportunity to observe the interaction between organizational procurement of resources and individual decisions on whether and how to use them. We should bear in mind, though, that this population is implicitly unrepresentative of Nigerian society, one with more options and likely more financial resources than many Nigerians.

Synthesizing all these considerations, I arrived at the research questions for this dissertation project:

1. ***What is the relationship between Nigerian university students' career aspirations and electronic access to educational and reference materials from the Internet?***

2. ***What is the relationship between these aspirations and access or use of an 'offline Internet' resource (specifically, the eGranary Digital Library)?***

1.3 Proposal for a Working Theory

The research questions for this project are intentionally bounded—no project could ever hope to explore all possible interactions between all ICT and all aspirations in all international development settings—but they exist in a wider theoretical context. This section documents the working theory I had in mind when developing the research questions. In a way, specifying

this theory is an exercise in self-awareness; I realized that I had embarked on the project with certain mechanisms and characteristics in mind regarding the relationship between ICTD and aspirations. Rather than keep those assumptions in the shadows, my intent here is to state them openly, to allow for evaluation and iteration based on the findings. This working theory is more general than the research questions, because it deals with situations beyond the specific ones chosen for the research questions, but it provides important insight into the intuitions that helped form those questions.

It is not the overarching goal of this research project to test the predictions of this theory, but recognizing these intuitions and expressing them as a theoretical whole are steps toward minimizing my own bias and maximizing my open-mindedness to new ideas. In stating these assumptions I enhance my capacity to reevaluate them, or to confirm them, as the data may compel.

The working theory is that access to an Internet information resource encourages users to consider new career paths that they would not have otherwise considered via two distinct channels. The first channel, purely informational, pertains to the set of careers of which the user is aware, both before and after the change in access. If, by accessing these Internet resources, a user enhances her knowledge about her own possible career paths of interest, then this channel has been activated. Such an enhancement of knowledge can take a number of specific forms: She may learn about careers that they may not have known existed, or she may gain more information about a career of which she was only vaguely aware. Moreover, she may have earlier lacked sufficient knowledge but now feel capable of assessing the viability of such a career path. In any of these cases, the key is that new information has an impact on the user's aspirations. The second causal channel is what I term *parainformational*. It consists of a host of other influences aside from the cognitive informational influence of the first channel; it includes, for example, changes in self-efficacy (Bandura, 1977), goal difficulty and self regulation Neal, Ballard, and Vancouver (2017), and changes to identities (Burke & Stets, 2009). Gaining access to an Internet resource allows users to hear more stories of people outside their immediate "neighborhood" (D. Ray, 2006), including those

of similar background pursuing other careers. These stories might feasibly act through the first, informational channel as well, but I suggest that they also exert a more subtle form of influence. Seeing others of similar background attain a certain goal increases an individual's propensity to view the same goal as attainable. The net effect is that not only do users come to a cognitive understanding that they can "get there from here"; seeing these stories may also prompt them to *feel* they can do so.

One can conceive of aspirations as either a level variable–in other words, a single continuous variable, where two people's aspirations could be compared along a single dimension–or as an expansion of a choice set, whereby enhanced aspirations could mean the possibility of choosing a career that brings one more happiness, better deploys one's skills, or is otherwise a better fit. Indeed, the two concepts need not be mutually exclusive, as an "improvement" could mean aspiring both to a job of greater income or status and to an increase in number of options. The nascent literature on aspirations emerging within development economics tends to focus almost exclusively on aspirations as a level variable. In this view, an individual setting her aspirations too low might result in not undertaking in beneficial career opportunities, which in turn can lead to a poverty trap (Dalton, Ghosal, & Mani, 2016). Those models and their empirical validation help shape our theoretical understanding of aspirations, and in particular help us to understand the benefits of bringing people's aspirations in line with their capabilities. But they lack depth in accounting for the fact that an individual might aspire to do a new kind of work, not just a higher level within the same occupational field. In other words, work is not monolithic, and occupations vary on many dimensions besides salary or prestige. Thus, the theoretical case for a broader view of considering career aspirations as broadening a set of choices is strong. This perspective meshes nicely with newer concepts of development that view it in terms of capabilities, not just wealth or income (Sen, 1999). Expanding one's capabilities means greater freedom of choice, which in this view is itself a desirable development outcome and not just an indirect means to wealth.[2] Moreover, theory

[2]I will explore Sen's views on development in more detail in the next chapter.

and empirical evidence on career choice establishes that individuals vary on the satisfaction they derive from different kinds of work. Consequently, perceiving a broader set of possibilities could lead to more individually suitable, better-tailored career outcomes. Therefore, my working theory tends toward a multifaceted view of aspirations, although still informed by the theories that treat aspirations as a level variable.

I theorize that these informational and parainformational causal channels combine to explain the relationship between technology access and aspirations. In this study, by gathering empirical data to understand the perspectives and behaviors of university students and staff at two Nigerian institutions, I explore this working theory and lay a novel foundation for future research on the complex relations between Internet information resources and aspirations in marginalized communities. Notwithstanding the working theory I have just laid out, this project's focus is on theory building rather than theory testing, a subtlety to which I will return in Chapter 3.

1.4 Definitions

A *career aspiration*, for purposes of this project, is any potential means of earning a living that an individual (1) perceives as a desirable future activity (2) perceives as a viable role for themselves to enter and perform satisfactorily (3) is not presently engaged in. Notably, an aspiration connotes a different idea than a goal in that an individual's aspiration implies no concrete ideas of how to attain it, nor does it imply that a decision among mutually exclusive goals has yet been made. That is to say, although an individual might hold multiple goals at once ("Find a job in sales," "Found a nonprofit by age 50," "Have two children"), calling them goals implies that they are not viewed as mutually exclusive. In contrast, for our purposes one could aspire to enter any of multiple different occupational fields, even if pursuing all of them in sequence or parallel would be impractical. My definition of an aspiration is entirely my own, not some sort of consensus standard—as we will seen, concepts of aspirations differ greatly across different scholarly communities—but it serves to define the area under study.

Throughout the body of this work, *technology* is used as synonymous with the common

understanding of information and communication technology, that is, the deployment of electronic infrastructure and devices to enhance human beings' ability to access information or to communicate with each other. This usage is for simplicity and to conform to current nonacademic parlance in preference to jargon. I adopt this usage cognizant of the broader economic use of *technology* to mean any learning or new information that positively increases production.

An ICTD *intervention* is the deployment of ICT by any institution, governmental or not, with the express intent of bringing about some sort of social change. When corporations invest in ICT infrastructure motivated primarily by profit, this could be considered a somewhat accidental intervention, but that sort of situation is not typically included in the unqualified use of the term.

Internet resource or *Internet information resource* refers to those interventions and technologies that provide access either to the Internet itself or to a wide variety of informational resources taken from the Internet. The oxymoron *offline Internet resource* refers to a technological system or service that gives users access to large amounts of content taken from the Internet but that is not itself connected to the Internet. Although most of my focus is on one particular product offline Internet resource, the eGranary Digital Library from the WiderNet Project, it is one of several efforts to bring Internet resources to locations where online access is limited or unavailable. Implicit in this designation is the idea that users in Internet-limited areas might use such an offline resource as better-connected users might use the actual Internet. Thus, such resources typically seek to contain large quantities of general-purpose information taken from the actual Internet; current releases of the eGranary fill up a hard drive of two to four terabytes.

Development, in the sense of international human development, is a concept with a wide and controversial range of interpretations, ranging from the simple accrual of wealth or income by poor societies or countries to something much broader (Gomez & Pather, 2012; Gomez, Reed, & Chae, 2013; Kleine, 2013; Sen, 1999). Its history and competing definitions are discussed in the literature review in Chapter 2. Following the tradition of Sen, I

understand development to be an expansion of human freedom through a wider range of capabilities and choices (Sen, 1999), but with an implication that reduction of material poverty plays a prominent role in that effort.

I use the term *North* to refer broadly speaking of the higher-income countries of North America, Europe, and Japan (and more figuratively, Australia and New Zealand)—in other words, what would often be called the Global North. This choice is in part to avoid confusion by speaking of the "West," but also to avoid getting bogged down in any debate or confusion about the meaning of *developing* versus *developed*.

1.5 Outline of the Dissertation

The remainder of this thesis proceeds as follows: Chapter 2 reviews a variety of literature to establish the salience and groundedness of my topic and approach. Chapter 3 lays out the rationale for the exploratory approach used in this project. Chapter 4 reports the findings, and Chapter 5 assembles them to address the research questions. In the final chapter I consider the implications for future research and likewise draw inferences for practice and policy.

Chapter 2

LITERATURE REVIEW

This chapter presents a review of extant literature related to the project's research questions. The core areas touched on are the benefits accruing to information and communication technologies for development (ICTD) and career aspirations. First I review the state of ICTD scholarship, progressively narrowing the focus to ICTD's benefits then specifically nonpecuniary benefits. I then follow a similar format for the interdisciplinary literature of career aspirations and related concepts. I close the chapter by synthesizing these two streams to identify gaps, particularly the gaps evident in research on the intersection between the two. By drawing on each of these two streams of scholarship, this project's research questions help to push forward research in the area of intersection between the two, thus making a strategic intellectual contribution.

In addition, this review also demonstrates connections between the working theory sketched out at the close of the last chapter and the extant literature in these two streams. Neither good theory nor good empirical research emerges in a vacuum, so it is important to consider existing work both in ICTD and from various fields engaging with the topic of aspirations. The working theory is intended to document and structure my own preexisting intuitions and to provide one example of a possible structure of the relationships dealt with in the research questions. To the extent that the literature reviewed here strengthens the case for plausibility of the working theory, it also helps to clarify some of the themes to look for in answering the research questions. One might object that this treatment of the relationship (extant literature → working theory → guidance for data analysis and findings) might introduce new bias into the findings; in the extreme case, the analysis might simply run in the well-worn channels of the literature as reflected in the working theory. To the contrary, though, I ad-

vocate for surfacing and disclosing one's own preconceptions, using self-awareness as a tool to increase one's own fidelity to the voice of participants in answering the research questions.

2.1 ICT and Development: The Evolution of a Field

ICTD has exploded in the past three decades from nonexistence, at least as an identifiable scholarly field, to one that draws in a variety of interdisciplinary work from various perspectives (Gomez, Baron, & Fiore-Silfvast, 2012; Heeks, 2009; Walsham, 2017). For example, of the three journals considered far and away most influential in the field (Heeks, 2010), two started early after the turn of the millennium (*Archives*, n.d.; "Editorial", 2002), with the third starting in 1986 ("Editorial", 1986). The two preeminent conferences in the field started in 1998 and 2006 (Walsham, 2017). Although young, these institutions help define a research community that seeks to touch on issues of tangible value to a broader scholarly understanding of international human development.

But in assessing whether ICT advances international development requires a clear, widespread understanding of what we mean by the term *development* —if not exactly a consensus definition, at least a mindfulness of the different interpretations thereof (Jonker, 2016; Walsham, 2017). This section starts by briefly considering various perspectives on the question in order to arrive at a working definition. By briefly surveying a few of the prevailing theories of development we can more fully understand how this research fits in the broader picture. Having developed a working understanding of what we mean by development, we are then in position to dive into the key questions of the field: Does the presence of ICT have a positive, neutral, or negative effect on human development, and if it has any effect, then how?

2.1.1 What is this thing called development?

The field has not always engaged adequately or effectively with theories of development, a deficiency running deep into the roots of the meaning of development itself (Jonker, 2016; Walsham, 2017). This lack of engagement has consequences for any research project seeking to contribute to the ICTD research literature. Even though this project's research questions

do not explicitly use the term *development*, in a sense the concept is always looming in the background, implied in the context of what it means to study access to certain technologies in any resource-limited environment. Since the ICTD research community has been accused of treating development as a "black box," assuming the term means the same thing to everyone (Jonker, 2016), it behooves us to briefly review some of the prevailing views of international development and clarify what we mean.

Jonker (2016) offers this definition for *development theory*: "a theory regarding desirable social or societal change, containing ontological, epistemological and methodological assumptions, serving specific purposes and interests, and operating at a specific level of analysis, often focusing on specific actors and locations" (pp. 7-8). Although some elements of this statement are more suited to a description than a definition, the core, "a theory regarding desirable social or societal change," serves as a valuable working definition.

Among the taxonomies of development theories are those of Peet and Hartwick (2009), A. Thomas (2000), and Willis (2005), as reviewed by Jonker (2016). Despite the dizzying array of differentiations and overlaps among the taxonomies, two points of rough consensus are particularly salient to this project. The first point is the presence of a category for views treating development as predominantly a question of traditional pecuniary outcomes. These run a gamut from neoclassical or neoliberal economics (A. Thomas, 2000) to Keynesian economics (Peet & Hartwick, 2009; Willis, 2005) to Marxist structuralism (Peet & Hartwick, 2009; A. Thomas, 2000), but they all start from an implicit assumption that development is intrinsically about wealth. These stand in contrast to other theories like "people-centered development" (A. Thomas, 2000), feminist development theories (A. Thomas, 2000; Willis, 2005), or "ethnodevelopment" (Willis, 2005), that take the focus off wealth as the central criterion. The second salient point is that a number of development theories use the language of modernity or modernization (Heeks, 2009; Jonker, 2016; Peet & Hartwick, 2009; A. Thomas, 2000). Modernization is defined in very different ways depending on each viewpoint's philosophical underpinnings; despite the differing definitions, it is notable that ICT often carries with it a similar, if vaguely defined, discourse of modernization (Heeks, 2009).

Another line of thought, sort of an antitheory of development, finds it inappropriate to speak of *development* at all. This "postdevelopment" view criticizes development as a "historically produced discourse," responsible for a "colonization of reality" (Escobar, 2012, p. 6). The term is indeed a charged one, bearing echoes of colonialism, but other commentators recognize some validity of the postdevelopment critique and still "attempt to reclaim the term and the idea of 'development' for a radically people-led and people-centered approach" (Kleine, 2013, p. 20). Finally, some scholars have recently promoted a view of "postcolonial computing," where moving beyond a relationship between colonizer and colonized requires a rethinking of technology. In this view, the emphasis placed by designers from former colonizing countries on innovation, sometimes at the expense of understanding usage of extant technologies, is itself a form of neocolonialism. This interpretation also applies to scholarly research and stands as a warning to those of us rooted in the North who study ICTD: If we substitute our own quest for novelty in place of a quest for understanding, we risk misinterpreting the reality of how people use technology in resource-constrained, formerly colonized settings (Wyche, 2015). In general, then, the ICTD community exhibits optimism about prospects for working to redeem rather than toss out the idea of development.

Finally, the view of development offered by Sen (1999) has been profoundly influential in the field of ICTD: development as "a process of expanding the real freedoms that people enjoy" (p. 36). Equating development with freedom implies that poverty is a lack of freedom or of freedoms, a constraint to follow a certain course of action because alternatives are not available. I return to the implications of Sen below, in the review of nonpecuniary benefits to technology access.

In this research I seek to follow this impulse toward postcolonial computing, seeking to understand the motivations and characteristics of technology's users rather than blindly proposing novelty for novelty's sake. I also desire to align this research with the "human-centered" view of development of Kleine (2013) without losing sight of the fact that poverty reduction is indeed one of the key outcomes to which scholarship on development is intended to contribute. The research questions speak of access and usage of technology by Nigerian

students, but these phenomena take place in this wider context of development.

2.1.2 The central question: Helpful, harmful, or something else?

With a clearer idea of the concepts of development and of ICTD that make up the context for this project's research questions, we can now situate them within ongoing trends in ICTD literature. Among the essential open questions of the field, none looms larger than those about the impact of technology. What role can ICT play to advance human development in resource-limited communities and societies, under what circumstances, and how? Or, lest we succumb to technological determinism, the question of benefit has a counterpart: Under what circumstances, if any, does ICT act at cross-purposes to development? These more general considerations cut across a vast swath of territory within ICTD, but in a sense the questions for this project are a narrow instantiation of this bigger question, limited to one population, subset of technologies, and specific kind of nonpecuniary outcome, namely aspirations.[1]

The case that ICT can help to address material poverty, under some circumstances, is strong. Information has had a measurable positive impact on the economic lot of the poor (Conley & Udry, 2010), and electronic ICT can serve as an effective means of information transmittal (Jensen, 2007). But this is does not imply that the net effect of ICT on development must be positive in all circumstances. In the next subsection I will touch on two very different "grand theoretical" perspectives on ICT's impact of ICT's effects, positive and negative. The following subsections will review literature on ICT's benefit, homing in on nonpecuniary outcomes.

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[1] Although this project does not seek to establish causality, the discourse of cause and effect is implicit in ICTD literature on impact or outcomes. In other words, this project will not establish causality, but it forms part of a broader research agenda that could.

2.1.3 Two grand theories of ICT impact

Extreme positions of both optimism and pessimism have been expressed about the potential for ICT to help address worldwide poverty, but a more nuanced consensus has emerged that technology can in various contexts have either a positive, neutral, or negative impact; the impact depends on the context in which it is deployed. Various views along this spectrum have attracted some theoretical attention, and scholars have elaborated theory to support, on one hand, a view of unbridled optimism and, on the other, one of measured skepticism if not quite outright pessimism. The most optimistic perspective holds that technological advances allow poorer countries to "leapfrog" stages of development that are no longer prerequisite to attaining the higher levels of development that they seek (Badimo, 2005; Gurumurthy & Singh, 2009; Mir & Mir, 2005; Norris, 2001; Pal, 2008). Mobile phones are sometimes cited as the example *par excellence* to support this view, because to a wide extent they substitute for an older capital-intensive technology (fixed-line telephones) in which poorer countries faced a large infrastructure deficit. As technological evolution makes conventional phone lines much less relevant to modern communication, developing countries can ostensibly completely skip this stage of development, which is now rendered superfluous. Indeed, the rate of adoption of mobile phones in poorer countries has been extraordinary (Duncombe & Boateng, 2009): According to one projection in 2010, mobile phone penetration was estimated to reach 80 percent in Africa by 2015 (Etzo & Collender, 2010). This proliferation of mobile phones has been linked with tangible economic benefit, for example, through more widespread market information (Jensen, 2007). Leapfrogging thus results not just in a more impressive level of technology *per se* but also in other observable societal benefits such as wealth. In sum, according to the leapfrog view, this rapid adoption accelerates development because it completely bypasses a phase where developing regions were behind, to a new phase where distribution of innovation is more equitable. Despite the optimism embedded in the leapfrog view , though, there are few examples of this pattern occurring in technologies other than mobile telephones. For example, the tangible benefit from public access computing is

at best uncertain (Gomez & Pather, 2012; Sey & Fellows, 2009),

In contrast to the leapfrog ideal, Toyama's amplification thesis offers an alternative view critical of the boundless optimism of the leapfrog view yet still holding out reasons for hope. This perspective asserts that ICTs can only amplify societal structures or institutions that are already there, not fundamentally change those structures by themselves (Toyama, 2011), nor can technologies produce the growth and maturity needed for an individual to aspire to make positive change in society (Toyama, 2015). The relationship with ICT is indeterminate, neither unambiguously positive nor completely negative, but technology alone is insufficient to bring about massive social change. One implication is that research can help society better understand these intricate relationships between institutional structures and individuals, and thus more prudently deploy the technologies that are alleged to benefit those individuals.

It would be unfair to frame the situation as a polarized and dichotomous debate, leapfrog versus amplification. For one thing, the former focuses on how societies as a whole modernize, whereas the latter is more concerned with patterns of inequality within a particular society. For another, Toyama (2015) himself recognizes that the individual can overcome the societal constraints resulting from amplification. Even so, there is an important element of the discourse that counterposes the two viewpoints, implying two different interpretations of my research topic here. If ICT helps to close transnational gaps in development, then its influence on aspirations might be one means by which it has that effect. On the other hand, if it only serves to amplify intranational divisions, then aspirations may also be a means—but in this case, those with greater access to technology might develop different aspirations, presumably wider or higher, than those with less access. Understanding the relationship between ICT and aspirations might not conclusively support either the the leapfrog view or the amplification view, but it helps us better assess the stakes in either case. A fair assessment of the median view, between extreme optimism or pessimism, is that we have a "current body of good practice examples and lessons learned" making it "now just as likely that ICTs make sectoral initiatives... more effective as it is that they divert funds toward the wrong priorities" (Kleine, 2013).

2.1.4 Impact of Internet information access

Narrowing the focus to research on the benefits of access to Internet information resources, one finds that even within the past few years, the "evidence outlining the direct economic impacts of the internet" was deemed "very scarce" (Salahuddin & Gow, 2016, p. 1144), let alone evidence specific to developing countries. This stands in some contrast to mobile telephones, which have spurred an immense amount of empirical research. Mobile telephony figures heavily in the case for the leapfrog view, so an ICTD benefit limited to that one technology would preclude drawing more sweeping inferences about information technology as a whole.

In spite of the relative paucity of studies on the Internet, extant economic research does indicate that an increase in Internet users can result in decreased inflation (Yi & Choi, 2005), increased economic growth (Choi & Yi, 2009), increased services trade (Choi, 2010), and reduced corruption (Goel, Nelson, & Naretta, 2012; Lio, Liu, & Ou, 2011; Salahuddin & Gow, 2016). An increased proportion of Internet users in South Africa was found to lead to GDP growth and "financial development," the latter measured as the ratio of total credit to the private sector as a whole. Recent research aimed at quantifying the effects of ICT expansion across 49 countries in sub-Saharan Africa illustrates the ambiguous nature of the question and the importance of the distinction between different technologies. Whereas mobile phone introduction was unambiguously associated with higher levels of inclusive human development, the situation with the Internet is less clear: "While internet penetration boosts inclusive human development, the incremental benefit of increasing internet access is not significantly apparent" (Asongu & Le Roux, 2017).

Often the benefits of access to the Internet seem to be taken as axiomatic: "As computer and internet technologies are increasingly crucial resources for functioning in today's society, it is generally accepted that populations lacking access to ICTs are disadvantaged in the global economy" (Sey et al., 2013, p. 26). Other scholarly work asserts benefits, at times sporadic ones, to specific sectors such as agriculture (Deichmann, Goyal, & Mishra, 2016)

and education (Cogburn & Levinson, 2008). At the same time, the benefits resulting from the Internet or from technology in general have often been somewhat more muted than hoped for; in agriculture "often these have not scaled up to the extent expected" and have only succeeded in addressing some of the adverse circumstances that afflict farmers (Deichmann et al., 2016).

To further narrow down the technological focus as we review this literature, it is helpful to distinguish between publicly- versus privately-funded technology and Internet access. Of course, an immense proportion of Internet usage comes through the former private channels, such as one's own subscription or one's work. When Sey et al. affirm that "public access ICTs matter" (Sey et al., 2013) it should prompt the question of whether and how much Internet specifically matters, and whether that importance is on balance because it brings benefit.

The next subsection dives more deeply into a taxonomy of possible benefits expected from ICT interventions. The key distinction here is that policymakers have often deployed ICT with the expectation of a pecuniary impact (Gomez & Pather, 2012; Gomez et al., 2013). One view is that this particular kind of benefit has not materialized, and thus public access computing (PAC) has been deemed ineffective (Gomez & Pather, 2012). A contrasting, more nuanced view holds that PAC may have been found *inconsistently* to provide some pecuniary benefit (Sey & Fellows, 2009). PAC is not synonymous with Internet access; for example, one could use public computers to edit documents offline or to play self-contained games. But in general the most popular observed uses of PAC integrally involve the Internet (Gomez & Gould, 2010; Nemer & Reed, 2013).

However, whereas PAC is both publicly funded and publicly accessible, this project concerns technology that is publicly funded but privately accessible, namely in a university. In contrast to the vibrant discourse summarized above, the ICTD literature seems to provide little guidance in assessing the pecuniary benefits of technology investment in higher education. Furthermore, although greater international scholarly collaboration is one benefit identified (Cogburn & Levinson, 2008), there are no prominent surveys of nonpecuniary

benefit in higher education across countries or projects.

2.1.5 Observable but not easily measurable

A growing current of work in ICTD follows Sen's view, as we saw earlier, that development is defined by the expansion of people's choices. Sen is sometimes considered a "heterodox economist" (Burrell, 2013), yet he bears the ultimate imprimatur of mainstream acceptance, a Nobel prize. In reframing development as the expansion of freedoms, he asserts that freedom "cannot yield a view of development that translates readily into some simple 'formula' of accumulation of capital, or opening up of markets, or having efficient economic planning (though each of these particular features fits into the broader picture)" (Sen, 1999). Notably, this perspective does not render pecuniary measures of development such as wealth or income as a means rather an end. Money may expand one's "real freedoms," after all—having more wealth introduces a new option of buying something or hiring someone while still retaining the option of not buying or hiring, so wealth should inherently be choice-enhancing —but accruing more money is not the only way to expand one's set of possibilities.

Sen's capability approach has been hailed as the leading alternative to traditional perspectives, centered on economic growth, of international human development. Within ICTD as a field, it has emerged as the "go-to alternative to more conventional economic growth based theories of development," (Burrell, 2013) as ICTD scholars have seized upon this theory as an alternative way to look at contributions to human development. This makes a lot of sense as a way to establish choice itself as a development outcome, as something to be sought for its own sake. But in addition choice can be seen as instrumental, as a means for an individual to make better decisions that pay off in some other outcome, in other words, not requiring the individual to value choice *per se*. Choosing between A, B, and C can maximize the utility across those options, versus being constrained only to A limits the opportunities to maximize utility. Indeed, information plays an important role in expanding choice in precisely this way, as theorized decades ago (Stigler, 1961). Sen insists that freedom is both "constitutive" of development and instrumental to achieving other positive develop-

ment outcomes (Sen, 1999); indeed, these factors may be interconnected in ways beyond simple unidirectional causality.

There is a gap between the wide esteem for Sen's capabilities approach within the ICTD field and the difficulties encountered in seeking to operationalize it (Jonker, 2016; Tshivhase, Turpin, & Matthee, 2016). Some of these efforts have been piecemeal, focusing on expanded freedom in only one domain, but Kleine's Choice Framework is intended to provide a comprehensive (Kleine, 2010) pattern to assist researchers operationalizing Sen. Notwithstanding the goal of a comprehensive framework, I consider its design to be modular, a bit like a software application that accommodates plugins. In this framework the plugins are the more specific domain-specific concepts of development, but it prescribes a general series of steps in the form of questions to be asked. Each domain can retain its own specific evaluation criteria, but the questions to be walked through are analogous.

This present dissertation project can be seen as fitting within this comprehensive view, in that aspirations could be considered one of the "modules" that fits into the Choice Framework. In other words, understanding whether ICT has a relationship (and eventually a causal relationship, although that may be beyond the scope of this project) helps us assess whether this expansion of choice opens the door to capabilities that the individuals served by the intervention would value. Indeed, it is conceivable that additional choice might be of a sort that individuals do not tend to value–hence the need for the Choice Framework–but at any rate, a first step is knowing whether there is any relationship in this area. A constant theme in Kleine's paper is that international funding agencies tend to adhere to a rigidly orthodox definition of development, focusing on pecuniary measures, implying that their funding priorities lead to suboptimal outcomes. This is no doubt true, but the proposal to substitute a radically different model runs up against the need to engage with some questions: If the population targeted to receive development aid has radically heterogeneous preferences, then funders still have to decide how to achieve the greatest "bang for the buck." To be sure, if the population *systemically* has preferences varying from what the funders value, this is a problem that needs to be addressed before squandering resources on aid that gives the bulk

of the people something they do not value.

ICT interventions can bring benefit even if not measured by traditional measures, but Sen's ideas on this matter are very high level. Kleine proposes that we examine the expansion of choice sets based on both individual and structural characteristics. If ICT is beneficial because it improves aspirations, and one of those ways it improves aspirations is to expand choice sets, then between Kleine and Sen we can make a case that ICT is contributing materially to human development. For this dissertation, Sen's approach will be one input into my a priori understanding of the question, but not a theoretical foundation in the same way. First of all, since the goal of this dissertation is to build theory rather than test it, the relationship with previous theory can be somewhat looser, with less requirement to adhere to one clear theoretical foundation. Secondly, some of the well-documented problems with operationalization militate against full-blown rollout of a Senian research program in this dissertation.

2.2 Career Aspirations and Related Theories

Scholars have ascribed a wide variety of meanings to the term *aspirations* over the decades, particularly as the topic has attracted broader attention in recent years. There are now emerging theories of aspirations, or of concepts related to aspirations that go under different names, in numerous social science disciplines and interdisciplinary fields. This section synthesizes that body of theoretical and empirical work, along with related theories that pertain to career aspirations as conceived of in this project's research questions. The first subsection looks at aspirations across disciplines, proposing some dimensions of taxonomy. The following subsections briefly explore theories of career choice and of identity. Finally, this section closes by examining aspirations in the field of ICTD, where the present project is rooted.

2.2.1 Aspirations across disciplines

Aspirations are complex and lack an interdisciplinary consensus about their nature, so it is not surprising that there are multiple coherent ways to organize scholarship on the topic. A purely disciplinary taxonomy is one obvious starting point, perhaps an appealing one because of the natural cohesion within each discipline. But we can also divide this material into simple versus multifaceted views of aspirations. The former category treats aspirations as a single variable indicating level of aspirations, whereas the latter group holds more nuanced views of aspirations, for example as a choice set. My own working theory, with its two posited channels by which ICT can influence aspirations, suggests an analogous division in the literature between theories that consider aspirations primarily cognitive, one's rational perception of their own expectations, and those that focus on non-cognitive means by which aspirations are formed. Even when ICT itself is not the impetus for aspirational change, concepts of aspirations tend to divide along these lines. In practice, a discipline's norms will often promote theory and research fitting exclusively on one side of one of the other taxonomies. For example, economics values quantitative models and tends to place less emphasis on details that cannot be easily quantified, so it is natural that extant development economic research on aspirations has tended toward the "level variable" view [2]. In contrast, anthropological views of aspirations tend by the nature of the discipline to reject a single-variable view as too mechanical.

This section divides the literature into the "level variable" versus "multifaceted" view of aspirations, and then further divides the first category into work concerned with purely informational influences on aspirations versus more subtle parainformational influences. The diversity of this literature argues for a theory that incorporates levels of aspiration but also other facets, and that considers informational and parainformational channels.

One category of theory and research treats aspirations as a unidimensional variable,

[2]There is no reason why economic models must be limited to only one variable of aspirations, but the natural progression of theory makes it unsurprising that quantitative theories have started from a single level variable.

reflecting that an individual aims for a certain level of attainment. This attainment can be measured in terms of large-scale economic outcomes such as wealth, income, or education; it can be more subtle yet large-scale, such as social status; or it can be on a smaller scale, such as performance of some particular task. In the context of poverty amelioration, the problem here is thus to help individuals reach an optimal level of aspiration. The important point is that different kinds of aspirations, of an individual adding an object of aspiration that was not previously in the picture, is a subject not directly addressed in this literature.

This outlook is typified by recent work by development economists, who in recent years have started to view "aspiration failure" as a contributing cause of poverty (Bernard, Dercon, & Taffesse, 2011). Generally speaking, the mechanism of failure is that an impoverished individual is, because of lack of information or misperception of her own abilities, aiming for an outcome lower than that could be attained. One theoretical model of aspirations failure suggests that, under certain circumstances, an exogenous increase in aspirations could be sufficient to allow an individual to escape from a poverty trap (Dalton et al., 2016). Empirical economic research has lent some credence to this view. For example, offering very simple information about the relationship between education and income to secondary students increased their propensity to seek further education in the Dominican Republic (Jensen, 2010).

But not all research in this category is concerned with large-scale attainment. Early psychological theory about *aspiration*, in the singular, also treated it as a one-dimensional level variable, observed in easily measurable goals such as firing shots at a target (Lewin, Dembo, Festinger, & Sears, 1944). An important sidebar here is that concepts related to aspirations show up in psychological theory under multiple names. In the earliest days of the discipline, William James (as cited in Burke & Stets, 2009) engaged with the topic under the term *pretensions*, where the individual's self-esteem is related to successes as compared to pretensions. Nowadays aspirations show up more often in association with *goal difficulty* (Neal et al., 2017). The question of whether these constructs are other names for aspirations or aspirations failure, or whether they are merely related is somewhat academic. The point

is that aspirations have not yet reached a consensus definition.

The implications of the informational view for ICTD are straightforward: A technological intervention can provide information that leads to an increase in aspirations. If the economy view of aspirations failure in relation to poverty traps holds, then with more information and more appropriate aspirations an individual should be able to get past and to a point where higher future attainment supports higher aspirations.

Level variable and the parainformational channel

Another stream of literature also views aspirations as unidimensional, but is less specific about information alone being the means by which aspirations change. D. Ray (2006), a development economist, suggested a theory of aspirations that, although speaking in terms of level of aspirations, focuses on the *aspirations gap*, the difference between status quo and the level of a variable such an income or education. This gap should be neither so large that despondency sets in nor so small that the individual feels there is little more to attain. An important point is that the individual sets aspirations based on other people considered sufficiently similar to himself or herself. While this theoretical formulation does not explicitly account for parainformational influence, there is an implication that proximity to others carries some sort of role model effect. A recent experiment conducted in rural Ethiopia tested this theoretical framework by selecting participants to view a documentary on other individuals of similar background who had improved their economic and social status (Bernard, Dercon, Orkin, & Taffesse, 2014), thus adding to their awareness of people similar to themselves who had attained more positive outcomes. Those viewing the documentary were found to have raised their level of aspiration according to a variety of measures relative to others viewing another type of film. This experiment did not explicitly differentiate between informational and parainformational channels— that is, some participants may have simply been unaware of the success of others like them— using movies as the experimental treatment implies some sort of parainformational effect of seeing these possible role models on the screen. This stands in contrast to Jensen (2010), where the treatment was simply

giving out the information.

There are also scholars who have theorized about aspirations in a broader sense than simply attainment along one or a few dimensions. The key figure in this broader view of aspirations is the anthropologist Appadurai, who based his understanding of aspirations on the understanding that "most approaches to culture do not ignore the future. But they smuggle it in indirectly, when they speak of norms, beliefs, and values as when they speak of norms, beliefs, and values as being central to cultures..." (Appadurai, 2004, p. 59-60). Building on a foundation of cultural norms, beliefs, and values reflects the markedly different disciplinary outlook that comes from anthropology. Appadurai also suggested that the poor draw on their culture to negotiate "terms of recognition," by which they demur on recognizing the legitimacy of the dominant culture until their own legitimacy is recognized. (Appadurai, 2004). Interestingly, though, D. Ray (2006), a development economist, built upon this idea of a capacity to aspire, particular focusing on the way in which culture can create a vicious cycle by depriving the poor of this capacity. Thus, despite the very real differences in the level variable versus broader view of aspirations, the latter has exerted some influence on development of theory under the former category.

2.2.2 Aspirations in ICTD scholarship

Although the ICTD research community has identified aspirations as an important factor of development (Gomez et al., 2013; I. Ray & Kuriyan, 2010), empirical ICTD research focusing on the topic is still in its earliest stages. Some empirical research has found a connection between between ICT introduction and parental aspirations for their children. In one study, parents in an agricultural area of India were found to ascribe a symbolic value to computers and ICT as a means of advancement, irrespective of their own level of experience with ICT (Pal, 2012; Pal, Lakshmanan, & Toyama, 2007). In addition, schoolchildren themselves placed emphasis on computer skills as an attribute to be admired, and in fact a surprising gender gap has developed where parents perceive girls as more likely to be studious and therefore more likely to succeed in computer-related fields (Pal, 2012).

In addition to this sparse empirical ICTD research on aspirations, one prominent figure in the field has touched on the topic in theoretical terms. Toyama (2015) views aspirations as "intrinsic, even if they are influenced by external factors" (p. 157). Shifting the focus to the individual seems to imply that the insight of the social scientist is of only limited value in understanding aspirations; what really matters is the internal characteristics of the individual. He expresses this view in terms of Maslow's hierarchy of needs, so there is some sort of generalizable understanding from psychology. If "intrinsic growth can be a climb with switchbacks" (p. 167), then placing people in a situation where they do not need to worry about the most basic needs at the bottom of the pyramid allows their true character to express itself through aspirations. Toyama does suggest that "virtue-building policies" might unfortunately be dismissed by others as the product of a "nanny state" (p. 170), but it is unclear how we can identify the virtue-building ones without some broader, generalizable theory of what leads to this sort of virtue—assuming society could ever hope to reach a consensus on what it is we find virtuous.

Interestingly Toyama juxtaposes economics and anthropology, using them both as foils for his own ideas about aspirations: Almost implicit to their discipline, economists view human nature as subject to external incentives. Toyama sees this view as systematically opposed to concern for "causing long-term changes in society through growth in individual character" (p. 169). At the same time, because anthropologists tend to view all cultures as equally valid, they tend to preclude acceptance of growth and advancement-whether individual or societal-as a goal worth striving for. Thus, despite the traditional opposition between these two disciplines on a host of issues, he positions himself in contrast to both by affirming that so much of the impetus to aspiration comes from within. In the end, the social context can only play a secondary role in promoting the aspirations that have to come through "internal maturation" and "our desires themselves evolving" (p. 171).

Synthesizing Toyama's amplification thesis—as distinguished from his more recent, more specific ideas about aspirations—with the economics literature about aspirations failure carries an implication that ICT could magnify this failure. If "aspirations failure" does indeed

contribute to a poverty trap within a particular society (Appadurai, 2004; Dalton et al., 2016; D. Ray, 2006), then the amplification thesis suggests that introducing ICT could make this failure more acute. In practical terms this serves as a helpful antidote to technical determinism, very much in the spirit of Toyama (2015) describing his own position as "geek heresy." But notably, marrying economic views of aspirations with Toyama's amplification thesis leads to a view quite different from Toyama's more recent views of aspirations (Toyama, 2015). The bottom line is that the process of unraveling the complexities of aspirations in ICTD has barely begun, but that much room still exists to learn from the perspectives of the traditional disciplines.

2.2.3 Career choice and career behavior

Aspirations could be interpreted very broadly—for example, getting married, buying a car, or quitting smoking could all be considered aspirations—but this dissertation's research questions concern *career* aspirations. This subsection reviews theories of occupational choice, starting with the mainstream of North American scholarship in this area. It then examines the need for theories applicable in other cultures, and closes by briefly touching on theories from economics and psychology.

The earliest efforts to bring a scientific approach to people's choice of occupations and careers date to the early 20th century (Parsons, 1909), but the mainstream of the field was largely developed in the second half of that century. Holland (Holland, 1959, 1985, 1996) divided the universe of occupations into six categories, which came to be known by the acronym RIASEC (realistic, investigative, artistic, social, enterprising, conventional); he theorized that each individual also has a hierarchy of six corresponding orientations and will tend to choose an occupation in the areas associated with orientations that are higher in the hierarchy. At the same time, one's choice of level to attain with that field will depend on both intelligence (specific to that field) and self-evaluation of one's own ability. Taken together, the elements of this theory imply that an individual with a high level of self-knowledge will make "adequate" career choices, whereas one without it will make "inadequate" ones.

Likewise, because information is accumulated through experience, people who have been in the workforce longer will make better vocational decisions, especially about those areas toward the top of their hierarchy (Holland, 1959).

For our purposes, the key feature in Holland's model is that it is information-focused. The primary means by which longevity in the workforce leads to better career decisions is the accumulation of information, as an individual gains feedback on which areas she succeeds at or finds most rewarding.

Compared to Holland, Super (1980) offered more of a metatheory, or a high-level theory, in that he suggested his own perspective was categorically different from preexisting theories but was intended lead to development of specific theories. In his formulation, individuals' career decisions must be viewed in the context of the entire lifespan, from childhood to retirement, and people can play multiple roles at each stage, such as "spouse," "parent," "employee," and "supervisor." These roles can change in importance over the lifespan, both in the amount of time and the amount of emotional energy invested in each of them. More recently career theorists have both criticized the more traditional models and offered alternatives (McMahon, Watson, & Patton, 2014; W. Patton & McMahon, 2006).

2.2.4 Challenging the North American view

Theoretical or metatheoretical contributions of Holland and Super are quintessentially Western and Northern, specifically North American, in their development and orientation. More recently, in order to address this potential for bias, some career development researchers have advocated for an indigenous approach to their field (Leong & Pearce, 2014). They juxtapose this approach to two other orientations toward the study of non-Western psychology—cross-cultural research, which is testing theories developed in Western settings to evaluate their applicability in other contexts, and cultural psychology, where a more anthropological approach is used. The latter alternative incorporates "sympathetic understanding," with the goal of "development of culture-bound knowledge systems across specific cultures" (p. 68). In one sense, this dissertation project falls in the cross-cultural category, because it starts

from a theory developed in a Western/Northern setting, based on an interdisciplinary selection of theories that are largely from a similar context. One of the reasons to test a theory in a new context is to identify situations where it does not fit, and thus to promote acceptable of alternative, more fitting perspectives, so this theory-testing component can contribute to greater sensitivity to a Nigerian point of view, provided the investigation is done in a way that does not impose the theory where it does not fit. In another sense, though, because this project is not primarily about testing theory, it could be said to incorporate elements of the "sympathetic understanding" approach. A true indigenous approach (Leong & Pearce, 2014) is outside of my capability, because it would be difficult to adopt an indigenous perspective with integrity. Instead, I can aim for greater understanding of career choice from a Nigerian perspective despite my inevitable status as an outsider.

More specific to the setting of this project, parental influence has been investigated as an important factor in career decisions among Nigerian secondary students (Salami & Aremu, 2007), although these findings are quite nuanced. In a model considering both parental attachment and psychological separation, no significant relationship emerged with career indecision, career information-seeking behavior (ISB), or satisfaction with career exploration over the whole regression. However, parental attachment *on the mother scale* bore a significant relationship to propensity to engage in career ISB. This relationship did not hold for parental attachment on the father scale. Salami and Aremu suggest that this is attributable to Nigerian culture, with a strong tendency for women to stay at home and raise children while men are largely absent from the house. One must take care not to draw unwarranted inferences from these regression findings-with some three dozen analogous regression coefficients in the study, it is unclear whether one or two statistically significant relationships actually reveal a meaningful underlying effect. Nevertheless, this work introduces specific attributes of Nigerian culture into the topic of career information gathering, and in particular suggests an alternative means of career influence, and possibly also of information gathering. Salami and Aremu's work hints at this possibility, that attachment to the mother is associated with a propensity to seek more career information, not simply to get information from

one's mother. This research into specific cultural traits of career ISB in Nigeria is in an early state, but this work starts to suggest that career-related ISB research from North American or other Northern countries can only be applied to Nigeria with great judiciousness.

Some economic research on occupational choice has focused on college major choices of American students, no doubt because this represents a convenient setting to observe vocational decisions. For example, Arcidiacono, Hotz, and Kang 2012 successfully developed a model of major choice that includes both self-assessed ability and salary expectations; they found that, if expectations about earnings could be removed, some eight percent of Duke University students would change majors. One recent study instead looked at post-college occupational choices of US-born males who specified at least one "ancestry" on the 2000 census (Zhan, 2015). When categorized according to each occupation's pecuniary reward versus prestige, job choices were found to bear a relationship to the cultural values of each individual's first country of ancestry, using the World Values Survey.

At the intersection of aspirations, career choice, and psychology is a good amount of literature connecting the theory of self-efficacy to career choices. This work, tracing its roots to Bandura's theory of self-efficacy Bandura (1977), stands as an important counterweight to Holland. Lent and Hackett Lent and Hackett (1987) reviewed the early progress of this literature. For this dissertation, this line of research is important because it establishes a theoretical basis for the psychological as well as the informational channel. Children's aspirations are largely conveyed by means of the self-efficacy of the student as well as the behaviors by the teacher to promote self-efficacy (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001). Student perceptions of their teacher's expectations have an influence on those students' self-efficacy by gender when it comes to aspiring to ICT jobs Vekiri (2010). More generally, this builds on the finding that children's behavior adapts based on "vicarious learning," where for example exposure to violence by others increases propensity to violence by the child (Bandura, Ross, & Ross, 1963). Taken together, this research paints a picture where individuals are deeply influenced by other individuals. If teachers can directly influence career aspirations in a face-to-face classroom situation, it prompts an interesting question of whether

online "teachers" can have a similar influence. These teachers could be literal instructors, such as teachers of a massively open online course (MOOC), or more metaphorically could be interpersonal interactions where other people teach informally, intentionally or by example. This empirical work provides some foundation the idea of a parainformational channel for Internet informational access to influence aspirations. If teachers and other role models matter, perhaps ICT can facilitate exposure to these other individuals.

2.2.5 Identity and the parainformational channel

If it is true that ICT access works to influence aspirations through parainformational channels, there are a variety of constructs (especially psychological constructs) that characterize ways in which this mechanism could operate. Self-esteem (Rosenberg, 1965) and its derivative self-efficacy (Bandura, 1977) are important building blocks a complete theoretical understanding of this channel. The previous section already introduced self-efficacy in relationship to career choice. Another psychological construct, that of identity, merits attention because, from various academic fields, theories have emerged of how identity relates to ICT use, to career choice, or to both. Identity is critical to people's work and career aspirations because it directly concerns their ability to envision themselves in a new role. As understood in the mainstream of psychology, one individual may have several identities–for example, as a spouse, a parent, an employee, a manager, a friend, a political partisan, a fan of a certain sports team (Burke & Stets, 2009). Importantly, these identities can also be related hierarchically. As access to a new Internet information source broadens a user's perspective, this opens up the possibility of either creating a new identity or refining existing identities. Either one could affect the perceived viability of future vocational paths, but the former (where one might take on a new identity of "possible computer programmer" or "aspiring ballet dancer") seems the more important of the two.

Identity theory is largely based on symbolic interactionism (SI), and one of the two branches of SI identified by Burke and Stets (2009), holds that there are certain preexisting social structures that are not completely malleable. Individuals can in fact create or change

these structures to a limited extent, but structures provide a constraint on social actions and on the roles that can be taken on. If the structural view is correct, ICT intervention could help expose an individual user to alternative structures—for example, the role of "computer programmer" might not be available in a society that does not have the structures to support it, but through an ICT intervention this role could become available. On the other hand, if both Toyama's amplification thesis and the structural view are correct (Toyama, 2011), ICT intervention could serve to ossify the same structure.

In addition the hierarchical nature of identity is salient because it suggests that an ICT intervention cannot simply blow away all existing identities and replace them with something new, even if that were deemed both desirable and ethically acceptable. If ICT introduces a new identity, that change occurs as part of a system where it falls somewhere within the identity hierarchy. The new identity will be subordinate to preexisting identities, and perhaps it might even occupy a place where it governs one or more lower-tier identities. For example, an individual might have a preexisting identity as a son or daughter that persists at the time of formation of another identity such as "aspiring computer programmer." The hierarchical relationship between the two identities will largely determine how this new identity grows. If the family-based identity is dominant, then feedback for the new identity of "aspiring computer programmer" would be interpreted in light of the dominant identity. If the two identities were to come into conflict, the tension would need to be resolved in one of various ways—but most often with the new identity ceding, being adapted by the individual to better conform with the preexisting one.

Burke and Stets (2009) identify four reasons why identities might change. First, an exogenous shock might cause the reorientation of identities. An ICT intervention seeks to create exactly such an exogenous shock. Second, two identities might be in conflict. This situation was already discussed above in considering the importance of hierarchy. The remaining two reasons, conflict between identity and behavior and "negotiation and the presence of others," are less clearly relevant to an ICT intervention.

Information Technology Identity (IT ID)

More recent developments connect identity theory to an individual's use of ICT to elaborate a theory of information technology identity (IT ID) (Carter & Grover, 2015). I posit that identity is relevant to aspirations, so a theory linking ICT to identity inherently holds the possibility of shedding light on my own underlying theory. Digging deeper, applying IT ID to the present project requires some nuance, because my own theoretical view tends to look at ICT access as an exogenous factor, [3] whereas IT ID, defined as "the extent to which an individual views use of an IT as integral to his or her sense of self" (Carter & Grover, 2015), implies a more endogenous or perhaps reciprocal relationship. This focus on the person-technology relationship gives the potential for capturing certain nuances that are missed in my own working theory, which treats ICT as separate entity to which the individual can gain more or less access. On the other hand, resource constraints such as systemic lack of access seem to be somewhat tangential to the theory of IT ID, and at least its early empirical support comes predominantly from resource-rich countries.

Even so, IT ID carries some implications for a theory of ICT access and career aspirations that merit pointing out for further consideration, even if they fall beyond the scope of this dissertation. One of IT ID's constructs is the *relatedness* of a specific technology to an individual, which in principle could cover a spectrum from complete separation to complete overlap between technology and individual. A high relatedness between person and technology bears implications for career aspirations. On the most basic level, ICT is often linked with the discourse of modernity or progress that is so polemic within the definition of development. An individual who perceives herself as more closely united with one or more ICTs might also perceive herself as more modern or more integrally part of the march of progress. Because ICT serves as a totem of modernity but also has become part of her, she too is part of this modernity. Moving from the general to the specific, a person who feels personally integrated with an ICT might also find it easier to believe that he possesses

[3] While remaining mindful that this exogeneity is a simplifying assumption

specific capabilities to perform in jobs associated with that ICT, or with related ICTs.

2.2.6 A literacy approach to identity

Among empirical work looking at ICT and identity, one study using a theoretical approach centered on literacy merits attention because it involves the eGranary, the same resource used for this dissertation research (Norton & Williams, 2012). Secondary school students were chosen as "library scholars" and given responsibilities in guiding others in the use of the eGranary; those participants then experienced development of a new identity: "Their identities shifted from trainee to trainer, their cultural capital and social power increased, and a range of imagined identities also emerged." The theoretical basis for this research comes from the field of language acquisition, but the key empirical finding is the fact that taking on a leadership role in deploying and training others in the eGranary was found to lead to participants taking on a new identity of tutor, [4] and that "the use of eGranary enhanced what was socially imaginable to the library scholars" (p. 315). Although I do not draw on literacy theory in my own project, Norton and Williams' work provokes some curiosity about whether a similar relationship could exist for individuals in other situations who gain access to the eGranary.

2.2.7 Economic theories of identity and career choice

Economists, too, have developed a theoretical view of identity. In some ways this body of theory abstracts away important nuanced present in the corresponding psychological theories, because distilling identity into a few directly quantifiable outcome variables is inherently an exercise in simplification. Notably, though, identity does constitute an explanatory factor for economic decisions that would otherwise be inexplicable. Akerlof and Kranton (2000) derived a model of utility as a function of one's own identity, conceptualized as group membership.

[4]Norton and Williams report that "students' identities shifted over time from trainee to tutor," but contemporary mainstream identity theory would more likely interpret this as taking on a new identity of tutor that can coexist with that of trainee, even if the preexisting trainee identity might make up markedly less of the person's self-perception.

Significantly, in this model, the individual's utility is increased by actions consonant with her own identity (i.e., with society's "prescriptions" for her group) and decreased by actions that deviate from those prescriptions. The authors allude to both psychological and sociological theory and to several disparate examples of situations explained by their model but not by conventional economic understandings. For example, they suggest that people climb mountains because enhancing their identity as someone who has successfully overcome danger provides a payoff to justify the risk and expense (Loewenstein, 1999), and that the "honor culture" of the Southern United States can be interpreted in terms of gender identity threats. More relevant among these authors' examples here, though, is gender issues in the labor market: Women in traditionally male work roles may not only face negative utility from the perceived discordance with their ideas about their own identity, but may also face reprisals from men who feel that their own identity is threatened by this intrusion (Padavic, 1991). Moreover, their analysis extends to any sort of marginalized community in relation to a dominant community; for certain levels of identification with the out-group, behavior to associate oneself with that group becomes more attractive for members than alternatives, even at some pecuniary cost (Akerlof & Kranton, 2000). The upshot is that people make occupational choices that appear irrational when viewed in purely pecuniary terms, but these variations can be explained by elements of their identity that, if measured, could predict and explain these otherwise irrational choices. An empirical test, somewhat confirming the applicability of this theory to the career choice process, used Danish PISA secondary school data from 2000 along with a follow-up survey four years later (Humlum, Kleinjans, & Nielsen, 2012).

2.3 Summary and synthesis

To this point I have discussed two different streams of literature. The first is that of ICTD, with a specific focus on empirical and theoretical work on the impacts of ICT for development. More specifically still, this discussion has included nonpecuniary impacts, those that are not easily measured through conventional economic indicators. The second stream is that

of career aspirations—not only the theoretical constructs from various disciplines that go by the name of aspirations, but also related literature on career choice and identity. The commonality between these two streams is that aspirations are one example of a nonpecuniary outcome.

At various points in this review, localized gaps in the literature have come up; one such gap that stands out the paucity of work systematically examining the impacts, both pecuniary and nonpecuniary, of the Internet itself. The main underresearched niche addressed by this project's research questions, though, is the intersection between the two literature streams discussed above. Although the topic of aspirations is starting to appear in ICTD literature, most of the references so far have been either somewhat vague and speculative (Gomez et al., 2013; I. Ray & Kuriyan, 2010) or emerging from projects on other topics (Pal et al., 2007). The need for exploratory research to help us better understand concrete relationships between technology and aspirations is evident. Tangentially, this project can also help ameliorate an absence of research on offline versus online provision of Internet content. There is a small amount of research on the eGranary, as we have seen (Norton & Williams, 2012), and on for-profit offline offerings (Dye et al., 2017; Kumar & Parikh, 2013), but notwithstanding Norton and Williams' finding about changes in students' identities, little if any research has been targeted at offline versus online resources as pertaining to aspirations.

This chapter has established that this project's research questions, and more generally its initial working theory, are both well-grounded in extant knowledge from a variety of fields. Although I propose a novel theoretical perspective on the relationship between Internet information access and career aspirations, this understanding synthesizes much of what we already know about these topics from a variety of fields.

The broad context of ICTD literature is important because it frames the reason for this problem and this research topic. The research questions focus on one nonpecuniary benefit among many, career aspirations, but it contributes to an important ongoing debate that gets to the heart of the value of certain forms of ICTD. The fact that ICTD scholars

have identified a connection between technology and aspirations indicates the presence a phenomenon worth studying. Since scholarly understanding of aspirations spans multiple fields, I suggest a general taxonomy based on aspirations as a level variable or something broader, and based on the informational versus parainformational channels for influence upon aspirations.

Chapter 3

PROJECT BACKGROUND AND METHODS

This project is an exploratory study with data collected by three means—interview, focus group, and observation—and analyzed through constant comparative analysis of qualitative data. In this section I establish the fit among the project's "question, method, data, and analytic strategy," a fit that is essential to a research project's integrity. (Richards & Morse, 2012, p. 4). Section 1 examines the choice of an exploratory study as the choice for an overarching research design. Section 2 gives background information about setting for data collection; this includes background on the eGranary Digital Library, the collection of offline Internet resources involved in the second research question. After Section 3 briefly traces the impact of this choice on the unit of analysis, and Section 4 considers the population from which I drew participants, Section 5 then details the sampling methods, with a focus on the philosophy and strategy of opportunistic sampling. Section 6 enumerates the data collection methods: individual and small group interviews, a focus group, and observation. Section 7 discusses the process for analyzing this data, emphasizing the constant comparative analysis. Sections 8 and 9 briefly consider the issues of validity and reliability and of ethics, respectively. The chapter then closes with some comments about the limitations of these methods.

For a few reasons this project's research questions call for a heavily qualitative set of methods, focused on interviews. First, the the questions pertain to individuals' career aspirations, a topic that is very tightly connected to participants' own personal interpretation. This consideration does not preclude making generalizations across different individuals' responses—and indeed, I will do so—but, particular in light of the subject matter, those generalizations need to be rooted in an understanding that is faithful to participants' own

understanding. Beginning with this commitment is especially important for these research questions about career aspirations because this is a topic with relatively little established empirical knowledge and few if any thoroughly tested theories. We have seen that there is some literature on the different aspects of the research question, such as aspirations, career choice, or Internet availability, but little if any that combines these elements. In the next section I elaborate on why this lack of theoretical or empirical consensus argues for a method that prevents us from imposing our own preexisting views, a method that is intentionally exploratory.As discussed in the section on analysis below, alternative approaches that organize qualitative data in predetermined categories carry the important advantage of expediency. However, this comes at a cost of openness to new perspectives, perspectives that are the participants' own understandings of the phenomena under study. In light of the personal nature of career aspirations and the state of knowledge on the topics of the research questions, I determined that this was too high a price. Instead, by using a constant comparative method, my analysis would surface themes that would arise organically from the data.to the contrary, I strongly advocate for future research to use very different methods, possibly including experiments or other techniques. On this point, it is helpful to distinguish between the suitability of methods for this project—that is, to study these research questions at this point in time—from the suitability of methods to be part of a much broader set that will move forward an effective long-term research agenda on the topic. Methods for future research are discussed in more detail in the conclusion in Chapter 6.

3.1 Exploratory study

This project consists of exploratory research, an approach that is not always well understood in the scholarly communities of social science —"mentioned, if at all, only in passing" (Stebbins, 2001, p. 1)— yet drawing on the essence of exploration at the very heart of the research enterprise. In Stebbins' definition, social science exploration stands in contrast to unplanned serendipity as a"broad-ranging, purposive, systematic, prearranged undertaking designed to maximize the discovery of generalizations leading to description and understand-

ing of an area of social or psychological life" (Stebbins, 2001, p. 2). This endeavor requires deliberately situating oneself: "Researchers must intentionally put themselves in a position to make discoveries, rather than carrying out their daily research agenda by passively awaiting the moment" where serendipity strikes (Stebbins, 2001, p. 4). In this view a plan for exploratory research is like a meeting agenda, set out well ahead of time but intended to generate discussion that can surface new ideas for future steps toward the goal. The willingness to update prior assumptions and adjust methodologies according to changing conditions in the field, much more quickly and agilely than by instantiating an entirely new project, results in an iterative strategy where each tactical decision is informed by all the feedback that came before it. In this section I establish a rationale for choosing exploratory research as an appropriate fit for this project, as well as considering the implications for methodology and situating this work within a longer-term research agenda or series of exploratory studies.

Two key values of exploratory research are open-mindedness and flexibility (Stebbins, 2001), and one implication is that these values are reflected in the wide range of methodologies used by projects embracing this designation. For example, one study used surveys administered to samples of software engineers in four different countries to assess technical employees motivation (Verner, Babar, Cerpa, Hall, & Beecham, 2014). Exploratory research can also be treated as a design methodology, both for design practitioners and scholarly researchers (Hanington & Martin, 2012).

Moreover, exploratory research is a good fit for ICTD research in general because of the specific characteristics of doing research in this field. Among the reasons cited for the relative slowness of fully-contextualized ICTD research are "the difficulty of conducting extended studies in impoverished settings, which would require researchers to immerse in the research location, overcoming challenges of language and culture, and time away in distant hard to reach areas" (M. A. Thomas, Li, & Oliveira, 2017, p. 1094). If expense and other resource constraints are limiting ICTD research, it becomes all the more imperative to choose long-term projects carefully. Exploratory research thus becomes a compelling means to assess possible research at an early stage in order to determine how to prioritize the most promising

lines of inquiry

Meanwhile, the inherent challenges of doing research in an unfamiliar culture in essence mandate an exploratory mindset, so deliberately embracing this bent toward exploration as part of my methodology is a natural implication.

3.1.1 Theory building versus theory testing

The founders and early adherents of grounded theory (GT) drew a strong distinction between theory building and theory testing: "because *emergence* is the foundation of our approach to theory building, a researcher cannot enter an investigation with a list of preconceived concepts, a guiding theoretical framework, or a well thought out design" (Strauss & Corbin, 1998, p. 34). Clearly in this project I have not embraced such purism toward theory. By positing at least a working theory, informed by theory from a variety of disciplines, I have asserted that there is some preexisting theoretical basis worth my while to confirm or refuse.

Nevertheless, this project is at least as much as a theory building effort as it is a test of extant theory. Because the theoretical understanding of aspirations is still undergoing quite a lot of development, across disciplines, I entered into this project intending to hold onto my own working theory fairly loosely. By so doing, I would allow theoretical insights to emerge. It is no coincidence that GT itself is in many ways itself an exploratory methodology (Stebbins, 2001), even though its full methodological prescriptions make it something more than "exploratory" as I use the term in this chapter. Because the nature of my fieldwork precluded iteration during data collection, this is fundamentally not a GT project. Even so, my philosophy of theory building is very much in line with the understanding from classical GT, only at an earlier stage in the construction process.

3.2 Background

Fieldwork for this project was performed in collaboration with the nonprofit WiderNet Project and the associated WiderNet@UNC, based at the University of North Carolina at

Chapel Hill.[1] WiderNet produces the eGranary Digital Library, an extensive collection of resources developed specifically for locations where access barriers impede the use of the Internet to access information. The focus is on locations where these barriers affect a wide swath of the population, because Internet access itself might be unavailable, cost prohibitive, or so unreliable and slow as to severely limit its usefulness for information acquisition. The purpose of the eGranary, WiderNet's flagship product with over 1,000 deployments in 48 countries, is to package a variety of Internet resources in a standardized, though constantly growing, collection for deployment in institutions, particularly educational and governmental institutions. The project developed from work by Cliff Missen at the University of Jos, in northern Nigeria, in 2002; in that setting, Internet access was completely absent, so early eGranary releases were burned onto a compact disc by university staff and shipped to Nigeria. This historical background contains important context about the situation for which the eGranary was originally designed. Nowadays, eGranary host institutions are often in locations with some Internet access, but access that users find unsatisfactory—for example, users might be accustomed to paying for data on their mobile phone or using very slow desktop access, or often both. The difference between no Internet access at all and deficient access is a substantial evolution in the nature of demand for the eGranary; nevertheless, these challenges associated with access generate a fairly robust demand for the system.

The slow speed of access influences information seeking behavior relative to regions with faster and less costly Internet, such as Europe, North America, or eastern Asia, because inhibited access is less conducive to random, unplanned exploration of information. For example, users might open separate browser tabs with pages they want to access, go do something else, and come back in a while when their pages have downloaded. Surfing, freely accessing information in a serendipitous, spontaneous manner, is either unknown or not perceived as a viable (C. Missen, personal correspondence). eGranary addresses this

[1]Generally my references to *WiderNet* refer to the former, but the the two organizations involve some of the same individuals to produce the same resource, and this distinction was unimportant to my collaboration with them.

situation by moving traffic for certain reference materials from the Internet to the intranet, with the net effect of exchanging one sort of freedom for another. With eGranary, the set of available material to be accessed is drastically more circumscribed than on the open Web, and for often-updated resources such as Wikipedia, information accessed will often not be the latest version. In contrast, a slow or financially costly Internet connection might allow users to access any content on the open Web, but limit their throughput, whether the limit is technical (i.e., Internet latency) or financial. In summary, then, the eGranary gives users much more better access—more reliable, less inhibited—to a subset of Internet resources, but those resources are drawn from a fairly limited pool.

Each eGranary installation contains up to four terabytes, including complete snapshots of Web sites such as Wikipedia and Khan Academy, academic journals, thousands of books, and educational and other software programs (WiderNet Project, n.d.). The first eGranary was installed in 2002, and a 2009-10 evaluation showed 91 percent of surveyed users would recommend the eGranary to others (Missen, n.d.). Findings from this evaluation suggest that users are well aware of the tradeoffs involved in an offline resource. 78 percent expressed that the use the eGranary was "easy" or "very easy." On the other hand, 81 percent of administrators, librarians, and technicians indicated that freshness was "very important," but only 4 percent judged the eGranary content to be fresh. Demand for the eGranary persists in spite of this perception, suggesting that the aforementioned impediments to Internet access are sufficiently serious as to place a high value on imperfect workarounds. This tradeoff suggests that users might see eGranary in something of a complementary rather than substitutionary role, creating a situation where they continue to depend on the Internet itself for discrete, quick tasks such as finding specific information, particularly for time-sensitive data where freshness is highly desirable. At the same time, the eGranary might come to offer a subtly different kind of informational access, allowing them to explore a limited selection of content at a more leisurely pace. Over the course of 2016 I worked with WiderNet to select a destination and plan data collection, according to a rationale described below under the discussion of the sample.

3.3 Unit of analysis

The unit of analysis for this project is the individual, because the interaction of information access and career aspirations is viewed as an individual phenomenon. However, the existence of a relationship between individual behavior and social influences is always implicit in social science, so it is worth considering how this unit of analysis interacts with both organizational-level and societal-level influences. Thus, each university site constituted an important secondary grouping, because the experiences of individual participants to some extent reflected the specific ICT-related decisions made by each institution's administration. To a lesser extent, participants from the two organizations involved in installation and support of the eGranary also reflected organizational influences. More generally, individual participants often spoke of influences from their own society (Nigerian culture, with the caveat that it was a Nigerian culture specific to the fairly cosmopolitan "melting pot" of the national capital). Although this project is not a case study of Abuja or of Nigeria itself, nor of the institutions deploying the eGranary, future research could treat any of these levels as a unit of analysis, albeit with a different theoretical lens.

3.4 Population

The population for this project was composed of students at two Abuja universities, with a secondary population of those who work closely enough with the primary population and with technology to provide insight into the research questions. This secondary population consists of various staff who work with the eGranary in various capacities, including both staff involved in eGranary deployment and those staff at the host institution. As detailed in the next section, inclusion of this secondary population was valuable, as it provided for a sample that included both staff of WiderNet and of Field Training and Services,[2] a small training and consulting firm that had implemented the eGranary in several institutions in Abuja, as well as staff of the universities themselves. All these subsets of the sample from

[2]Pseudonym

the secondary population provided valuable information from their perspective working with students, and in some cases could talk about their own fairly recent experiences as students themselves.

3.5 Sample

3.5.1 Opportunistic sampling (and complementary strategies)

Opportunistic sampling (also *opportunity* or *emergent sampling* (M. Q. Patton, 1990)), has been defined as "purposeful sampling undertaken after the research begins, to take advantage of unfolding events that will help answer research questions" (Creswell, 2012, p. 209). This approach, as much a philosophical position on how to use fine-grained tactics as it is a specific strategy, figured heavily in the sampling during this project. Opportunistic sampling is a natural fit within the rubric of exploratory research; both categories emphasize flexibility in responding to conditions that may arise during the research process, and opportunistic sampling is one of the practices that helps bring the exploratory mindset to life.

Opportunistic sampling is a nonprobability strategy, so its primary goal is not to draw explicit inferences from the sample to the population, but rather to identify cases that help answer the research questions and to reap the benefits of incorporating them into the data. Mindfulness about selection biases is still necessary in nonprobability sampling, but the benefit of the richness of data that results from digging into the details of individual cases compensates for the cost. Opportunistic sampling is a subset of nonprobability sampling that values flexibility and taking advantage of circumstances that arise, embracing one's own inability to control the research environment. This approach recognizes that data are all around us, with value in contributing to answers to research questions.

It may seem counterintuitive that planning is essential to an effective opportunistic approach, but forethought is essential to situate oneself in information-rich environments. Opportunism means that, after making a forward looking plan to maximize effectiveness, the researcher constantly revises it to identify new opportunities that emerge. This could mean

abandoning parts of the original plan that seem to get in the way of other unanticipated opportunities that have presented themselves.

Opportunistic sampling is especially suited to early-stage qualitative ICTD research, which involves all the logistic challenges of international fieldwork, potentially with additional challenges of working in a developing country. Any cross-national researcher arrives with certain semiconscious assumptions of the nature of research, of what it means to participate in research, of ethical issues. In fact, in the short term a researcher's cultural sensitivity can lead to less data being collected, as a partially-informed desire to err on the side of avoiding taboos might result in missed opportunities where participants want to share more depth about their own experiences. A cautious strategy can be tempting, but a better approach is to integrate it into a constant openness to feedback and a willingness to adapt to the preferences of one's hosts—in other words, into the values of opportunistic sampling. In sum, then, an opportunistic approach is especially appropriate for a qualitative ICTD project.

Beyond general characteristics of ICTD fieldwork, opportunistic sampling fits well with specific attributes of my project. I began with no experience or network in any eGranary country, so it was unavoidable that I would be in early stages of building a network (except for eGranary staff, who were present the first week of my stay). Hence all the above considerations, particularly about following the lead of local informants, were especially germane. Therefore, even though I made some plans of how to sample, I began with the assumption that these plans would be subject to continuous updating, and would take second place to intuition in the field and gathering relevant data as it appeared.

This opportunistic approach not only affected how the sample was drawn, but also induced me to marginally augment the population studied when it proved useful. In planning to work in two Abuja universities with the eGranary installed, students in those universities (both eGranary users and nonusers) constituted a logical population for the project. However, in light of the situations that arose, I judged it expedient to expand my scope to include other individuals with exposure to the eGranary ranging from light to heavy: staff involved

in installation of the eGranary, both from Widernet and from the consultancy deploying it, and both academic and nonacademic staff from the universities in question. The rationale for this expansion was that all these individuals: (1) had at least some familiarity with sites where the eGranary was used (2) occupied position where I expected some self-awareness about their own educational and vocational decisions (3) were clearly of an age where their own career decisions had occurred in an environment with some ICT availability (4) were in enough contact with sites and with their peers to provide insight into how young Nigerians make career decisions. In other words, where I saw a chance to interview someone whose perspective could help address the research questions, I took it.

An effective opportunistic approach does require planning, and other qualitative sampling strategies proved helpful in orienting the project and in priming my thinking to help me identify and take advantage of nascent opportunities. I planned for maximal variation sampling (Creswell, 2012; M. Q. Patton, 2002), a strategy that involves choosing cases or participants that exhibit extreme characteristics of interest. At the outset I applied such a strategy by planning to seek out participants who were both heavy users of the eGranary and who had never availed themselves of opportunities to use it. As the fieldwork phase developed, I felt less freedom to choose a sample than originally envisioned. Consequently, even though the principal of maximal variation influenced how I communicated my desired sample to my hosts, I was not able to select interviewees explicitly on this basis. Even so, maximal variation still figured in my fieldwork, as I chose one university site at a well-resourced private institution and another at a much larger, much less affluent public campus.[3]

3.5.2 Sample size in qualitative research

The question of appropriate sample size for qualitative projects is somewhat controversial despite some consensus views. Looking for a "magic number" for a qualitative sample size valid across multiple projects, for multiple research questions, is widely regarded as something of

[3]I will refer to the two universities under the pseudonyms Central University and Northern University, assigned at random.

a fool's errand (M. Q. Patton, 2002). Instead, most commentators endorse a criterion of *saturation* (Mason, 2010), deriving from grounded theory's *theoretical saturation* (Glaser & Strauss, 1965). In simplified form, saturation is the point at which adding additional participants will add little or no new information relevant to the goals of the project. Saturation is a helpful goal for orienting my thinking, but there are three caveats to using it as my main criterion, if not my exclusive criterion, for my project. First, although the quest for a magic number is generally deprecated, some dissenting voices hold that it is a justifiable goal (Guest, Bunce, & Johnson, 2006; Mason, 2010). Second, saturation is not universally endorsed as a qualitative criterion, even among the majority who reject the a universal magic number (Mason, 2010). Although saturation as a primary criterion for qualitative sample size is indeed a consensus, it is not a unanimous one. And third, even where saturation is accepted as a valid criterion for ending data collection, there are obstacles to operationalizing it *a priori* except with the luxury of an open-ended project that can proceed without any regard for time.

As for this third point, in essence the problem in applying the saturation criterion is one of deadlock: We identify the point of saturation as arising when one more marginal case seems unlikely to produce new information relevant to better answering the research questions of the project. However, this determination cannot be confidently made until that point is reached. There is no doubt an intuition, honed through experience, that sees the data converging on this point ahead of time, as new data coming in render progressively new insight into the questions, but this convergence can only be identified after some data, perhaps most of the data, has been collected. If saturation is our only criterion, it seems we can only know once we get there.

Another problem of operationalization that recurs in the literature is "the age old 'lumper-splitter problem'"(Guest et al., 2006, p. 77), which reflects that different researchers will make different judgments on how coarse- or fine-grained codes or theoretical contributions must be. The problem is not that any of these variegated judgments is poorly reasoned or ungrounded; rather, different kinds of projects may call for a coarser or finer approach,

and these different approaches identify very different points of saturation. For example, a researcher identifying only a few broad codes or looking for overarching theoretical contributions may conclude that saturation has been reached based on relatively few informants; meanwhile, someone extracting many codes or elaborating a very complex theory might continue to derive new information from cases that would not be of interest to the former researcher.

For these reasons, I decided that saturation alone was not a fitting criterion for choosing my target sample size. Instead, I took a starting point from a roughly comparable project (Guest et al., 2006). Those researchers saw their coding approaching saturation after 12 interviews, but they also offer as caveats the following three questions: How heterogeneous or homogenous are the populations relative to each other? How does the depth or complexity of the subject matter of my study compare to theirs? In other words, "It really depends on how you want to use your data and what you want to achieve from your analysis" (Guest et al., 2006, pp. 75-77). Finally, what is the implication of the skill of the respective researchers on the sample size? In spite of the problems with saturation as the sole criterion, its popularity in the literature on quantitative methods speaks to its value as a stopping criterion. Thus, although I planned around the estimation given over, I also intentionally retained room to reassess after data collection has commenced. I resolved to keep saturation in mind as a supporting criterion, subject to the pragmatic considerations of resource limitations and of opportunistic sampling.

3.5.3 Choice of setting: country, city, and institutions

I chose to do data collection in a location with a high concentration of existing eGranary field sites, maximizing the probability of finding sites that would give me adequate access to conduct interviews.[4] Nigeria was selected because, owing to the eGranary's deep his-

[4]An earlier plan was to find sites that had not yet installed the eGranary but would do so during the study, and that thus could provide access to potential users both before and after rollout of the eGranary. Because of delays in installation, this proved infeasible.

torical roots in that country, the density of possible sites was greatest. Furthermore, the WiderNet director enjoyed the closest ties with site administrators (and others associated with deployment) in Nigeria, increasing the availability of access to interview participants. Within the country, the city of Abuja was the choice because the WiderNet director was there in January 2017 for a training, allowing him to serve as an intermediary to approach site administrators or other local individuals able to facilitate access to participants. Abuja is a substantial metropolitan area with multiple eGranary installations within a reasonable distance, and the presence of WiderNet affiliates and associates in that city facilitated access after the director had returned to the United States at the end of training.

Nigeria is the most populous country in Africa, with more than 200 million people, roughly one-fifth of the continent's population. Oil wealth flowed into the country beginning in the 1970s, and continuing to the present day, leading to federal and state governments eager to invest in tangible signs of modernity. Abuja, the national capital, is a planned city that came into existence in the 1980s and is now the fastest growing city in Africa. As a new city that houses the federal government, Abuja receives a lot of attention in the form of public works projects, with a new highway to the airport opened soon before my visit and signs for multinational construction firms visible throughout. The distinctive character of the city has implications for this research: Its relatively affluent residents seem to enjoy more consistent access to the Internet than do people elsewhere in the country, and the proximity of the federal government increases the incentive for public investment, whether with the intent to impress government officials or to produce something visible for the public to show where the tax dollars are being spent. I do not presume that Abuja eGranary sites may not be representative of the nation as a whole, because of the distinctive characteristics of the capital city, but the relative ease of gaining access to participants made it a beneficial choice.

I made site visits to each of the two selected universities for the purpose of conducting interviews. At Central University, students were only made accessible to me in an impromptu focus group, so specifics of this site visit are discussed below under focus groups. I made two visits to Northern University, with most of the interviews conducted sequentially on one day.

That primary visit began by me interviewing the director of ICT, who then proceeded to arrange the subsequent interviews. In response to my request for participants, he instructed his staff to assist me by bringing participants into the assigned room. At other points staff associated with implementation of the eGranary, or other academic and library staff, were also made available

Although I had envisioned access to conduct individual interviews, for the most part student availability was in groups of two or three. To most easily accommodate the students, I adapted the protocol slightly to do small group interviews. This extemporaneous change to the interview design led to beneficial crosstalk between participants that sometimes elicited important data—particularly when the participants disagreed or corrected each other's misunderstandings of the interview questions—that might not have been gathered in an individual interview.

Students were the focus of my sampling strategy at both institutions, but at Northern University I also had the opportunity to speak with the ICT Director and to interview various staff members at the university: a senior ICT staff member who runs much of the day-to-day of the ICT unit and leads trainings including the eGranary; another programmer; two librarians; and an economics lecturer. Secondarily, away from the universities, I also conducted two individual interviews with WiderNet field associates, part time contractors who are primarily responsible for installation and client liason at eGranary sites. The two field associates interviewed were both Nigerian (as were all other participants), and together their territory spans all Nigerian eGranary sites.

In addition, I interviewed staff of a small firm that provides ICT training and consultation for higher education institutions, and counts the eGranary among its flagship products to implement. Participants were six employees, young men hired to do installation of various systems including the eGranary. Not only were they able to provide some more information on implementation of the eGranary, but the employees also provided a complementary perspective on technology and aspirations from college-aged men who were not enrolled full-time in a university.

Intv #	***Pseudonym***	***Description***	***Age or career stage***	***Academic field***	***Gndr***
		Students (and recent graduate)			
1	Kebe	Student, Northern Univ.	2nd year	Law	F
1	Joy	Student, Northern Univ.	2nd year	Business admin.	F
2	Chetachukwu	Student, Northern Univ.	5th year; age in 50s.	Law	M
3	Aziz	Student, Northern Univ.	4th year	Economics	M
3	Diana	Student, Northern Univ.	1st year	Software eng.	F
4	Vivian	Student, Northern Univ.	4th year (of 4)		F
4	Esther	Student, Northern Univ.	4th year (of 5)		F
4	Michael	Finished few wks previous, Northern Univ.	recent grad	Mass Communications	M
5	12 focus group participants	Students, Central Univ.			
		Non-students			
6	Solomon	WiderNet field associate	Mid-career		M
7	Grace	WiderNet field associate	Mid-career		F
8	Williams	Staff, Northern Univ.	Mid-career		M
9, 15	Hadiza	Lecturer, Northern Univ.	Early career	Economics	F
9	Sodiq	Computer programmer, Northern Univ.	In role since 2009		M
10	Kingsley	Staff, Field Svcs.	College age		M

11, 16	Barka	Staff, Field Svcs.	College age		M
12	Victor	Staff, Field Svcs.	College age		M
13	Peter	Staff, Field Svcs.	College age		M
14	Chiagozie	Librarian, Northern Univ.	Graduated uni in 2004	Library Archival and Information Studies	F
14	Ayomide	Librarian, Northern Univ.	5th year of professional career	Library and Information Technology	F

Table 3.1: Participants in interviews and focus group

3.6 Data collection

3.6.1 Interviews

Why interviews?

Interviews are a commonly-used research technique to allow a researcher to enter into the perspective of participants, "to find out what is in and on someone else's mind," without imposing the researcher's own presuppositions upon the data (M. Q. Patton, 1990, p. 278). They are so common because they allow for collecting data from the perspective of each participant in real time. In contrast to documentary methods, which depend on what has already been recorded, interviews allow participants to shape the data provided in real time according to whatever aspects they find important.

Because the use of individual interviews in qualitative research is so well established, it can be easy to lose sight of the challenges they pose. As a result of his or her own involvement in the interview, the potential always exists for the interviewer to impose an external view rather than faithfully reflect that of the participant subject. Open-ended interview questions

have the substantial benefit of allowing respondents to choose what is important to them in responding, but they also allow the researcher to guide the conversation; as a consequence, simply by creating a plan for interviews I was unavoidably filtering responses through my own understanding of the topic (Creswell, 2012). This tendency is not entirely bad, since it allowed me to focus my inquiry on topics that relate to the the research questions and to relate these topics to participants' unobservable attitudes and perceptions. However, self-awareness and sensitivity to what respondents were actually saying, rather than what I expected them to be saying, were essential to successfully carry out interviews. I retained audio recordings of interviews until the end of the project.

One particular issue of possible concern in interviews was cultural gender dynamics. Nigerian culture does tend to have more tightly prescribed gender norms than my own, and there is some chance that female respondents in particular may have interacted differently with me than they would have with a female interviewer. However, there are multiple reasons why this effect was probably not as great as would be inferred for paternalistic cultures in general. First, with the exception of a second interview with one academic staff member, interviews with women were always in pairs or groups. Second, the environment was an open computer lab with (at various times) other students going about their business or with the next set of participants waiting for the present interview to conclude. Although this setup may have resulted in less privacy in general for the interviews, my inference is that it would also yield a less intimidating environment and thus reduce the impact of gender dynamics. Third, because most of the sample interviewed was university students or others with a university education, familiarity with intercultural perspectives and with Western or Northern research procedures may have been higher. Even so, it is important to keep this issue in mind as a source of potential bias.

Interviews in this project

M. Q. Patton (2002) offers three possible categories of interviews, running from least to most structured: the informal conversational interview, the "interview guide" interview, and the

standardized open-ended interview. Within this taxonomy, my methods here fit solidly in the second category, with an interview guide developed *a priori*. However, at times the interviews used the full latitude afforded by a semistructured interview guide, with the interview guide offered a compass to help orient the discussion. In general the discussion remained on the topics relevant to this project.

One justification for this sort of semistructured interview is that the theoretical concepts surrounding the research questions are not set in stone, so using a strict interview protocol would have stifled the ability to elicit new concepts. For example, the scholarly community is still very much in the early stages of understanding how aspirations fit into development theory, so an overly structured interview would risk imposing one theoretical view of aspirations while denying participants the voice to explain their reality in a way that would lead to development of alternative theoretical approaches. This consideration is all the more relevant for international development research, for the reasons already given above in the discussion of opportunistic sampling. As the interviews progressed in the field, it was inevitable that they would diverge somewhat from the strictures of the interview guide. On the other hand, my view was that a fully open-ended conversational interview would have risked drifting too far off topic, or never hitting the important points for the topic. With limited time in the field, this was not a luxury I could afford. Thus, a semistructured interview guide seemed a clear choice as the best way to gather data. One taxonomy of interview questions includes several interview types, such as to ask about a participant's feelings, opinions, or behaviors (M. Q. Patton, 2002). Most of my early questions are about behaviors–how students use information resources–with some questions about knowledge (of the eGranary or other tools) and, arguably, opinions or feelings (aspirations themselves).

I conducted the Northern University interviews in a computer lab where other students were sporadically present working on the computers. In a computer center with roughly 15 to 20 units, there were at most two or three people working in the room as interviews proceeded. I used two devices to record audio, a Motorola RAZR X mobile phone and a Nexus tablet, each running the Tape-a-Talk recording software. To maximize intelligibility

of the recordings I placed the two devices at a distance of roughly three to five meters apart; each device was located near a different participant in pair or group interviews.

In general my strategy in conducting interviews was to hew to the topics stated in the interview guide while allowing room to follow where the participants might lead, as long as such improvisation helped answer the research questions. To carry out an effective interview, it was important to know a priori the nature of the data I was seeking(M. Q. Patton, 2002, p. 376), so in following the lead of respondents I was mindful of the important of not crowding out our time to cover the core topics as I perceived them. For example, I consciously decided to introduce some questions related to IT identity shortly before the end of each interview (rotating the order of the three main questions within that set).

To ensure faithful recording of participants' words, particularly given my relative infamiliarity with Nigerian English, I frequently repeated my interlocutors' words back to them. After my return to the US, interviews were transcribed by a Lagos-based transcription service in order to minimize the amount of material lost owing to my own incomprehension. In several instances I started the transcription then turned it over to the Nigerian service for completion.

3.6.2 Focus groups

Why focus groups?

Focus groups can be useful in exploring "shared understandings" (Creswell, 2012, p. 218). In addition to revealing differences between individually-held and collectively-held ideas, they also provide a valuable check on biases that a researcher might introduce in the individual interviews; if I had unwittingly imposed my own preconceptions in a way that did not surface during the individual interviews, a focus group could expose these false assumptions by allowing a group to work out and express a more relevant shared understanding. More specific to this project, a focus group has the potential to uncover specific items such as job aspirations that did not come up in interviews, but might emerge from group crosstalk.

This sort of dynamic is particularly relevant given the nature of career aspirations, where a participant might have forgotten a past aspiration, or might have discarded it as too outlandish or irrelevant. The same dynamic could apply, perhaps less clearly, to ICT-related behavior. A focus group could help elicit such an important yet marginalized piece of data if other participants' remarks serve to remind an individual of internal subjective impressions they might have forgotten. On the other hand, this last dynamic could be reversed, where the group's opinion serves to invalidate or further marginalize an individual's opinions.

Among the numerous rationales offered for scholarly focus groups (see for example Stewart & Shamdasani, 1990, p. 15), a few stand out for their relevance to this project. Focus groups can be particularly effective at laying groundwork for future hypothesis testing; this approach is often referred to as exploratory (Tashakkori & Teddlie, 2003). Although the primary purpose of this dissertation project is not to test hypotheses generated from my theory posited above, this work could provide a foundation for future hypothesis testing. Focus groups are also valuable for prompting "new ideas and creative concepts" and "learning how respondents talk about the phenomenon of interest," with the latter helping to design future research instruments that better correspond to how research participants perceive the issues being studied. Both these attributes are important because scholarly study of aspirations is still in its infancy, both within and across many social science disciplines.

Some definitions of a focus group emphasis the *focus*, that is, insist that a true focus group must keep the scope fairly narrow. They distinguish group interviews "from focus groups, which feature individuals brought together by the researcher to specifically focus on one, usually narrow, topic" (Richards & Morse, 2012, pp. 128-129). However, this differentiation based on subject matter ultimately hinges on how thinly one wishes to slice a "topic." By this strict definition, the data collection method actually used in this case might be termed an impromptu 12-person group interview, with some characteristics of a focus group. For simplicity and in view of the slightly differing opinions on the margins of what constitutes a focus group, though, I will continue to use the term with the above as a caveat.

Critically important to the success of this data collection method are group dynamics

among participants (Stewart & Shamdasani, 1990). In particular group compatibility is key to effectiveness, but this consideration is not perfectly correlated with homogeneity. Even so, the two variables are connected (Stewart & Shamdasani, 1990). Cultural issues, including the gender dynamics discussed above under interviews, were a consideration here too. On one hand, men "speak about themselves more often in mixed-gender groups than in same-sex groups" (Aries, 1976), whereas in same-sex groups they are "more concerned with status and competition." For their part, "women in mixed-sex groups tend to be less dominant than in all-female groups" (Aries, 1976). All these observations are stated without reference to any particular culture, but in a traditionally male-dominated professional and educational culture such as Nigeria, some of these tendencies might be even stronger.

Understandably, most of the extant theory of focus group design presupposes a great deal of control by the researcher over the design of the data collection, so the application may be less straightforward to an unplanned focus group, as was the case here. Nevertheless, an understanding of the theory of effective focus group matters for two reasons. First, these factors still weighed on real-time decisions made in the execution of the focus group, even if the degree of control was substantially less than might have been the case for a planned focus group. Second, an understanding of best practices in a more idealized and controlled focus group setting still has retrospective value.

The focus group in this project

In this study the focus group emerged from an opportunity that presented itself during my visit to Central University. In preparatory meetings, I had requested of senior library staff that they facilitate access to students for interviews . In response, they introduced a student employee who worked in the library; he escorted me to the library as the designated site for interviews. He then rallied all the users of the library's open study area to gather, resulting in a focus group of 12 people rather than individual interviews. Scholarly focus groups are typically limited to around four to six people (Creswell, 2012), but in this case extending this limit allowed the benefit of access to the students in a way that seemed to accommodated

everyone.

I adapted my interview protocol ad hoc to a focus group protocol, helped by the fact that earlier iterations of the research design had included focus groups. My goal was to lead the discussion in accordance with practices of effective focus group moderation; in particular I sought to moderate discussion so that the most active voices could not dominate. In this particular instance, the population sampled was fairly homogenous, owing to the presumed commonality of the participants in the library being students. There were roughly equal numbers of males and females, and the focus group responses indicated that Christian and Muslim participants were included.

I recorded contact information for follow-up with focus group participants. I received two follow-up messages from participants and conducted a brief email interview with one of them, the student staff member working at the library.

3.6.3 Observation

Observation often receives less attention than interviews or focus groups, but its importance to sound exploratory qualitative research must not be underestimated. This is particularly true for exploratory research, because such an approach by its very nature involves seeking out unanticipated opportunities for knowledge discovery. Interviews and focus groups–except for the rare unplanned ones–require at least the degree of planning necessary to be in the same place as participants. Observation still requires the intentionality to be in a place where interesting phenomena or behaviors can be observed, but this is still more amenable to making unplanned discoveries where even the category is unplanned (i.e., not something where we ask about a certain topic in an interview and get an unplanned discovery). Charmaz (2014, p. 111) vehemently advocates the importance of observation, especially for less experienced researchers who might be tempted to perceive it as somehow less than legitimate.

Good observation requires mindfulness toward the way in which the researcher can affect the environment being observed: "Observing is the most natural of all the ways of making data, but observing unobtrusively is extremely difficult" (Richards & Morse, 2012, p. 129).

On-site fieldwork opens up the possibility of direct observation, and in this project my presence allowed me to gather general impressions of the facilities I was visiting and the way students were using them. At times these observations took the form of explicit field notes, but at other times the observation was more informal, with my presence there shaping my perceptions of the context. Unfortunately data for this project did not include direct visual observation of users interacting with the eGranary, as I had hoped, owing to lower than expected utilization of the eGranary. However, I was present at a four-day training cosponsored by WiderNet, and I also spent several days at the headquarters of Field Training and Services, the small training firm that helped with eGranary installations in and around Abuja.

I did not directly code my field notes along with the interview and focus group data, but on occasion they proved to be a useful resource to help me recollect details. Instead, these recollected observations from the research sites helped to inform the coding of those other kinds of data, as well as influencing my interpretation of the analysis results. I also noted contact information that allowed me to follow up with participants, resulting in a few clarifying responses.

3.7 Data analysis

My qualitative data analysis was primarily based on constant comparative analysis (CCA; also constant comparative method, CCM) (Fram, 2013), influenced by the particular flavor of CCA promoted by Charmaz (2014). The key to this method is iteration, and my own implementation comprised four iterations of codebook creation, involving both "pre-coding" and card-sorting to identify themes recurring through the data, followed by three passes of actual coding of the data. Finally I subjectively synthesized the data in order to report on the next chapter, informed by the organization of data by code.

3.7.1 The nature of CCA

The variant of CCA advocated by Charmaz emphasizes two explicit phases of coding— *initial* and *focused*. These two phases constitute a sort of cycle of creative decomposition followed by reconstruction, of divergent thinking followed by convergent thinking. Initial coding means "tak[ing] segments of data apart, nam[ing] them" (p. 133), thus placing an emphasis on rooting the analysis in the fine-grained data. Focused coding, in turn, is "a focused, selective phase that uses the most significant or frequent initial codes to sort, synthesize, integrate, and organize large amounts of data" (Charmaz, 2014, p. 113). In other words, the latter phase rebuilds the pieces surfaced in the former phase into a more patterned, coherent whole.

The Charmaz approach to CCA is not the clear consensus as the dominant force in ongoing research, and her manual provides room for other forms of coding, albeit without any particular advocacy. *Theoretical* coding dates back to the original forms of grounded theory and represents a late stage where codes are reassembled into theoretical insights. *Axial* coding, also part of the original formulation of GT, seems to be particularly deprecated by its critics, including Charmaz. In their view, by following up on initial (or open) coding with a point out that axial coding can impose a framework and prevent the researcher from seeing emerging truths (Charmaz, 2014). In my application of the Charmaz approach, the initial coding phase corresponded to multiple iterations of codebook development, whereas the focused coding phase took place when I consolidated those codes into a final codebook and then applied them (in passes) to my dataset. In summary, I included multiple iterations corresponding to each of Charmaz's two primary phases, but a greater concern was the progression of deconstruction followed by reassembly in the respective phases.

CCA is a good fit for this project because of its primary rationale, identifying codes that emerge from the data rather than those brought into the project by the coder. This rootedness in the data starts with a focus on the words of participants themselves, privileging them over the preconceptions of the researcher. But naturally, over time it proves necessary to unify similar themes represented by different language from participants; on those occasions,

CCA provides a rigorous, prinicpled way to move from the specific words in the data to thematic descriptions in a way that still places the focus on the data. Inferences from the verbatim words used by participants to the thematic meanings behind those words are "one way in which you raise teh analytic level of your work, but the data must support your inferences" (Charmaz, 2014, p. 146). This benefit of CCA relates back into my rationale for an exploratory project to investigate a relationship, ICT access and aspirations, that is still only poorly understood. When a prevailing theory regarding a particular topic has yet to emerge, it becomes particularly important for theoretical construction to focus on its fidelity to the meanings and understandings of participants. Thus, CCA's emphasis on rigor through iteration helps ensure that this research is legitimate exploration, seeking to understand the perspectives of participants, and not simply a researcher imposing his own views.

Despite the predominance of CCA in contemporary qualitative coding, there are alternative methods; the most straightforward is to predetermine the codebook before coding. This deterministic approach is well suited for a theory-testing context, where the key constructs to be sought in the data are assumed ahead of time. A predetermined codebook can thus categorize data that narrowly matches the themes of interest to address the research questions, without spending time trying to sort out other themes that may have already been defined as irrelevant or out of scope to the research. However, for an exploratory project, the increased prospect of researcher bias, of missing out on themes that are important to participants but not anticipated by the researcher, is an unacceptably high cost. Although I did not work from a predetermined codebook, I did begin the first iteration of codebook creation with a few "seed" codes, to give a starting point for aligning the coding project with the research questions. What differentiated these seed codes from a predetermined codebook was my willingness to reorganize, restate, or abandon them to be faithful to where the data was leading.

3.7.2 CCA in this project

I adapted CCA to fit this particular exploratory project, drawing heavily on Charmaz and emphasizing the need for flexibility to vary parameters during the analysis as needed. CCA is a highly iterative process; I planned for three phases of analysis. As designed, the first two phases would involve development of the codebook: The first would develop high-level codes and do a heuristic analysis of the codes I might need, using only a small portion of the data. Second, I would use these preliminary codes to analyze all the data, adding codes that would be useful to answering the RQs to the codebook. The codebook, the end product of the second phase, was then to be deployed for the third phase. In the end, my analysis hewed fairly closely to this plan, but with multiple passes in each phase which tended to blur the line a bit in the two codebook creation phases. As I conducted this coding, my foremost concern was fidelity in listening to what the data was telling me. Adding more small iterations in codebook creation helped to create a codebook that progressively converged on what I was seeing in the data. Subsequently, adding more passes in the codebook application was intended to minimize the need to deal with all the codes at once, which would have introduced more opporuntities for researcher bias through selective memory. Coding was supported by use of the Dedoose online software suite.

The first phase began with three top-level "seed" codes, chosen to align the project with the research questions: (1) use or awareness of the eGranary (or lack of either use or awareness) (2) career aspirations (3) career related information seeking. The goal was not to preordain that these three items would remain top-level codes in the final codebook, but rather to give structure to the ensuing analysis. A middle ground exists between two extremes: I sought to interpret participants' experiences through a lens that helps to answer the research questions from their perspective without imposing my own perspective upon them. Thus, starting with these top-level codes in generating the codebook, without any guarantee that they would still be present in any subsequent revision of the codebook, was the approach selected. The use of seed codes represented a departure from the initial coding

of the Charmaz approach, strictly speaking, but maintaining this loose grip on the original seed codes meant that my subsequent coding was not tightly bound to my preconceptions.

In two passes of this phase, I selected two interviews in each pass and performed initial coding. My analysis proceeded in a very open-minded fashion, with me intentionally looking both for subcodes that could fit under the three seed codes and for new codes that represented important perceptions held by participants that I may not have anticipated. As such, I was intentionally tolerant in my criteria for coding, anticipating categories that might or might not recur later in the data and be elaborated in the final codebook. I then performed three card sorts (starting anew each time) to think open-mindedly about how to categorize this data. From this procedure, I inferred five main themes, along with two others that in my view cut across a number of the other main categories. I then proceeded to code another pass of two new transcripts according to these main themes and categorized subcodes, adding new codes as seemed appropriate. Completion of this phase resulted in a thorough, categorized list of some 100 to 150 codes. I completed the phase by collapsing the over 100 codes from the initial coding to around 50.

In the second phase of my CCA implementation, I organized this prototype codebook and applied it to the rest of the data, in order to identify modifications needed for the final codebook. In essence my card sorting in the first phase had played the role of focused coding (that is, convergent), and these new passes of coding were a return to something along the lines of initial coding (divergent). In this phase I introduced new data, again starting with two transcripts at a time, but moving to bigger batches until I had prototype-coded all 19 transcripts (18 interviews and the impromptu focus group). At this point my codebook was effectively finished with 75 to 80 codes, although a few more codes were added in the third phase.

For the third phase I started again with uncoded transcripts and applied the codes from the codebook. Because the number of codes had grown relatively large, I felt that it was suboptimal to try to apply the codes from memory. Instead, I divided them into three groups (organized according to the now eight top-level codes) and made three passes through the

data. This division into three passes carried an additional benefit: When I added another few more codes during the first and second passes, I was able to check for those in the subsequent passes. The outcome from this phase with its three passes was a codebook with 80 codes [5] and a fully coded set of 19 transcripts.

The final analysis step involved synthesizing the data into concrete findings to be reported in the next chapter. The process used was a mix of subjectivity and objectivity, based heavily on my emerging understandings as I performed the previous coding phases. There was a need for making sense of the 80 codes. Number of occurrences would be a deceptive measurement of a topic's importance, and not just because the code applications themselves reflect the researcher's judgment. There are two additional related reasons why simply counting code occurrences would not be optimal: By nature of the subject matter, certain kinds of codes were sure to recur often,[6] and codes that pertained to a specific question asked to most respondents benefited from that bias. Therefore, I did consider some of these statistics in this final analytical step, but the main themes mentioned in the findings are a subjective judgment informed by the familiarity with the data that comes from multiple passes and phases.

3.8 Validity and reliability

In this qualitative, exploratory project, the chief criterion of validity is fidelity to both the language and the meanings expressed by participants. This implies not just mere accuracy, making every effort to correctly identify the concrete words used by participants, but more importantly managing the data in a way that does not put words in people's mouths. In this project validity was addressed both in data collection and in data analysis. Techniques for enhancing validity of data collection were: recording interviews; the interviewing technique

[5] Plus seven "meta" tags related to the project, but not relevant to my analysis of the content

[6] The most popular top-level code, "ICT AND INFO BEHAVIOR," ended up with 149 occurrences in 19 transcripts. The most prominent second level code, "Specific ICT used [other than eGranary]," had 47. During early phases of codebook creation I was coding for a specific technology such as Google or a smartphone, but I found codes at that level of detail to be unwieldy in the other direction.

of frequently confirming key words that I might not have heard correctly; entrusting transcription of interviews and focus group to a third party familiar with Nigerian language and culture; and offering the opportunity for member checking after the fact via collected email addresses for participants. Validity in data analysis was enhanced through the iterative rigor of the CCA technique, involving multiple passes through the data and an open-mindedness about finalizing the codebook until after the initial iterations. More abstractly, validity was enhanced through my self-awareness as an analyst, in particular awareness of my own biases, so that at each iteration I was constantly asking whether I was fitting the data into my own preconceptions or faithfully representing concepts from the data.

Reliability is also an important consideration in evaluating this project, but it is important to consider how this plays out in an exploratory qualitative project. The instruments from this dissertation project are intended for reuse in future research, but only after another iteration of intensive revision based on the findings here. Moreover, although it might be reasonable to administer these instruments to research among a different population, generalizability across populations is not an important criterion in this sort of project. Reliability thus takes on a bit of an abstract or hypothetical meaning: The project is reliable if a hypothetical sample drawn from the same population studied here, with the same experiences as my actual sample, would give similar answers, and if reproducing my same process of analysis would yield similar results. In other words, to the extent possible, results should not be subject to arbitrary misunderstandings of language or caprices in analysis. In that regard, important factors enhancing the reliability are similar to those enhancing validity: use of clear language in the interview questions; an interviewing pace and technique that ensured interviewer and participants were communicating effectively; and the iterative character of data analysis.

Validity and reliability each have a meaning in qualititative research quite different from their respective meanings in quantitative research. (Golafshani, 2003; Richards & Morse, 2012). In large part this derives from the elimination of generalizability as a goal and the addition of depth of understanding as a goal. In addition, an exploratory project derives a

shared validity and reliability from its situation within a series of projects, exploratory or otherwise, a consideration that Stebbins (2001) calls *concatenation*.

3.9 Ethics

In evaluating the ethical nature of a research project with human participants, it is important not only to ensure not only that participation carries no harm, a first order consideration, but also the second order consideration of the project's indirect benefit to the participants. The Belmont Report, the standard for academic research in the United States, establishes three principles: respect for persons, beneficence,[7] and justice (US Department of Health & Human Services, 1979). This project has maintained respect for persons by carefully managing interview topics to reduce risk, by and through sensitivity to the cultural differences inherent in this sort of research. The topics covered in this project questions do not tread on any obviously sensitive ground, related to vulnerable populations, it is still important to always be examining this work to uncover any ethical concerns that might not be obvious. That said, although career aspirations are not an inherently sensitive subject, they could be such. For example, someone might not wish to discuss their own career within earshot of a manager or decisionmaker, for fear of appearing to lack commitment to their current employer. This risk only came up in a couple of interviews, when I asked people currently employed about their future plans, and I made sure to preface my question with a qualification to encourage them not to respond if they did not wish to do so. However, no one declined to answer that particular question, and my observation was that those answering seemed to share freely.

Notwithstanding the general low risk of the data, and in light of the risk around that one particular question, I did take care to be mindful of my data. Recordings were stored on my devices then uploaded to secure online services. I shared the recordings with the Nigeria-based transcriptionist via a secure Google Drive folder, and he emailed me back transcripts via GMail, also a secure service. I also obtained permission from several individuals to take

[7]Defined as "the quality or state of doing or producing good"(Merriam-Webster, n.d.)

photos.

To practice beneficence and justice, I have conducted this research in a way that participants can expect benefit from it and so that different participants are not benefited disproportionately. Based on advice from local contacts, I jettisoned a chance to offer a drawing for one of a few USB drives as compensation, and instead relied on the good graces of those who volunteered to be interviewed. The benefit to them, then, is the prospect of longer-term social benefit as a result of this project and future projects in the same line of research. Despite the indirect nature of such a form of beneficence, I believe it is important to keep this goal in mind. As for justice, this project did not involve treatment such as in a randomized control trial, so it carries no issues of providing treatment of differing value.

3.10 Limitations

Explicitly recognizing the limitations of one's own project is an important component of contributing to the scholarly enterprise. This statement is even truer in exploratory research, where the consciousness of each project setting the stage for the next is strongest. For the "concatenation" posited by Stebbins (2001) to take place, future projects require an awareness of the boundaries of the projects that came before them. Here I discuss limitations of scope, of philosophy, of methodology, and of technology or technique.

The scope of this project is the relationship between ICT and career aspirations among university-age Nigerians, with a specific focus on students at two Abuja-area universities. During the data collection it became clear that limiting this research to the eGranary would be suboptimal for the project, because many participants at one site had only limited awareness of the eGranary. This decision to widen the scope carries a trade-off, in that this study does not address any specific online Internet resource at the same level of depth that it addresses an offline resource, the eGranary. The compensating benefit is the ability to compare online and offline Internet resources. Also out of scope are populations outside the specific one studied, university students at these two Abuja universities.

As an exploratory project, the goal of this investigation is to, by addressing the research

questions, unearth areas that merit further research, not to produce an exhaustive treatment of any one or more of those areas. As a consequence the findings here should not be taken as a categorical statement on the nature of the ICT-aspirations relationship in Abuja universities, much less in other contexts.

Along the same lines, the use of opportunistic sampling offers both possibilities and limitations. This flexibility of approach opened up access to interview participants, so its fruit was evident in the data collected. On the other hand, opportunistic sampling cannot make certain claims that could be made based on other kinds of sampling. Most prominently, whereas a probability sample can often credibly assert an absence of selection bias, research based on an opportunistic sample must always be mindful of that sample's implications. Since access to participants was driven by gatekeepers at each of the institutions involved, as well as by availability of students on the days research was conducted, biases from each of those selection factors could easily may have entered into the sample. For example, participants in the *ad hoc* focus group at Central University's library were self-selected by presence at the library. If higher-performing students there tend to be present at the library more often (or, for that matter, if higher-performing students tend to have less need of the library), the tendency will be represented in the sample. In the same way, a nonprobability sample fully implementing the principal of maximal variation could make claims to have spanned the full range of the variable of variation, at least assuming a reasonable degree of participant availability. So neither avoidance of bias nor maximal variation is the driving factor for the opportunistic sampling used here, and diligent and reflective research requires being mindful of biases and of potentially extreme cases when interpreting and applying the findings.

Finally, there were some technical or situational limitations that adversely affected the effectiveness of the data collection. For audio recording I used two standard Android devices (a smartphone and a tablet) running the Tape-a-Talk application, and one of the devices failed in the midst of data collection. The clarity of the audio, and hence the thoroughness of the transcriptions, was suboptimal. A setup using dedicated recording equipment, particularly one more deliberate placement of microphones, might have rendered better results.

Interviews at Northern University were scheduled on a day just before the beginning of instruction for the semester; as a result, my hosts indicated that it was harder to find students to interview. In the event they did located a constant stream of interviewees, but interviewing during the term might have yielded a larger sampling frame of potential participants, allowing more randomization or maximal variation. Interviewees might also have been better able to talk about their recent experience using ICT in a typical in-semester workflow. Fortunately both these issues, setup of the environment and scheduling of interviews, can be ameliorated in future research through researcher experience and relationship-building, as gatekeepers are more likely to give latitude to a familiar researcher than one whom they have just met. Furthermore, scheduling more time in the research setting will give opportunity to influence these factors.

Exploration has an important role to play in the research enterprise, but exploratory research is most valuable when its limitations are clearly spelled out. This section has established this beneficial self-awareness and contributing to making future "concatenated" research more targeted to these limitations.

Chapter 4

FINDINGS

To this point we have seen details of how the project was designed to answer two questions: "What is the relationship between Nigerian university students' career aspirations and electronic access to educational and reference materials from the Internet?" and "What is the relationship between these aspirations and access or use of an 'offline Internet' resource (specifically, the eGranary Digital Library)?" In this chapter I review the data and analysis yielded by these methods, which will then serve to answer the research questions in the next chapter's discussion. Thus, here the findings are organized according to the major themes that emerged, whereas the following chapter will draw on this data to construct answers to the questions.

In the course of addressing the research questions, I have presented a snapshot of my working theory, of the theoretical mechanism that I expected to be in operation as I entered the project: namely, that information access influences job and career aspirations through two different channels. I further posited that, as an Internet information resource albeit one operating over an intranet, the eGranary could serve as a means by which this influence could take place. From the data reported on in this chapter, it is clear that multiple nuances which did not figure in this original working theory recurred throughout the data. In one sense this should not be surprising—after all, all social science theories are abstractions of some detail or other—but the strength of these recurring themes suggests areas in which this working theory could be revised, a topic to which I return in the next chapter.

One interview sequence typifies the gap between expectation and reality that characterizes these findings:

KINGSLEY: I think the eGranary has a lot of information and if someone

> could be opportuned to access the information at the eGranary, he could fall in love with a particular field and just go a long way in changing your particular career with respect to what you've read or what you've accessed on the eGranary.
> PHILIP: OK. So you think that [the eGranary] has the potential to do that?
> KINGSLEY: Sure, sure.
> PHILIP: Do you know any examples of that? Any examples of what happened?
> KINGSLEY: Not really.

Much like in this quote, the findings generally indicated that some of the elements of my two-channel theory are present, but that so many other variables and nuances enter in that it is hard to see the direct effects of technology access without consider the other variables.

This chapter organizes findings according to three main themes that emerged from the data analysis. First, participants spoke often of interpersonal relationships influencing the career choice process. Parental and other close family relationships played a particularly strong role, with information (and information technology) at times taking a secondary role that complemented the effects of relationships. Second, the topic of career exploration was often linked to a broader theme of exploration in general, with related concepts such as creativity and entrepreneurship in Nigerian society recurring through many aspects of the data. Third, a certain amount of organizational dysfunction or lack of student awareness limited usage of the eGranary; there was some evidence of usage, especially information related to users' respective academic fields, but this was quite sporadic and not generally related to open career exploration. There was the prominent exception, though, of individuals who pursued ICT as a career.

In this chapter I report on these three themes with excerpts selected for one of two reasons: Either I consider them representative of some element that recurred in other places in the data, or I cite them as counterexamples to emphasize the limits on these themes. Counterexamples will be clearly identified as such.

4.1 Relationships and career choice

The preponderance of interview respondents offered up some sort of interpersonal influence as a factor in how they considered careers or fields of study, even though the interview protocol did not specifically include questions about interpersonal sources of information.[1] This trend was clear throughout the data, across students at both institutions and staff of various roles. The closeness of personal relationship and the degree and type of influence varied greatly.

The most common influencers were family members, with nine of the 17 interview participants and three focus group participants mentioning their influence, most often parents, and fathers more often than mothers. In addition seven of 12 focus group participants expressed agreement, by show of hands, that "family is an important influence on how you plan your careers," with three [2] expressing that they do "not think that family influence is important on how you plan your careers." The range of parental influence was quite wide, at one extreme approaching near-total determination of the field of study:

> KEBE: ...I never thought about studying Law, it was just something my parents said. So I was kind of okay, I can do it, because of my parents.
> PHILIP: And do you know what their motivation was for wanting you to study Law?
> KEBE: My dad wanted to study Law, but he couldn't, so he wanted me to take it up

A bit later in the same interview, she joked about the disagreement that might result from choosing an alternative path:

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[1] As the interviews unfolded and it became clear that other people were a major information source, I mentioned interpersonal information in my questions, but without highlighting it. That is, if the respondent needed examples of an information source, my extemporaneous prompt would ask for either ICT or human information sources.

[2] Including one respondent who agreed with both.

> PHILIP: If you were going to gather information about [the specific alternative career paths you named], what sort of sources would you use? Sources by the way could include conversations with people and friends, parents.
> KEBE: Not with my parents because they won't agree. (laughs) Go for friends and the Internet.

On the other extreme, one focus group participant spoke of her parents offering near total autonomy:

> All right, like, they can't decide for you. Like my own family, they will tell you that do what you think is best for you. "Just pick what you think you can excel in very well. We don't have any opinion, just go out there, pick what you think would suit you and come out well."

In one exchange, two colleagues agreed that parental career influence was strong but disagreed on the extent to which the degree to which this phenomenon was specific to Nigeria or to Africa. Here Chiagozie argues that the phenomenon is specific to the setting:

> ...I said that Nigeria is in Africa, we are deeply cultural, and we said that our parents have a strong influence on how we make our decisions. As against the western culture, you have more freedom to choose and do whatever you want. The argument there was that it happens all over the world - the parents having an influence over the career choices that their children choose in life. But I was like it's not as bad as it is. I don't even think it exists.
>
> For instance, if your child is old enough to go to college, and she wants to study probably Law, Medicine, anything. She wants to be a scientist, or a writer, an artist, I don't think in the Western world, any parent would be like, "No you can't, you can't do that. This is what I want you to do." But here, a parent can put their feet down and say "No, not in my house. No child of mine is going to be a seamstress or an artist. I want him to be a medical doctor or I want him

> to be a lawyer or something like that." That was the argument, that was the context. It doesn't exist. It does, but it's more prevalent here in our society.

Most commonly, though, family influence was exerted through suggestion, not coercion, especially suggestion of a field to study:

> AZIZ: I was introduced to Economics by my father when I finished my secondary school. So I intended to study Political Science or Mass Communication. So he said no, that I should prefer Economics better than the other courses that I had before. So I should apply for Northern University.

Sometimes parents offered accompanying rationales. In response to the focus group prompt I reminded them that one participant had "described the situation where you apply for your first choice of course, but you don't get it, so you end up in another field. So who here has a friend who has experienced that?" One response brought up parental influence:

> Mine was a personal experience. I actually put in for Law and I was given Christian Religious Studies and my father was like, considering Nigeria and the economy like, I should change my course. So I changed to English and it was when I got it that I actually realized that I can get something out.

In another instance, a father advocated for a strategy based on an assessment of the labor market. I asked about his rationale for advocating for a particular course:

> CHIAGOZIE: The department is called Library Archival and Information Studies. So he was always focused on the archival part because he had colleagues and he had known people who worked with national archives. So he was probably looking into a career for me in the archives. But the archives in Nigeria, they are not so effective. So along the line, it was more of library-based and information-based. We just touched on archives, but it was mostly focused on librarianship

> and information studies. His focus was mainly on the archives. In the university, the national archives were situated in there, so probably he was like, "If you finish, it is easy to get a job." It was not a popular course at that time. There not so many people into it, so he didn't think there was going to be a lot of competition. And there was no issue of "Okay, you've finished."

Finally, in the case of participants who pursued ICT careers, parents or other close relatives often played an important role by providing access to technology. This consideration will be revisited below in findings on ICT careers.

Non-parental relationships also played a role in career decisions. In particular, in multiple cases friends exerted influence when an individual had to settle for a second choice. I asked Ayomide when she first became aware of librarianship as a career she would like to pursue. Sighing, she replied,

> In fact, I wanted to read Geology, because I loved calculations. I was very good in calculations. And then I just wanted to stick to science and just keep doing it. So I wanted to read Geology.... I didn't have a second choice because I made Geology first choice, Geology second choice, and they said it's not done. What if they don't give you Geology? So one of my friends in school then, he just finished a school before you enter university a pre-school. So I now said, "Okay, let me just put Fishery, if they don't give me Geology."
>
> He now said "Fishery? That is School of Agriculture. They are wicked in that school. Come on. Take Library and Information Technology."
>
> ...When my admission came out, I was given my second choice, and I started crying. Why? I don't even know what Library and Information Technology is. Oh God, how am I going to cope?

Sometimes the influential relationship, whether a relative or someone else, led the participant to seek more information through ICT—and sometimes, their findings from ICT led

them back to seeking information through a relationship. I asked Esther if she remembered when she first identified Law as something she would like to study:

> ESTHER: It was after we had like a day when parents came to school to talk about their occupations. A parent talked about how she was a lawyer and I liked it. But then afterwards, I Googled what aspect of Law I really wanted to do if I was going to enter university....
> PHILIP: ...Are there any other resources other than the internet that you used?
> ESTHER: Yeah. My uncle
> PHILIP: What sort of information did your uncle provide?
> ESTHER: Like how long I was going to spend in school, what they were going to teach me, what happens to me after school.

There were a couple of cases where respondents' narratives of their career choices downplayed the impact of relationally-conveyed information or influence, relative to information from other sources. We saw one in the introduction, with Chetachukwu's story of seeing a film about Ghandi. In another instance, a participant working in ICT describes his path through various fields of interest, where influence through relationships proved to be tangential to his eventual path. I asked John when he first realized ICT was a field in which he might like to work:

> I would say when I was young.... Since when I was a child. My truest passion was Astronomy. Along the way, I wanted to be an accountant, so that is one. I ended up in science....

Later, he had to designate two fields of interest on an entrance examination:

> So first option, I chose Medicine, based on advice from parents, people and society.... My second option was Computer Engineering because because I applied within Nigeria. To be sincere with myself, I still wanted Astronomy, but there

> was no such a thing in Nigeria and I wasn't so serious and very active towards seeking for Astronomy in other countries.... When I finished exams in Dental Surgery and Computer Engineering.... I did not really like Medicine as such. So me personally, I prefer to be an engineer than to be a dental surgeon.

But these examples are exceptions with respect to the much larger number of participants citing a relational influence on their career paths.

Finally, one other sort of "interpersonal relationship" appeared a few times, as participants described their relationship with ICT by personifying a particular technology. In response to the question, "So you use it almost all the time, you feel connected? You and Google are one?" Kebe, who had selected Google as the technology she used the most, stated simply, "We're friends." A young staffer at Field Training and Services, Victor, said, "You must be properly oriented and the maneuverability of the e-learning, everything about the e-learning, must fully informed, must be well-scaled before you talk of e-learning. So it's just like husband and wife. " And in a third instance, another Field Training and Services staff member described the experience of seeing the eGranary first-hand with a personifying simile: "like a friend who has taken you to his town. You try not to be scared of it...."

In summary, then, a solid majority of the interviews and focus group responses indicated that career decisions were greatly influenced by interpersonal relationships, usually but not solely with parents or close relatives. These relationships did not completely stifle the use of ICT for seeking career information, but ICT clearly played a subordinate role for most of the respondents.

4.2 Nigerian society: Comparison, curiosity, and creativity

A second recurring theme was respondents' perceptions of Nigerian society. The research instruments were designed to investigate the relationships of ICT access and career aspirations, not to inquire broadly into perceptions of Nigeria as a whole. As a consequence, when the conversation did turn to these broader issues, the resulting data reveals an important

relationship from respondents' perspectives. On several occasions this topic manifested in the form of comparisons between Nigeria and other countries, often an idealized image of countries of the North. At times the opinions on Nigeria concerned limitations or possibilities of ICT use. But often the subject matter was more abstract, about a perceived lack of creativity or perceived closed-mindedness. This assessment about respondents' own nation stood in contrast to evidence throughout the data of individual entrepreneurial efforts and of many occasions of career-related adaptation.

Sometimes participants connected ICT usage to attributes that collectively characterized their compatriots. Here one of the participants has asked me about the topic of my thesis:

> PHILIP: ...[T]he big picture is how ICT access interacts with people's career-aspirations.
>
> VIVIAN: I think it depends on what part of the world you are in because it's like in Africa, a lot of people choose their career depending on like who they see around them and stuff. So I choose maybe I want to study Medicine, maybe I have an auntie or uncle or someone I know that studied Medicine, it gets easier to ask the person, and to go on the internet. Do you get?
>
> PHILIP: OK. So do you guys agree to it that it is more common for people to choose their career based on people around them?
>
> ESTHER: I think family has a role to play in choosing your career in Nigeria actually.
>
> PHILIP: Do you think about it like that?
>
> MICHAEL: Well, as she said, it depends on what side of the world that you are in. And actually, I think in other parts of the world, it is a major factor in whatever you do or want to do, I think. So, but this side of the world, not necessarily because I think we are not literate enough to be able to handle certain technologies. So on other sides, yes I think so.
>
> PHILIP: Okay. So you feel that ICT is not as much of a factor in how people

make career decisions in Nigeria as it would be in other countries? MICHAEL: Not in Nigeria alone, in developing nations, compared to developed nations.
PHILIP: So developing nations in general, you feel that ICT is not as big a factor?
MICHAEL: Yeah.

In contrasting the availability of information in West Africa and in Europe, Solomon (a field associate for WiderNet) linked that availability to different user behavior with the eGranary. His response corresponds to a phenomenon observed in other interviews, to which I will return in the next section: Students use the eGranary (or ICT more generally) for homework but not for open exploration of career-related topics or other personal interests:

PHILIP: So they're [using the eGranary] more as homework outside of class? They're doing it more as homework for a specific class than just people going in and surfing the eGranary for their own personal interest?
SOLOMON: No we really do, and that is actually based on the instructor because the instructor will actually tell them that this is what I want you guys to get for me. So that will give the students the zeal to work in the eGranary. But based on my own experience, a lot of those students, I could say in a ratio of one to ten, actually just decide they want to query the eGranary and know more general topics, general knowledge, you understand.

He then went on to describe a question he posed to a mutual acquaintance, an American also familiar with the eGranary:

SOLOMON: ..."How come you have a lot of European kids that are so broad in knowledge, compared to some West African kids that they are so ignorant about a lot of things?" So what he said was that a lot of them in European countries, they have easy access to information, which is very true. And because of that, once they are born into the world their parents already have most of those information, and it's just like they are born into those information and just

> keep getting those information easily, compared to the West African kid, that the information is not readily available....
>
> So there is no [way] they will be so enthusiastic to want to get more when the information now comes, until an instructor comes and tells them "This is what you can get here, this is what this can help you with" and all those things. But like [the American contact] said, someone like me is quite unique because I always want to know much about everything. I believe in the philosophy "know something about everything, and everything about something" and that has really been helping me.

This same participant noted that the particular characteristics of Nigeria led to a situation where breadth of skills or experience would be rewarded in the job market:

> In [the] African setup here, knowing a particular thing is also good, but based on my own experience, I discovered that when you know a lot of things about a particular field of specialization, it gives you edge than the other. So that in the IT world, we have networking, we have website design and development we have graphics, we have quite a lot of things. So if you are just a consultant on graphics, it doesn't work better than you that you have a broad knowledge of graphics, website design, networking and quite a lot of all those things. I hope you do get what I'm saying. In America, let me use America as a case study, I appreciate you having a broad knowledge of a particular field but in Nigeria, if you have just a broad knowledge on graphics, because most of all these things are interwoven.... I believe that if you have knowledge, a very broad knowledge of all these fields, it works better.

This topic of exploration, and the perceptions of how Nigeria differs in that regard, surfaced in this economics lecturer's comments about going to another country for her doctorate.

BLESSING: I did my masters in the UK and ⟨inaudible⟩ in Nigeria. Comparing the two in terms of research, I will definitely go outside the country. We don't really appreciate research here. It's more of copy and paste, there is no initiatives in doing research so I might really want to aspire and learn certain ways of doing research.

Chiagozie, the respondent who reluctantly found herself entering librarianship as a stated second choice saw a contrast between Nigeria and England in the status afforded by society to libraries:

PHILIP: Were there any sources of information that you sought out to help you in that decision?

CHIAGOZIE: No. I was just communicating with people or friends here and there. And I think as at that time, there were kind of a lot of people in my situation then, not knowing what to do with the course after they were done, because librarianship is not is not our tradition here, it's not an African thing. It's not like when you go to England, you have community libraries here and there, state libraries, and they are active, it's like entrenched in your upbringing from the beginning. But then, you only come across library in school, and you might not even go there throughout your school days, so it was something very abstract. It was really an abstract part of our society. ...

So having that internship was really good because when we came back, everybody had been to so many places. We knew it wasn't just a state library that existed. We knew there was a state library, but I've never been there. And there's only one library in one state, it wasn't like there was a library with subdivisions. So like in this one state, there will be just one library. So it wasn't part of our society. We don't wake up and say I want to go to the public library. It was hard really, to actually think about, oh really, there's a future for me out there, in that library. It's either you work in a public library or you work in a

> university library. Because university, that is where the library is mostly used, in this society. That is where the people really, not other than secondary school. So those were the options.

The comments about libraries in Nigeria versus England were echoed in this suggestion, by the other participant in the same interview, of an aversion to reading by young Nigerians, with a concomitant implication that young people in other countries must be more inclined to read. Also notable is a commonality in both these excerpts: Library usage or reading are reported to be perceived as instrumental to academic requirements, not part of life outside of class:

> PHILIP: Do you have any sense of whether students use the internet for information about their careers, or to discover?
>
> AYOMIDE: Yes, for social media. They use the internet for social media. Mostly, most people don't read. I'm sorry, in Nigeria here, we don't read. We only read to pass. We only read for that course in particular. But when they are in their free time, you see them on social media, doing one thing or the other, chatting, chatting with friends, trying to do some online new things. They prefer that to reading books.

The meaning ascribed to visits by "experts" from more affluent Northern countries, and the intertwined racial dynamics, often surfaced during my visit there in light of my identity as a white American and doctoral student. Sometimes this topic came up in non-research contexts, but this introduction by university staff to the impromptu focus group shows the same topic surfacing in an academic setting:

> So ladies and gentlemen, I am back, and I am happy to introduce Dr. Philip [sic] to you. I know you guys are reading ⟨inaudible⟩. It's just a brief interview, a brief discussion with you. Thank you. If I were in your shoes, it would be an

> honour for me to discuss with a white man. Is it not an honour? If I were you, I will snap selfie with him and put it on my Whatsapp and Facebook.

As a contrast to some of the statements participants made about their compatriots, several spoke of entrepreneurship or adaptation in their own lives. These initiatives spanned a wide range of subject matter: starting a "Citizens' Club" to enable farmers to better take advantage of smartphones, working with a nonprofit organization that promotes women starting businesses throughout Africa, or embracing new career goals after an adverse circumstance.

Interviewees statements about Nigerian society, then, covered a wide range of subject matter, but often tended to compare their own country unfavorably with others, especially in the North. Some of these critiques seemed to overlap in portraying a culture that deprecated innovation or the pursuit of knowledge for its own sake, but the observations were quite varied and do not support broad generalizations.

4.3 eGranary

A third major finding is that students sometimes used ICT to learn more about their existing academic field or a career already suggested, but there tended to be little evidence of ICT access promoting exploration of new careers. This finding is even more applicable to the eGranary itself, where students awareness was nonexistent among the sample at one site's sample and the other site reported disappointment in the degree of usage. There was one area of exception to this general pattern: Respondents working in an ICT-related capacity often reported that they discovered an appreciation and interest for technology because of access to ICT early in life.

In this interview, two librarians familiar to a certain extent with student technology usage at Northern University gave their views of ICT behavior, both of the eGranary and of the Internet:

> PHILIP: So do either of you have a sense of whether students who are using the eGranary, healthily use it to look for information about their career, about

their career aspirations?

CHIAGOZIE: Im not aware of that. Im not aware of whether they use it in terms of career or to inform their career choice. I can only assume that they use it to support probably the work they are doing, or in completing an assignment or their research. But in terms of information, I dont know what they are using it for.

PHILIP: So would you say more of the use of the eGranary then is for specific assignments associated with a course, or associated with other personal usages that are not associated with the course?

CHIAGOZIE: I will say associated with the course.

AYOMIDE: Associated with the course because mostly, the reason why we have e-resources or e-database, is because in a university, you want students to make good use of it for reading, learning and research. That's the purpose.

PHILIP: ...Do you have any sense of whether students use the internet for information about their careers, or to discover?

AYOMIDE: Yes, for social media. They use the internet for social media.

A senior ICT staff member also at Northern University lamented the low utilization of the eGranary:

PHILIP: So you guys are using the eGranary? And how long has it been since you deployed it?

WILLIAMS: Just... I think under a year. Just... eight months

PHILIP: How many students use it versus the proportion of students who dont use it?

WILLIAMS: Id say just over 10 to 15 percent. Very low

PHILIP: Okay. Do you feel like that number is adequate or do you feel it should be more or less?

WILLIAMS: Should be a lot more, which means we have 70 percent usage.

PHILIP: Why is that? Why arent more people using it?
WILLIAMS: I think that because of the limitations that you have to be on campus to use the eGranary. It uses the local network here in Baze. So you have to be in Baze to access it. I think thats part of the low usage rate.

Meanwhile, at Central University, the student library employee participating in the impromptu focus group gave his assessment:

PHILIP: So has anyone here ever used an electronic resource, an ICT—meaning the Internet, you know, a computer in any way—have you ever used electronic resource to find out more about different options to help you think about careers you might want to explore? So does the question make sense?...
BENJAMIN: We actually use electronic resources. And even in the university there is e-library where have all these resources. But the use, most of the students are not aware of it. Some of them prefer to use their phones in their studies, and the network there sometimes fluctuates. So that's a very big barrier [for] the students....
PHILIP: You just said that there are resources that people don't use, so what is a specific example?
BENJAMIN: Like the network we have there, we have websites. Weve registered. There are those who are registered, and there are those that you have free like the DOAJ [Directory of Open Access Journals] which is free if you go to the website. We have DOAJ, we have academics, we have other free websites which is free there. Some students come, people come around. But there are some registered ones with, where you can even download books, journals and articles, and most of them are not aware of it. So I think that awareness is another problem for the students in the University....
PHILIP: Okay, let's use that as an example then. Who here has heard of DOAJ before? Okay, I see no hands. Nobody has ever heard of DOAJ. So I think that

backs up your point, Benjamin, that it's maybe not fully utilized. Has anyone ever heard of the eGranary? I see a little bit of recognition but not really. No one's heard of the eGranary? No? Okay. So Benjamin, if I'm understanding your point, you're saying there's a lot of resources here in the library that are of use, but that are not being utilized.

BENJAMIN: They are not aware of the resources we have in the library. So sometimes we advise them to come around and ask questions.

At Northern University there was clearly some student awareness of eGranary, thanks to a deliberate effort to promote it through training:

PHILIP: How often are trainings done on the eGranary?

WILLIAMS: Mostly Id say in a month, like once or twice.

PHILIP: And how many attendees per training?

WILLIAMS: It depends. Lets say the last one I did, it was before that invitation. So people felt like they need to come and learn it, they had to show other people or just use it to get information. That was quite high, I think about 50 people over a week.

PHILIP: Thats like a maximum?

WILLIAMS: Yes

PHILIP: Okay. What about a minimum?

WILLIAMS: Minimum, lets say 10 to 15 people

This training included not just the eGranary but also other technical resources. (E-library USA, from the US Department of State, was a resource that came up in this and other interviews.) The organization seemed to be transitioning from scheduling regular trainings twice a month to one of making them available upon request:

WILLIAMS: Just fix a time and email me and they will come for training, even if it is a single person. So sometimes we have poor attendance. We fix it,

and maybe no one comes. So right now, currently what I am doing, I just keep it open. If you want a training on the platforms, just email me and Google calendar just select the time and we just fix a time and do it.

PHILIP: Do you oftentimes do one on one trainings like that?

WILLIAMS: Yes. The last training I did, at the beginning, I started one to one, then it picked up.

PHILIP: So more people join the training?

WILLIAMS: Yes

PHILIP: How many ended up?

WILLIAMS: That was the total up to about fifty. So once people find out, basically the schedules of one to one once people find out, they join the training.

There were examples of students at that institution using the eGranary for more information about their present career:

PHILIP: So now I'm going to ask some questions about different information resources at the university, and I will start with asking about something called the eGranary Digital Library. So are each of you familiar with that?

KEBE: Yeah, I am....

PHILIP: ...So Kebe nodded immediately. It sounds like you have a pretty high level of familiarity with that?... What kind of information do you seek out?

KEBE: When I'm looking for something that has to do with Law, I go there and I look for things that has to do with Law there.

PHILIP: And is this specific coursework you're looking for there, or is this?

KEBE: No I havent had any course work, its used for fun.

PHILIP: ...What specific sort of information do you read?

KEBE: I look for, like, Oil and Gas Law.

PHILIP: Okay. Very good. Oil and Gas Law. Now would you say that the information you are seeking out for fun, in the Oil and Gas Law, would you say

that that has a relationship to your career planning?

KEBE: Yeah, it does.

In this instance, an employee of Field Training and Services involved in installation of the eGranary and other systems has told me that he uses the eGranary to learn more about economics, a field he would like to study:

> PHILIP: When you use the eGranary, so you say that youre looking up things on Economics and ICT, related to your potential study. Have you ever specifically looked for information on the eGranary to help you consider different career options, or consider different things you would like to do?
> PETER: Yeah. Actually, Ive not had time to do that. And then secondly, after the period of installation, Ive not had access to the eGranary yet. Now that we have it on ground, I think I have more interest to go for it.

As we saw earlier, some of the career-related ICT use came in response to influences through relationships, although this phenomenon seemed to involve the open Internet but not the eGranary. Here, the other participant in the previous interview find out about her field from her mother but used the Internet for more information:

> PHILIP: Do you remember when you first decided that Business Management was the first thing you would like to study?
> JOY: It was just something that I just came across and I wanted to study. I had various offers, but I was like I can offer it because it is seems interesting and thats why I chose to study Business Management.
> PHILIP: Now you said that it was just something that you came across. Where did you find information about that?
> JOY: My mum actually finished from here, so when she gave me the prospectus of what they had, so thats where I saw the names of the courses they will offer....

> PHILIP: Did you use informational resources such as the internet, or library resources or anything like that,[3] to find out more information about these courses?
> JOY: Yes, sometimes I [would] go on Internet to search Business Management and see different universities coming up with their own course, and the modules they offer. I was quite interested in the modules they offer

4.3.1 ICT as a job or as a career

Access to ICT played a much different role for respondents who actually ended up working in technology. The sample of interview participants included a few different ICT-related roles: mid-career field associates responsible for installing and providing support on the eGranary, younger employees of Field Training and Services performing installation and support for a number of systems (including the eGranary), and from the ICT staff of one of the universities. Access to ICT, particularly at a young age, was usually cited as an important factor in this career decision. Some participants also suggested that this early access interacted with the narrative of technology as modernity to influence their decisions to work in ICT.

In this case access came through the individual's father, who later encouraged him to seek training:

> PHILIP: At what point (if you do remember) did you first decide that IT was something you wanted to work in, something you'd be successful in?
> SOLOMON: Yes. I did it before I got into college, I actually do music, so my dad just gave me an insight that I should go for a training on word processing and the basic use of IT fundamentals on Microsoft Office and all those things. So it was during the course of that training I got inspired and I saw that wow! IT is really interesting and I love what I am actually seeing and getting from it. So that was how the motivation came up. It was from there I got enthusiastic, I want to know more about IT, how wide it is and all those things.

[3]This was before the point in the interview where I asked explicitly about the eGranary

PHILIP: Was there any sort of information that went into that decision? In other words, were you using the internet? Were you using something like the eGranary? Did you go out and find out some more information on what it would be like to, did you talk to other people about IT, what sort of ⟨inaudible⟩?
SOLOMON: No. I think the only thing was that my dad had a computer. [I'd] been doing some little work on the computer to just have a basic knowledge on how the computer works and all those things. So that's where I actually got the basic knowledge and understanding of the computer. It was when I went for the training, I now had a broader knowledge of what IT was all about.

In this instance the important influence came later in life, not long before entering a present course—and not via access to computers in general, but through a particular Web site:

PHILIP: How did you first get interested in programming?
DIANA: I don't know. I was always surfing the net. I don't know how I came across it. There was this code.org, that was the website. They had this tutorial, this teaching programme then, and I was just following it and I got interested in it. code.org.
PHILIP: Okay. But you don't remember how you came across code.org?
DIANA: I was just ⟨inaudible⟩.
PHILIP: So you were surfing. So access to the internet played a role in finding code.org and you started code.org or something?
DIANA: Yeah. I was interested in it. I could stay online for like throughout the whole day and just coding and programming stuff.

In several instances, various respondents spoke of a general sense that technology was on the rise as a career field:

PHILIP: You said that you are into programming. Do you remember when you considered programming or something that you would like to do as a career?
SODIQ: Initially I wanted to be a medical doctor when I graduated from secondary school and about to get admission into the university. So within that period, I now decided to take a short computer programme course and when I started the course, I found out that I was kind of good at computing, so that was how I now dumped the idea of going to study Medicine....
PHILIP: Okay. What motivated you to take that course?
SODIQ: Then, that was like 2009, computing here in Africa, it has gained a kind of popularity and they were kind of looking for people who knew how to operate the computer....
PHILIP: So you said in Africa, that was becoming a big thing. So how did you know that? Did you see that in the media, did you find it out in other sources?
SODIQ: Yeah, I found it out from friends and also from the internet because then I do go to the cyber cafe to just browse, maybe to go look for information.

The data shows, in summary, that there was some use of ICT in general and the eGranary in particular for career-related investigation, but with some caveats. First, at Central University I found no students who were even aware of the eGranary, and at Northern UniversityICT staff expressed dissatisfaction at the level of usage. Second, this use was aimed at exploring one's existing career, not at seeking ideas of different careers, with a prominent exception: Individuals employed in ICT often spoke about how access to technology shaped their thinking in seeking a career in that area.

Chapter 5

DISCUSSION

This chapter draws on the findings from the previous chapter to construct answers to both the research questions. It then returns to the working theory laid out in the introduction and discusses ways to integrate these answers to construct the next iteration of this theory, closing with some considerations about my positionality as a researcher of a different nationality and race than all the participants.

Both the research questions investigate the relationship between two factors, so it is helpful to pause and consider what this sort of question means. Social phenomena that work out with a tidy relationship between only two factors are rare, so it is no surprise that the findings here have unearthed new items that must be considered to accurately characterize the relationships to which the research questions pertain. This complexity is further heightened by the exploratory nature of the project, where collecting and analyzing the data surfaces a host of other themes and topics worthy of further investigation. Indeed, that is the goal of exploration. For this project, then, answering research questions about relationships between pairs of variables means applying the data and the analysis to further our understanding of each relationship. This will involve identifying the most important additional factors that emerged from the data, making some informed conjecture about ways those factors could fit into the theoretical landscape, and specifying those areas where the data supports the conjecture as well as those where more data is needed. By giving up the expectation of tidy answers to the questions, we instead get untidy answers that not only reflect the complexity of the phenomena under study but also point the way toward future inquiry that can dig deeper into these specifics.

5.1 RQ1: Relationship between Aspirations and Informational Access

The first research question asks, "What is the relationship between Nigerian university students' career aspirations and electronic access to educational and reference materials from the Internet?" The working theory posited a straightforward causality where access to technology would lead to an expansion or elevation of career aspirations, but this research has revealed factors that need to be taken into account to fully characterize this relationship. The best way to answer the research question, then, is to consider the most important of these other factors and their implications for the relationship in the question. The two key findings discussed here are the importance of interpersonal connections and participants' reported perceptions of Nigerian society in general.

As an overview, I found that interpersonal connections are an important additional factor at play when considering the relationship between Internet information access and aspirations, but the shape of the relationship among those three factors can vary. Furthermore, I found that these connections can involve family, friends, or colleagues, but that the importance of the latter two relationships can vary depending on whether the individual in question aspires to a career in an ICT or non-ICT field. As for the second finding, regarding how participants perceived Nigerian society and culture, I found that the modernity discourse often associated with technology was present on a national level. In the next section I discuss the role of interpersonal relationships in more detail, and in the following section I turn my attention to perceptions of Nigerian society and culture.

5.1.1 Interpersonal connections

The importance of interpersonal connections to Nigerian students' career development process cannot be ignored. The exploratory nature of this project and the purposeful sample require caution to avoid unwarranted generalizations about the population of Nigerian students, but we can be confident in the need for future research in this area to consider interpersonal connections. If the sample here is even remotely representative of the popu-

lation, it is hard to see how a research agenda could gain ground without accounting for this factor. One way to look at them is to consider each type of connection involved, with parental relationships standing out as by far the most influential and other types playing less important roles. Another way is fairly abstract, enumerating the different ways in which the three variables—career aspirations, access to (and use of) Internet information resources, and interpersonal connections—can fit together. The first perspective is more directly salient to answering the research question with this project's findings, but the second is germane because, as an exploratory project, this effort's findings are valuable to develop theory for future research. After considering these two perspectives, I close this section by discussing an ancillary but related observation, concerning not veritable actual human relationships but rather how certain technologies might come to occupy a psychological place of being perceived as like a human involved in a relationship.

The consistent presence of interpersonal connections in Nigerian students' description of their own career choice is, as laid out in the previous chapter starting on page 76, the key finding of this research. Notably this topic came up again and again despite an interview protocol that asked about career decisions generically or as related to ICT and information behavior. These were of various types, so it is useful to classify them by the broad nature of the connection, as illustrated in Table 5.1. By far the most influential relationships were those with close family—usually parents but occasionally aunts or uncles, or for one participant with a spouse and children. However, there was also some influence exerted by two other kinds of connections: professional relationships (with business peers or authority figures) and friendships. We can further subdivide the findings into those pertaining to individuals working or seeking to work in an ICT-related field and findings pertaining to people others in non-ICT fields. Whereas familial relationships mattered in both cases, there was some evidence of professional connections being influential to individuals in ICT fields but friends' influence playing a role among those in non-ICT fields.

Just as family relationships played the predominant role relative to other interpersonal connections among participants' narratives, parental relationships played the predominant

Table 5.1: Interpersonal connections: Summary of findings by type and ICT/non-ICT career

Career field	***Family***	***Friends***	***Colleagues***
ICT	Influence through provision of early access to technology.	Little evidence found.	Peers and authority figures influence
non-ICT	Influence through other means (information, persuasion, command)	Friends influence, e.g. via the second choice	Little evidence found.

role among family relationships. There was an instance of an uncle exerting some influence, and Chetachukwumemorably spoke of acting on his long-held aspiration to become a lawyer only after facilitating the same for his wife and daughter. But by and large it was parents who motivated their children to explore certain fields—at times so vehemently that it sounded to me like a command, but more often through provision of information or arguments for a certain path. For example, CHIAGOZIE's father touted the benefits of library and information studies because "If you finish, it is easy to get a job" (p. 78). One specific kind of parental influence pertained to ICT: the access that some respondents enjoyed early in life to ICT, often by means of parents' decisions or work environment, led to an appreciation for technology. For example, Solomonmentioned access to a computer from his father's work—a computer without any Internet access, yet one that likely would have been a rarity in Nigeria at the time—as a key factor in motivating him to pursue ICT training and eventually to end up in a role supporting and training on use of the eGranary. This relationship between early access and eventual ICT career aspirations certainly makes sense, but it is worth noting the absence of any analogous relationship for non-ICT careers. It is already well-established that Nigerian parents often exert a powerful influence on careers (Salami & Aremu, 2007), but the novelty here is that the strength of this influence has resisted encroachment from Internet information resources as a means of career discovery. Technology still plays a role, but it is a clearly subordinate one.

Friends also played an influential role in students' career choice decisions. One memorable example was the case of Chiagozie (p. 79), where a friend talked her into selecting Library and Information Technology as a second choice for university major, a decision that ended up determining her ensuing career path. But for those participants who had pursued an ICT-related career, it was professional relationships with colleagues, both peers and more senior colleagues, that seemed to be more influential. In light of the nonprobability sampling strategy, this distinction could merely be a reflection of the different samples of current students, which included a variety of areas of study, and staff working with the eGranary. Participants who had already graduated and gained professional experience had no doubt benefited from more opportunities to build a bigger network of professional contacts. Even so, the fact that only those in non-ICT careers mentioned friends as influencers was notable.

Next, we move from the concrete to the more abstract, to consider different ways in which introducing interpersonal connections to my theory might better characterize the relationship under study, and thus help answer the research question. For this endeavor it will be helpful to use abbreviated forms to talk about the three factors: *Internet resources* represents access to Internet information resources, including offline Internet resources, and usage thereof. *Aspirations* is simply an abbreviation for career aspirations. *Connections* are the interpersonal connections that in view of my findings now need to be incorporated into any theoretical model. The quantity of data and the nature of the project means that any inferences about these abstract relationships are highly speculative; nevertheless, as this project is highly exploratory, it is fitting to document some of these possibilities for future reference.

In some cases, an individual might be introduced to new career ideas by other people, then subsequently draw on access to Internet resources to learn more about them (row 1 on Table 5.2), and there is some evidence of this happening in the data. In other cases, the chronological order might be reversed, so that a person might first be exposed to career ideas through ICT access and then turn to relationships (especially those of authority) for validation, encouragement, or information (row 2). This phenomenon was rare in the data

Table 5.2: Possible shapes of the three-factor relationship among aspirations, Internet resources, and interpersonal connections

	Notation	***Description***
1	**Connections** ⟶ **Aspirations** ↑ moderated by **Internet resources**	Interpersonal connections influence aspirations; access to Internet information strengthens or weakens that influence.
2	**Internet resources** ⟶ **Aspirations** ↑ moderated by **Connections**	Access to Internet information influences aspirations; interpersonal connections strengthen or weaken that influence.
3	**Connections** ⟶ **Aspirations** ↑↓ **Internet resources** ⟶ **Aspirations**	Interpersonal connections influence aspirations; access to Internet information also influences aspirations; the two relationships strengthen or weaken each other.

for this project, but nevertheless is an important possibility worth investigating in the future. These two directions of causality are not mutually exclusive; one's career exploration process could plausibly involve innumerable cycles of learning about new possibilities by technological means, discussing them with trusted others, and then going back to the Internet or some other ICT to follow up on new ideas generated from those conversations (row 3).

But the preceding analysis is still too simplistic because it considers influences on a career choice only at an individual level. In the broader societal context, promoting access to Internet resources might indirectly affect aspirations through opening up possibilities that are collectively enjoyed. For example, if a nonprofit or government entity embarks on a project to bring Internet resources en masse to a certain location, that form of expanded ICT access would likely operate within preexisting social networks, but holistically, not purely individually. While there could conceivably be value to modeling the dozens, hundreds, or thousands of interpersonal interactions that could lead to changes in aspirations, it would be very difficult to observe each of them individually. For the most part, it would be appropriate to treat the entire site or entire community as a unit of analysis, assessing whether this intervention changed either the collective aspirations of the community or the distribution of In this sort of communal setting aspirations could come into play as a cause, too, not merely an outcome. A change in some people's aspirations could lead them to influence others—perhaps directly, or perhaps their own updated employment prospects creating a different climate in which others form aspirations. If a particular individual's influencers[s] change their views on careers as a result of ICT access, that change could be evident in the influenced individual's aspirations regardless of their own ICT access or behavior.

This is not an exhaustive list of all the ways these influences could be related, and the relationship between different channels of influence could become quite complex. For example, there were hints of this potential for a complex interaction in Solomon's story: Both access to his father's computer early in life and his father's encouragement (itself a reflection of the father's own access to ICT) played a role in motivating him to pursue a career in technology.

A final aspect of the data related to interpersonal connections, although only partially attested and perhaps a bit tangential to the aspects already mentioned, is the instances where participants seemed to personify their technology. If this data is truly revelatory of an underlying phenomenon, it is a phenomenon with interesting implications about how those participants experience their own interaction with ICT. Such personification is far from unknown in the North, where people might speak metaphorically about the mobile phone being their best friend. Nevertheless, the multiple occurrences of personification in a dataset of this size, and the invocation of more complex relationships than mere friendship, suggests that personification may be relevant to how this population experiences the use of ICT. Another possible subtlety of this connection between ICT and interpersonal relationships is foreshadowed by the finding that young adults first attached relational meanings to mobile phones as a precursor to developing their own IT identity around them (Carter, Grover, & Thatcher, 2013). The fact that this research took place at a time when smartphones were less prevalent in North America suggests an interesting implication for Nigeria and other lower-income countries: Plausibly, rather than this ICT-and-relationships interaction being rooted in specific cultures, it might diminish as certain kinds of technology grow in ubiquity. More research across numerous different cultures and levels of technological development could help shed light on this issue. At present, the interesting implication is that participants' interaction with technology may have been shaped by a particularly "interpersonal" view of it, as though the technology itself can have an interpersonal relationship with its user.

5.1.2 Nigerian society, Internet information access, and aspirations

The second major finding pertaining to RQ1 is that participants often linked our discussions of career-related behavior to their views on Nigerian society. Drawing on this insight to shed light on the first research question is a bit more complex than was the previous finding about interpersonal connections, for a couple of reasons. Perspectives on Nigerian society are not heterogeneous across all participants who mentioned these factors, and those views expressed do not all fit in an organized taxonomy. Even so, a pair of themes stands out

as providing important nuance to enhance our understanding of the relationship between Internet information access and career aspirations dealt with in the research question. First, respondents often defined Nigerian society in terms of its relationship to "the other," in particular to more affluent countries: especially the United Kingdom but also the rest of Europe and North America. Second, the career-related ICT use observed by students was often more closely related to one's existing choice of field of study than to open exploration of new possibilities.

When Nigerians define their own society in relationship to others, it carries at least a whiff of colonialism. We saw earlier that some commentators perceive development itself as a neocolonialistic construct (Escobar, 2012), but even less radical approaches to ICT and development are careful to take into account the realities of colonial and postcolonial history (Kleine, 2011; Wyche, 2015). In this regard, racial and national identities intersect and are often blurred,[1] as starkly illustrated in the prelude to my focus group on page 87. If prevailing views of technology among the researched population reveal entrenched neocolonialistic assumptions—or worse, if the net effect of ICT is to reproduce these divisions between countries —this presents a dilemma. Making normative critiques of someone else's perspectives on their own society, especially when that society is not one's own, is uncomfortable, yet it does no one a service to hide from the possibility that views such as those surfaced here help propagate neocolonialistic trends. If participants offer these topics as relevant to the way they view careers, then we should consider them relevant.

So then, if the above characterizes how respondents saw their own society vis-á-vis others, what relevance does that have to a research question about ICT and career aspirations? The simplest answer is that my semistructured interview protocol did not contain questions designed to explore views on Nigerian society *per se*, and yet the participants often introduced this broader topic. Making comparative observations is a natural part of answering

[1] In an unrecorded sidebar conversation, one of the interview participants suggested that white instructors on the eGranary from my country, the United States, would be afforded greater credibility regardless of their actual credentials or capabilities. In response to the obvious follow-up question, he opined that an African-American instructor would probably not enjoy the same presumptive credibility.

questions posed by an interviewer from another continent and a very different culture, but even so, these responses give us insight on how Nigerians perceive the relationship between societal characteristics, technology, and their own career aspirations. One key theme here is technology-as-modernity. In the brief historical material on ICTD in Chapter 2, we saw that that the rhetoric of modernization has been a constant component of discourse about development in general and about ICTD specifically (Heeks, 2009; Jonker, 2016; Peet & Hartwick, 2009; A. Thomas, 2000). This same tendency to speak in these same terms of technology as a whole, to implicitly ascribe modernizing influence beyond the direct effect of one technology, came up several times in the data, sometimes but not always related to a decision to pursue ICT as a career field. The answer to the first research question, then, is that the nature of the relationship between career aspirations and access to Internet resources goes beyond the simple causality relationship posited at the beginning of the project. The relationship is characterized by additional factors that, although not anticipated in that working theory Simply discovering the factors that need to be included for a full view of this relationship is not a completely satisfying answer to the question, because of course it would be nice to state something more categorical—for example, to choose one of the specific ways in which connections, aspirations, and Internet info resources interact. But consonant with the goals of an exploratory project, identifying these nuances helps to expand our understanding of the answer to the RQ even if this understanding is still incomplete and even somewhat speculative.

5.2 RQ2: Career Aspirations and an Offline Internet Resource (eGranary)

Many of the general observations about the relationship between aspirations and Internet information access will still apply to offline Internet technologies. The focus for this part of the discussion, then, will be on features to the answer to RQ1 that are specifically salient to offline Internet resources and on additional features germane only to this specific RQ about offline resources. There are two related angles that emerge from this specific focus on the eGranary as an example of this class of resource. First is the question of whether these

resources is categorically different from conventional online resources in ways that touch on the relationship between technology and career aspirations. Second is the related problem of nonutilization or underutilization, quite evident at both research sites.

5.2.1 Offline versus online resources as pertaining to RQ2

It is subject to question, and might even be considered counterintuitive, that an offline resource could play a role in relationship to career aspirations that is in any way comparable to Internet access itself. After all, is not the timely and ever-changing content essential to the very attraction of the Internet? Furthermore, the social aspects of the Internet are mostly lost on a platform that is disconnected from the wider world (although below I discuss how the eGranary offers a limited form of social networking within each installation's set of users). Despite these grounds for skepticism, some of the empirical and theoretical aspects of the eGranary and other offline Internet resources suggest that this sort of access and use could indeed bear some relationship to career aspirations.

The study discussed in the literature review, finding that secondary students in Uganda developed a new identity as eGranary tutors (Norton & Williams, 2012), is the most direct empirical support, but other pieces of evidence also speak to the relevance of offline tools. Anecdotally, I sat in two training classes that included some elements of a sales pitch for the eGranary; despite attendees' pointed questions about the lack of updated information on the eGranary, everyone (from an audience admittedly self-selected for interest in the eGranary) seemed to agree that lack of fast, reliable, affordable Internet was a problem. In addition to the Offline Internet consortium, recent research has explored commercial provision content taken from the Internet via offline means. In India this phenomenon goes by the name of *download market* (Kumar & Parikh, 2013), and in Cuba by the *paquete semanal*, the weekly packet (Dye et al., 2017). Although provision of entertainment content as a business is driven by a very different motive than the eGranary, these spontaneously occurring phenomena serve as further evidence that offline Internet resources remain relevant to a variety of users despite their obvious limitations.

Meanwhile, there are theoretical arguments both for and against expecting an offline resource to serve as a partial proxy for the Internet itself. Regarding the informational channel from my working theory in Chapter 1, the straightforward question is whether an offline resource can offer a comparable quantity and quality of career-relevant information. If so, the physical location of that data should in theory not matter, be it on an offline server on the actual, connected Internet. But of course, that assumption of identical information may be thwarted if the offline information is not timely. This would seem to be more acute threat to relevance in considering careers that are rapidly changing, for example careers in ICT, than in those more established and (at least in Nigeria) more traditional fields of study such as law or teaching. In any event, the salience is that access to an offline resource can reasonably be expected to act through the informational channel to influence career choice.

The relevance of an offline resource to career aspirations via the second, parainformational channel is more nuanced because the underlying psychological processes could be quite complex. I had suggested that new awareness of role models, of examples of success by other similarly situated people, could be an important component of the parainformational channel. To the extent that this awareness comes through time-sensitive uses of the Internet, such as social networking or reading the latest news, we would not expect its relevance to be replicated on offline resources. On the other hand, awareness of role models or other processes with a parainformational influence on aspirations could act through an offline Internet resource—for example, by reading biographies on Wikipedia or watching an inspirational TED Talk. Even some of the more specific subject matter on the eGranary, such as an agricultural site or a software development tool, could exert parainformational influence by enabling a user to envision how endeavors in that area can be successful.

One more theoretical consideration differentiating between the actual Internet and offline Internet resources is worth noting. Serendipity has accounted for a substantial amount of scientific progress (De Rond & Morley, 2010) as well as playing an important role in ICT-enabled information seeking behavior, and the always-connected nature of the Internet contributes to the range of serendipitous activity. There is some room for surfing on the

eGranary—indeed, the fact that poor Internet makes it so hard to surf is a selling point for an offline information store—but, of course, only within the predetermined set of content on the server. It is not yet clear whether users such as the Nigerian students in this project acquire new career ideas through serendipitous use of Internet resources, but if so, it is also unclear to what extent the "walled garden" of the eGranary would substitute for open surfing of the entire Web. As for online social networking, WiderNet has been promoting sharing of user-created content through a feature in the latest releases of the eGranary called the Community Information Platform. This feature allows users to create their own Web-formatted content and make it accessible to others at the same site, all without requiring specific Web programming or formatting skills. But this platform does not facilitate the transfer of content across different eGranary installation sites, so it cannot be considered a viable substitute for conventional online social media sites.

To this point, I have treated the eGranary as a proxy for the entire class of offline Internet resources, but this assumption should not pass without comment. Although the design decisions of any product unavoidably feed into the way that such product is used, treating the eGranary as representative is warranted. In early 2018, an effort has sprung up to unify a number of efforts (including the eGranary) to make Internet resources accessible offline (Offline Internet, n.d.). From that group's initial summit meeting, WiderNet's director came away with the impression that the eGranary is among the most developed offerings, with many of the attendees still at the stage of envisioning something that the eGranary has been doing for almost two decades (C. Missen, personal conversation). It is certainly possible that micro-level decisions to include or exclude certain content could have an effect on suitability for career exploration, but without undertaking a true comparative study of different combinations of content, there is no reason to think these content decisions have a systemically positive or negative relationship to the degree of such usage. Meanwhile, what probably would have such a relationship is the sheer quantity of material included, and on that score the eGranary is in a good position. Thus, although more research would be welcome, for purposes of the present study, it seems reasonable to infer that findings specific

to the eGranary are probably applicable to other offline Internet resources that are similar in scope.

In summary, then, it is certainly plausible that some of the characteristics of offline Internet resources vis-à-vis the online Internet have implications for career- and aspiration-related activity. Many of the limitations that motivated the eGranary in the first place are still evident in Nigeria and elsewhere in large African cities, so it seems premature to reject the offline Internet as an obsolete concept. On the other hand, there were strong indications that the offline nature of the eGranary was negatively affecting students' propensity to use it. WiderNet, and more generally the offline Internet movement that has sprung up recently, are strategizing about how to deal more nimbly with the intranet/Internet relationship. Next I dig deeper into this observation—the likelihood that students simply aren't using the eGranary much at all.

5.2.2 The shelfware problem

Staff at both institutions expressed disappointment at the level of eGranary usage, albeit with different organizational dynamics that suggest there might have been different root causes for this nonutilization or underutilization. At Central University, none of the 12 students in the impromptu focus group had even heard of the eGranary. For this site, characterizing the relationship between the eGranary and these students' aspirations is simple: There was no relationship. At Northern University there was limited use of the eGranary for certain career-related information gathering, but the use seemed to more focused on a narrow set of topics than I had anticipated.

This lack of awareness of the eGranary at Central University seemed to characterize the broader panorama of university-provided ICT there, with the online resource DOAJ mentioned as another example. One library staff member responsible for the eGranary told me, in an unrecorded sidebar conversation, that he had not been aware of the existence of the eGranary until almost a year in that role. This phenomenon should prompt several questions, starting with this one: Why was the eGranary procured in the first place? Was

the rationale for the procurement at the time still valid at the time of the focus group, or is it still valid today? If the reasons for acquisition were still present, then that institution could design training and assessment programs to encourage these uses of the system. But if the reasons were not valid at the time of my research, regardless of whether they were originally valid or not, then I was unable to ascertain when or why the eGranary had been procured in the first place—relevant decision makers had since left those roles—but it was clear that there had been little institutional commitment to training, and probably little commitment to usage assessment.[2]

At Northern University the situation was more favorable to awareness of the eGranary, and of university-supplied ICT in general, because of a policy of monthly trainings on several systems including the eGranary . Although student participation in these trainings seemed to be highly variable, with social networks playing a role in expanding the attendance from one to 50, it is likely that the trainings are the biggest factor in student awareness there. Nevertheless, the same staff member in charge of trainings expressed that eGranary utilization at Northern University was "just over ten [to] fifteen percent. Very low," far short of his normative target (see Williams, p. 88). The reason given was lack of off-campus access, which itself is another example of a salient feature of the Internet itself that is virtually impossible to replicate at scale for an intranet-based resource. [3] It must be cautioned that Northern University seemed to enjoy high access to technology—both institutionally and among its students in their personal use—relative to other Nigerian universities, so generalizations to other institutions on this point are especially perilous.

Interviews indicated some students at Northern University were using the eGranary for class-related activities, and in one instance also for "fun" (see Kebe, p. 91). However, even this participant's recreational use consisted of learning more about her fairly narrow chosen field of specialization, oil and gas law. This exploration of an existing career aspiration fits

[2]A senior figure in the library system, fairly new to the role, stated that there would be more organizational commitment in these areas going forward.

[3]This dissatisfaction was echoed by comments I observed at an eGranary training for prospective users, where integration between the eGranary and open Internet access was a common feature request.

under the aegis of the research questions for this project, but it is nevertheless categorically different from either gaining information or being influenced in one's perception of a new career field. In particular, if aspirational effects are offered as a putative benefit of ICT access, this sort of deeper information might help strengthen an existing aspiration, which might or might not prove to be a benefit, but would not necessarily create new aspirations. There was little indication of eGranary access serving in this latter capacity of broadening or creating aspirations, but for that matter, I rarely saw mention of the Internet itself serving in that capacity either. It could well be the case that the scenario I had envisioned of open-ended career exploration through Internet informational resources is infrequent anywhere, whether inside or outside Nigeria; at any rate, it did not seem common in this setting. Where the eGranary is used only to to explore existing careers, as was the prevailing case observed at Northern University, the relationship is characterized by deepening existing aspirations rather than contributing to the development of new ones.

In summary, the answer offered to the second question can be only partial. The relationship between eGranary use and career aspirations did not exist in some circumstances, and in those circumstances where it did exist, it was characterized by a narrow understanding of career-related behavior. This answer is informed by consideration of some of the ways in which an offline Internet resource inherently differs from the Internet itself. At least for these two sites, use or non-use of the eGranary seemed highly dependent on institutional characteristics and commitment. Underutilization relates to a whole host of considerations, involving the organizational context and the decisions made therein, and future research could look at these questions from an organizational point of view, or from the point of view of individual decisionmakers acting on behalf of the institution. The small number of people actually reporting any career-related use of the Internet renders highly anecdotal the empirical findings related to this topic. I can characterize the relationship between the eGranary and career aspirations as weak, and I have pointed out some nuances of that weak relationship, but further investigation is needed to draw inferences confidently.

5.3 Revising a working theory

The findings provide an impetus to revisit the original working theory and explore ways in which it might be extended to reflect the behavior observed among this study's population. Theoretical iteration helps drive future research questions, so that scholarly activity in this area can better synchronize its theoretical basis with the reality experienced by different populations, whether similar to Nigerian university students or very different. In addition to iterating this project's working theory as laid out at the outset, we can also draw on the findings where appropriate to assess the applicability of two prominent ICTD theories terms of the leapfrog and amplification theories.

An adequate theory of Internet information access and career aspirations, feeding into a broader agenda of scholarship on international development, should account for the factors mentioned in Section 1 of this chapter, especially interpersonal connections. The various possibilities laid out there for relating the three factors for connections, aspirations, and Internet information access should inform this theoretical development, although much more exploration is necessary to assess which of these possible forms of relationship best represents reality. Interpersonal connections can be integrated into both channels of the original working theory: Participants might receive career information from others (especially parents) that would not have been available elsewhere, or they might trust the information received interpersonally more than they trust electronically procured information. As for the parainformational channel, the potential for interpersonal connections to influence role modeling, self-efficacy, identity formation, and other key factors in this channel is self-evident. The evidence presented heretofore does not argue for abandoning the theorized relationship between Internet information access as a factor in career aspirations, but clearly a theory that considers ICT's effects in a relational context holds more promise than one that ignores interpersonal connections.

Applying the second main finding, of respondents' views on Nigerian society, is somewhat less straightforward but nonetheless merits some consideration. The key questions here are,

first, whether these findings are specific to Nigeria and, second, whether it makes sense to aim for a generalized theory of ICT access, aspirations, and development, versus a theoretical view that accommodates specialization for different society, cultures, or nations. To the extent that findings on this topic are manifestations of neocolonialism, it is likely that they could be replicated in some fashion in other formerly colonized locations. On the other hand, it is not clear if other cultural attributes could be more specific to Nigeria or to West Africa, such as the strong parental influence noted by Salami and Aremu (2007). My own intuition is that it is worthwhile to keep pursuing a theory that can apply across developing regions and countries, but where necessary to modularize such a theory so that it can accommodate differing cultural nuances. This modularization might require sacrificing some parsimony, but it is fitting to only make claims to universality where such claims are warranted.

Turning our attention to more general ICTD theories, there is no obvious single way to incorporate the importance of interpersonal relationships into the leapfrog perspective. However, some the considerations mentioned earlier in the discussion above could also fit into this view. In particular, if enhancing influencers' ICT access leads to positive aspirations-based spillovers among those whom they influence, then this dynamic would strengthen the potential of ICT to address transnational inequality. As for Toyama's amplification thesis, the finding on the importance of interpersonal connections both provides evidence to support the thesis and suggests ways in which to benefit both from relational influence and amplification. Relational networks would seem to epitomize the kind of social structures that Toyama theorizes are subject to amplification, Meanwhile, relational influence and amplification can both be redirected to address inequality, if ICT access empowers influencers to make positive change as already discussed.

Another finding was that respondents often expressed views of ICT and career-related information gathering within associated opinions on Nigerian society as a whole, tending to speak of Nigeria in comparison with other countries, sometimes vehemently ascribing positive traits to the North in comparison to Nigeria or to West Africa. As already discussed, this finding is somewhat awkward to deal with, but it does underscore that a theory of ICT and

aspirations not only should be sensitive to differences across cultures, but also could view this consideration as a channel of parainformational influence. That is to say, it would be useful to investigate whether access to information across international borders influences users' perceptions of their own cultures—in a positive or negative direction—and whether that changed perception leads to changed motivations.

The findings related to ICT use itself can also feed into theoretical development on this topic. Evidence of underutilization of university-provided resources, and in particular the complete student unawareness of relevant resources at one university, emphasize the need to situate the technology-to-human relationship in an broader context. For this particular issue, the theoretical territory will be organizational as well as individual. The finding that students look for information on their present career path but do not typically explore alternatives also bears further scrutiny. It is not clear whether students in other countries, or for that matter in other populations in Nigeria, would be more apt to engage in open career exploration through technology, but this distinction could contribute to a fuller picture of information behavior.

Theory is always evolving, especially in a relatively new field like ICTD, and there is always tension between parsimony and empirical validity. This research project has uncovered a number of factors worthy of further study, and blindly seeking to incorporate them all to create an intractably complex theory is not the best next step. Rather, the need is for careful, considered integration of these ideas, oriented toward iterations of empirical verification and theory building. Among the multiple factors laid out here, though, one stands out: interpersonal connections. In my view, this is clearly the heading to which theoretical development should navigate.

5.4 Positionality of the Researcher

Finally, a fair assessment of these findings requires mindfulness toward positionality, toward the implicit nature of the relationship between researcher and participants. In Abuja, the most obvious consideration was my identity as a white American interviewing black Nigeri-

ans, including some from different parts of the country. As the center of federal government, Abuja attracts residents from all corners of the country, and it would be misleading to portray Nigerian culture as largely homogeneous; nevertheless, for this discussion of my own positionality as an outsider researcher, I will deal with the simpler but incomplete picture of considering participants' commonalities as black Nigerians. I strongly suspect that the project's findings would have been different in at least one respect had I not occupied the role of outsider with respect to the participants. One of the principal findings was that respondents often talked about aspirations, career choice, and technology usage with respect to their own views on Nigerian society. It seems likely that they would have been less apt to state this connection explicitly had they been working with an interviewer who came from their own country or from a similar culture, and thus already shared in certain collective understandings. This consideration does not render that particular finding invalid or tautological; interpreting one's own context for an outsider does not equate to exaggerating or inventing those phenomena that are being interpreted. But it does seem likely that this topic would not have occupied the same conspicuous place in the data had the same interviews been conducted by a black researcher from West Africa. (Less clear would be the nature of interaction with, for example, an African-American or Black British researcher.)

This prompts some interesting corollary questions: If these insights surfaced in the data partially owing to my status as an outsider, are there other insights that might have surfaced only to an insider? Furthermore, do the other findings also reflect undetected ways in which positionality affected the data and my interpretation thereof? Since research can never be completely free of a researcher's bias, the most likely answer to both questions is that some bias exists that would be difficult to surface. Although I consider this occurrence unavoidable, I took steps to mitigate its effects by cultivating relationships with Nigerians, both during and after the data collection. These colleagues could, by virtue of their own experience working with visitors from the other countries, serve as cultural interpreters or help me make sense of the social phenomena I observed. While these connections may not have changed the way I was perceived as a visiting interviewer, they helped give me a better

sense of what subtle implicit barriers might exist.

Chapter 6

CONCLUSION

This project has been an exploratory investigation of the relationship between use of Internet information resources and career aspirations, as experienced by students at two universities in Abuja, Nigeria. In this final chapter I summarize that research and discuss its significance for the field of ICTD and for international development. As part of that conclusion I address the known limitations of the present project research and consider how future research can draw on these findings, while exploring theoretical and methodological alternatives, to further increase our understanding of ICT and aspirations in development. I then close by considering implications of this work for policy, practice, and society.

I have explored this relationship both involving Internet access in general and a specific technology, the eGranary Digital Library, an offline collection of educational resources taken from the Internet. I conducted 18 interviews and an impromptu focus group, as well as contemporaneously noting my own observations, in Abuja in January, 2017. My analysis of this data followed the principles of constant comparative analysis (CCA), adapted from grounded theory, although the project itself was not a full implementation of grounded theory.

The most prominent finding was the near ubiquity of interpersonal relationships in these Nigerian students' career choice process. ICT interacted with these relationships, at times and in various ways, but the influence of other people was hard to escape. Another finding was a strong connection between participants' perception of Nigerian society and their perspectives on career aspirations. Finally, I found that the eGranary was substantially underutilized, at one site because students did not know about it. At the other site the reasons were less clear, but there is some indication that the limitations of an offline resource

may have had an effect. Below, I revisit these findings in considering their implications for scholarly research, policy, practice, and society.

6.1 Limitations

Explicitly recognizing the limitations of one's own project is an important component of contributing to the scholarly enterprise. This statement is even truer in exploratory research, where the consciousness of each project setting the stage for the next is strongest. For the "concatenation" posited by Stebbins (2001) to take place, future projects require an awareness of the boundaries of the projects that came before them. Here I discuss limitations of scope, of philosophy, of methodology, and of technology or technique.

The scope of this project is the relationship between ICT and career aspirations among university-age Nigerians, with a specific focus on students at two Abuja-area universities. During the data collection it became clear that limiting this research to the eGranary would be suboptimal for the project, because many participants at one site had only limited awareness of the eGranary. This decision to widen the scope carries a trade-off, in that this study does not address any specific online Internet resource at the same level of depth that it addresses an offline resource, the eGranary. The compensating benefit is the ability to compare online and offline Internet resources. Also out of scope are populations outside the specific one studied, university students at these two Abuja universities.

As an exploratory project, the goal of this investigation is to, by addressing the research questions, unearth areas that merit further research, not to produce an exhaustive treatment of any one or more of those areas. As a consequence the findings here should not be taken as a categorical statement on the nature of the ICT-aspirations relationship in Abuja universities, much less in other contexts.

Along the same lines, the use of opportunistic sampling offers both possibilities and limitations. This flexibility of approach opened up access to interview participants, so its fruit was evident in the data collected. On the other hand, opportunistic sampling cannot make certain claims that could be made based on other kinds of sampling. Most prominently,

whereas a probability sample can often credibly assert an absence of selection bias, research based on an opportunistic sample must always be mindful of that sample's implications. Since access to participants was driven by gatekeepers at each of the institutions involved, as well as by availability of students on the days research was conducted, biases from each of those selection factors could easily may have entered into the sample. For example, participants in the *ad hoc* focus group at Central University's library were self-selected by presence at the library. If higher-performing students there tend to be present at the library more often (or, for that matter, if higher-performing students tend to have less need of the library), the tendency will be represented in the sample. In the same way, a nonprobability sample fully implementing the principal of maximal variation could make claims to have spanned the full range of the variable of variation, at least assuming a reasonable degree of participant availability. So neither avoidance of bias nor maximal variation is the driving factor for the opportunistic sampling used here, and diligent and reflective research requires being mindful of biases and of potentially extreme cases when interpreting and applying the findings.

Finally, there were some technical or situational limitations that adversely affected the effectiveness of the data collection. For audio recording I used two standard Android devices (a smartphone and a tablet) running the Tape-a-Talk application, and one of the devices failed in the midst of data collection. The clarity of the audio, and hence the thoroughness of the transcriptions, was suboptimal. A setup using dedicated recording equipment, particularly one more deliberate placement of microphones, might have rendered better results. Interviews at Northern University were scheduled on a day just before the beginning of instruction for the semester; as a result, my hosts indicated that it was harder to find students to interview. In the event they did located a constant stream of interviewees, but interviewing during the term might have yielded a larger sampling frame of potential participants, allowing more randomization or maximal variation. Interviewees might also have been better able to talk about their recent experience using ICT in a typical in-semester workflow. Fortunately both these issues, setup of the environment and scheduling of interviews, can be ameliorated in future research through researcher experience and relationship-building, as

gatekeepers are more likely to give latitude to a familiar researcher than one whom they have just met. Furthermore, scheduling more time in the research setting will give opportunity to influence these factors.

Exploration has an important role to play in the research enterprise, but exploratory research is most valuable when its limitations are clearly spelled out. This section has established this beneficial self-awareness and contributing to making future "concatenated" research more targeted to these limitations.

6.2 Implications for Future Scholarly Research

By contributing to our understanding of the career-related information behavior of Nigeria university students, this exploratory project has helped lay a foundation for further research. Some of these lines of possible research would involve completely new, though related, research questions. Others might adopt of deeper complementary methodologies, and still others might simply make incremental enhancements to address the limitations just discussed. This last category is quite straightforward—for example, a project with more time in the field, a different sampling strategy, and better recording equipment would directly complement this project in those areas—but the first two merit some depth of attention.

The nature of exploratory research encompasses series of consecutive exploratory projects, where one exploration touches off another one (Stebbins, 2001), and many of these enhancements One example of an area ripe for exploratory research is the procurement decisions by universities to purchase ICT software and hardware that goes underutilized. Hints of this topic emerged in several of the interviews, particularly with the ICT staff at each institution. Literature on ICT underutilization in universities, particularly in Africa or other resource-constrained locations, appears to be scant, so an exploratory research on this topic would also be most valuable.

In the discussion of theoretical enhancements, I asserted that a credible future theory of ICT and career aspirations in development almost has to incorporate interpersonal relationships. Exploratory research as well as deeper grounded theory research would benefit from

an interview protocol focusing on these particular interactions, teasing out the cases where another person leads to career-oriented ICT behavior, vice versa, where the influencer's ICT access spills over to the individual influenced, and other possibilities. Other research methods could also address this distinction—for example, by treating interpersonal influence as an experimental treatment and measuring inclination to seek further information.

Meanwhile, from an organizational or cultural point of view, it would be interesting to know if this observed non-use of the eGranary for career-related inquiry is characteristic of other universities, other kinds of eGranary host institutions (besides universities), other parts of Nigeria, or other countries. Likewise, the observed tendency to use technology to learn more about existing careers, but not to explore new ones, could be the focus of a comparative study involving other geographical locations, with results illuminating whether the phenomena observed in Abuja are local or global.

It should be clear, then, that some paths of future research will require different methodologies. One obvious next step would be to implement full-fledged grounded theory (GT), since GT is itself largely exploratory in nature. The iteration and flexibility of GT would bring particular value through theoretical sampling, where new participants could be drawn into the sample based on concurrent analysis rather than the *a posteriori* analysis here. This project explored how Nigerian university students seek career-related information from various technological devices or services. Design research could be a promising methodological family to deploy to develop a system that better addresses these expressed needs. Thus, further studies of how students and others use existing systems could go hand-in-hand with design of new systems, creating a cycle of iteration that leads both to more useful technical artifacts and to a better theoretical understanding. Participatory photo elicitation, originally planned in this project, could be a good qualitative method to surface some of the deeply held beliefs and perceptions regarding aspirations of which participants might not even be entirely aware, and hence might not bring up in interviews unprompted.As mentioned above, experimental methods could play a prominent role too—not only to explore the interaction with interpersonal relationships, but also to help distinguish the two channels originally posited

in the working theory, informational and parainformational. An experimental treatment involving a purely informational ICT intervention might look like the study by Jensen (2010), providing raw information but assessing aspirations (including breadth of aspirations) rather than years of schooling as an outcome. On the other hand, a parainformational treatment might look like Bernard et al. (2014), which involved showing aspirations-elevating films; beyond the value of testing their finding through replication in a new setting, looking at the breadth as well as the level of aspirations would make a substantial contribution to theory.

This project makes various contributions to the field of ICTD research: advancing one particular area of nonpecuniary impact on our field's collective research agenda, increased engagement with other scholarly fields that are important to understanding technology's impact, illustration of how a working theory and an exploratory project can take their place in an iterative process of concatenation with previous and with future work (Stebbins, 2001), and not least the findings themselves. Two decades or more of ICTD research underscore the need to evaluate technology within the context of society (Walsham, 2017), and nonpecuniary impacts are theorized to be necessary to accurately assess the capabilities of technology to improve lives (Gomez & Pather, 2012; Gomez et al., 2013; Kleine, 2013), but there is relatively little research singling out these fine-grained potential impacts. This project homes in on of those, aspirations, that has been addressed in very abstract terms within ICTD literature (Gomez et al., 2013; I. Ray & Kuriyan, 2010) but barely explored empirically. Second, as an interdisciplinary field ICTD benefits when it engages with other relevant literatures. For example, scholarship in ICTD and in development economics sometimes seem to operate in different silos. Since aspirations have emerged within the past decade in development economics literature, this is a promising point of contact that my project has sought to expand. The same is true with other areas, arguably with somewhat less of a siloing problem, including psychology. Third, this project provides an example of how to recognize our own preconceptions about the impact of technology without holding on too tightly to them. By laying out my working theory as a reflection of my own semiconscious assumptions at the start of the project, and by drawing on the findings to suggest ways to update and refine

it, I have sought to provide an example of how to approach our own biases with integrity. Finally, the findings themselves help to increment scholarly understanding, of technology and aspirations specifically but of the larger issue of technology's impacts. We may not be surprised that these Nigerian students' career decisions were strongly related to relationships, for example, but the specific characteristics of that relationship are valuable to assembling a fuller picture of technology's effects. The examples herein, though not generalizable, provide an important point of departure for investigation of those specific characteristics.

In addition to those contributions, this work also deals with an area of technology that has gone largely unexplored by the scholarly community, the offline Internet. The recent work on offline provision of mostly entertainment content from the Internet (Kumar & Parikh, 2013) represents the infancy of this line of research. Even less empirical work has been done regarding educational resources on the offline Internet, save for the aforementioned study involving the eGranary itself (Norton & Williams, 2012). If the research community finds offline Internet less compelling than alternative topics, perhaps that shared perception stems from ICTD research agendas still driven largely from countries and continents where constant Internet access is now assumed to be a staple of life. The offline Internet may be an awkward fit with the discourse of modernity around ICT that we have seen, but the persistence of the entertainment markets in Cuba and India and the roughly one thousand installations of the eGranary purchased suggest that there are places where the value of an offline resource is still easy to grasp. In this project I found limited use of such resources in two particular universities, most likely because of institutional characteristics in one instance and the ready availability of actual Internet in the other. Taken together, all these findings suggest that content providers or aggregators such as WiderNet may need to develop a clearer understanding of where they add the most value. At the same time they may also benefit from considering alternative offerings such as hybrid online/offline solutions for locations with "middle tier" Internet access. Meanwhile, for researchers, the implication is that there are opportunities to contribute much-needed understanding by better identifying those places where an offline Internet offering can thrive, and for what uses.

6.3 Implications for policy, practice, and society

ICTD research can carry great value to decisionmakers—not just those in charge of government policy, but also those in NGOs or even profit-oriented corporations who decide where and how to invest in technology for the public good. The clearer the understanding of ICT's benefits and drawbacks, the better the decisions that result. Researchers are decisionmakers too, of a different sort, but where the two constituencies operate in completely disjunct spheres, as has often been the case with ICTD research, the impact on human development is negative (Harris, 2016). For researchers this means not just choosing relevant topics, as discussed, but also disseminating research by means accessible to practitioners, conveying a clear, actionable message, and starting off by listening to practitioners.

The present work fits within the larger picture of assessing ICTD's impacts because aspirations are potentially a source of nonpecuniary advantage to users. Of course pecuniary outcomes are important too, and ICTD research should continue to deepen our understanding thereof, but leaving out the harder-to-measure impacts could cause society to undervalue (or even overvalue) technology for development. The findings here are just one step towards improving understanding, for the particular outcome of career aspirations, but they carry implications for policy and practice.

The most important finding is that students' career decisions virtually always take place within the context of interpersonal connections, and that use and access to Internet information play a supporting role within that context. This calls for more breadth of planning in ICT interventions. For example, instead of promoting individual use through telecenters or providing unsupervised access to resources such as the eGranary in schools, perhaps a longer-lasting initiative might involve interpersonal influences, especially those from parents, to make the best use of those technologies. The second major finding, about Nigerians' perceptions of their own country as related to career-related ICT use, is less straightforward in its implications. Certainly, though, efforts to promote ICT need to be culturally relevant—indeed, advocating for one policy prescription for "development," irrespective of

geographical or cultural context, would fly in the face of this research. Moreover, decision-makers should consider very carefully how to engage with the discourse of technology and modernity. For example, multiple times I came across the implication that Nigerian institutions tend to overvalue computer hardware and perhaps software relative to training and technical support. This phenomenon may be a manifestation of the perception that tangible technical artifacts are somehow more exciting, more "modern," than the intangible services that facilitate their effective use.

Finally, the set of findings specific to the second research question can help enlighten the development and procurement of the eGranary, and perhaps of other offline Internet resources. In light of another research project's finding that the eGranary did have an impact on Ugandan high schoolers' identity as tutors (Norton & Williams, 2012), it does seem that offline Internet resources can add value in certain settings. However, the finding from Northern University suggest that Nigerian students may not find such a resource well-suited to their needs if they are part of an institution with reliable Internet. Meanwhile, at Central University the problem seemed to be one of awareness. Both findings imply that producers of offline resources might benefit from developing new strategies. The needs of a "medium resource" setting such as Northern University—specifically, with an institutional investment in Internet access but in a national context where individuals' access may be expensive or unreliable—no doubt differ from those of a more disconnected rural setting. Hybrid solutions, which combine the advantage of caching content on the intranet to reduce bandwidth usage with the freshness of constantly updating content from the actual Internet, could be one way to serve this audience. It does seem that some of these design considerations were discussed at the Offline Internet Summit in early 2018 (C. Missen, personal communication). At the same time, the experience of Central University suggests that follow-up and training are also essential to make use of what tools have already been procured.

Information and communication technology will unavoidably be part of development research and practice from now into the future. However, unquestioning faith in the ability of technology to improve lives, as if by magic, has proved an unsuitable compass to guide

decisions on deployment technology in the service of poverty reduction. The explosive growth of ICTD research should have helped immensely, as researchers and practitioners join voices for a more nuanced, more circumspect approach to technology and development. And yet, researchers who have long been active in ICTD indicate that the research has a long way to go to realize its potential (Gomez & Pather, 2012; Harris, 2016; Heeks, 2009; Walsham, 2017). The empirical evidence indicates that ICT *sometimes* contributes to poverty reduction, but our understanding of the magnitude and nature of this benefit is incomplete—and in few areas more lacking than regarding aspirations. The intent of this exploratory study is to contribute to scholarly discourse, but in hopes that future theory is of a kind that is faithful to the experiences of those people whom development is supposed to serve. If answering these two research questions prompts a dozen more, or maybe even 100, and if the answers to those questions help decisionmakers better assess the aspirational impacts of Internet access in development, then this exploration will have accomplished its goal.

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