

# Chapter 11

## Design Thinking for Technology Supporting Individuals With Neurodevelopmental Disorders in Developing Countries: Participatory Design for Inclusivity

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### **ABSTRACT**

*This research is concerned with analysing the value of using participatory design, and in particular the design thinking methodology, as a basis for the participative development of interfacing technology for use by individuals with neuro-developmental disorders, with a particular focus on developing economies with restrictions in budget and know-how. It becomes crucial as our knowledge expands to ensure that tools developed to assist individuals with neurological disorders to live a full and independent life are designed in conjunction with the users concerned. Inclusive design, however, is not limited to the technology itself, but rather taking into account the individual as well as the wider community in the design. Design needs to also be based in social accessibility to counter stigmas and ableism views. This study found that design thinking has proven to be an effective framework for involving individuals with neuro-developmental disorders to come up with solutions that address their needs and should be used in future implementations in order to assess the results.*

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## **INTRODUCTION**

As medical insight progresses and strengthens, so too does our understanding of neuro-developmental disorders. It becomes crucial as our knowledge expands to ensure that tools developed to assist individuals with neurological disorders to live a full and independent life are designed in conjunction with the users concerned. However, the development cannot be limited to the individual, but caregivers and the wider community as well. This becomes increasingly difficult in developing economies such as South Africa and India, where socioeconomic inequality has led to unequal access to healthcare facilities and services. In these countries it becomes imperative to engage in creative methods in context-responsive practices to ensure equitable healthcare service delivery (Cloete, Wilson, Petersen & Kathard, 2015).

Based on this reality, it is necessary to investigate other methods of design for technology used by individuals with neuro-developmental disorder that are participative and inclusive in nature. According to Newell and Gregor (2000), an inclusive design perspective must include a larger variety of user characteristics and functionality, include representative users, manage accessibility for people with different types of disability, balance accessibility and ease of use for a variety of abilities, clearly specify characteristics and functionality of the overall user group, and provide any additional components for accessibility. Design Thinking is one such methodology and has been successfully used to address technology development for neurodevelopmental disorder users, as it extends User Centred Design to become User Sensitive Inclusive Design, which includes both experimental techniques and effective results communication methods for mainstream researchers and product developers (Newell and Gregor, 2000).

This chapter is concerned with assessing the value of using participatory design, and in particular the Design Thinking methodology as a basis for the participative development of interfacing technology for use by individuals with neuro-developmental disorders, with a particular focus on developing economies with restrictions in budget and know-how. The chapter presents multi-disciplinary literature across both the information technology and medical sciences bodies of knowledge in order to arrive at an assessment and recommendations for implementation of inclusive technology projects for people with intellectual disabilities such as neuro-developmental disorders across the developing world.

## **BACKGROUND AND RELATED WORK**

### **Intellectual Disabilities and Neuro-developmental Disorders**

According to ‘International Classification of Functioning, Disability and Health’ (ICF) published by the World Health Organization, the term disability is an all-encompassing term that includes activity limitations, physical and mental impairments, and participation restrictions, all which fall into a subset of a larger classification grouping which covers three main areas including environmental factors, body functioning and structure and activities and participation (WHO, n.d.). Mullin, Gokhale, Moreno-De-Luca, Sanyal, Waddington and Faundez (2013) specify neuro-developmental disorder (NDD) conditions as intellectual disabilities that are multifaceted in nature and are normally characterised by impairments in a large number of possible fields. These include cognition, communication, behaviour and/or motor skills. These typically are a result of abnormal brain development. Also falling within the NDD spectrum include communication disorders, intellectual disability, attention deficit/hyperactivity disorder (ADHD), autism spectrum disorder (ASD), and schizophrenia (Mullin et. al., 2013).

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