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Mobile Phone Use for Empowerment and Well-Being of the Physically Challenged in Nigeria

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Abstract. National and economic benefits of mobile phone use in developing countries has been a well-articulated research domain over an extended period. This can be attributed to the ubiquitous nature of mobile phones and their increased penetration in developing nations. However, the potential benefits of mobile phones for empowerment and well-being of people with disability (PWD) has been ignored. This paper focuses on the well-being of the physically challenged in Nigeria and how mobile phones can be employed to empower them. The link between ICT and human development has been well researched, but minimal research has attempted to link ICT, mobile phone and disability using the Capability Approach as a theoretical lens. The critical realist ethnographic study approach is employed in this study to show how mobile phones can be used to empower and impact on the well-being of the physically challenged. Data were collected from the Adamawa skill acquisition center for persons with disability, Nigeria. It is argued that mobile phones have the capabilities to empower and impact on the well-being of the physically challenged. Thus, the findings illustrate that mobile phones play significant roles in the well-being and empowerment of the physically challenged.

Keywords: Mobile Phones, Physically challenged, Critical realist ethnography, Capability Approach

1 Introduction

Mobile phones are regarded as an important tool for national development and poverty reduction (Bhavnani, Chiu, Janakiram, Silarszky, & Bhatia, 2008; Hoan, Chib, & Mahalingham, 2016). The contributions of mobile phones have generated numerous studies in developing countries. As such, these studies are generally attributed to economic development (Shirazi, 2012), gender empowerment (Hoan, Chib, & Mahalingham, 2016), improvement of maternal health (Nyemba-Mudenda, & Chigona, 2015) and poverty reduction (Islam & Slack, 2016). Similarly, there are many studies on mobile phone use in developing countries (Donner, 2008) that focus on marginalized populations. Most of these studies focus on marginalized women (Shirazi, 2012), marginalized youth (Sam, 2017) and well-being of blind micro-entrepreneurs (Anwar and Johanson, 2015). However, in-depth and/or extensive studies on physically challenged persons have not been carried out. Walsham (2017), indicate the need for more focused studies on disability in the ICT4D domain. The term ‘empowerment’ can mean different things to different people, but in this research, empowerment refers to the ability for people with disability to overcome their deficiencies in society. It is the ability to exhibit social, economic, political and cultural freedoms (Sen, 2014). Lately, technological advancements have been touted to enhance and empower People with

disabilities (PWDs) especially in the provision of access to information and services, as well as, the physical environment (D'Aubin, 2007). ICT has proven to play a vital role in the spheres of PwDs. It has removed barriers which prevent PwDs from participating in daily activities (D'Aubin, 2007). Although, a number of studies have linked ICT with disability (e.g., Goggin, 2011; Kane et al., 2009; Toboso, 2011; Chaudhry, 2005; Pal et al., 2009), there are no empirical evidences of studies on the use of mobile phones in empowering the physically challenged. Studies have categorized the PwDs into the virtually impaired (Hashemi, Khabazkhoob, Saatchi & Yekta, 2018), hearing impaired (Qi & Mitchell, 2011), mental health conditions (Kleinman, 2009), intellectual disability (Lindsay, 2002), autism spectrum disorder (Virnes, Karna & Vellonen, 2015) and the physical disability or physically challenged (Miyahara & Piek, 2006). To contextualize disability in this study, our focus is on the physically challenged (Wheelchair users). Therefore, we define the physically challenged people as those who have significant limitations in functioning and often experience exclusion from participation in their societies due to their impairments (Krahn, Walker, & Correa-De-Araujo, 2015).

This research is part of a larger PhD work that is looking at how the use of mobile phones can empower the physically challenged in Nigeria. Our emphasis is on understanding how the use of mobile phones can empower the physically challenged. This is accomplished by understanding and framing technology use from the human development point of view. Human development stresses on a community where individual dreams can be actualized. This perspective is similar in view to that expressed in Amartya Sen's work (1985, 1999) on freedom of choice. Sen developed a framework for evaluating individual well-being called the Capability Approach (CA). The CA has been widely used by various researchers (Grunfeld, Hak, & Pin, 2011; Zheng & Walsham, 2008; Robeyns, 2005; Nussbaum, 2000, Dasuki et al. 2017) and organizations as published in the United Nations Development Programme (UNDP) report on human development. In this study, a number of concepts including empowerment, well-being, human development, the CA and ICT4D are employed with emphasis on disability. Consequently, the study's focus is to explore the capabilities of mobile usage in empowering and improving the well-being of the physically challenged persons in Nigeria. Thus, the study asked the following question:

What are the effects of mobile phone use in empowering and well-being of people with physical disabilities in Nigeria?

The question suggests that the study is focusing on how mobile phone use support economic and social development, including its impact in contributing to some aspects of human well-being. Secondly, the study sets out to investigate how CA and ICT are linked to empowerment, especially, of the physical challenged.

The paper is structured as follows: the next section will discuss the research context of empowerment and mobile phones in developing countries, followed by the methodology. Preliminary results of the findings are presented. Finally, the study concludes with a discussion of how CA evaluates the contributions of mobile phones to

empowerment and well-being of the physically challenged.

2 Research context: Physically challenged and Mobile phones in Nigeria

There are approximately 25 million people living with disabilities in Nigeria (Eleweke, 2013; Obiakor & Eleweke, 2014), of these, those using mobile phones for their daily activities is not known. The Nigerian government has provided support to the people with disability through services offered by the skill acquisition centers established in every state of the country. The skill acquisition centers are saddled with the responsibilities of empowering people with disabilities including the physically challenged. Skill training offered include making of shoes, bags and soaps. This initiative has no doubt empowered people with disability. Nonetheless, evidence have shown that PwDs continue to face widespread discrimination, barriers in accessing service and societal exclusion (Eleweke, 2013; Obiakor & Eleweke, 2014).

In Nigeria, the number of mobile phone subscribers have increased from 10.2 to 144 Million from 2005 to 2017 (NCC, 2017). Mobile phones have become an integral part of the day-to-day activities in Nigeria. People engage their mobile phones in sending text messages, making calls and sometimes listening to music or FM radio. Due to its ubiquity, mobile phones have penetrated all of life including the poor, marginalized and the disabled. Mobile phone has become the IT artefact that seems to provide the social inclusion of people below the pyramid.

3 Research Methodology

This study focus on understanding participants' experiences and views, using critical realist ethnographic approach. Critical realist ethnographic approach provides understandings of participants' perceptions, beliefs and experiences. Critical realism regards reality as objective and stratifies ontology into empirical, actual and real domains. The empirical domain includes what we see and observe, the actual domain comprises events that are generated by mechanism while the real domain contains mechanisms and structures with enduring properties (Mingers, 2013). Critical realist ethnography is associated with reflexivity and has the prospects to be a dominant methodological framework about the nature of reality (Barron, 2013). The adequacy and representation of the world of the empirical requires audio, visual and written representations. Writing of field notes and photographs are essential in capturing the world of the empirical without being intrusive (Barron, 2013). For adequate representation, sharing of the field notes and photographs with participants will enhanced, challenge and provide additional empirical detail where necessary. At the 'actual' world, it is imperative to consider the events that may not have been experience and what had been experience related to had not. This is where reflexivity plays a vital role in enabling the researcher challenge straightforward outcomes and consider "as

many events as possible in the world of the actual". This include the use of photography as a 'text'.

3.1 Research method

The research approach (ethnography) constructs theory from the data obtained in the field through participants' observation. Participant's observation and in-depth interviews were used as the core data collection method. The field notes constituted the primary data, together with semi-structured interview were analyzed.

Various questions were developed to facilitate the semi-structured interviews. The investigations carried out in the field addressed questions on how mobile phones contribute to empowerment and well-being of the physically challenged.

We conducted our field work from February 2018 to September 2018 in the city of Yola, Nigeria. The location represents the northern part of Nigeria. A total of 10 participants were observed and interviewed. Been a critical realist ethnographic study, attention is given at the empirical domain for this study. Further work will focus on the actual and real domains. We envisage that the data collection will continue for about 2 years.

3.2 Semi-Structured Interviews

We conducted in-depth interviews with the members of the Adamawa skill acquisition center for persons with disabilities. Our focus was on the physically challenged. The interviews varied in duration but with an average length of 30 minutes. For the purpose of this study, 10 interviews were conducted. Each interview was intensively written (note taking).

3.3 Focus Group Interviews

The focus group interview occurred in May 2018 where the 10 participants were brief about the 1st order categories of our findings. A unanimous agreement was reach about the about the first-order concepts (those important to the participants)

3.4 Participant Observations

We were allowed access to the Adamawa skill acquisition center over the course of our field study. This has provided valuable understandings into the day-day activities of the physically challenged. Detailed notes were taken during the events to complement the semi-structured interviews and the focus group interviews. Discussion and note taking were conducted within the research team to arrive at the participants' expressions. The names used in this study were given pseudonyms so as to protect the security and privacy of the research subjects.

3.5 Data Analysis

The data was deductively analyzed following the naturalistic inquiry method (Lincoln and Guba, 1985) under the CA theoretical underpinnings. These methods of data analysis “provide rigor in analyzing qualitative data to simultaneously assist in determining the sampling and content foci of future data collection efforts” (Harrison et. al, 2011)

Figure 1 at the appendix represent the data structure we analyzed. We began by analyzing the initial transcribed data to grouped them as the *1st order categories*. Next, we examined the relationships among these categories where we arrived at the *2nd order themes*. The similar themes were further reduced into the *aggregate dimensions* that led to the emergent of our model. Been a critical realist ethnographic study, the *1st categories*, *2nd order themes* and the *aggregate dimensions* has only focused on the empirical domain. This is where our study intends to contribute. A further study will focus on the underlying mechanism that must exist for empowerment and well-being to occur.

The figure shows the data structure, including first-order concepts (those important to the participants) and second-order themes (induced by the researchers), that led to the generation of the aggregate dimensions.

4 The participants: Physically challenged

4.1 Preliminary Findings

In this section, preliminary findings of the study are discussed, including the concept of well-being and empowerment as understood by the participants. How the physically challenged use mobile phones for personal and business activities is also discussed.

4.2 The well-being of the Physically challenged

For the well-being of the physically challenged, it is necessary to understand their perceptions and what is vital to their well-being. Numerous concepts were advanced to explain what constitutes the term ‘well-being’ to the physically challenged. This is necessary to successfully define an accurate representation of well-being to the physically challenged. The empirical location where this study was conducted consists of participants’ mostly of the *Fulani* tribe, who are mostly Muslims. They speak Fulfulde and they view well-being as ‘*Nanugobeldum*’. *Nanugobeldum* meaning enjoyment, peace of mind and satisfaction. Clearly, this has no similar meaning in the English word well-being. Although, *Nanugobeldum* was interpreted differently between the participants, a common perception was achieved. *Nanugobeldum* was comprehended as a form of spiritual and physical fulfillments. Spiritual context here depicts freedom to practice their religion and physical fulfillment is linked to healthy lifestyle and wealth. Being valuable to family and society was also perceived as a form of *Nanugobeldum*. In summary, it is evident from the interviews that what matter to the

well-being of the physically challenged can be categorized as follows: being healthy, family, peaceful co-existence and being independent.

4.2.1 Being Healthy

Participants in this study believe that being healthy is an integral part of their well-being. In their context, being healthy means psychological ability to be able to provide for their family. Getting ill is an added disadvantage to their disability, as such they use mobile phone to contact their doctor or pharmacist whenever they feel sick.

All I want in life is to be healthy so that I can be able to provide food for my children. I call my doctor whenever I feel sick (Amadu)

4.2.2 Family

The participants believe that the happiness of their family is paramount to their well-being. Family is important to them. In fact, some participants believe their well-being is not their own, but for their family. They use mobile phone to communicate to their family whenever it is necessary.

My family is everything to me; I work hard every day to provide for them. I just called my wife to check on her and our new baby. (Moses)

4.2.3 Peaceful co-existence

All the participants believe that societal peace is paramount to their well-being. They lament on the increase in-security cause by Boko-haram as a drawback to their well-being. Their mobile phone serves as a form of news channel.

Boko-haram have crippled my business; I hardly make money for my upkeep. I am however, grateful to Allah. Thank God for my phone, it has help me follow the news on boko haram crisis. (Adamu)

4.2.4 Being independent

The physically challenged perceived being independent as an important aspect to their well-being. They see dependency as a form of inferiority and as such they prefer to do everything by themselves if they can. Mobile phone provide support for the physically challenged though physical mobility.

My husband died in 2012 during the Boko-haram crisis. He left me with 4 children and I have to come out here every day to sell my products so that I can be able to feed my children. If I am not feeling too good, I call on my sister to take me to the hospital. But I don't like troubling her all the time (Asabe).

4.3 The business and personal use of Mobile phones

The other categories that emerged from the interview data are the use of mobile phones for business and personal use. These can be categorized into the following themes: mobile phone use for business networking, maintaining kingship amongst family members and mobile phones for sales/customers' relationships. These are discussed below.

4.3.1 Mobile Phone use for Business Networking

Participants agreed to use mobile phones to communicate amongst themselves. They used mobile phones to schedule for business meetings between themselves.

Before, it is difficult to have everybody participate in a meeting. But now that we all have a mobile phone, I called everyone on the phone whenever we are having a meeting. For example, I called everyone to let them know you (researcher) are coming to interview them. (Sera)

It also helps the participant to agree on a collective price for their products

Due to the recent recession, we all receive a message from our coordinator to review our prices so as to be in line with each other. (Shuaibu)

4.3.2 Maintaining Kingship amongst Family Members

Mobile phone is an integral artifact in the life of the physically challenged. As a ubiquitous device, it has facilitated communication amongst relatives, family and friends. The participants believe that the mobile phone is important in maintaining relationships amongst them.

Mobile phone has helped me communicate with my son who is a soldier. He is at the battle grounds fighting with boko-haram. I am always happy when he calls me. (umma)

However, other participants believe maintaining a mobile phone is very expensive. For example,

I always call my wife in the village to find out how she is doing with our children. She doesn't have a phone; I always call my neighbor to help me take the phone to her so that I can talk to her. I want to buy her a phone but it is expensive. I will buy her a phone soon. In sha Allah. (Idris)

4.3.3 Mobile Phones for Sales and customer relationships

All the participants have access to mobile phones. They agreed that mobile phone help them maintain relationship with their customers.

In fact, since I started using a mobile phone, my customers have increased dramatically. They can now call to order for their type of bags and shoes. I am very happy to use my mobile phone all the time. (Ibrahim)

The mobile phone also help them to showcase their products:

I have been using my phone for almost three years now. However, I was recently introduced to WhatsApp messenger which has made my business so easy. I can now snap pictures of my products and send it to my customers. But the data price is very high. (Saleh)

5 Discussion

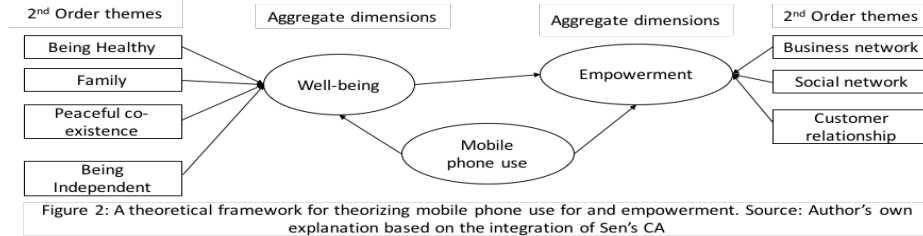
5.1 How Mobile Phones impact on Well-being and Empowerment

As described in the findings, mobile phones assist the physically challenged in communicating with their friends, family and improving their business strategies and network. But most importantly, it helps them to be independent and brings them to be an inclusive part of the society. The ubiquity of mobile phones which provide information sharing and connectedness offer opportunities that may have been challenging to realized. The effective use of mobile phones for business activities has resulted in increased income, more customers thereby improving the livelihood of the physically challenged. It also facilitated freedom and independence in conducting business and personal activities. In the case of the physically challenged, mobile phones are seen as the more preferred tool for communication amongst the group. The lack of assistance and flexibility from government agencies promotes networking within the group. These virtual interaction benefits the physically challenged by offering efficient and more effective avenues for business interaction thereby leading to empowerment. However, this comes with its own disadvantage as mobile phones and their services are very expensive to maintain. The ability to contact family members at any given time enhanced their social empowerment. Being able to convey their feelings freely through the mobile phones have surely given them a sense of self-expression among one another. All these can be attributed to the participants' goals in achieving well-being and empowerment.

The findings indicate that the physically challenged often experience inferiority around able people. Certainly, this has led people with disability to be culturally, economically and socially marginalized. In the case of the physically challenged, dependency is being attributed to a form of inferiority. Removing dependency and improving the physically challenged independence proves vital in achieving a better life and empowerment. Despite the barriers of costs involved in the maintenance of mobile phones, participants still utilized the capability of mobile phones for their empowerment.

Drawing from the concept of the CA, a theoretical framework is proposed as shown in figure 2. The framework is illustrated in the form of a diagram that depicts the relationships between well-being, mobile phone use and empowerment. It shows that mobile phone use has an impact on the well-being and can empower the physically chal-

lenged. The framework also shows that well-being lead to empowerment of the physically challenged.



6 Conclusion and Future Work

This paper has demonstrated that the primary effects of mobile phones to the well-being and empowerment of the physically challenged include their family, being healthy, peaceful co-existence and being independent. The paper has also shown how mobile phone is used for personal and business purposes of the physically challenged. It can be concluded that mobile phones use has expanded the capabilities of the physically challenged to live the type of life they value. Although, the results from the study has depict the positive effects of mobile phones to the physically challenged, there might be negative elements that may affect the well-being of the physically challenged.

The findings have shown that there is a strong relationship between well-being and empowerment. For the physically challenged, the categories of well-being such as being healthy, family, being independent and peaceful co-existence as discovered from this research has the capability to empower the physically challenged. And as such, well-being leads to empowerment to the physically challenged.

Additionally, the paper has contributed to the ignored topic of disability and mobile phone in the ICT4D domain. As a timely contribution, it has given insights into how mobile phone can be linked to human development frameworks, particularly, the capability approach. It has reported with empirical evidence how mobile phones have the capabilities of expanding the well-being and empower the physically challenged in a developing country. The findings from the study is significant to policy and policy makers in addressing the challenges faced by disabled in Nigeria.

Future work needed in this research domain is to understand the underlying mechanisms that affect disabled people from using mobile phones to achieve empowerment. Mechanisms such as these can then be addressed to enhance the well-being of the physically challenged. The research could be important to a wider social domain, as findings from the research can be used to address social marginalization and inequalities among people living with disability.

To this end, the prevailing notion of technology in the CA has not been harmonized empirically. A further work which this study intends to continue with is how to ex-

plicitly justify the inclusion of technology (mobile phone) and disabilism into the CA, thus, contribute to the theoretical development of the CA. We believe that our contribution will fill an important theoretical gap in the CA and add to the current contribution by Haenssger & Ariana (2017), who examines the concept of technology in the CA with the aim of understanding the technical objects, social structures and individuals. By putting disabilism within the CA, we are not adding another framework. Instead, our goal is to contribute to the harmonizing discussion on technology and disabilism in the CA.

References

1. Anwar, M. & Johanson, G. (2015). Mobile phones and the well-being of blind micro-entrepreneurs in Indonesia. *EJISDC*, 67, 3, 1-18
2. Bhavnani, A., Chiu, R. W.-W., Janakiram, S., Silarszky, P., & Bhatia, D. (2008). The role of mobile phones in sustainable rural poverty reduction. *Retrieved November, 22, 2008*.
3. Chaudhry, V. (2005). Rethinking the Digital Divide in Relation to Visual Disability in India and the United States: Towards a Paradigm of "Information Inequity". *Disability Studies Quarterly* 25, 2: <http://dsq-sds.org/article/view/553/730>
4. D'Aubin, A. (2007). Working for Barrier Removal in the ICT Area: Creating a More Accessible and Inclusive Canada: *A Position Statement by the Council of Canadians with Disabilities. The Information Society*, 23(3), 193–201. <https://doi.org/10.1080/01972240701323622>
5. Dasuki, S. I., Quaye, A. M., & Abubakar, N. H. (2017). An Evaluation of Information Systems Students Internship Programs in Nigeria: A Capability Perspective. *The Electronic Journal of Information Systems in Developing Countries*, 83(1), 1–19. <https://doi.org/10.1002/j.1681-4835.2017.tb00614.x>
6. Donner, J. (2008). Research approaches to mobile use in the developing world: A review of the literature. *The information society*, 24(3), 140-159.
7. Eleweke, C. J. (2013). A review of the challenges of achieving the goals of the African Plan of Action for people with disabilities in Nigeria. *Disability & Society*, 28(3); 313 – 323
8. Gigler, B.S. (2011) 'Informational Capabilities'- The Missing Link for the Impact of ICT on development. World Bank ICT Sector Week. E-Transformation Working Paper Series: World Bank Working Paper Series.
9. Goggin, G. (2011). Disability, Mobiles, and Social Policy: New Modes of Communication and Governance, in: Katz, J.E. (Ed). *Mobile Communication: Dimensions of Social Policy*, Transaction Publishers, 259-272.
10. Grunfeld, H., Hak, S., & Pin, T. (2011). Understanding benefits realisation of iREACH from a capability approach perspective. *Ethics and Information Technology*, 13(2), 151-172.
11. Hashemi, H., Khabazkhoob, M., Saatchi, M., Ostadimoghaddam, H., & Yekta, A. (2018). Visual impairment and blindness in a population-based study of Mashhad, Iran. *Journal of Current Ophthalmology*, 30(2), 161–168. doi:10.1016/j.joco.2017.01.003
12. Harrison, S. H., & Corley, K. G. (2011). Clean Climbing, Carabiners, and Cultural Cultivation: Developing an Open-Systems Perspective of Culture. *Organization Science*, 22(2), 391–412. doi:10.1287/orsc.1100.0538
13. Hoan, N. T., Chib, A., & Mahalingham, R. (2016). Mobile phones and Gender Empowerment: Enactment of "Restricted Agency" (pp. 1–10). ACM Press. <https://doi.org/10.1145/2909609.2909671>
14. Ian Barron (2013) The potential and challenges of critical realist ethnography, Interna-

- tional Journal of Research & Method in Education, 36:2, 117-130, DOI: [10.1080/1743727X.2012.683634](https://doi.org/10.1080/1743727X.2012.683634)
15. Islam, M. K., & Slack, F. (2016). Women in rural Bangladesh: empowered by access to mobile phones. In *Proceedings of the 9th International Conference on Theory and Practice of Electronic Governance* (pp. 75–84). ACM.
 16. ICT and Development - Research Voices from Africa. International Federation for Information Processing (IFIP), Technical Commission 9 – Relationship Between Computers and Society. Workshop at Makerere University, Uganda. 22-23 March 2010
 17. Kane, S. K., Jayant, C., Wobbrock, J. O., & Ladner, R. E. (2009). Freedom to Roam: A Study of Mobile Device Adoption and Accessibility for People with Visual and Motor Disabilities. Paper presented at the Proceedings of the 11th international ACM SIGACCESS conference on Computers and accessibility.
 18. Kleine, D. (2009). The Ideology behind the Technology – Chilean Micro-entrepreneurs and Public ICT Policies. *Geoforum* 40, 171-183.
 19. Kleine, D. (2013). Technologies of choice?: ICTs, development, and the capabilities approach. MIT Press.
 20. Kleinman, A. (2009) Global mental health: a failure of humanity. *Lancet* 374, 603–604.
 21. Krahn, G. L., Walker, D. K., & Correa-De-Araujo, R. (2015). Persons with disabilities as an unrecognized health disparity population. *American Journal of Public Health*, 105(S2), S198–S206.
 22. Lincoln, Y., E. Guba. 1985. *Naturalistic Inquiry*. Sage, Beverly Hills, CA.
 23. Lindsay, W. R. (2002). Research and literature on sex offenders with intellectual and developmental disabilities. *Journal of Intellectual Disability Research*, 46(s1), 74–85. doi:10.1046/j.1365-2788.2002.00006.x
 24. Marco J. Haenssger & Prochista Ariana (2017): The place of technology in the Capability Approach, Oxford Development Studies, DOI: 10.1080/13600818.2017.1325456
 25. Mingers, J., Mutch, A., & Willcocks, L. (2013). Introduction [special issue: Critical realism in information systems research]. *MIS Quarterly*, 37(3), 795–802.
 26. Miyahara, M., & Piek, J. (2006). Self-Esteem of Children and Adolescents with Physical Disabilities: Quantitative Evidence from Meta-Analysis. *Journal of Developmental and Physical Disabilities*, 18(3), 219–234. doi:10.1007/s10882-006-9014-8
 27. NCC (2017) Nigeria Communications Commission, [Online], Available: HYPERLINK "<https://www.ncc.gov.ng/stakeholder/statistics-reports/subscriber-data>" [2 February 2018]
 28. Nussbaum, M. (2000). Women's capabilities and social justice. *Journal of Human Development*, 1(2), 219-247.
 29. Nyemba-Mudenda, M. & Chigona, W. (2015). mHealth drivers for maternal health outcomes in developing countries: A systematic review. In proceedings of the 13th International Conference on Social Implications of Computers in Developing Countries, Negombo, Sri Lanka, May 2015. http://ifipwg.org/files/IFIPWG94_2015_PROCEEDINGS.pdf
 30. Obiakor, F. E., & Eleweke, C. J. (2014). Special education in Nigeria today. In: A. Rotatori, J. Bakken, F. Obiakor, & U. Sharma: *Advances in special education: International perspectives*, 28; 379-397. London, England: Emerald.
 31. Pal, J., Freistadt, J., Frix, M., & Neff, P. (2009). Technology for Employability in Latin America: Research with At-risk Youth and People with Disabilities. <https://digital.lib.washington.edu/researchworks/handle/1773/16297?show=full>.
 32. Robeyns, I. (2005). The capability approach: A theoretical survey. *Journal of Human Development*, 6(1), 93-114.
 33. Sam, S. (2017b). Towards an empowerment framework for evaluating mobile phone use and impact in developing countries. *Telematics and Informatics*, 34(1), 359–369. <https://doi.org/10.1016/j.tele.2016.06.003>

- 34.
- 35.Sen, A. (1985). *Commodities and Capabilities*. Delhi: Oxford University Press.
- 36.Sen, A. (1985). Well-being, agency and freedom: The Dewey lectures 1984. *The Journal of Philosophy*, 82(4), 169-221
- 37.Sen, A. (1992). *Inequality reexamined*. Oxford University Press.
- 38.Sen, A. (1999). *Development as freedom*. New York: Knopf.
- 39.Shirazi, F. (2012). Information and communication technology and women empowerment in Iran. *Telematics and Informatics*, 29(1), 45–55. <https://doi.org/10.1016/j.tele.2011.02.001>
40. Qi S, Mitchell R (2011). Large scale academic achievement testing of deaf and hard of hearing students: Past, present and future. *Journal of Deaf Studies and Deaf Education*; 17(1): 1-18. <https://doi.org/10.1093/deafed/enr028>. PMID:21712463
- 41.Toboso (2011). Rethinking Disability in Amartya Sen's Approach: ICT and Equality of Opportunity, *Ethics of Information Technology*. 13, 107–118.
42. Virnes, M., Kärnä, E., & Vellonen, V. (2015). Review of Research on Children with Autism Spectrum Disorder and the Use of Technology. *Journal of Special Education Technology*, 30(1), 13–27. doi:10.1177/016264341503000102
- 43.Walsham, G. (2017). ICT4D research: reflections on history and future agenda. *Information Technology for Development*, 23(1), 18–41. <https://doi.org/10.1080/02681102.2016.1246406>
- 44.Zheng, Y. (2007). Exploring the Value of the Capability Approach for E-Development. *Proceedings of the 9th International Conference on Social Implications of Computers in Developing Countries*, São Paulo, Brazil.
- 45.Zheng, Y., & Walsham, G. (2008). Inequality of what? social exclusion in the e-society as capability deprivation. *Information Technology People*, 21(3), 222-243.

Appendix

Figure 1 Data Structure

