

**Mainstream mobile messaging for youth with complex communication needs:
A South African case study exploring interactional aspects**

Clara Wepener

A thesis in partial fulfilment of the requirements for the degree

**Philosophiae Doctor
in Augmentative and Alternative Communication**

Centre for Augmentative and Alternative Communication
Faculty of Humanities
University of Pretoria

Supervisor: Prof. Juan Bornman

Co-supervisor: Dr Ensa Johnson

2019

DECLARATION OF ORIGINALITY

With this I, Clara Wepener, declare that the thesis titled “Mainstream mobile messaging for youth with complex communication needs: A South African case study exploring interactional aspects”, is my original work written under the supervision of Prof. Juan Bornman and Dr Ensa Johnson.

I, Clara Wepener, have also obtained, for the research described in this work, the applicable research ethics approval. I have observed the ethical standards required in terms of the University of Pretoria’s Code of ethics for researchers and the Policy guidelines for responsible research.

Clara Wepener

August 2019

ACKNOWLEDGEMENTS

I would like to thank the following people:

- Prof. Juan Bornman and Dr Ensa Johnson for their excellent guidance the past four years.
- The participants and their communication partners for their time and their willingness to share their experiences with me.
- Cas, Aloise, Adriana and Casper for their loving encouragement.
- Arabella, the other staff members at the Centre for Augmentative and Augmentative Communication and fellow PhD students for their support and input.
- Everyone who helped me to arrange meetings with the participants.
- The University of Pretoria for their financial assistance.
- The editors for their thorough work.

INDEX

Acknowledgements	i
List of Tables	v
List of Figures	vi
List of Appendices	vii
Abstract	viii
Opsomming	ix
Chapter 1: Problem Statement and Rationale	1-1
1.1 Introduction	1-1
1.2 Background and Problem Statement	1-1
1.3 Terminology	1-3
1.3.1 Assistive technology (AT)	1-3
1.3.2 Complex communication needs (CCN)	1-4
1.3.3 Interactional aspects of communication	1-4
1.3.4 Mainstream mobile messaging (messaging)	1-5
1.3.5 Youth	1-5
1.4 Abbreviations and Acronyms	1-6
1.5 A Note on Notation	1-7
1.6 Overview of the Chapters	1-7
1.7 Conclusion	1-9
Chapter 2: Literature Review	2-1
2.1 Introduction	2-1
2.2 Adoption and Use of Mainstream Mobile Technologies by Individuals without CCN, with a Focus on Youth	2-3
2.3 Mainstream Mobile Messaging	2-4
2.4 Adoption and Use of Messaging by Youth without CCN	2-6
2.4.1 Personal factors and range of communication partners	2-7
2.4.2 Convenience	2-7
2.4.3 Communication functions, depth and urgency	2-8
2.4.4 Speed and ease	2-9
2.4.5 Communication synchronicity	2-10
2.4.6 Communication structure	2-11
2.4.7 Social aspects	2-13
2.4.8 Self-protection aspects	2-14
2.4.9 Additional concerns	2-15
2.4.10 Summary of youth without CCN	2-15
2.5 Adoption and Use of Mainstream Mobile Technologies by Individuals with CCN	2-15
2.6 AT and AAC Models	2-16
2.6.1 Operational aspects	2-19
2.6.2 Cognitive aspects	2-20
2.6.3 Linguistic aspects	2-22
2.6.4 Interactional aspects	2-23

	2.6.5 Social aspects	2-25
	2.7 Conclusion	2-26
Chapter 3:	Research Methodology	3-1
	3.1 Introduction	3-1
	3.2 Main Aim and Subaims	3-1
	3.3 Research Design	3-2
	3.4 Participants	3-4
	3.4.1 Recruitment of potential participants	3-5
	3.4.1.1 Recruitment strategy 1: Schools	3-5
	3.4.1.2 Recruitment strategy 2: Fofa Youth Empowerment Programme	3-6
	3.4.2 Potential participant screening for selection	3-7
	3.4.3 Description of selected participants	3-10
	3.4.3.1 Participant 1 (P1): Xolani	3-15
	3.4.3.2 Participant 2 (P2): Nomsa	3-16
	3.4.3.3 Participant 3 (P3): Elijah	3-16
	3.4.3.4 Participant 4 (P4): Naleli	3-17
	3.4.3.5 Participant 5 (P5): Tapiwa	3-18
	3.4.3.6 Participant 6 (P6): Mayowa	3-18
	3.4.3.7 Participant 7 (P7): Boipelo	3-20
	3.4.4 Description of familiar communication partner selected by participants	3-21
	3.4.4.1 Frequency of interaction with selected communication partners versus other partners	3-22
	3.5 Interview Setting and Mood	3-23
	3.5.1 Interviews with Xolani (P1)	3-23
	3.5.2 Interviews with Nomsa (P2)	3-24
	3.5.3 Interviews with Elijah (P3)	3-25
	3.5.4 Interviews with Naleli (P4)	3-25
	3.5.5 Interviews with Tapiwa (P5)	3-26
	3.5.6 Interviews with Mayowa (P6)	3-26
	3.5.6 Interviews with Boipelo (P7)	3-26
	3.6 Material and Equipment	3-27
	3.6.1 Materials and equipment used for screening	3-27
	3.6.1.1 Messaging Screening Checklist and corresponding activity material	3-27
	3.6.1.2 Assessment of Intelligibility of Dysarthric Speech Test	3-28
	3.6.2 Materials used for participant description	3-28
	3.6.2.1 Participant Background Information Script	3-28
	3.6.2.2 Gross Motor Function Classification System & Manual Ability Classification System	3-29
	3.6.2.3 Kaufman Brief Intelligence Test	3-29
	3.6.2.4 Peabody Picture Vocabulary Test & Clinical Evaluation of Language Fundamentals	3-30
	3.6.2.5 Western Aphasia Battery Reading Comprehension Subtests	3-30
	3.6.2.6 Researcher Observation Form	3-30

3.6.3	Materials and equipment used for data collection	3-31
3.6.3.1	Participant Interview Script	3-33
3.6.3.2	Communication Partner Interview Script	3-34
3.6.3.3	WhatsApp Focus Group Script	3-35
3.6.3.4	Researcher Observation Form	3-36
3.6.3.5	Follow-up Interview Script and Member Checking Scripts	3-37
3.6.3.6	Samsung Grand Prime Plus smartphone, iPad, Sony video recorder, Dell laptop	3-38
3.7	Pilot Study	3-38
3.8	Data Collection	3-42
3.8.1	Data collection method 1: Participant interviews	3-42
3.8.1.1	Aim	3-42
3.8.1.2	Method	3-43
3.8.1.3	Procedure	3-43
3.8.2	Data collection method 2: Communication partner interviews	3-45
3.8.2.1	Aim	3-45
3.8.2.2	Method	3-46
3.8.2.3	Procedure	3-46
3.8.3	Data collection method 3: WhatsApp focus group	3-47
3.8.3.1	Aim	3-47
3.8.3.2	Method	3-47
3.8.3.3	Procedure	3-48
3.8.4	Data collection method 4: Researcher observations	3-49
3.8.4.1	Aim	3-49
3.8.4.2	Method	3-49
3.8.4.3	Procedure	3-49
3.9	Reliability and Validation Strategies	3-50
3.9.1	Follow-up interview and member checking	3-51
3.10	Data Analysis Procedures	3-52
3.10.1	Thematic analysis of participant and communication partner responses	3-52
3.10.2	Thematic analysis of text message features	3-54
3.11	Conclusion	3-56
Chapter 4:	Results	4-1
4.1	Introduction	4-1
4.2	Reported Benefits and Challenges of MIM Use	4-3
4.2.1	Benefits	4-3
4.2.2	Challenges	4-8
4.2.3	Benefits versus challenges	4-11
4.3	Results Pertaining to the Main Thematic Areas	4-11
4.3.1	Communication partners	4-12
4.3.2	Interaction convenience: Place and time	4-17
4.3.3	Communication content	4-21
4.3.4	Communication maintenance and repair of breakdown	4-32
4.3.5	Interaction ease and rate	4-36
4.4	Recommendations	4-45

4.4.1	Recommendations by participants for other individuals with CCN	4-45
4.4.2	Recommendations for participants by their communication partners	4-45
4.4.3	General suggestions	4-47
4.5	Participant Reflections on Participating in the WhatsApp Focus Group	4-49
4.6	Conclusion	4-50
Chapter 5:	Discussion	5-1
5.1	Introduction	5-1
5.2	Affordances of Mainstream Mobile Messaging	5-3
5.2.1	Circles of partners	5-3
5.2.2	Partner symmetry	5-7
5.2.3	Absent presence	5-9
5.2.4	Recognised anonymity	5-11
5.2.5	Expressive control	5-12
5.2.6	Control over partner inclusion or exclusion	5-14
5.2.7	Convenience	5-15
5.2.8	Synchronicity	5-16
5.2.9	Privacy	5-17
5.2.10	Ease and rate features and strategies	5-18
5.2.11	Maintenance features and strategies	5-20
5.3	Social Connectedness	5-21
5.4	Conclusion	5-22
Chapter 6:	Conclusion and Recommendations	6-1
6.1	Introduction	6-1
6.2	Summary of Findings	6-1
6.3	Critical Evaluation of this Study	6-2
6.4	Clinical Implications of this Study	6-8
6.5	Recommendations for Future Research	6-9
6.6	Conclusion	6-12
	References	R-1
	Appendices	A-1

LIST OF TABLES

Table 3.1	Criteria for Selection of Participants	3-7
Table 3.2	Screening Results for Potential Participants	3-9
Table 3.3	Categories Included in Participant Description	3-11
Table 3.4	Description of Participants Identified for Study (n=7)	3-13
Table 3.5	Description of Communication Partners	3-21
Table 3.6	Frequency of WhatsApp Interactions	3-22
Table 3.7	Development of the Aspects for Various Data Collection Materials	3-31
Table 3.8	Development of the Questions in the Participant Interview Script	3-33
Table 3.9	Development of the Questions in the Communication Partner Interview Script	3-34
Table 3.10	Development of the Questions in the WhatsApp Focus Group Script	3-35
Table 3.11	Development of the Researcher Observation Form	3-37
Table 3.12	Development of the Follow-up Interview Script	3-38
Table 3.13	Pilot Study Participant Description (n=2)	3-39
Table 3.14	Aims, Materials, Procedures, Results and Recommendations of the Pilot Study	3-40
Table 3.15	Reliability Procedures and Their Application During the Data Collection and Analysis of the Present Study	3-50
Table 3.16	Validation Strategies Outlined in Creswell and Poth (2018) and Their Application During the Data Collection and Analysis of the Present Study	3-51
Table 3.17	Description and Examples of Messaging Features	3-55
Table 4.1	Chapter Layout of the Results According to the Subaims of the Study	4-2
Table 4.2	Benefits of Messaging	4-6
Table 4.3	Challenges of Messaging	4-10
Table 4.4	Benefits and Challenges of Messaging Use	4-11
Table 4.5	Communication Partners	4-16
Table 4.6	Interaction Convenience: Place and Time	4-19
Table 4.7	Communication Content	4-24
Table 4.8	Expressive Features	4-31
Table 4.9	Communication Breakdown and Repair	4-35
Table 4.10	Response Rate Between the Participants and their Selected Communication Partners	4-36
Table 4.11	Interaction Ease and Rate	4-42
Table 4.12	Structural Features Related to Ease- and Rate-Enhancement and Expressive Features	4-44
Table 4.13	Recommendations	4-46
Table 4.14	General Suggestions	4-48
Table 4.15	Participant Reflections on WhatsApp Group Interactions	4-49
Table 6.1	Critical Evaluation of the Study	6-3

LIST OF FIGURES

Figure 2.1	Visual representation of the layout of the chapter	2-2
Figure 3.1	Steps followed to select participants for the study	3-4
Figure 3.2	Four data collection methods used to address subaims of the study	3-42
Figure 4.1	Benefits of messaging	4-3
Figure 4.2	Challenges of messaging	4-8
Figure 4.3	Main thematic areas used to report results	4-12
Figure 4.4	Themes pertaining to communication partners	4-13
Figure 4.5	Themes pertaining to interaction convenience	4-17
Figure 4.6	Themes pertaining to communication content	4-21
Figure 4.7	Expressive features	4-27
Figure 4.8	Examples of profile pictures used by the participants	4-49
Figure 4.9	Example of the reply feature	4-32
Figure 4.10	Themes pertaining to communication breakdown and repair	4-33
Figure 4.11	Themes pertaining interaction ease and rate	4-37
Figure 4.12	Summary of themes	4-51
Figure 5.1	Visual representation of affordances of messaging	5-2
Figure 5.2	Communication partners listed by the participants	5-6

LIST OF APPENDICES

APPENDIX A	Ethics Approval Research Ethics Committee UP	A-1
APPENDIX B1	Ethics Approval Gauteng Department of Education	A-2
APPENDIX B2	Ethics Approval North West Province Department of Education	A-3
APPENDIX C	School Request Letter and Permission Form	A-4
APPENDIX D	Parent Informed Consent Letter and Form	A-7
APPENDIX E	Participant Informed Assent/Consent Form	A-10
APPENDIX F	Fofa Project Leader Request Letter and Permission Form	A-11
APPENDIX G	Fofa Participant Informed Consent Letter	A-14
APPENDIX H	Picture and Questions used for Screening	A-16
APPENDIX I	Messaging Screening Checklist	A-17
APPENDIX J	Example of Sentence Intelligibility Task	A-18
APPENDIX K	Participant Background Information Script	A-19
APPENDIX L	Researcher Observation Form	A-20
APPENDIX M	Communication Partner Informed Consent Letter and Form	A-21
APPENDIX N	Participant Interview Script	A-23
APPENDIX O	Communication Partner Interview Script	A-25
APPENDIX P	WhatsApp Focus Group Script	A-27
APPENDIX Q	Excerpt from the WhatsApp Focus Group	A-29
APPENDIX R	Follow-up Interview Script	A-30
APPENDIX S	Example of Member Checking Script	A-31
APPENDIX T	Coding Manual	A-33

ABSTRACT

Mainstream mobile messaging is a widely researched theme as it is a favoured means of interaction by youth who are the so-called *digital natives*. To limit marginalisation and promote inclusion, it is essential for youth with complex communication needs to participate in the same activities as their peers without disabilities. However, there is a paucity of research regarding the use of messaging by youth with complex communication needs in both the disability literature and in the information and communication technology literature. Therefore, the main aim of this study was to explore and describe the interactional aspects of mainstream mobile messaging (related to the why, who, what, when, where and how of communication) for youth with complex communication needs. These aspects were considered in terms of the enduring Human Activity Assistive Technology model, which was supplemented in the current study to include a communication partner (or group of partners) using the same type of technology (smartphones) to engage in the same activity (messaging). A qualitative case study design was used to gather data from three sources using four data collection methods: (i) face-to-face participant interviews using WhatsApp (n=7); (ii) WhatsApp communication partner interviews (n=7); (iii) an asynchronous WhatsApp focus group; and (iv) observations of youth interacting on WhatsApp. All data was analysed using thematic analysis. The results showed that messaging afforded the participants new communication possibilities despite certain limitations. These affordances included a degree of interaction symmetry; the possibility to interact with a wide range of partners including groups; interaction with others outside their often-restricted environments (absent presence); privacy; a measure of anonymity and control over interactions; a means of expressing themselves that was easier than face-to-face interactions; and the ability to meaningfully connect with others. Future research should explore these affordances in more detail and consider the impact of limited literacy skills and the expressive use of pictures in mainstream mobile messaging.

Keywords: assistive technology (AT), augmentative and alternative communication (AAC), complex communication needs (CCN), disability, interactional aspects, messaging, texting, youth

OPSOMMING

Die gebruik van teksboodskappe is 'n deeglik nagevorsde tema aangesien dit 'n interaksiemetode van voorkeur is vir jongmense wat as *digitale boorlinge* bekend staan. Om marginalisering te voorkom en inklusiwiteit te bevorder, is dit belangrik dat jeug met beduidende kommunikasieprobleme ook toegang tot dieselfde aktiwiteite as hul portuur sonder gestremdhede het, maar daar is ongelukkig min inligting beskikbaar in literatuur oor gestremdheid en kommunikasietegnologie oor hoe hulle van teksboodskappe gebruik maak. Die hoofdoel van hierdie studie was dus om die interaksionele aspekte van die gebruik van teksboodskappe (d.w.s. die hoekom, wie, wat, waar, wanneer en hoe van kommunikasie) vir jeug met beduidende kommunikasieprobleme te verken en te beskryf. Die aspekte word verken binne die tydlose Human Activity Assistive Technology model wat in hierdie studie aangepas is om 'n kommunikasievenoot (of groep vennote) in te sluit wat dieselfde tipe tegnologie (slimfone) gebruik om aan dieselfde aktiwiteit (stuur en ontvang van teksboodskappe) deel te neem. 'n Kwalitatiewe gevallestudie is gebruik om data uit drie bronne met behulp van vier verskillende metodes te versamel: (i) persoonlike onderhoude via WhatsApp (n=7); (ii) WhatsApp onderhoude met kommunikasievennote (n=7); (iii) 'n asinkrone (nie-gelyktydige) WhatsApp fokusgroep, en (iv) waarnemings van die manier waarop deelnemers WhatsApp gebruik. Al die data is aan die hand van tematiese analise ontleed. Die resultate toon dat die gebruik van teksboodskappe vir deelnemers nuwe kommunikasiemoontlikhede skep ten spyte van sekere tekortkominge. Hierdie moontlikhede sluit die volgende in: 'n mate van simmetriese interaksie; die moontlikheid om met 'n wye spektrum kommunikasievennote (selfs groepe) in interaksie te tree; interaksie met ander buite hul eie dikwels-beperkte omgewings (afwesige teenwoordigheid); privaatheid; 'n mate van anonimiteit en beheer oor interaksies; 'n makliker manier om hulself uit te druk in vergelyking met fisiese interaksie; en die moontlikheid om sinvol met ander te skakel. Toekomstige navorsing behoort 'n dieptestudie van hierdie aspekte te maak en moet oorweging skenk aan die rol wat geletterdheid en visuele beelde in teksboodskappe speel.

Sleutelterm: aanvullende en alternatiewe kommunikasie (AAK), beduidende kommunikasieprobleme, gestremdheid, interaksionele aspekte, jeug, ondersteunende tegnologie, teksboodskappe

CHAPTER 1

Problem Statement and Rationale

1.1 Introduction

This chapter presents the problem statement and contextualises the study. Definitions of the most important terms are provided, followed by a list of the abbreviations and acronyms used throughout this study. Chapter 1 concludes with an overview of the six chapters of this thesis.

1.2 Background and Problem Statement

Communication plays a vital role in social participation. For youth, social participation is particularly important, as interactions with individuals and groups serve to develop critical life skills needed for the transition from childhood to independent adulthood. Youth with complex communication needs (CCN) experience barriers to social participation because of their limited communication abilities and opportunities. These limitations may have a negative effect on the development of their relationships and sense of belonging, and ultimately reduce their quality of life (Grace, Raghavendra, & Newman, 2014; Thirumanickam, Raghavendra, & Olsson, 2011). Youth with CCN may use augmentative and alternative communication (AAC) modes and strategies to participate in everyday life (Beukelman & Mirenda, 2013). The specific mode of aided AAC that they use may require specialised assistive technology (also known as dedicated AAC devices) and they may need training in respect of communication competence skills to successfully use this technology. Unfortunately, dedicated AAC devices are often expensive, and they may be difficult to source, acquire and master in certain parts of South Africa, seeing that limited infrastructure and services exist.

The arrival of mainstream mobile technologies in the 21st century has provided individuals with CCN including youth, the opportunity to access more readily available and affordable technologies that have not only greater functionality and interconnectivity, but also wide social appeal (Light & McNaughton, 2012; McNaughton & Light, 2013). Individuals with CCN who own mainstream mobile technologies report that the use of these technologies has increased their

independence and granted them a sense of normality (Bryen & Pecunas, 2004; Hyatt, 2011; Williams, Beukelman, & Ullman, 2012). However, there are also concerns regarding the access and use of mainstream mobile technologies by individuals with CCN as concomitant physical, sensory, motor and cognitive difficulties experienced by some individuals with CCN may mean that their use of technologies can be slow, fatiguing, confusing and potentially even frustrating (Bryen & Pecunas, 2004; Kagohara et al., 2013). Nonetheless these individuals need to have the same access to and use of mainstream mobile technologies as their peers without disabilities in order to reduce the digital divide and limit further isolation and marginalisation in an era where the use of mainstream mobile technologies has become ubiquitous (Baker & Bellordre, 2004; Barlott, Adams, & Cook, 2016; Borg, Lantz & Gulliksen, 2015; Bryen & Moolman, 2015; Darcy, Maxwell, & Green, 2016). This may be particularly applicable to the youth who try to fit in and develop friendships with their peers and enhance their social networks, all while keeping up with their studies, thinking of their future in the workplace, or contemplating their role in society at large (Light, 1997; McNaughton, Bryen, Blackstone, Williams, & Kennedy, 2012).

A study conducted in the United States of America (US) reports that adults who rely on AAC and own mobile phones use these technologies for numerous activities, including messaging (Morris & Bryen, 2015). Similarly, a recent South African study that recruited 30 adults with CCN who owned mobile phones (also called cell phones in South Africa) found that messaging was the most frequent activity for which these technologies were used (Bornman, Bryen, Moolman, & Morris, 2016). *Messaging* (used interchangeably with the phrase *mainstream mobile messaging* in the present study) is a means of interpersonal text-based communication on mainstream mobile technologies and is a particularly popular means of interaction among the youth (Ling, 2007). In countries such as the US, it has become so popular that youth reportedly prefer messaging rather than face-to-face or other means of communication (Pew Research Center, 2010).

Youth without disabilities experience messaging as a fast, easy, convenient, playful and inexpensive means of communication (Agosto, Abbas, & Naughton, 2012; Church & De Oliveira, 2013). Messaging also allows them a measure of independence and emancipation (Grinter, Palen, & Eldridge, 2006; Thurlow & Poff, 2011), as well as giving them a sense of being socially connected (Ling, 2007; Reid & Reid, 2004). However, the literature also warns against the potential negative aspects of computer-mediated communication, for example literacy and privacy concerns, cyber bullying, and addiction (Turner, 2015).

Although previously mentioned studies report the use of messaging by adults with CCN, there is a paucity of information regarding the affordances and possible challenges of messaging for individuals with CCN, specifically youth with CCN. McNaughton and Light (2013) are of the opinion that although developments in the field of mainstream technologies have had far-reaching effects on the lives of many individuals with CCN, urgent research is needed to establish if the use of mainstream technologies by individuals with CCN can fulfil the purposes of communication in real-life situations.

The aim of this study is therefore to explore and describe the interactional aspects of mainstream mobile messaging; to gain a deeper understanding of how youth with CCN interact using this means of communication; and how it affects their social participation. A deeper understanding of this means of communication will be of particular value in low- and middle-income countries (LMICs) such as South Africa, where communication via a mobile phone may be the most available and affordable means of communication for individuals who have to rely on AAC to participate in society.

1.3 Terminology

The following terms are critical to this study and are therefore clarified.

1.3.1 Assistive technology (AT)

Assistive technology (AT) devices, which help individuals with disabilities to perform an action or function, include custom-designed, modified and commercial devices (Cook & Polgar, 2008). Dedicated communication devices are specific-purpose ATs that can be used for AAC by individuals with CCN. Mainstream mobile technologies, such as the mobile phones used in the present study, are also considered ATs when used by individuals with disabilities to ameliorate communication difficulties. Mainstream mobile technologies vary from many other dedicated communication devices in that they can be used for asynchronous communication. In the present study, none of the participants owned dedicated communication devices, however they all owned smartphones. One participant had a speech generating application on his smartphone which he occasionally used when interacting with a stranger. Another participant also had a speech

generating application on his tablet which he only used when it was essential to interact in class at the university he attended.

1.3.2 Complex communication needs (CCN)

According to Loncke (2014), a debate surrounds the terminology used when referring to individuals who need to supplement or replace natural speech and/or writing with aided or unaided modes of communication. He suggests the use of the phrase *people who use AAC* as he regards it to be a “neutral term” (Loncke, 2014, p.5). Examples of this terminology are the use of the phrases “teenagers who use AAC” and “young people who use AAC” in a study with participants in a similar age range as the present study (Wickenden, 2011, p.151). Another term frequently found in papers on designing AAC research and intervention is *individuals with complex communication needs* (Blackstone, Williams, & Wilkins, 2007; Light & McNaughton, 2015). This term was originally coined by the International Society for AAC and has a strong advocacy orientation (Alant, Bornman, & Lloyd, 2006). In a South African study on wireless device use individuals with severe communication disabilities did not prefer one term over the other and said that they preferred to describe themselves as having “difficulties speaking so that other people can understand them” (Bornman et al., 2016, p. 4). The present study has opted to use the phrase *youth with CCN* to describe youth who cannot rely on speech to meet all their communication needs due to poor speech intelligibility and who do not use dedicated communication devices to augment their speech or as an alternative to speech. This definition is similar to the description given in a study by Caron and Light (2016).

1.3.3 Interactional aspects of communication

According to Von Tetzchner et al. (1996), a comprehensive communication model may for practical purposes be divided into physical, cognitive/linguistic, interactional and socio-cultural aspects. These aspects are not easily separated as they are inter-related, but they can offer different descriptive points of view. The present study focuses on the *interactional aspects* of messaging (a text-based means of interpersonal communication using mainstream mobile technologies) by youth with CCN. For the purposes of the present study, the term interactional aspects is defined according to aspects highlighted in both the AAC and Information and Communication Technology (ICT) literature. Interactional aspects are therefore conceptualised as including

communication functions of messages; the depth and urgency of messages; the ease and speed of communication; the convenience of communication (place and time); as well as communication maintenance and repair of breakdown. These aspects are considered within the broader communication and AT frameworks that highlight the collaborative interplay between communication partners (with their individual characteristics, abilities, experiences and skills); the interplay between communication partners and the technologies they use to interact; as well as the environment and broader context in which these interactions take place. In the present study the basic units of interaction between the communication partners are referred to as *interactional turns*.

1.3.4 Mainstream mobile messaging (messaging)

Terms such as *texting* or *text messaging* primarily refer to the sending and receiving of text messages using the short message service (SMS) of technologies such as mobile phones, smartphones or personal digital assistants (Thurlow & Poff, 2011). Smartphones also allow for the use of online messaging applications. Text-based communication using a smartphone application is referred to as *mobile instant messaging* (Church & De Oliveira, 2013). There are many mobile instant messaging options available, such as WhatsApp or Facebook Messenger, and their popularity varies across contexts. Although traditional text messaging and mobile instant messaging differ (Grinter, Palen & Eldridge, 2006), they are essentially both text-based mobile communication. In the present study the term mainstream mobile messaging, used interchangeably with the term messaging, refers to any text-based mobile communication on mainstream mobile devices such as mobile (cellular/cell) phones. The present study used the mobile instant messaging application WhatsApp to gather the data, as it was the most widely used messaging application in South Africa at the time when the study was conducted (Simons, 2017).

1.3.5 Youth

The term *youth* refers to a fluid period between childhood dependence and adulthood independence (United Nations Educational, Scientific and Cultural Organization, 2016). For the sake of statistical consistency, the United Nations (UN) uses the term youth when referring to individuals between the ages 15 to 24 years (United Nations Department of Economic and Social Affairs, 2013). Many terms such as adolescents, teenagers, teens, young adults, students, or

scholars are used as synonyms for individuals within this same broad age range. In the present study the term youth was selected and refers to the same age range as stipulated by the UN, namely 15 to 24 years. This specific population was selected as social participation is critical at this transitional stage between childhood and adulthood, and a paucity of research exists related to this population when compared to the extended bodies of work on children and adults.

1.4 Abbreviations and Acronyms

AAC	: Augmentative and Alternative Communication
App(s)	: Application(s)
AT	: Assistive Technology
CAQDAS	: Computer-Aided Qualitative Data Analysis Software
CCN	: Complex Communication Needs
CELF 5	: Clinical Evaluation of Language Fundamentals 5 (Semel, Wiig, & Secord, 2013)
GMFCS-E&R	: Gross Motor Functional Classification System Expanded and Revised (Palisano, Rosenbaum, Bartlett, & Livingston, 2007)
HAAT	: Human Activity Assistive Technology model (Cook & Hussey, 2002)
ICF	: International Classification of Functioning, Disability and Health
ICT	: Information and Communication Technology
KBIT-2	: Kaufman Brief Intelligence Test, Second Edition (Kaufman & Kaufman, 2004)
LoLT	: Language of Learning and Teaching
MACS	: Manual Ability Classification System (Eliasson et al., 2006)
PPVT-IV	: Peabody Picture Vocabulary Test, Fourth Edition (Dunn & Dunn, 2007)
SA	: South Africa
[<i>sic</i>]	: Abbreviation of Latin <i>sic erat scriptum</i> meaning <i>thus was it written</i>
SIT	: Sentence Intelligence Test (Yorkston, Beukelman, & Tice, 1996)
SLI	: Specific Language Impairment
SMS	: Short Message Service
TATE-ZC	: Test of Ability to Explain for Zulu-speaking Children (Solarsh, 2001)
UN	: United Nations
US	: United States of America

WAB : Western Aphasia Battery (Kertesz, 1982)

1.5 A Note on Notation

- In this thesis, the notation conventions proposed for AAC by Von Tetzchner and Basil (2011) are utilized:
 - Spoken utterances are italicized (e.g. *a lot*)
 - Unaided communication is marked by single quotation marks as well as a description in brackets (e.g. ‘no’ (nods head)).
- As there is no specific notation style for messaging, and to ensure that the messages retained their original format (including emojis), the messaging data is presented in the same font as the electronically transferred data and is marked by an asterisk, for example *Cool😎👍👍😄*. Messages containing *language switching*, and messages containing shortened words, were left unchanged and the meaning of these words is explained in brackets, for example *hayibo* (*wow! really? can it be*) and *huw* (*how are you doing*).
- Key concepts, emphasised words and linguistic examples from other sources were also written in italics.

1.6 Overview of the Chapters

This thesis is presented in six chapters. Chapter 1 provides the background and rationale for the study, defines the frequently used terms in the thesis and lists all abbreviations and acronyms occurring in the thesis. Chapter 1 concludes with an overview of the individual chapters included in the thesis.

Chapter 2 provides a review of the literature pertaining to the research topic. As little has been written about the use of mainstream mobile messaging by youth with CCN, the chapter first reviews relevant literature on the messaging practices of individuals without CCN, in particular the youth. Next, the chapter reviews relevant literature pertaining to the use of technologies (especially mainstream technologies) by individuals with CCN. The literature reviewed for both

Chapter 1: Problem Statement and Rationale

individuals without CCN and individuals with CCN includes relevant theories and models pertaining to the use of communication technologies.

Chapter 3 presents the methodology used in the study. The chapter begins by stating the aim of the study, namely, to explore and describe the interactional aspects of mainstream mobile messaging (related to the why, who, when, where, what and how of communication) for youth with CCN. Then the sub-aims of the study are listed, followed by a discussion of the reasons for selecting a qualitative research design to address the aim and subaims. Next, the participant recruitment, screening, selection and description processes are presented. This is followed by a discussion of the material and equipment used in the study, the various data collection methods utilised, and the validation and reliability strategies employed to strengthen the trustworthiness of the findings. The chapter concludes with a discussion of the data analysis procedures used in the study.

Chapter 4 presents the research findings according to the subaims of the study. It starts by describing why youth with CCN find messaging beneficial and challenging, with whom they interact through messaging, and when and where they use messaging. Next, the content of these interactions is discussed, followed by how they are maintained and repaired after a breakdown, and how ease- and rate-enhancing strategies and features are used by these youths. The recommendations regarding messaging by youth with CCN are discussed next and the chapter ends by reporting on how youth with CCN experienced their participation in the focus group discussion.

Chapter 5 discusses the results of the study by focusing on the interactional affordances of messaging for youth with CCN. These affordances are discussed in the light of the relevant literature and eleven aspects are highlighted: the circles of partners; the symmetry between partners; recognised anonymity; absent presence; expressive control; control over partner inclusion/exclusion; convenience; synchronicity; privacy; ease- and rate-enhancing features and strategies; and maintenance features and strategies. The chapter closes with the finding that messaging instilled a sense of connectedness in the youth in the study.

Chapter 6 commences with a summary of the findings reported in Chapter 5. Next the strengths and limitations of the study are discussed, followed by the clinical implications of the study. The chapter concludes with recommendations for future research.

1.7 Conclusion

Chapter 1 provides a justification for the study by sensitising the reader to the ubiquitous use of messaging by youth without CCN. It also highlights the need to explore and describe the potential affordances of messaging for youth with CCN. This could have a positive impact on informed decisions in clinical practice about the use of messaging by youth with CCN. The chapter furthermore explains the frequently used terms and lists the abbreviations and acronyms used in this thesis, before concluding with an overview of the six chapters of the thesis.

CHAPTER 2

Literature Review

2.1 Introduction

The aim of this chapter is twofold. The first aim is to provide an overview of the relevant literature on the adoption and use of messaging as a mode of communication, with a focus on the messaging practices of youth. The second aim of the chapter is to discuss recent literature pertaining to general communication practices and the use of mainstream technologies by individuals with CCN, as there is little current literature available on the use of messaging by individuals with CCN. In this chapter, messaging is used as an umbrella term to include text messages as well as mobile instant messaging.

Chapter 2 thus starts with a discussion on the adoption and use of mainstream mobile technologies by individuals *without* CCN. This is followed by a discussion on the adoption and use of mainstream mobile messaging by individuals *without* CCN, particularly youth. Next the adoption and use of mainstream mobile technologies by individuals *with* CCN is introduced by a discussion of the relevant AT and communication models in the literature. The discussion then turns to the aspects highlighted in the literature on the use of aided communication by individuals with disabilities, including CCN, and how these aspects also need to be considered in a discussion on messaging. The chapter draws the conclusion that all the aspects involved in the messaging practices of individuals with CCN can only be determined once these practices have been documented, thus the need for this study. An in-depth look at the use of messaging by youth with CCN, in particular the interactional aspects afforded by messaging, could lead to more informed clinical decision-making and intervention practices that aim to enhance communication interactions and social participation of youth with CCN. A visual overview of the chapter layout is presented in Figure 2.1.

Chapter 2: Literature Review

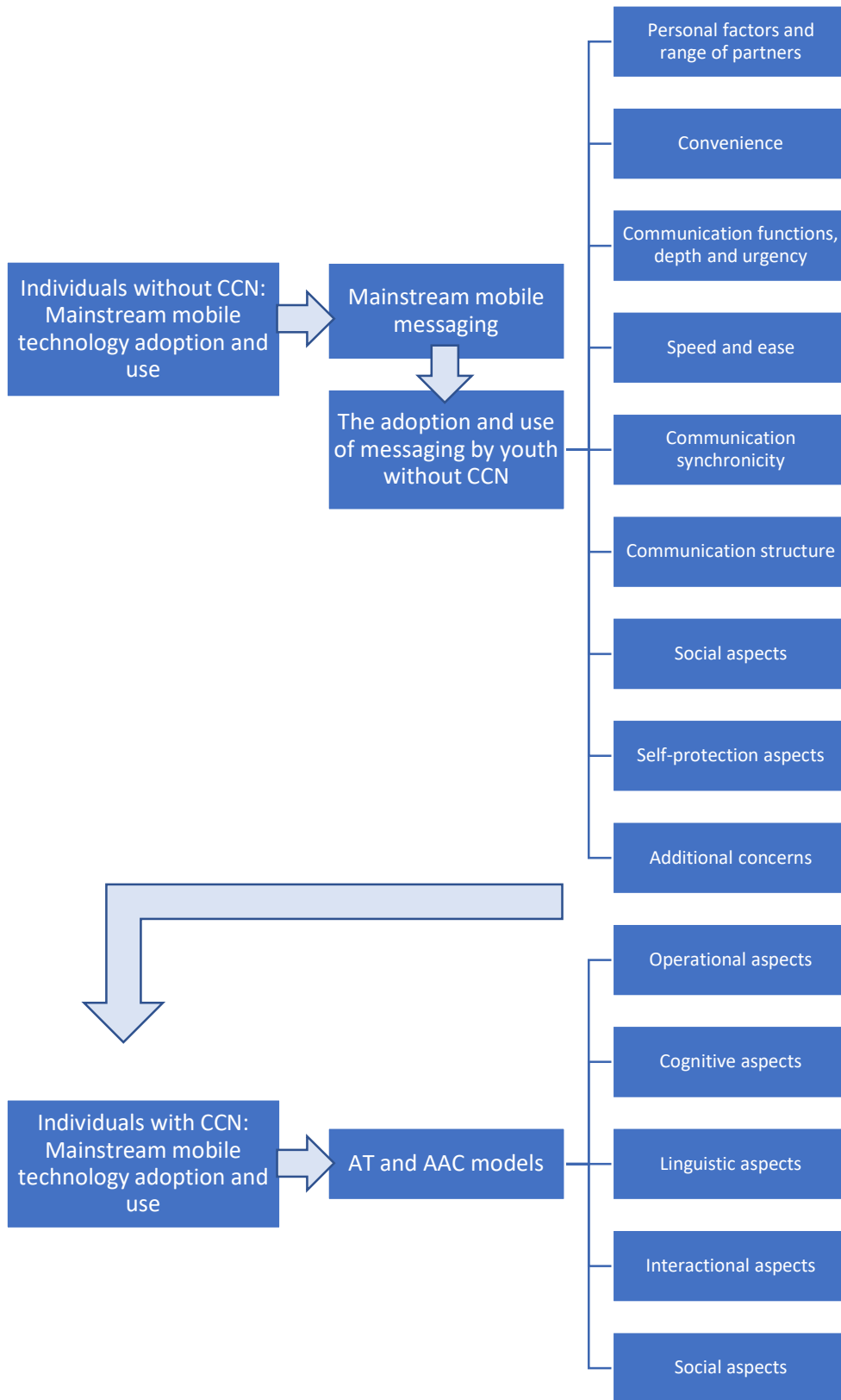


Figure 2.1. Visual representation of the layout of the chapter.

2.2 Adoption and Use of Mainstream Mobile Technologies by Individuals without CCN, with a Focus on Youth

South Africa has experienced exponential growth in the use of ICTs over the past decade, in particular the use of mobile phones. Mobile phone ownership is ubiquitous on the African continent, including South Africa (Pew Research Center, 2015). Mobile phone ownership in South Africa increased to 93% in 2018 (Pew Research Center, 2019), while 88,2% of South African households do not have landlines and exclusively use mobile phones – a trend that is especially evident in the poorer provinces (Statistics South Africa, 2018a).

A wide range of mobile phones are readily available to the South African public. These phones differ greatly in price. One of the aspects associated with cost is the functionality of the phone. Older model mobile phones can be used for numerous functions, including keeping a list of contacts that can be contacted through messaging. Newer model mobile phones, called smartphones, have a much wider range of functionality, as they operate as small computers or tablets with the additional functionality of a phone. Therefore, they can be used for communication as well as many other functions, such as access to information via the Internet, banking, shopping and entertainment. Despite these significant functionality differences, many studies do not make the distinction between older mobile phones and newer smartphones and generally just refer to all phones as mobile or cell (cellular) phones.

Smartphone ownership is rising in the LMICs, but these countries still lag behind high-income countries (Pew Research Center, 2016, 2019). In countries such as the US, Australia and South Korea, smartphone ownership is more than 80%, whereas at the time of the research a country like South Africa had a smartphone ownership of 60%. The increase in local and international smartphone ownership, also among youth, may correlate with the fact that more affordable smartphones are entering the market (Park, Kim, Shon, & Shim, 2013; Pew Research Center, 2013a).

The present youth, born between 1995 and 2010, have been labelled as Generation Z or Gen Z (mainly by marketing research firms) and have been attributed various characteristics (Mohr & Mohr, 2017; Shatto & Erwin, 2017; Turner, 2015). As far as technology use is concerned, Generation Z has been described as a generation raised in a digital world, making them the so-called *digital natives* (Shatto & Erwin, 2017) who are connected at all times (Turner, 2015). They

appear to be used to rapidly changing technologies, to prefer multitasking between technologies and activities, to have a great sense of immediacy, as well as a need for instant gratification as a result of their connected environment (Shatto & Erwin, 2016; Shatto & Erwin, 2017).

Mobile phones provide teens from low-income households in the US greater access to the Internet, thereby helping to bridge the digital divide (Pew Research Centre, 2010). A study by the Bureau of Market Research (2012) found that in South Africa's Gauteng province only 2.7% of secondary school learners (from a sample of 4000 learners) did not have access to a mobile phone and more of these learners have access to the Internet via these phones as opposed to computers. By the year 2016 it was reported that 55,2% of youth access the Internet through a smartphone (Statistics South Africa, 2016). Thus, despite the reported digital and/or data divide in the country (Dalvit, Kromberg, & Miya, 2014), mobile phone access gives the youth of South Africa many of the technological affordances enjoyed by the youth in other parts of the world who are exposed to a plethora of technologies (Burns, Jobson, & Zuma, 2015; Gunzo & Dalvit, 2012; Kreutzer, 2009; Thinyane, 2010). One of these affordances includes access to mobile communication.

2.3 Mainstream Mobile Messaging

Personal communication is an interactive process whereby messages are shared between individuals within specific contexts. Personal characteristics (including age, gender, personality), skills, abilities, experiences and psychosocial factors (e.g. motivation, confidence, resilience) of both the sender and receiver(s), along with their internal feedback, influence this interaction (Clarke & Wilkinson, 2013; Light & McNaughton, 2014). The specific combination of the partners and the feedback they provide to each other also influence the interaction (Blackstone, Williams, & Wilkins, 2007). Furthermore, communication takes place in different environments and contexts, which affects the different partners' communication interaction (Lloyd, Fuller, & Arvidson, 1997). There is thus an interplay between the sender and the receiver(s) of a message, as well as an interplay between them and the context in which their communication takes place. For example, the communication interaction between two adolescent girls compared to the interaction between an adolescent girl and boy may be very different and will also vary according to where the interaction takes place, such as at school versus at home.

The introduction of mobile technologies has led to new mobile communication possibilities. Communication on mobile technologies differs from face-to-face communication in that the communication takes place via the technology and there is an interplay between the individual using the technology and the affordances of the technology (Park, Chung, & Lee, 2012; Thurlow & Poff, 2011). The Uses and Gratification Theory in the ICT literature postulates that this interplay between user and technology influences the gratification of the user who uses the technology (Thurlow, 2003). As the name implies, mobile communication is not restricted to a specific setting because of its portable size and can be used to communicate with another individual who is in another setting (and possibly different context), thus enabling remote communication.

Communication on mobile technologies can be speech-based or text-based. Since the commercial release of text-based messaging or messaging in the 1990s, messaging has grown enormously in popularity (Pew Research Center, 2013b; Thurlow & Poff, 2011). Messaging is the most common use for mobile phones in Africa (Pew Research Center, 2015). This may possibly be because of the relative low cost of messaging compared to other modes of remote communication (Shahyad et al., 2011; Thurlow & Poff, 2011), as well as the lack of alternative communication infrastructures such as fixed telephone lines. According to Research ICT Africa (2013), 96.6% of mobile phone use in South Africa is for the sending and receiving of text messages.

There are numerous messaging platforms for personal communication. All mobile phones are equipped with the function to send and receive text messages. These messages vary in cost according to the individual's service provider contract or their *pay-as-you-go*/prepaid plan (Grinter & Eldridge, 2003). Smartphones that can connect to the Internet have applications that allow for mobile instant messaging (Montag et al., 2015; Van Cleemput, 2010). There are numerous such applications, for example WhatsApp, Facebook Messenger and Viber. The applications are continuously changing, merging and being replaced by newer applications (Junco, Merson, & Salter, 2010). The cost of instant messages will depend on the individual's data plan or access to Wi-Fi. When mobile instant messaging is used in a Wi-Fi area, the mobile instant messaging interaction carries no additional cost, which has led to the popularity of an application such as WhatsApp (Church & De Oliveira, 2013). A study comparing the use of mobile instant messaging versus text messaging showed that the senders of messages are not only concerned about the cost they incur, but also the cost that the recipient(s) of the message may incur (Church & De Oliveira,

2013). This depends on the type of cost plan the recipient has, as well as the context in which the recipient is when the message is received.

Messaging may also be influenced by the age, gender and culture of the individual. Variations and similarities in messaging frequency and orientation (along with linguistic variations) have been documented in various studies (Forgays, Hyman, & Schreiber, 2014; Pierce, 2009; Van Volkom, Stapley, & Malter, 2013). An example is a study on gender differences in the text messages of 13- to 18-year-olds, which showed that the texts of older boys were similar to those of younger girls. The study concluded that the differences noted in their study were related to age and experience (Goumi, Volckaert-Legrier, Bert-Erboul, & Bernicot, 2011). The present study focuses on the messaging practices of youth in general.

2.4 Adoption and Use of Messaging by Youth without CCN

Messaging has become a particularly popular means of personal communication for the youth. US statistics show that mobile phone messaging is the preferred mode of basic communication between teens (Pew Research Center, 2010) and that older teens (14 to 17 years old) send a median of 100 texts a day (Pew Research Center, 2012). Furthermore, studies show that adolescents and younger adults send and receive far more text messages than older adults (Forgays, et al., 2014; Ling, 2010; Van Volkom et al., 2013). Although South Africa is faced with large economic discrepancies preventing the generalisation of the above statistics, previously mentioned studies note the prevalence of messaging on mobile phones in South Africa, including the widespread use of mobile phones among the youth.

Many studies look at different aspects of the adoption and use of messaging by youth (Church & De Oliveira, 2013; Drouin & Driver, 2014; Durkin, Conti-Ramsden, & Walker, 2011; Farina & Lyddy, 2011, Heidari & Alibabae, 2013; Thurlow & Poff, 2011; Tossell et al., 2012). Some of these studies highlight various models and theories that explain aspects of the adoption and use of ICTs in general or messaging specifically. Examples of such models and theories are the technology acceptance model, which highlights perceived usefulness and perceived ease of use as the main factors that influence ITC adoption (Ceccucci, Peslak, & Sendall, 2010; Glass & Li, 2010; Yoon, Jeong, & Rolland, 2015), or the social network theory, which highlights the social dimension of ICT adoption (Agosto, Abbas, & Naughton, 2012). However, there is not a single

theoretical framework that provides a complete picture of the aspects that influence the youth's choice of communication media (Agosto et al., 2012; Park et al., 2012). Instead, a list of aspects that have led to the widespread adoption and use of messaging as a mode of communication by the youth has been compiled after scrutiny of the literature and are discussed in the following section. These aspects include: i) personal factors and range of communication partners; ii) convenience; iii) communication functions, depth and urgency; iv) speed and ease; v) synchronicity; vi) structure; and vii) social aspects. There are also certain concerns linked to the use of messaging that need to be considered and these are discussed under viii) self-protection aspects; and ix) additional concerns. In the discussion to follow, the connection with being part of the digitally native generation (Gen Z) will become clear.

2.4.1 Personal factors and range of communication partners

Different individuals have different characteristics and needs that will influence their adoption of technologies. Research on personal factors that motivate individuals to use technologies has found that factors such as individuals' belief in their capabilities (computer self-efficacy), levels of spontaneity (computer playfulness) and willingness to try something new (personal innovativeness) influence technology use (Gu, Zhu, & Guo, 2013; Yoon et al., 2015). Although it is beyond the scope of this research to explore these aspects, it must be noted that personal factors play a role in technology adoption and use.

Communication entails the interaction between various individuals. Messaging allows individuals to select their communication partner(s). Individuals can send a message to one or many receivers, or in the case of mobile instant messaging applications such as WhatsApp, to communicate within a selected group (www.whatsapp.com). These groups could be social groups or groups for specific activities such as sports groups or study groups. Individuals may also choose not to interact with certain individuals via messaging by ignoring, blocking or deleting their messages.

2.4.2 Convenience

The convenience of communicating on mobile technologies is an important aspect highlighted by youth. Convenience in the ICT context is seen as the ability to use the technology any place and any time (Yoon et al., 2015). Mobile phones are relatively small, portable and

unobtrusive. This allows for convenient use in many different locations and at a time that suits the individual. Messaging makes proximity obsolete as it allows for communication between people in the same room, as well as communication across continents. A study on adolescent perceptions regarding messaging versus voice calling indicated that adolescents felt they could text in virtually any circumstance (Blair, Fletcher, & Gaskin, 2015; Harrison & Gilmore, 2011). The convenience of messaging in any place is magnified by the fact that messaging can be done whilst doing something else (multitasking), which was described earlier as one of the characteristics of Gen Z (Blair et al., 2015; Grinter & Palen, 2002). Messaging can also be performed silently, which implies that communication can take place discreetly (Peslak, Ceccucci, & Sendall, 2010). For example, youth may message their parents to fetch them from a party because they are feeling uncomfortable without their peers knowing, even though they are in each other's company. This also exemplifies how mobile phones can enhance personal safety.

2.4.3 Communication functions, depth and urgency

In a large UK study on recorded text messages of first-year university students, it was found that although it is difficult to separate relational intent from transactional intent, only 15% of the messages they analysed were explicitly transactional messages (Thurlow, 2003). These authors found that text messaging generally had a relational orientation and could be viewed as small talk (Thurlow & Poff, 2011). Small talk is a very important means of connecting with others and messaging thus provides individuals with a sense of connectedness or social cohesion (Reid & Reid, 2004).

It is interesting to note that when messaging is transactional and not relational, preliminary greetings are not deemed necessary (Blair et al., 2015). An example would be asking a friend to come and visit without first saying *hallo, how are you?* as one would generally do in face-to-face or telephone communication. This gives individuals a sense of immediate reward (Blair et al., 2015), as well as saving time and effort.

The depth of the communication interaction is considered an important aspect by the youth (Agosto et al., 2012). Messaging is considered tedious for longer and more in-depth conversations (Agosto et al., 2012). The content of a message is furthermore influenced by the messaging platform. Mobile instant messaging applications, such as WhatsApp for example, are seen as more informal and thus suitable for chatting to individuals and groups. SMS is viewed as more reliable

and private (Church & De Oliveira, 2013), and would rather be used for more formal interactions. Alant (2017) discusses the contrast between the need to be able to have a more in-depth discussion via technology as friendships deepen and the fact that communication in well-established relationships can be very cryptic because of shared experiences.

The urgency of the communication need is also an important aspect that the youth consider when selecting personal communication media (Agosto et al., 2012). Messaging is seen by youth as the quickest way to reach their peers and to obtain a response. However, when urgently needing to reach an older person, the youth will first consider the technological skills of the receiver before deciding to interact via messaging (Blair et al., 2015).

2.4.4 Speed and ease of use

Speed and ease of use have been identified by the youth as one of the most important factors when choosing communication media (Agosto et al., 2012). The advent of personal computers meant that people without a background in computers needed to operate computers. This led to software that was more intuitively designed and that individuals could learn to operate themselves. The technology company, Apple, in particular spent much time on making operating systems that were as intuitive as possible (Elman, 2016). An example of this intuitive design is the icons that access various functions. Since the advent of mobile technologies new design adaptations had to be made so that a relatively small device could be quickly and easily accessed while being hand held (by a person who is possibly not stationary).

The design of mobile phones is continually improving according to these intuitive design principles, as well as universal design principles that strive to ensure fast and easy access for all. Older model mobile phones have buttons (differing in size according to the model), whereas more recent mobile phones and smartphones have touch screens that are activated by touching the screen in various ways such as tapping, swiping, pinching or zooming. These changes in interface design have resulted in a more physical access to mobile technologies (Elman, 2016). At the same time, access to mobile technologies has also become social in the sense that individuals learn how to operate these technologies by learning from others. This has led to the new notion of shareable design, which highlights the physical and social aspects in mobile technology design (Elman, 2016).

When considering the operational demands of messaging, messaging requires only a short series of operational steps on a mobile phone to send and receive messages. There are various websites that explain these steps (e.g. lifehacker.com). In short, mobile phones have icons representing the various functions of the phone to enhance easy function selection. When sending a message, the messaging function of the phone must be selected. Next, the individual sending the message needs to either enter the phone number(s) of the receiver(s) into the phone, or select the number(s) of the receiver(s) from a list of contacts stored on the phone or from the list of recent chats. Selecting a receiver from a list rather than remembering and entering a number adds to the speed and ease of use. On newer mobile phones photos of the contacts can be added to the numbers, further enhancing the ease of selection especially for individuals with literacy concerns. Once the contact has been selected or the number has been entered, the text message must be composed by selecting letters, words or emoticons. Finally, the sender must send the message. On the receiver's end, the receipt of a new message is indicated on the screen of the mobile phone. This icon must then be selected, and the message must be opened and read. Certain additional steps may need to be followed on phones that have functions such as screen locks; however, these may be deactivated.

Many mobile phones also have predictive text as well as previous word use recall. This allows the sender of the message to select an entire word with a single selection entry. The word recall function of newer phones also stores words in another language, which is very helpful in a multilingual country such as South Africa. The above aspects minimise both the physical and cognitive operational demands of the interaction.

2.4.5 Communication synchronicity

Messaging can be used in a synchronous or an asynchronous way (Durkin et al., 2011; Tossell et al., 2012). The advantage of asynchronicity is that individuals have the time to reflect and compose a response (Thurlow, 2003), giving them a sense of control during communication (Reid & Reid, 2004). This may add to youth experiencing less pressure when communicating via messaging (Agosto et al., 2012). However, messaging also lends itself to a degree of synchronicity or dialogue and an interaction may therefore be continuous (Ling, 2007). This conversational aspect is more evident when sending text messages via mobile instant messaging applications such as WhatsApp (Church & De Oliveira, 2013). Again, there is an interplay between the sender and

the receiver of the message and individuals may be sensitive to message reciprocity and the timing thereof (Thurlow & Poff, 2011). These expectations are more prominent when using mobile instant messaging applications such as WhatsApp that provide status information (whether the person is online or not) and visual delivery feedback (Church & De Oliveira, 2013). It is possible to deactivate the feedback notification of certain messaging applications, for example disabling read receipts in the privacy settings of WhatsApp (www.whatsapp.com); however, it is then deactivated for both the sender and receiver of the message.

Asynchronous conversations are possible as messages remain on the device as a *thread*. This may be viewed positively or negatively by youth. The fact that the messaging conversation can remain on the device is viewed as a positive aspect by certain youth as it allows them to save their favourite text messages for nostalgic reasons (Agosto et al., 2012). Miscommunications can also be clarified timeously as there is a record of preceding interactions. Keeping a record of a conversation may sometimes be viewed negatively and therefore messages on certain newer communication media such as Snapchat only remain on a device for a short while (www.webwise.ie).

2.4.6 Communication structure

Messaging is not only fast because of limited operational demands, but also because of the brevity and simplicity of the messages, which greatly contribute to the popularity of messaging (Thurlow, 2003; Thurlow & Poff, 2011). This is not necessarily because of space limitations in certain messaging platforms such as SMS, but rather to also enhance speed and ease. Text messages mainly consist of short simplified words and phrases, contractions, abbreviations, and they have a lack of punctuation and capitalisation (Farina & Lyddy, 2011; Grinter & Eldridge, 2003; Heidari & Alibabae, 2013; Thurlow, 2003). Examples of these shortenings are *pls* for *please* or *wud* for *what are you doing*. The language variations used in messaging have been called *textspeak* (Crystal, 2008), *textisms* or *textese* (Farina & Lyddy, 2011).

Textese is particularly prevalent in the youth culture as it has a playful informal register that encourages interaction (Thurlow & Poff, 2011). As previously mentioned, textese is brief and includes shortenings, contractions and clippings; acronyms and initialisms; letter/number homophones; misspellings and typos; non-conventional spellings, accent stylisations; and emoticons and typographic symbols (Farina & Lyddy, 2011; Thurlow, 2003). These linguistic

variations appeal to the youth's sense of creativity (Thurlow & Poff, 2011). This creativity appears to have developed organically within certain social communities where there is a homogeneity of experiences and information networks (Heidari & Alibabae, 2013). Age, gender and cultural differences thus exist in messaging. For example, a South African study indicated that abbreviations, paralinguistic restitutions and non-standard spellings were used when messaging in English but not in isiXhosa (Deumert & Masinyana, 2008).

Thurlow and Poff (2011) state that paralinguistic restitution (along with brevity, speed and phonological approximation) is one of the maxims that underpin messaging, referring to prosodic or socio-emotional features added to text (Thurlow & Poff, 2011; Shortis, 2001). This is vital for self-expression. Some pragmatic and emotional features have been identified in a study by Cenoz and Bereziartua (2016), namely pragmatic lengthening to mirror the intonation of spoken language (e.g. *yeeees*), upper case or extra capitals to signal an increase in volume (e.g. *NO*), emotion words (e.g. *sob*) and emotion punctuation for emphasis (e.g. *!!!*). Punctuation, or the lack thereof, can also be used to convey social information. This was demonstrated in a study on punctuation in text messaging that showed how messages ending with a period were rated as less sincere than messages without a period (Gunraj, Drumm-Hewitt, Dahow & Upadhyay, 2016).

Emojis are also used in messaging (Sánchez-Moya & Cruz-Moya, 2015a). Besides embellishing a message or providing socio-emotional context, a picture may function as an entire message and is thus a fast and convenient way of interacting (Amaglobeli, 2012; Dresner & Herring, 2010). For example, a thumbs-up emoticon can be used to indicate a positive reply to a question.

Allowing linguistic variations in messaging may also be potentially negative in that it may affect literacy development adversely. The effect of messaging on literacy development is a topic of discussion in the literature. Studies report that messaging may have both a positive and a negative impact on literacy (Drouin & Driver, 2014). Predictive text, for example, may enhance spelling. On the other hand, the use of accent stylisation such as *bii* (for *bye*) may lead to incorrect spelling practices. Other studies report little association between messaging and literacy (Ouellette & Michaud, 2016). Most of the empirical studies state that individuals understand that language varies according to different contexts (Sánchez-Moya & Cruz-Moya, 2015b; Thurlow & Poff, 2011; Thurlow, 2003). For example, a study of WhatsApp conversations of Spanish teenagers showed that the use of textese decreased as the level of familiarity decreased, indicating that the

teenagers knew that interactions with unfamiliar people were more formal and thus required standardised spelling and syntax (Sanches-Moya & Cruz-Moya, 2015b).

According to Thurlow and Poff (2011), the linguistic variations in messaging can to a great extent be explained by the combined need for immediacy and intimacy, and the appeal to the youth's need for identity formation. Different groups make use of a specific code when communicating, which adds to the social cohesion of the group (Thurlow & Poff, 2011; Thurlow, 2003). For example, individuals will spell words phonetically to voice their belonging to a specific age group (such as the youth using *kwl* instead of *cool*), or a specific cultural group (for example *luv* to highlight dialectal differences). A potential problem with strong group cohesion is that it may lead to group exclusion (Ling, 2007). An individual who has not been exposed to the linguistic variations used in a group may find it difficult to gain access to the social group. This type of exclusion is also prevalent in spoken interactions, albeit that meaning can be more easily decoded by context.

2.4.7 Social aspects

The social aspects that are linked to messaging are extremely important in the adoption and use of this mode of communication. Critical mass theory has shown that messaging is very popular because of the number of other individuals who text (Yoon et al., 2015). Youth feel that messaging is the social norm and that they are thus accommodating their peers by also messaging (Blair et al., 2015; Shahyad et al., 2011). Social network theory has furthermore highlighted individuals' need for a sense of connectedness and belonging (Ling, 2007; Reid & Reid, 2004). The connection messaging provides between individuals that are not in the same context has been referred to maintaining an *absent presence* in relationships (Thurlow & Poff, 2011) (also called a "connected presence" by Licoppe (2004) as cited by Ling (2007, p. 62)).

As previously mentioned, messaging fosters social interactions between individuals. Although new friendships can be established through messaging (Thurlow & Poff, 2011), studies have shown that the largest segment of the text messages was to maintain and reinforce existing friendships (Ishii, 2006; Sotillo, 2012; Thurlow, 2003). Messaging is thus described as an intimate form of communication (Agosto et al., 2012), unlike communication via social media. A study on instant messaging showed that the exchange of intimate information has had a positive effect on the quality of friendships (Valkenburg & Peter, 2009). Friendships can be fostered by for example

sending a *have a nice day* message, a joke, or just an emoji such as a heart. Messages with romantic and sexual content are also shared using messaging (Thurlow, 2003). Sexting messages have a high intimacy level and can be viewed in a positive or negative light, depending on the intent of the message and the relationship between the sender and receiver of the message.

Youth also demonstrate a strong awareness of the social acceptability of using different technologies and therefore often choose messaging in contexts such as at school, as it is the least conspicuous (Agosto et al., 2012). However, the youth differ in opinion regarding the social rules regarding messaging. For example, in a study on ICT selection practices, the youth agreed that it was acceptable to text whilst conversing face to face as long as the communication was not interrupted, but disagreed on whether it was acceptable to initiate an intimate relationship via technologies (Agosto et al., 2012). It must be remembered that different contexts and people have different social norms (which may shift over time). These norms may be breached as a result of the disinhibition caused by messaging being convenient, fast and faceless (Harrison & Gilmore, 2012). Thurlow and Poff (2011) refer to the “relative anonymity” (p. 10) afforded by messaging as *recognised anonymity*. Individuals may thus use messaging to communicate something that they would deem inappropriate when communicating face to face, such as commenting on someone’s physical appearance. Furthermore, blocking contact from an individual or deleting someone from a social group such as WhatsApp may also be hurtful. At the same time the ability to regulate contact with others (unlike certain social media) may be a positive self-protective function.

2.4.8 Self-protection aspects

It must be admitted that there are concerns regarding technologically mediated modes of communication such as messaging, specifically related to the youth. Some of these concerns include cyberbullying, disrupted sleep patterns, exposure to unregulated messages and addiction (Ahad & Lim, 2014; Porter et al., 2016; Sadhir, Stockburger & Omar, 2016; Turner, 2015). According to Agosto et al. (2012) the teens themselves are aware of privacy, security and communication overload concerns and take these into account in their choice of ICT. For example, teens in a study preferred messaging sensitive information rather than using social network sites as they were aware of the potential harm of social media sites (Agosto et al., 2012). However, even though messaging is more personal, the danger exists that the content of a message may be

forwarded or shared by the receiver of the message and that this could result in serious negative consequences.

2.4.9 Additional concerns

Potential negative interactional aspects are highlighted in certain studies. For example, a lack of face-to-face communication as the result of computer-mediated communication may lead to a decline in the skills needed for communicating in person (Turner, 2015). He further warns that the constant access to communication technologies has led to a generation that is used to instant gratification and who may also feel instantly hurt or dismayed because of the content or context of the communication.

2.4.10 Summary of youth without CCN

In the preceding sections a broad overview was given of the messaging practices of youth without CCN. The literature on this topic is vast and various aspects, for example those relating to different personality types and the use of messaging, do not fall within the scope of this research. Research on the messaging practices of youth with CCN is sparse despite the vast body of knowledge on messaging practices of typically developing youth. The next section therefore looks at the general adoption and use of mainstream mobile technologies by individuals with CCN. The section includes a description of selected AAC and AT models to frame the discussion. In the discussion it is important to note that communication via mainstream mobile technologies complement and do not replace other forms of interaction (Alant, 2017).

2.5 Adoption and Use of Mainstream Mobile Technologies by Individuals with CCN

The availability, affordability, portability, functionality and general appeal of mainstream mobile technologies have led to the popularity of these technologies (AAC-RERC, 2011; Bryen & Moolman, 2015; Chapple, 2011; McLeod, 2011; McNaughton & Light, 2013; Meder & Wegner, 2015; O'Brien, 2015). The popularity of mainstream mobile technologies has resulted in certain individuals with CCN acquiring these technologies without the help of clinicians (Loncke, 2014). This has caused a shift in the AAC service delivery model from a clinician-guided access model

to a consumer-driven access model (otherwise described as a platform-first approach) (Meder & Wegner, 2015; Myrden, Schudlo, Weyand, Zeyl, & Chau, 2014). Individuals with CCN are furthermore making their own adaptations to these technologies (Bornman et al., 2016) or they use various applications (apps) on their mainstream technologies (O'Brien, 2015). Some of the benefits of these technologies for individuals with CCN have been documented in the literature. For example, they may offer the individual with CCN the opportunity to access information, run errands like shopping and banking, access entertainment, improve safety, further education, provide vocational opportunities, etc. (Caron & Light, 2016; McNaughton & Light, 2013). They can also assist in increasing social engagement via social media (Caron & Light, 2016; Hemsley, Balandin, Palmer, & Dann, 2017; Hynan, Goldbart, & Murray, 2015; Paterson, 2017). However, the use of messaging specifically, which is a common personal form of communication for youth, has not received much attention other than in studies like the previously mentioned ones in the US and South Africa, which highlighted that individuals with CCN use mainstream mobile messaging (Bornman et al., 2016; Bryen & Moolman, 2015).

2.6 AT and AAC Models

Aided communication is depicted as the intersection of AT and AAC according to Lloyd's Relationship of Augmentative and Alternative Communication to Assistive Technology model (Wendt, Quist, & Lloyd, 2011). In the US, mainstream technologies such as mobile phones function as assistive technology (AT) when used as a communication aid by individuals with disabilities (Individuals with Disabilities Education Act, 2004). Thus, when discussing communication by individuals with CCN who use mobile technologies such as mobile phones, components that are highlighted in the models related to both AT and AAC literature need to be considered. Cook and Hussey's (2002) Human Activity Assistive Technology (HAAT) model, as well as Lloyd, Quist and Windsor's (1990) original AAC Communication Model (Lloyd et al., 1997), will be used to introduce this discussion.

Cook and Hussey first described the HAAT model in 1995, where after it was revised in 2002 by the same authors and in 2008 by Cook and Polgar. The model comprises four main components, namely the human component (the individual with disabilities); the activity component (the activity the individual engages in); the assistive technology component (the device

the individual uses to engage in the activity); and the context in which the activity is performed (the setting and the social, cultural and physical contexts). The authors of the model use the term *intrinsic enablers* and *extrinsic enablers* in their discussion of the model, which includes personal aspects and device aspects that are linked through the human/technology interface and that enable the individual with disabilities to perform the activity (Cook & Hussey, 2002). According to the HAAT model, everyone has certain individual skills, abilities, experiences and preferences that should be considered in conjunction with the technology (Darcy et al., 2016; Wendt et al., 2011).

The 2008 version of the HAAT model underwent certain significant changes and emphasised the three-dimensionality of the concepts by depicting the human, the activity and the assistive technology components as an interlocking sphere (Giesbrecht, 2013). This sphere is situated within a shallow box that depicts the context. The adaptation of how the context is represented is criticised by Giesbrecht (2013), who prefers the context to be indicated as encompassing the other components. Although slight changes were made to the model (some of which have been criticised), the model has proven to be robust over time and is used in numerous studies concerning the use of AT (Giesbrecht, 2013; Smith et al., 2018). The HAAT model relates well to the present study, as it illustrates that ATs (such as mobile phones) can be used by individuals with disabilities (youth with CCN) to gain access to activities (such as messaging) within various contexts. This again resonates strongly with the interplay between the individual and technology as was highlighted in the previous discussion on mainstream mobile device use by individuals without CCN. The inclusion of contextual factors is particularly important in a qualitative case study design such as the one used in the present study.

Lloyd, Quist and Windsor's (1990) AAC Communication Model is based on elements of the basic human communication model that was developed in the 20th century, in other words pre-mobile technologies. These elements include the sender and receiver (with their physical, cognitive, linguistic, psychological and social abilities, as well as prior experience), the message, the environment (including a potential noise component), and the internal and external feedback components (Lloyd et al., 1997). Lloyd et al. (1997) expand on previous models by differentiating between the communication environment and the transmission environment. Furthermore, their model (Lloyd et al., 1990) views the communication process as multimodal and thus highlights a more detailed transmission process that is particularly relevant to AAC. The transmission process involves three interactive aspects, namely the means to represent, the means to select and the

means to transmit the message (Lloyd et al., 1997). Although not originally intended as such, Lloyd et al.'s model (1990) is applicable not only to the use of dedicated devices for AAC, but also to mobile communication on mainstream technologies. Their model for example illustrates the interplay between the individuals concerned, as well as between the individuals and the environment, as highlighted in the discussion about mainstream mobile technologies (Lloyd et al., 1990). It could furthermore be used to illustrate that, during messaging, individuals need to select and transmit their text-based message on their mobile device. However, certain affordances of interacting on mainstream technologies were not available at the time when Lloyd et al.'s model (1990) was published and may thus not be represented in it.

Although the above models include many important aspects of communication, it is not possible for a single communication model to include all aspects of communication in detail (Von Tetzchner et al., 1996). For example, Alant (2017) highlights the more recent notion of the transactional nature of communication and proposes an adapted communication model that focuses on the meaning-making aspect of communication. Instead of proposing a single model, Von Tetzchner et al. (1996) therefore provide a more detailed discussion on the physical, cognitive, interactional and socio-cultural aspects that are critical to consider in AAC. These authors caution that distinguishing between these aspects is a purely academic exercise and that they should all be considered as being inter-related. However, discussing them separately can provide different descriptive points of view.

The present study opted to view messaging from an interactional perspective, while acknowledging that to have a more comprehensive understanding of any means of communication, a general discussion of the various aspects is warranted. It is interesting to note that the four aspects highlighted by Von Tetzchner et al. (1996) – physical, cognitive, interactional and socio-cultural – resonate with the communicative competencies conceptualised by Light (1989) as operational, linguistic, strategic and social competence. In subsequent work, Light and McNaughton (2014) added that psychosocial aspects such as motivation, resilience and attitude are also important to attain communicative competence. As all the aspects are linked to one another, any attempted separation is superficial. However, for the sake of comprehensiveness and clarity, aspects are separated into subheadings for discussion purposes. Most of the aspects could be placed under numerous subheadings and some of them are thus also discussed under more than one subheading.

2.6.1 Operational aspects

The value of independent access was highlighted in a study on the perceptions that young people who use AAC have in respect of digital technologies (Hynan et al., 2014). For example, the handling of the actual mobile phone handset may be difficult for individuals with disabilities and devices may break when dropped (Wendt et al., 2011). Newer phones are shock and water resistant, whereas individual adjustments can be made to older phones. Bryen and Pecunas (2004) suggest some custom-made solutions like placing the phone in a plastic cover and mounting the mobile phone to the wheelchair, while also using the wheelchair to charge the phone's battery. Individuals with CCN may also make personal adjustments to their mobile phones, for instance adding accessories, assistive devices or improvised solutions such as protective cases, switches or Velcro straps (Bornman et al., 2016).

Communication using mobile technologies furthermore has device-specific operational requirements. These include activating the device, selecting the appropriate function, executing the function and exiting the function. Both ease of use and fatigue can influence the speed of communication and are thus important considerations (Bryant & Bryant, 2012). Technology design should thus adhere to universal design principles and continue to strive for universal access for all (Bryant & Bryant, 2012; Jacko & Vitense, 2001). In Bryen and Pecunas's (2004) study on cell phone use by individuals who use AAC, the need for a universal cell phone design was emphasised and suggestions were made regarding specific design modifications of cell phones for use by individuals who rely on AAC (e.g. larger buttons). Since this 2004 study, touch-screen devices have come into mainstream use, offering easier access to more individuals. For example, a review on the use of touch-screen mobile devices by people with developmental disabilities concludes with the notion that these individuals do not find device operation per se difficult, but the various applications used to perform a function may be challenging and therefore more research is needed (Stephenson & Limbrick, 2015).

Certain mainstream mobile phones are already equipped with extended functions that improve access to the technologies, for example the possibility to adjust selection speed, visual and auditory features, as well as voice activation and voice output features (Higginbotham & Jacobs, 2011). Furthermore, as technology advances, more mainstream mobile technologies could be activated through alternative access modes such as eye-controlled input (Myrden et al., 2014; Wendt et al., 2011) or Bluetooth scanning switches (Kagohara et al., 2013). These are often used

in conjunction with downloaded applications (O'Brien, 2015). However, certain individuals with physical and cognitive impairments may still struggle to access these technologies and access for all remains a concern (Borg, Lantz, & Gulliksen, 2015; Caron & Light, 2016; Chapple, 2011). Further advancements in technologies will be welcomed by the disability community at large.

An important feature for individuals with poor motor control who fatigue easily is the number of keystrokes needed to formulate a message (Beukelman & Mirenda, 2013). The literature on messaging of individuals without CCN stresses that messaging is brief. According to Cook and Polgar (2008), specific device characteristics may also compensate for user skills and the word recall and predictive text functions of mobile technologies may fall into this category. These aspects may be particularly beneficial to individuals who fatigue easily.

Depending on the abilities of the individual with CCN, operational aspects may involve the help of someone else (typically a family member or personal assistant). For example, the individual with CCN may need to rely on someone else to charge the device (Darcy et al., 2016). Young adults who use AAC note that their parents' general lack of knowledge of technologies and of access equipment is a concern (Hynan et al., 2014). Even though many individuals without CCN may be more familiar with the operational requirements of mobile phones than of dedicated AAC devices, device knowledge, system support and maintenance, as well as training for use of mainstream technologies remain areas of concern (Alant, 2017; Bryant & Bryant, 2012; Caron & Light, 2016; Grace et al., 2014; McNaughton & Light, 2013). Training individuals to use these technologies is considered vital (Bryant & Bryant, 2012). It is interesting to note that a study by Hemsley, Dann, Palmer, Allan and Balandin (2015) shows that the operational competence of technology use by individuals who use AAC was shown to develop through incidental learning such as watching others – as illustrated in a study on Twitter use by individuals who use AAC (Twitter is also a short text-based messaging medium on mainstream technologies).

2.6.2 Cognitive aspects

The operating of mainstream mobile technologies requires certain cognitive skills. Examples of operational difficulties experienced by individuals with cognitive disabilities are selecting the correct contact or forgetting to press the send button (Stock, Davies, Wehmeyer, & Palmer, 2008). Again, universal design principles strive to ensure access to all individuals and thus continually endeavour to minimise the cognitive demands for accessing technologies, for example

having icons to access different functions on the device. However, even though there has been progress regarding access for all, individuals with cognitive disabilities are still underutilising these potentially beneficial technologies (Palmer, Wehmeyer, Davies, & Stock, 2012). Guidelines exist that try to ensure that electronic communication is accessible for individuals with cognitive disabilities (Borg et al., 2015). A systematic review of the empirical evidence of the measures that ensure such accessibility has shown that the accessibility needs and requirements of people with cognitive disabilities are diverse. The authors of the review therefore suggested that these measures should be adaptable according to individual needs (Borg et al., 2015). An example given in the review is that enhancing background-foreground contrast on the display screen may not benefit all individuals with cognitive disabilities and that the individual should be able to adjust such a setting. Another systematic review on the efficacy and usability of AT such as mobile phones for individuals with cognitive deficits also concluded that AT should be individually adjustable based on the abilities and needs of the individual (De Joode, Van Heugten, Verhey, & Van Boxtel, 2010). The study furthermore states that multipurpose technologies such as smartphones can potentially support memory deficits as well as aid executive functioning and attention. A study by Stock et al. (2008) found that newer multimedia mobile phones, with universal design features that ensure cognitive access, can be of great benefit to individuals with cognitive disabilities. These phones not only improve the safety and security of their users, but also enhance their community participation and social connectedness. All these studies stress the need for further evidence through research.

Von Tetzchner et al. (1996) use the term *bilinguality* to describe an individual's cognitive competence to deal with issues such as differences between receptive and productive skills. Thus, another important consideration is that communication interactions between individuals who use AAC (who may or may not have cognitive disabilities) and individuals who do not use AAC (who may or may not have cognitive disabilities) may mean that two or more different modes of communication are used, resulting in an asymmetry in competencies of the communication partners. A text message is transmitted from one mobile phone to another; therefore both the sender and receiver are using the same mode of communication, minimising the concerns regarding bilinguality.

2.6.3 Linguistic aspects

Cognitive and linguistic aspects are strongly related (Owens, 1996) and both have an impact on literacy development (along with other intrinsic and extrinsic factors). Literacy development for individuals who require AAC has been neglected for many years (Loncke, 2014) and literacy skills remain a concern for many individuals who use AAC (Dahlgren, Sandberg, Smith, & Larsson, 2010; Hynan et al., 2014). According to Bornman (2017), South Africa has numerous policies in place to ensure equal education for all, yet several barriers are preventing a large portion of children with disabilities from receiving adequate education and, consequently, literacy development suffers. Bornman (2017) further states that some of these barriers include poor implementation of policies (preventing children with disabilities to gain access to schools), low literacy expectations by teachers and parents, and a lack of learning environments that foster literacy development. Furthermore, these barriers are even more significant in rural parts of South Africa.

Messaging requires a level of literacy, as it is mainly text based (excluding the use of emojis). One of the problems of learning traditional orthography (written words) as an aided symbol system is the fact that there is not a one-to-one relationship between letter and sound (Lloyd et al., 1997). In messaging, phonetic spelling (phonological approximation) is allowed (Thurlow, 2003; Thurlow & Poff, 2011). Furthermore, messaging does not adhere to strict language conventions, as it allows short utterances with omission of words and punctuation, as well as abbreviations and shortenings (Thurlow, 2003; Thurlow & Poff, 2011). As previously stated, this specific register is referred to as textese and it is popular because it is brief and saves time and effort. Messaging potentially also has an equalizing effect for individuals who have literacy difficulties, as linguistic “errors” are tolerated. The fact that poor spelling and grammar are tolerated in messaging via Twitter is one of the favoured features noted by individuals who use AAC (Hemsley et al., 2015).

The possibility that emojis can further minimise literacy demands is an area that warrants investigation. Emojis (as well as their predecessor emoticons) can be used to provide socio-emotional context to text messages (Tossell et al., 2012). A study on emoticon use showed that an emoticon can also be used instead of a written word or punctuation, or as an entire turn (or message) (Amaghlobeli, 2012). This also applies to the use of emojis. For example, the question *Where are you* can be answered with an emoji of a house to answer *home*. Individuals who use a

pictographic symbol system to communicate may thus be able to text a restricted number of messages by only using emojis. This applies particularly to messages that promote social closeness, like a smiley face.

The fact that emojis provide socio-emotional context may furthermore benefit individuals who struggle to convey emotion through their voice, gestural or facial expressions. A pertinent example is the use of emojis to convey sarcasm, as in the remark *I am happy for them* 😞. Emojis as well as emoticons, on the other hand, may also require contextual interpretation, for example to understand the degree of playfulness that is often conveyed through their use (Dresner & Herring, 2010). The development of this skill requires social exposure.

Recognised linguistic variations differ from spelling mistakes in that they develop within social circles and whereas spelling mistakes may allow for more inclusion, not knowing the correct linguistic variations may result in exclusion. A study on the messaging practices of individuals with specific language impairment (SLI) showed that children with SLI used the same number of word omissions as children with typical development, but not as many textisms (alternate ways of spelling words) (Blom, Van Dijk, Vasic, Van Witteloostuijn, & Avrutin, 2017). Another study on messaging use by adolescents with and without SLI also showed that adolescents with SLI sent texts less frequently and that their texts were shorter and contained fewer textisms (Durkin et al., 2011). This may possibly relate to the fact that individuals with SLI may not have experienced the same social exposure as their peers, as is shown in a study that highlighted the possibility of social rather than language factors being associated with the frequency of messaging by adolescents with SLI (Conti-Ramsden, Durkin, & Simkin, 2010). Thus, an individual who has not been exposed to these linguistic variations may find it difficult to understand or gain access to a social group. This is an important factor to consider in the current study for the youth with CCN whose social participation may be limited.

2.6.4 Interactional aspects

Light (1989) documented four purposes that communicative interactions fulfil, namely communication of needs/wants, information transfer, social closeness and social etiquette. Of these, social closeness is often a great priority for individuals with CCN, but in the past the focus of intervention was often on training individuals with CCN to express their needs and wants (Light, 1997). In a study by Bornman et al. (2016), persons who use AAC indicated that they used their

mobile phones mainly for transactional purposes (such as making arrangements). The fact that the relational aspect of messaging is not highlighted by these users may be because this communicative function of messaging is not realised or expressed by them. It may also be because the individuals in Bornman's study did not use mobile technologies as their primary communication device. For adolescents, social closeness with their peers is particularly important (Light, 1997). Messaging on mobile phones can potentially fulfil all communication functions and is a particularly useful communication tool for enhancing social closeness.

Although messaging may be slow for individuals with physical disabilities, the fact that individuals can communicate over a distance and at a time when the person with CCN is least tired is very beneficial (Paterson, 2017). This may be particularly so for individuals who are homebound. As previously mentioned, messaging can be used in both an asynchronous and synchronous way (Durkin et al., 2011; Tossell et al., 2012). This provides the youth a measure of independence and emancipation as they can control their communication interactions (Thurlow & Poff, 2011). The advantage of asynchronicity for individuals who use AAC is that there is no immediate temporal pressure and thus there is time to reflect and compose a response (Blackstone et al., 2007). The asynchronous nature of messaging may also lessen the trend that individuals without CCN typically generate more turns and use more fillers than those who use communication aids (Noren, Samuelsson, & Plejert, 2013). Blackstone and colleagues (2007) state that certain means of communication are no longer constrained by temporal and spatial factors and how this may benefit communication parity and symmetry.

Messaging also lends itself to a degree of synchronicity or dialogue, and thus it can be used to have a conversation. Youths are known to text each other even in each other's presence, and a conversation on mobile phones between individuals within the same physical context is thus possible. This aspect may have a normalising effect on interactions between individuals with and without disabilities. However, such interactions may still be slow. Luckily text messages remain on the device and show the train of conversation. This conversational thread may aid both communication partners and allow them to adjust and respond to a breakdown in communication. Adequate strategic competence is particularly important for individuals with CCN who are faced with limitations in their operational, linguistic and/or social competence (Light & McNaughton, 2014).

The need for a personal assistant to help with the operational requirements of messaging may also have an impact on the interactional aspects of communication. Negative attitudes of certain significant others and service providers may influence not only the technology adoption of the individual with disabilities (Darcy et al., 2016), but also inhibit these individuals from expressing themselves freely when using these technologies. Therefore it remains important to consider the physical and cognitive demands that any device usage places on personal assistants and communication partners (Blackstone et al., 2007).

There seems to be a correlation between experiencing the benefits of messaging and subsequent use (Reid & Reid, 2010; Shahyad et al., 2011). In other words, messaging needs to be used in order to be found useful. It is therefore essential that individuals with CCN have the social opportunities to practise these interactional skills, just as face-to-face interactions need to be developed through practice (Alant, 2017).

2.6.5 Social aspects

Individuals with CCN will intrinsically be from different age, language, socio-economic or ethnic groups (Beukelman & Mirenda, 2013) and may interact in various social and cultural settings (Von Tetzchner et al., 1996). Blackstone and Hunt Berg (2003) developed a social networks approach that includes a Social Networks Inventory to illustrate the circles of communication partners for individuals with CCN. The circles around the communicator include lifelong communication partners (including family and others with whom the individual resides), close friends and relatives (with whom the individual spends leisure time, shares mutual interests, plays and confides in), acquaintances (with whom the individual does not socialise on a regular basis), paid workers and unfamiliar partners (Blackstone & Hunt Berg, 2003; Granlund, Björck-Åkesson, Wilder, & Ylvén, 2008). According to Blackstone et al. (2007), individuals with CCN may have restricted social networks despite inclusive policies.

A study on the school participation and social networks of children with CCN showed that children with CCN had fewer acquaintances and friends, as well as limited communication opportunities at school, compared to children with typical development and children with physical disabilities (Raghavendra, Olsson, Sampson, McInerney, & Connell, 2012). Raghavendra et al. (2012) stress the importance of having the opportunities to practise communication and social skills and warn that limited participation results in a downward spiral of these skills. A study that

looked at training social interaction between adolescents and a classroom peer with CCN showed that training can enhance social participation (Lilienfeld, 2002). Unfortunately, only a small portion of communication-related goals in individualised education programmes for children with CCN focus on interaction with others and participation in classroom and leisure activities (Klang et al., 2016).

Mobile communication has been shown to enhance social interactions in immediate friendship circles. However, as previously alluded to, the strong cohesion within a group may also lead to the exclusion of others (Ling, 2007). Messaging may be a means of expanding the social participation of an individual with CCN. However, this may need to be facilitated because of existing barriers.

2.7 Conclusion

Messaging is an extremely popular means of communication by the youth. It allows for inexpensive, fast, easy, convenient, informal and independent communication with peers, and it provides the youth with a sense of connectedness. Messaging is known for permissive linguistic variations and shortenings called textese. Youth with CCN face many challenges that may influence or even prohibit their use of messaging. These possibly include physical and cognitive challenges that hamper access to the technologies, limited linguistic and literacy skills, as well as limited social opportunities to practise interactions and learn strategic skills. However, preferences and priorities are just as important as abilities and skills (Blackstone et al., 2007). It is therefore not surprising that various studies already report wide mobile phone ownership and messaging use by individuals with CCN (Bornman et al., 2016; Bryen & Moolman, 2015). However, they also stress the need for greater technology ownership and access to decrease the digital divide (Morris & Bryen, 2015).

Thus, despite barriers to mobile phone use by individuals with CCN, many of them already own phones and more are encouraged to do so. Numerous studies have been done on the adoption and use of mobile phones and messaging by youth *without* CCN. Yet, to date the researcher has found no specific studies giving detailed accounts of the messaging practices of youth *with* CCN and the aspects that influence these practices. The present study therefore attempted to take an in-depth look at why, with whom, where, when, what, and how youth with CCN interact via

Chapter 2: Literature Review

messaging. The findings that emerge will contribute to the knowledge base of the AT field in general and the AAC field in particular by providing insight into the messaging practices of this population and highlighting potential aspects that need to be addressed to ensure access to technologies for all.

CHAPTER 3

Research Methodology

3.1 Introduction

This chapter discusses the methodology used in this study. First, the main aim and subaims of the research are stated. Next, an overview is given of why a qualitative case study design suited the aims of this study, and the participants' recruitment, screening, selection and description are discussed. This is followed by a description of the interview settings and mood, the material and equipment used, as well as the procedures adhered to in the pilot study. Next, the various data collection methods used are reviewed, and the validation and reliability strategies that were employed to strengthen the trustworthiness of the findings are presented in table format. To conclude, the key points of the chapter are summarised.

3.2 Main Aim and Subaims

The main aim of the study is to explore and describe the interactional aspects of mainstream mobile messaging (related to the why, who, when, where, what and how of communication) for youth with CCN.

To address the main aim of the study, the following subaims were formulated:

- i. To explore and identify the benefits as well as challenges associated with the use of messaging according to youth with CCN and their selected communication partners.
- ii. To describe who the messaging communication partners of youth with CCN are.
- iii. To describe where and when messaging interactions take place.
- iv. To describe what the functional orientation of the messaging content is, as well as the expressive features used.
- v. To describe how youth with CCN maintain interactions and repair potential communication breakdowns when using messaging.

- vi. To describe how youth with CCN use messaging to increase the ease and rate of these interactions.
- vii. To report the recommendations made by the participants and their selected communication partners on the use of messaging for individuals with CCN.

3.3 Research Design

A qualitative case study research design was selected to explore and describe a single phenomenon within its real-life context (Yin, 1999). Such a design has several core characteristics that are well suited towards enhancing our understanding of a complex issue such as communication that is specific to persons within a given context (youth with CCN in South Africa). One of the core characteristics of a qualitative case study design is that it allows for the use of multiple methods of data gathering, including interviews and observations (Creswell, Hanson, Plano Clark, & Morales, 2007; Creswell & Poth, 2018). Individual interviews provide a more holistic account of each individual's unique realities (Edmonds & Kennedy, 2013) and observations of an individual in their natural context provide context-specific information (McMillan & Schumacher, 2014). In the present study both participant interviews and observations were used, which enabled the researcher to familiarise herself with the different participants and their respective contexts, as well as to explore messaging from each participant's personal perspective. A WhatsApp focus group was also included, which stimulated discussions among the participants, highlighting similarities and differences of opinion about the various aspects explored. As communication is interactive, partner interviews were included to obtain the perspectives of the communication partners.

A second core characteristic of a qualitative research design is that the researcher acts as the key instrument in the development of appropriate questions, data collection and analysis of the research (Creswell, 2014). As the researcher was a white middle-aged female and the selected participants and their communication partners differed from the researcher in age as well as cultural- and economic backgrounds, the researcher had to reflect on possible personal biases (Salkind, 2006) during the documentation and analysis of the data. The researcher also guided the enquiry according to the various aspects identified in the literature. The use and timing of the review of literature vary in qualitative research (Creswell & Poth, 2018) and the present study

chose to review the literature prior to data collection. This approach was chosen as peer performance of a task or behaviour is often the first step in understanding potential participation of individuals with CCN, as is recommended in the Participation Model (Beukelman & Mirenda, 2013). As previously stated, the use of messaging by typically developing youth is well documented in the literature (Drouin & Driver, 2014; Heidari & Alibabae, 2013; Thurlow & Poff, 2011; Tossell et al., 2012) and thus served as a frame of reference for the study. The literature that was reviewed also scrutinised research into the use of technologies by individuals with CCN in general (e.g. Bryen & Moolman, 2015; Bornman et al., 2016; Caron & Light, 2015; Darcy et al., 2016; Hynan et al., 2014), which guided the design of the study in hand (Jacob & Furgerson, 2012).

A third key component of a research project such as that the current one (which involves vulnerable participants) is the ethical issue of remaining sensitive to the needs of the participants and selecting suitable sites for conducting the research (Creswell & Poth, 2018). The researcher forged a good relationship with staff members at the schools attended by the participants, and subsequently established a good rapport with the participants and assured them of confidentiality (McMillan & Schumacher, 2014). The participants were asked to select the interview sites. It was important to bear in mind that the youth may be particularly sensitive about the information they share with the researcher. The researcher was also aware of the ethical implications of involving youth and the fact that the questions could trigger unforeseen responses (Agee, 2009). Therefore, she aimed to use a collaborative approach with the participants and encouraged them to see the research as an opportunity to express their views. Blackstone et al. (2007) note that active involvement of people who rely on AAC in research is the first key underlying principle in AAC research and practice. There is a current drive in disability studies to actively engage individuals with disabilities themselves, rather than to study them from an outside perspective (Wickenden, 2011). Unfortunately, this trend is not often seen in studies including individuals with severe communication impairments. According to Ajodhia-Andrews (2016), there is a pressing need for research where children with disabilities are given a voice to express their own understanding of their lives, identities and experiences. The same can be said for the youth with CCN. As case study designs are bound by time and activity (Creswell, 2014), the parameters of the interviews and WhatsApp discussion group were clearly defined to the participants.

Even though a case study design is well suited to the present study for the above-mentioned reasons, case study designs also have specific limitations. The main limitation is that case study

research has a narrow focus, which causes generalisability of the results to be limited, even when a multiple case study design is used (Yin, 2013). Yin (2013) nevertheless suggests several ways to ensure the validity and wider generalisation of case study design, to which the present study tried to adhere. These included the use of data source and method triangulation to strengthen the validity of the finding, and the use of *analytic generalisation*. The term analytic generalisation means “the extraction of a more abstract level of ideas from a set of case study finding” (Yin, 2013, p.321). In the present study, the research findings are discussed in terms of more abstract concepts such as *absent presence* and *recognised anonymity* to enhance generalisation of the findings. Therefore, what case studies lack in breadth, they make up in depth and thus provide a richness of data on human behaviour (Salkind, 2006).

3.4 Participants

The selection of participants is visually represented in Figure 3.1. In the present study it entailed the recruitment of potential participants using two different strategies and the screening of these potential participants to see if they met the selection criteria.

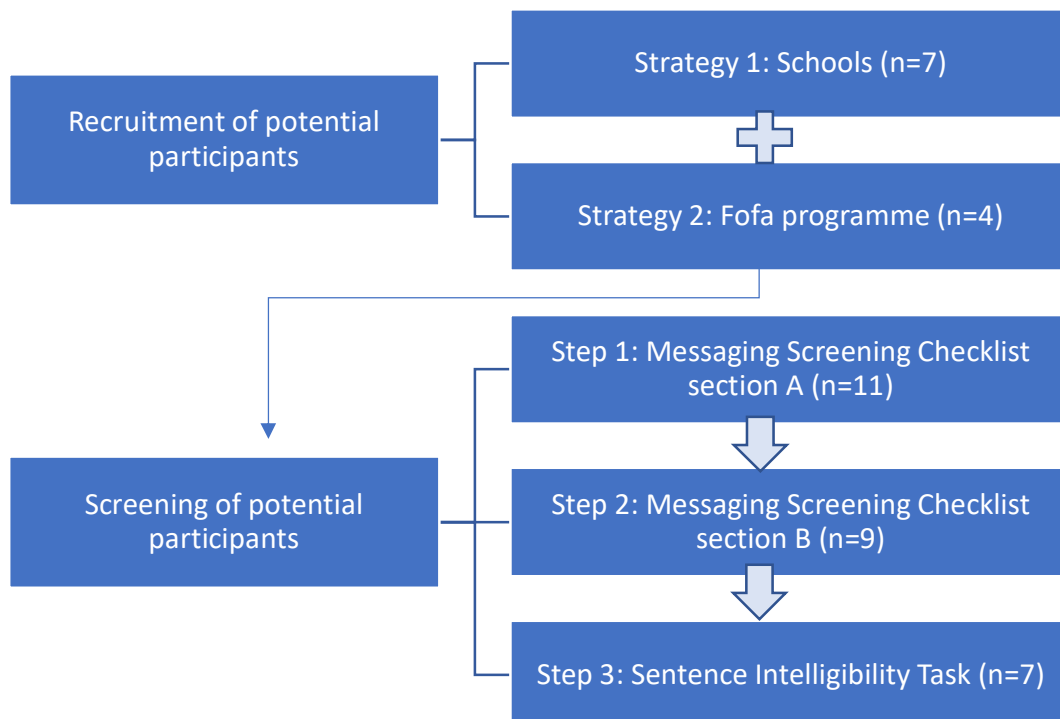


Figure 3.1. Steps followed to select participants for the study.

3.4.1 Recruitment of potential participants

In the present study, the term *youth* covers young persons in the age range 15;0 to 24;11 (years; months). This necessitated a twofold recruitment strategy to include individuals who were still in school (strategy 1), as well as those who have already left school (strategy 2). For strategy 1, participants were recruited from two schools for learners with special educational needs, and for strategy 2 participants were recruited from the Fofa Youth Empowerment Programme, a programme aimed at equipping young adults with CCN who use AAC with communication skills. This programme is run by the Centre for AAC of the University of Pretoria on an annual basis (<http://www.up.ac.za/centre-for-augmentative-alternative-communication/article/56192/about-fofa>). The two strategies aimed to recruit potential participants over a broad spectrum to include as many potential participants as possible, as recommended in a study by Hynan et al. (2014). Recruiting participants from several different sources also reduces potential bias in sampling (Morgan & Lobe, 2011).

3.4.1.1 Recruitment strategy 1: Schools

Before recruitment commenced, ethics approval was obtained from the Research Ethics Committee at the Faculty of Humanities, University of Pretoria (Appendix A), and permission was granted by the Gauteng and North-West Departments of Education (Appendix B1 and B2). These two provinces were purposefully selected as they vary greatly in average household income and thus provide a realistic representation of different South African contexts (Statistics South Africa, 2011). The schools within these provinces were also purposefully selected on the grounds that the schools provided services to learners with special educational needs (including learners with CCN) and use English as the language of learning and teaching (LoLT).

An email was sent to the school principals of the respective schools to explain the nature and purposed benefits of the study, and to request permission to recruit learners from their schools (Appendix C). Upon written permission from the school principals, appointments were scheduled with the senior speech-language therapists at their schools to discuss the aim of the research and request their assistance with identifying current or former learners with CCN who met the participant selection criteria as stipulated in Table 3.1. After consultation with colleagues (including other speech-language therapists, occupational therapists and teachers), the speech-

language therapists emailed lists of potential participants to the researcher. The researcher then visited the schools to distribute personally addressed consent letters to the parents or legal guardians of the potential participants (Appendix D). The consent letters explained the purpose of the study and requested informed consent for the children to participate in the study. Parents or legal guardians had to indicate their response on an attached consent reply form, on which they also had to stipulate their child's date of birth. They were furthermore requested to indicate whether their child communicated via messaging on a mobile phone and had access to a mobile phone to participate in the study. The consent reply forms had to be returned to the schools' senior speech-language therapists within two weeks, after which the researcher collected the completed forms. This time frame was recommended, as the learners who resided in the school hostels did not go home every weekend. The senior speech-language therapists also sent out reminders to potential participants after a week. A total of 11 consent letters were sent out at the schools, and 10 reply forms were returned (91% return rate), of whom all 10 gave consent. However, according to two parents, their child did not use a mobile phone for messaging and thus they could not be recruited into the study. Two other children were also under the recruitment age and therefore had to be excluded.

The speech-language therapist at one of the schools provided the researcher with the names of two former learners who could be potential participants. These former learners were directly contacted by the researcher. One of them was living in a home for persons with disabilities at the time of the study and was recruited to be screened after her mother gave her consent. The other former learner was also contacted, and her primary caregiver consented to participation. However, upon meeting her at her home, it was found that she was unable to send messages on her mobile phone because of physical restrictions. A total of seven potential participants were thus recruited for screening via the two schools. Prior to the commencement of the screening, these potential participants were asked to sign a letter of informed assent (Appendix E).

3.4.1.2 Recruitment strategy 2: Fofa Youth Empowerment Programme

The co-ordinator of the Fofa Youth Empowerment Programme was contacted via email (Appendix F) to obtain permission to recruit from the programme potential participants who met the selection criteria (see Table 3.1). This included current and former Fofa trainees. Once permission had been granted, the researcher contacted potential participants who met the selection

criteria to explain the aim of the research (Appendix G) and ask for their consent to participate (Appendix E). A total of four individuals were identified (the majority of the other Fofa trainees were slightly older than required). The four were approached directly by the researcher and they all consented to participate in the study.

The two recruitment strategies thus yielded a total of 11 potential participants. They proceeded to the next step of the study, namely a custom-designed screening procedure (Appendix H and I), to establish if they met all the selection criteria to participate in the study.

3.4.2 Potential participant screening for selection

The researcher screened all 11 potential participants to establish if they met the selection criteria as outlined in Table 3.1. The table includes a theoretical justification for each criterion, as well as the material/method used to determine eligibility.

Table 3.1

Criteria for Selection of Participants

Criteria	Theoretical justification	Method and material
1. Participant should be between 15;0 and 24;11 (years; months) of age.	The study focuses on youth, as it is an important transitional phase for individuals with CCN (McNaughton & Beukelman, 2010). Furthermore, youth view messaging on mobile phones as a favoured form of communication (Pew Research, 2010).	Indicated on the Consent Reply Forms (Appendix D and E).
2. Participants should be able to converse in English. Prior enrolment in a school where English is the language of LoLT for a minimum of six months was regarded a minimum requirement.	South Africa is a multilingual country (Statistics South Africa, 2015) and the participants had to be able to interact with the researcher and each other in a common language. English is often used as the lingua franca (Khokhlova, 2015).	Participant self-report during the completion of the Messaging Screening Checklist Section A (Appendix I).
3. Participants should have access to a mobile phone that has the WhatsApp messaging application.	Mobile phones were the device of choice for the present study as mobile phone ownership and use is prevalent in South Africa (Bureau of Market Research, 2012). Messaging applications are continuously changing, merging and being replaced by newer applications (Junco et al., 2010). WhatsApp was the most common messaging application in South Africa at the time of the research (Simons, 2017) and lends itself to group discussions.	Participant self-report during the completion of the Messaging Screening Checklist Section A (Appendix I).
4. Participants should have the operational skills to use a mobile phone to type, send and access messages via WhatsApp.	The access to mainstream mobile technologies is a topic of concern for individuals with disabilities (Bryen & Pecunas, 2004). Certain operational skills are needed to operate an AAC system	Observed and recorded by the researcher on the custom-designed

Criteria	Theoretical justification	Method and material
5. Participants should have the functional literacy skills to use a mobile phone to type comprehensible messages, as well as read and comprehend received messages via WhatsApp.	accurately and effectively (Beukelman & Mirenda, 2013), as is the case with mobile phones. These skills were essential for participation in the study. Messaging entails reading and writing; however, the messages are brief and abbreviated, as well as contextually specific (Thurlow & Poff, 2011). Functional literacy required for messaging required the individuals engaging in the task to be able to understand each other for effective communication to occur. As there is no specific measure for this type of literacy, a custom-designed Messaging Screening Checklist was used as a functional activity-based task. Similar to a study by Hynan et al. (2014), effective engagement in the activity that requires literacy was seen as functional.	Messaging Screening Checklist Section B (Appendix I).
6. Participants should present with CCN. The present study defines youth with CCN as youth whose speech is not understood by all communication partners (refer to Chapter 1 of this thesis for a more comprehensive definition).	Speech intelligibility is often used clinically as an index of the overall severity of a communication disorder (Yorkston, Beukelman, & Tice, 1996).	Intelligibility Percentage score on performing the Assessment of Intelligibility of Dysarthric Speech Test (Yorkston & Beukelman, 1981). An example of the sentences used is shown in Appendix J.

Individual appointments for the screening assessments were scheduled either via the schools or directly with the potential participants. At the face-to-face appointments, each of the 11 potential participants were reminded of the aims of the study and the components of the screening. The potential participants were reassured that they were free to exit the screening at any time without any negative consequences. The screening procedure followed three steps. If a participant failed the screening at a particular step, the process was terminated, and they were thanked for their contribution to the study. Step 1 entailed asking the potential participants if they met the criteria regarding language and the use of WhatsApp (using the Messaging Screening Checklist Section A, Appendix I).

The potential participants who met the criteria of Step 1 were asked to perform a messaging task (Step 2). The messaging task entailed answering five custom-designed questions about a picture stimulus (Appendix H) using WhatsApp on their mobile phone (see Section 3.6.1.1 for a description of the material). The task was performed within a Wi-Fi zone created by the researcher, to ensure the potential participants did not incur any costs, thus limiting the influence of the so-

called ‘data divide’ (Dalvit et al., 2014). The latter continues to be a more pressing topic of concern in South Africa than mobile phone access, due to poor network cover in certain rural areas and the high cost of data (Research ICT Africa, 2017). The interaction was documented by the researcher using the custom-designed Messaging Screening Checklist (Section 3.6.1.1 and Appendix I, Section B). Those participants who demonstrated all of the operational and literacy skills stipulated on the Messaging Screening Checklist, continued to Step 3.

Step 3 entailed obtaining a descriptive measure of the speech intelligibility of the potential participants who had demonstrated all of the messaging skills needed to participate in the study. The Assessment of Intelligibility of Dysarthric Speech Test (Yorkston & Beukelman, 1981) (see Section 3.6.1.2 and Appendix J) was used to measure speech intelligibility. Each potential participant was presented with the printed sentence stimuli. To ensure that literacy levels did not affect the test, the researcher read the sentences to the participant who was then instructed to repeat the sentences. The researcher recorded the speech samples, which were then transcribed by an independent listener who was unfamiliar with the test stimuli, using broad orthographic transcription techniques (Joubert, 2009). Transcription analysis was used to calculate the percentage of intelligible words by dividing the number of intelligible words by the total number of words in the sentences. The score of normal speakers when performing this task is nearly 100% (Yorskton & Beukelman, 1981). Potential participants whose speech intelligibility was 70% or less were selected to participate in the study (see Table 3.2 for scores).

Of the 11 potential participants who were recruited and screened, seven met the selection criteria and were included in the study. The results of the screening, as well as whether the potential participants were included in or excluded from the study, are shown in Table 3.2.

Table 3.2

Screening Results for Potential Participants

Participants' pseudonyms	Age (years; months)	STEP 1		STEP 2	STEP 3	Included/ Excluded
		Converse in English	WhatsApp	Operational and literacy skills demonstrated	SI Scores	
Xolani	21;5	Yes	Yes	Met all operational and functional literacy requirements	0%	Included
Nomsa	24;7	Yes	Yes	Met all operational and functional literacy requirements	0%	Included

Participants' pseudonyms	Age (years; months)	STEP 1		STEP 2	STEP 3	Included/ Excluded
		Converse in English	WhatsApp	Operational and literacy skills demonstrated	SI Scores	
Elijah	23;7	Yes	Yes	Met all operational and functional literacy requirements	6%	Included
Naleli	21;11	Yes	Yes	Met all operational and functional literacy requirements	0%	Included
Tapiwa	22;2	Yes	Yes	Met all operational and functional literacy requirements	6%	Included
Mayowa	18;11	Yes	Yes	Met all operational and functional literacy requirements	24%	Included
Boipelo	17;10	Yes	Yes	Met all operational and functional literacy requirements	70%	Included
Sesi	17;2	Yes	Yes	Met the operational requirements but needed reading and writing assistance	N/A	Excluded
Rapula	18;2	Yes	Yes	Met the operational requirements but struggled to comprehend certain questions, as well as to read and write certain words.	N/A	Excluded
Tuma	17;4	Yes	No	N/A	N/A	Excluded
Kananelo	19;4	Yes	No	N/A	N/A	Excluded

Note: SI refers to Speech Intelligibility at the sentence level

All the 11 potential participants screened had been in a school where English was or had been the LoLT and they were therefore able to converse with the researcher in English. However, because two of them did not use WhatsApp, they had to be excluded. A further two potential participants used WhatsApp but struggled to read the questions and needed spelling assistance. Thus they were not included. The seven remaining potential participants met the speech intelligibility criteria. The spread of speech intelligibility scores (0%-70%) enhanced the discussion of the various aspects during data collection. These seven potential participants are described in the following section.

3.4.3 Description of selected participants

Individual appointments were arranged with each participant in order to obtain descriptive information regarding their personal details, functioning on various skill levels, as well as information regarding their mobile phone ownership and access. The categories for the description

of the participants, as well as a justification for each category, are set out in Table 3.3. This table also includes the method or measure used to describe each category (see Section 3.6.2 for a description of these measures).

Table 3.3

Categories Included in Participant Description

Category	Theoretical justification	Method/measure
Name	Since the study provides a descriptive account of several individuals, names had to be assigned to the different individuals for discussion purposes. Pseudonyms were used, as it is important to retain individual confidentiality (Brinkmann & Kvale, 2008).	Replacing names from Biographical Questionnaire with pseudonyms
Participant's chronological age	The study focuses on youth as they view messaging on mobile phones as a favoured form of communication (Pew Research, 2010).	Consent reply forms (Appendix D and E)
Gender	Gender differences in messaging practices are reported in the literature (Heidari & Alibabae, 2013).	Obtained during screening (Appendix I)
Primary diagnosis	Although disability 'labelling' is commonly used in certain cultures to obtain services (such as being provided with assistive technology), it should be used sensitively to avoid stigmatisation (Beukelman & Mirenda, 2013). In the present study, it is included for descriptive purposes.	Participant Background Information Script (Appendix K)
Additional sensory impairments (corrected and uncorrected)	Visual impairments accompany many disabilities common in people who rely on AAC (Beukelman & Mirenda, 2013) and uncorrected concomitant visual difficulties could have an impact on the reading of text messages, as well as on the input selection on a device. Hearing capabilities must also be documented, as hearing loss affects language skills (Owens, 1996).	Participant Background Information Script (Appendix K)
Gross motor function	Functional classification systems such as the GMFCS are commonly used by clinicians and researchers to describe individuals with physical disability (Paulson & Vargus-Adams, 2017). This allows a standard method of participant description.	Gross Motor Function Classification System Expanded and Revised (GMFCS-E&R) (Palisano, Rosenbaum, Bartlett, & Livingston, 2007) recorded on Researcher Observation Form (Appendix L)
Manual ability and mobile phone access	Messaging on mobile phones requires a direct access pathway (Myrden et al., 2014) and participants therefore required the manual ability to operate the device (Beukelman & Mirenda, 2013).	Participant Background Information Script (Appendix K); Manual Ability Classification System (MACS) (Eliasson et al., 2006) recorded on Researcher Observation Form (Appendix L)
Highest level of schooling	Schooling entails various educational and social benefits (Beukelman & Mirenda, 2013). The level of schooling completed provided an indication of the level of literacy skills.	Participant Background Information Script (Appendix K)
Nonverbal intelligence score	Nonverbal intelligence scores provide information on fluid reasoning and visual processing abilities (Kaufman & Kaufman, 2004). The data obtained for the present study relies on the participants' understanding and interpreting of questions. Thus,	Kaufman Brief Intelligence Test, Second Edition, non-verbal subtest (KBIT2)

Category	Theoretical justification	Method/measure
	background information regarding their reasoning abilities provided insight into their responses.	(Kaufman & Kaufman, 2004)
Current activities	Educational, vocational and other commitments have an impact on participation in activities (Beukelman & Mirenda, 2013) and may influence messaging behaviour (e.g. time spent at work vs at home)	Participant Background Information Script (Appendix K)
First language and primary messaging language	Although all participants could converse in English, English might not be their primary home language. Differences in messaging in various South African languages have been reported (Deumert & Masinyana, 2008).	Participant Background Information Script (Appendix K)
Communication with friends, family and strangers	Individuals with disabilities adapt their communication according to their communication partner and context (Beukelman & Mirenda, 2013).	Participant Background Information Script (Appendix K)
Receptive language skills	As messaging is a language-based task, it is important to describe the individual's language abilities. The selected language tests use a pointing format and could be administered with the participants (Beukelman & Mirenda, 2013). Since messaging is brief (Thurlow & Poff, 2011), testing at word and basic sentence level was deemed sufficient.	Peabody Picture Vocabulary Test, Fourth Edition (Dunn & Dunn, 2007); Sentence Structure Subtest of CELF 5 (Semel, Wiig, & Secord, 2013)
Functional orthographic literacy	As the questions asked in the interview and focus group were text-based, reading comprehension at a sentence level was necessary to understand the questions. Individuals with CCN often experience literacy difficulties (Hynan et al., 2014; Raghavendra et al., 2012). Therefore, a functional measure was selected that would provide descriptive information regarding reading comprehension at a sentence level, appropriate for second language English speakers with CCN.	Western Aphasia Battery Reading Comprehension of Sentences and Reading Commands Subtests (Kertesz, 1982)
Type and size of mobile phone used presently	Smartphones allow for an internet-based messaging application such as WhatsApp. Display size is an important consideration for the selection of items (Beukelman & Mirenda, 2013).	Participant Background Information Script (Appendix K)
Time period of past and current mobile phone use	Accurate and efficient device use depends on the familiarity of the user with the operational requirements of the device (Beukelman & Mirenda, 2013).	Participant Background Information Script (Appendix K)
Mobile phone adaptations	Individual adaptations can be made to technologies to improve operational demands (Bornman et al., 2016)	Participant Background Information Script (Appendix K)
Mobile phone assistance	Individuals with CCN who rely on a personal assistant to aid their communication may feel inhibited when messaging; however, support may also be needed to facilitate interactions (Hynan et al., 2014).	Participant Background Information Script (Appendix K)

The data describing each participant is documented in Table 3.4 and subsequently presented in Sections 3.4.3.1 to 3.4.3.7. The participants' names were replaced with pseudonyms to ensure the confidentiality of each participant.

Table 3.4

Description of Participants Identified for Study (n=7)

Descriptive categories	Xolani P1	Nomsa P2	Elijah P3	Naleli P4	Tapiwa P5	Mayowa P6	Boipelo P7
Chronological age (years; months)	21;5	24;7	23;7	21;11	22;7	18;4	18;2
Gender	Male	Female	Male	Female	Male	Female	Female
Primary diagnosis	Cerebral palsy	Cerebral palsy	Cerebral palsy	Cerebral palsy	Spinal injury at the age of 5 years	Cerebral palsy	Cerebral palsy
Sensory impairment	None	None	None	None	None	None	None
Gross motor function: GMFCS-E&R	Level 1	Level 4	Level 1	Level 2	Level 2	Level 3	Level 4
Reported manual ability	Writes and dresses independently	Struggles to write, needs assistance with dressing and eating	Needs assistance with dressing	Struggles to write, needs assistance with dressing	Struggles to write, needs assistance with dressing and eating	Struggles to write, needs assistance with dressing	Struggles to write, needs assistance with dressing
Observed mobile phone access	Knuckle of left-hand middle finger	Left-hand middle, index or ring finger	Right index finger	Right index finger	Left-hand thumb	Right thumb	Right-hand index finger or thumb
Manual ability specific to messaging use: MACS	Level 1	Level 2	Level 1	Level 2	Level 3	Level 2	Level 2
Highest level of schooling completed	Grade 12	Grade 7	Grade 12	Adapted Grade 9	Grade 12	Grade 9	Grade 9
Nonverbal Intelligence descriptive category: KBIT2	Average (standard score 86)	Lower extreme (standard score 64)	Average (standard score 92)	Below average (standard score 76)	Average (standard score 98)	Average (standard score 108)	Average (standard score 87)
Current activities	Lives in apartment. First-year student at University of Zululand.	Lives at home. Part of church media team.	Lives at home. Works at a clothing store in a mall in his home community.	Lives at home. Works at a Centre for Children with Disabilities. Enrolled in computer course	Lives at home. In the process of obtaining school-leaving certificate	Lives at home. Second year of attending a training academy organised through school.	Lives in group home for persons with disabilities. Writing her memoirs.
Primary first language	isiZulu	isiXhosa	Shangaan	Sepedi	Setswana	English and Yoruba	Tshivenda and Setswana
Primary messaging language	English and Zulu	English	English and Afrikaans	English and Afrikaans	English	English and Afrikaans	English
Reported means of communication	Speech, natural gestures, speech	Speech, natural gestures, facial	Speech, natural gestures, speech	Speech, natural gestures, facial	Speech, natural gestures,	Speech, natural gestures,	Speech, phone calls and

Descriptive categories	Xolani P1	Nomsa P2	Elijah P3	Naleli P4	Tapiwa P5	Mayowa P6	Boipelo P7
	application on iPad, e-mail and messaging on smartphone. Shows typed messages on smartphone, writes on paper.	expressions. Types on laptop and smart phone, draws letters with finger on a surface.	application or messaging on smartphone. Shows typed messages on smartphone.	expressions (especially her eyes), messaging on smartphone.	messaging on smart phone. Shows messages typed on smartphone.	messaging on smartphone. Shows messages typed on smartphone.	messaging on smartphone.
Receptive Language: Peabody Age Equivalent Scores (years; months)	8;8	4;7	5;9	5;6	7;2	14;5	5;8
Sentence Comprehension: CELF 5 Sentence Structure Subtest	Understood all basic sentence structures	Struggled with prepositional phrases	Understood all basic sentence structures	Understood all basic sentence structures	Understood all basic sentence structures	Understood all basic sentence structures	Understood all basic sentence structures
Reading Comprehension: WAB Reading Commands & Reading Comprehension of Sentences Subtests	Able to read and execute 3-part commands; 6/8 correct reading comprehension of sentences.	Able to read and execute 3-part commands; 4/8 correct reading comprehension of sentences.	Able to read and execute 3-part commands; 5/8 correct reading comprehension of sentences.	Able to read and execute 3-part commands; 4/8 correct reading comprehension of sentences.	Able to read and execute 3-part commands; 7/8 correct reading comprehension of sentences.	Able to read and execute 3-part commands; 7/8 correct reading comprehension of sentences.	Able to read and execute 3-part commands; 5/8 correct reading comprehension of sentences.
Current mobile phone type and size	Smartphone 4.7 inches (new)	Smartphone 5 inches	Smartphone 4.5 inches	Smartphone 4.5 inches	Smartphone 5 inches	Smartphone 6 inches	Smartphone 5 inches
Mobile phone adaptations for communication needs	None	None	Speech application (used occasionally)	Speech application (used infrequently)	None	Enlarged keyboard on old smaller phone	None
Length of mobile phone use	Since 2009	Since 2001	Since 2008	Since 2007	Since 2017	Since 2007	Since 2009
Length of current phone use	3 years (new smartphone for follow-up interview)	4 months	3 months	3 years	1 year	Used her brother's phone for interview and new phone for follow-up interview	1 month
Mobile phone assistance	None	None	None	Brother assists with reading messages	Needs assistance to charge his phone and obtain phone when out of reach	None	Needs assistance to charge his phone and asks for spelling assistance

A narrative description of participants follows. These interviews took place over a period of four months, from March 2018 to June 2018. The information included in the descriptions does not repeat all the test scores, as these can be viewed in Table 3.4.

3.4.3.1 Participant 1 (P1): Xolani

At the time of the first interview, Xolani was 21;5 years; months old and was enrolled as a first-year student at a university two hours' drive from his home. He resided close to the university campus in a room in an apartment building that he shared with another student. Xolani described himself as independent (GMFCS-E&R Level 1) and said that he walked to class and to the nearby shopping mall. However, he had not seen much of the town. He had no support where he lived other than the spiritual support of the church he had joined. He spoke a mixture of several South African languages but considered isiZulu to be his first language. Xolani reported using natural speech and gestures when communicating face-to-face with family and friends and felt that they understood him as they were familiar with his speech. He used his smartphone to communicate with unfamiliar communication partners by typing a message on the phone and showing it to them. Alternatively, he would write a message on a piece of paper when communicating with an unfamiliar person. He added that his preferred means of communication was writing and typing, as he was understood when using these means of communication. He did not interact in class unless it was necessary, and would then use the Speech Assistant application on his iPad to communicate. He seldomly used this application for activities other than his studies. He would use email on his smartphone if he needed to correspond with a lecturer, but used to use WhatsApp when communicating with his school teachers the previous year. His parents called to speak to him on his smartphone, which he experienced as challenging. Xolani started sending text messages via SMS around 2009 but has predominantly used WhatsApp to socialise with others since 2012. He sends messages in both English and isiZulu. In the initial interview he used a Sony smartphone (5 inches) which he had owned for the past three years, but in the follow-up interview used a new Huawei smartphone (4.7 inches) (which he greatly preferred). He kept his phone in his pocket at all times. During the interviews Xolani was seated and held his smartphone in his right hand on his lap or placed it on the table in front of him. He accessed his smartphone with the back of his left middle finger and interacted with the researcher on WhatsApp without any visible physical

effort. However, an increase in jaw movements was noted whilst typing, compared to when he was not typing. His typing speed was well paced and accurate (MACS Level 1).

3.4.3.2 Participant 2 (P2): Nomsa

Nomsa was 24;7 years; months at the time of the first interview and lived with her parents and two of her three siblings. She had been mainly home based since leaving school in Grade 7 and preferred to move around the house on her knees as she is unable to walk (GMFCS-E&R Level 4). Nomsa was able to independently use the outside toilet but reported that she needed assistance with dressing and eating. Outside of her home, Nomsa was pushed in a wheelchair. At the time of the interview, she was very involved in a local church run by her father and was part of the church's media team. Although Nomsa's first language is isiXhosa, she reported using only English for messaging. She communicated with her family by drawing letters with her finger on a surface like the floor, using natural gestures and facial expressions, as well as vocalisations. She reported that she communicated with unfamiliar people by typing on her smartphone and showing them the messages, which they then understood. She also had a computer at home on which she was reportedly able to type. Nomsa furthermore reported that she had started sending text messages around 2001 and had used WhatsApp since it became available in South Africa. She had used her current Mobicel smartphone (5 inches) for the past three months. She did not need any help with her phone and her smartphone was always by her side or under her pillow at night. For the interviews, Nomsa was either seated on the floor or in a slouched seated position on the couch. She used these surfaces to support her smartphone which she accessed with her left-hand middle, index or ring finger. It appeared as if Nomsa used a moderate amount of physical effort to type her messages and her typing speed was medium paced and accurate (MACS Level 2).

3.4.3.3 Participant 3 (P3): Elijah

Elijah was 23;7 years; months at the time of the first interview. After obtaining his Grade 12 school-leaving certificate, he began to search for a job despite people in his community telling him that he would not succeed. His efforts paid off and at the time of the interviews he worked at a clothing retailer in a mall in his home community. He commented on the social interaction that resulted from working and how important it was to not be isolated. Elijah was able to walk independently (GMFCS-E&R Level 1) but struggled with tasks that required fine motor control

like doing buttons. Elijah's first language is Shangaan (which is not one of South Africa's official languages), however, he used English and Afrikaans for sending messages on his phone. He reported using natural speech to communicate with family and friends. He tries speaking slowly to unfamiliar listeners and uses natural gestures as an aid, however he is not always understood. Elijah also asks familiar people to assist when communicating with unfamiliar listeners. Elijah reported having the Speech Assistant application on his smartphone but added that he was not allowed to use his phone whilst working. Outside of work, he occasionally used this speech application when asking an unfamiliar person for information. Elijah said that he had started sending text messages around 2008 on MXit and then changed over to WhatsApp around 2011. He had been using his Samsung Mini smartphone (4.5 inches) for the past three months and preferred it as it was small and, unlike his tablet, could always (outside working hours) be kept on him in his pocket. For the interviews, Elijah's smartphone was placed on the table where he was seated. He accessed his smartphone with his right index finger. His typing appeared to be well paced and accurate and no visible effort was noted by the researcher (MACS Level 1).

3.4.3.4 Participant 4 (P4): Naleli

Naleli was 21;11 years; months at the time of the first interview. She had returned to live at home after attending a vocational skills development programme from 2015 to the end of 2016, organised through her school for learners with cerebral palsy. Prior to the vocational skills programme, Naleli had completed an adapted Grade 9 year at the same school, which meant that she had worked at her own level and according to the school, her numeracy and literacy skills were equivalent to Grade 7 or lower. In 2018 she enrolled in an information technology correspondence course which she reported to be very challenging because of her limited literacy skills. At the time of the interview she also worked at a centre for children with disabilities in her hometown, which she enjoyed tremendously. Naleli was able to walk independently but required support for longer distances (GMFCS-E&R Level 2). She reported struggling with tasks requiring fine motor movements like putting on her shoes. Her first language is Sepedi, but she used English (and occasionally Afrikaans) when interacting via messaging. Naleli uses natural speech to communicate with friends and family, and rarely spoke to strangers because of her speech difficulties. She would ask her closest friend (with whom she spent most of her free time) to interpret for her if she needed to communicate with an unfamiliar person. Naleli had used a mobile

phone since 2007 and had been using her current Samsung smartphone (4.5 inches) for the past three years. She had been messaging on her phone since 2015, but at times struggled to read messages on her phone and would then ask her younger brother or mother to help her. When Naleli typed a WhatsApp message to her closest friend, the friend would often reply with a WhatsApp voice note, which Naleli found easier to understand. Naleli's smartphone was placed on the table throughout the interviews, and she accessed it with her right index finger. Little physical effort was noted during her typing, which was medium paced and accurate (MACS Level 2).

3.4.3.5 Participant 5 (P5): Tapiwa

Tapiwa was 22;7 years; months at the time of the first interview. He had written his Grade 12 school-leaving exams at the end of the previous year and was preparing to re-write two of the subjects shortly after the initial interview to obtain the grades needed for his school-leaving certificate. He resided at home and was planning to pursue business-related studies once he had finished his exams. Tapiwa's physical and speech difficulties resulted from a spinal injury at the age of 5 years. He was able to walk independently but needed assistance with stairs and uneven surfaces (GMFCS-E&R Level 2). He reported struggling with most fine motor tasks. Tapiwa used natural speech to communicate with family and friends. Although they sometimes struggled to understand him initially, he was able to make himself understood with effort. Unfamiliar communication partners found it particularly difficult to understand him. He would typically type a message on his phone and show them the message after having first tried to communicate using natural speech. He had used messaging on his smartphone since 2012 and had started using WhatsApp in 2013. He had been using his current Samsung smartphone (5 inches) for just over a year and kept it with him at all times. Tapiwa reported sometimes struggling to get the phone out of his pocket. He would then ask someone present to assist him. Tapiwa kept his smartphone on his lap during the interviews and accessed the phone with his left-hand thumb. Typing a message was slow and seemed to require much effort (MACS Level 3), even though this was not highlighted as a concern by Tapiwa.

3.4.3.6 Participant 6 (P6): Mayowa

Mayowa was 18;4 years; months at the time of the first interview. She had completed Grade 9 schooling at a school for learners with cerebral palsy and then continued her education at a local

academy via the career-orientated programme offered by her school. The academy that she attended offers a skills programme where students can obtain certificates in a variety of subjects recognised by certain employers. She had completed a course in Information Technology and, at the time of the interviews, was busy with a course in Administration. Mayowa reported walking at home but used a wheelchair at school and at college (GMFCS-E&R Level 3). She made use of transport organised by the school, but public transport was a problem for her. Mayowa's first languages were Yoruba (a Nigerian language) and English but she used English and occasionally Afrikaans for text messaging. She had learnt to text in Afrikaans as some of her friends spoke Afrikaans. She used natural speech to communicate with family and friends but also used natural gestures as they were not able to always understand her. Mayowa used speech and gestures to communicate with unfamiliar communication partners and rarely spoke at the academy she attended, as they did not understand her. She would type a message in Notes on her smartphone and show it to the person to repair communication breakdowns. Mayowa did not use her phone at school as it was against school policy but used to keep it in her bag – until it was stolen at school just prior to the interviews. Mayowa was of the opinion that smartphones were not allowed at school as children would access inappropriate websites. At the time of the initial interview she was borrowing her brother's phone and said she was planning to leave her phone at home in the future. When asked, she admitted that it would be helpful to have her phone at the academy, but she was very concerned about the theft risk. She had used a mobile phone since 2007 and was familiar with the operational requirements of the three different phones used during her interactions with the researcher. She started sending text messages, including WhatsApp messages, in 2012. Mayowa had downloaded a special keyboard application on a previous smartphone that increased the size of the keyboard and offered a wider range of predicted words. When this phone was stolen, Mayowa acquired a bigger Mobicel smartphone (6 inches) but found the bigger phone more difficult to operate. She reported always having her phone with her (when not at school) and slept with her phone under her pillow. During the interviews, Mayowa held her smartphone in her left hand supported in her lap and accessed the phone with her right thumb. Moderate effort to control movements was noted, and her typing was medium paced (MACS Level 2). Typing was mainly accurate; however, backspacing was used occasionally to rectify incorrect letter selection.

3.4.3.7 Participant 7 (P7): Boipelo

Boipelo was 18;2 years; months at the time of the initial interview. She resided in a home for persons with disabilities, where she shared a room with another resident. At the time of the interviews, Boipelo was typing her memoirs on a computer with the help of a staff member. She was hoping to publish her story and inspire other persons with disabilities. She reported missing her old school, which offers specialised education and support for learners with physical challenges, where she had boarded and which she had left after her Grade 9 year. She also missed her mother when she was in the home for persons with disabilities and was glad when she was collected to go home on occasion. Boipelo was unable to walk but was able to independently operate her electric wheelchair (GMFCS-E&R Level 4). Boipelo's first languages were Tshivenda and Setswana, but she used English for text message interactions. Boipelo generally used natural speech to communicate with familiar and unfamiliar communication partners and said that she would make an effort and speak more slowly to unfamiliar listeners. She also reported asking her mother to translate if someone new did not understand her when she was at her mother's home. Boipelo had used a mobile phone for messaging since 2009 and had been using her current Hisense smartphone (5 inches) for a month at the time of the first interview. She started using WhatsApp in 2013 and reported always having her smartphone with her, unless it was charging in her room. Boipelo needed assistance to charge her phone and would ask who-ever was around to help. During the interviews, Boipelo placed her smartphone in her lap and accessed it with her right-hand ring finger or thumb while stabilising her right hand on her right leg. Her typing speed was medium paced and accurate. Moderate notable effort to control movements was noted (MACS Level 2). However, Boipelo described her typing as fast and added that there was nothing about WhatsApp that she did not like.

3.4.4 Description of familiar communication partner selected by participants

Each participant was asked to select a familiar communication partner with whom they enjoyed interacting regularly on WhatsApp. The participants were asked to provide their selected communication partner with an informed consent letter and reply form, asking their consent to participate in the study (Appendix M). The reply forms needed to be returned to the researcher via WhatsApp if they were willing to participate in the study. Two of the participants (Nomsa and Naleli) initially chose communication partners who did not give consent to participate in an interview and Tapiwa's selected communication partner could not be reached as her phone was stolen. These three participants then selected an alternative familiar communication partner. Table 3.5 gives an overview of each participant's communication partner.

Table 3.5

Description of Communication Partners

Participant (Pseudonym)	Communication partner (Pseudonym)	Relationship to participant	Means of communication between partners
Xolani (P1)	Bandile (P1P)	Close male friend (attended the same school)	Bandile stated that he and Xolani mainly communicated via WhatsApp.
Nomsa (P2)	Thando (P2P) (2 nd choice)	"Older sister" from church	According to Thando, she and Nomsa usually communicate via Facebook, WhatsApp or SMS.
Elijah (P3)	Patience (P3P)	Female friend from same community and church	According to Patience, she and Elijah communicated with natural speech and natural gestures when in direct contact and via WhatsApp and Facebook when in separate settings.
Naleli (P4)	Amahle (P4P) (2 nd choice)	Naleli's close friend did not consent to participate. Naleli then selected her older sister as communication partner.	Amahle commented that she and Naleli communicated with natural speech and natural gestures when in direct contact. Otherwise they used WhatsApp as she struggled to understand Naleli's speech over the phone.
Tapiwa (P5)	Elijah (P5P) (2 nd choice)	Tapiwa struggled thinking of partners who were literate enough to answer the research questions (after his initial choice could not be reached). He thus resorted to asking Elijah to answer the questions, as they knew each other from school.	Elijah commented that he and Tapiwa do not interact regularly. They communicate through natural speech and natural gestures when they see each other and WhatsApp each other occasionally.

Participant (Pseudonym)	Communication partner (Pseudonym)	Relationship to participant	Means of communication between partners
Mayowa (P6)	Tshegofatso (P6P)	Close female friend from school	Tshegofatso commented that she and Mayowa communicated more on WhatsApp than directly, but that she preferred face-to-face communication.
Boipelo (P7)	Amogelang (P7P)	Mother	According to Amogelang, she and Boipelo communicated using WhatsApp or call each other when Boipelo is not at home. Amogelang experienced WhatsApp as being easier than calling.

3.4.4.1 Frequency of interaction with selected communication partners versus other partners

Interaction is a collaborative activity that engages both partners and it is therefore important to consider the frequency of interactions (Alant, 2017). To obtain a better understanding of the frequency of the interactions with the selected communication partners versus other communication partners, participants were asked to count the number of partners (including groups) they had interacted with over the three days prior to the interview. The participants all indicated that the researcher could help with these counts and the number of partners with whom each participant interacted were thus counted by the researcher and the participant (see Table 3.6). The frequency with which each participant interacted with their selected communication partner was also reported by the participants (see Table 3.6). P2 and P4 commented that they had daily WhatsApp contact with close friends, and that they did not regularly interact with their selected communication partners on WhatsApp. For example, P4 and her close friend had interacted 23 times on WhatsApp the previous day, whereas she had interacted only once with her selected communication partner in the past week.

Table 3.6

Frequency of WhatsApp Interactions

Participant	Number of partners per day over past three days	Number of interaction turns with selected communication partner
Xolani (P1)	4, 5, 21	Interacted with Bandile (P1P) almost every day: most recent chat consisted of 29 turns
Nomsa (P2)	4, 32, 7	Interacted with Thando (P2P) four or five times in the past week

Participant	Number of partners per day over past three days	Number of interaction turns with selected communication partner
Elijah (P3)	4, 4, 5	Interacted with Patience (P3P) four or five times in the past week
Naleli (P4)	6, 3, 2	Interacted with Amahle (P4P) once in the past week
Tapiwa (P5)	1, 2, 3	Interacted with Elijah (P5P) once in the past week
Mayowa (P6)	3, 3, 4	Interacted with Tshegofatso (P6P) every day: most recent chat consisted of 33 turns
Boipelo (P7)	1, 1, 1	Sends Amogelang (P7P) three messages a day and reported that her mom sends her many messages.

3.5 Interview Setting and Mood

The participants were asked to inform the researcher where they would like to be interviewed and the interview settings were selected accordingly. These settings were documented on the Researcher Observation Forms (Appendix L) and are reported below, along with a description of how the researcher experienced the mood of the interactions, which was also recorded on the Researcher Observation Forms. (See Table 3.11 for the theoretical justification for the inclusion of the information on the form.) It must be noted that the testing to describe participants was mainly performed at the first appointment with each participant and lasted about one and a half to two hours. In some instances, the participant showed signs of fatigue during the testing and the testing was then completed during a second appointment with the participant.

3.5.1 Interviews with Xolani (P1)

Xolani chose to have the initial interview at the researcher's hotel near the university campus as he said his residence was too noisy. For the follow-up interview, Xolani was on holiday and selected to see the researcher in a public library near his home. The arrangements for these appointments were made directly with Xolani via WhatsApp. The first setting was in a quiet room of the hotel without anyone else present. At the library, there were many other people working at other tables, as well as entering and leaving the library. Unlike libraries that do not tolerate noise, people spoke to each other in a subdued manner. In both settings Xolani was seated at a table at right angles to the researcher and appeared relaxed and confident. Even though the library was a public space, the presence of other persons did not appear to influence the interaction between

Xolani and the researcher, other than the latter having to speak softer. The initial interview lasted approximately three hours and the follow-up interview one and a half hours.

3.5.2 Interviews with Nomsa (P2)

The researcher contacted Nomsa directly via WhatsApp to arrange the interviews, but she asked the researcher to contact her parents to arrange the dates and times. Subsequently, arrangements were made with her mother who suggested interviewing Nomsa at their home. As the area where she lived was unfamiliar to the researcher, the researcher was accompanied by a driver. Both the interviews were held in the open plan living/kitchen area of the three-roomed house. Nomsa was seated on the floor for the first part of both interviews and then moved to the couch where she was seated in a slumped position over her phone. She reported that this was where she usually was when interacting on WhatsApp. During the first interview, her mother assisted with the settling in and the initial questions, whilst her father, brother and other people from the community came and went. During the follow-up interview, a neighbour who had been her nanny came to sit in on the interview. Other family members and friends also came and went during this interview. The people's presence did not seem to distract the interview process, possibly as Nomsa was used to little privacy. Furthermore, she was communicating with the researcher via WhatsApp, which offered her privacy, as the messages were not spoken aloud. Nomsa was very animated during the initial interview and felt comfortable telling the researcher that she had a boyfriend who she kept secret from her parents (despite her parents being present in the same room). At the second meeting, Nomsa was visibly glad to see the researcher and appeared to be pleased and amused by her own responses during the first few questions. However, her mood suddenly changed, and she started crying. The researcher established that her boyfriend had just ended their relationship via WhatsApp because she had sent him a WhatsApp message to say she could not interact with him as she was busy with something important. He apparently incorrectly interpreted this as that she was ignoring him. Nomsa insisted on continuing after she had settled, and it was possible to complete the proceedings. The initial interview lasted approximately three hours and the follow-up interview two hours.

3.5.3 Interviews with Elijah (P3)

Elijah was contacted by the researcher via WhatsApp. He agreed that it was convenient to meet the researcher at the management meetings room in the mall where he worked. Elijah selected a suitable date and time for both interviews. He said he enjoyed being in the venue and asked the researcher to take photographs of him in the venue, which he then used as his WhatsApp profile picture. Elijah and the researcher sat at right angles to each other at the conference table in the meeting room. He appeared to be comfortable and confident during the interviews, which gave the interviews an informal tone. The initial interview lasted roughly three hours and the follow-up interview just over an hour.

3.5.4 Interviews with Naleli (P4)

The researcher contacted Naleli via WhatsApp and arranged to interview her at her home. Naleli and the researcher sat at right angles to each other at a table in the living/dining area. On both occasions, the researcher asked permission and switched off the television in the room before commencing with the interviews so as to reduce external distractions. No one else was present in the room during the interviews, besides Naleli's younger brother who walked past on two occasions. Naleli appeared to be friendly during the initial interview but looked uncertain at times during the WhatsApp interactions between her and the researcher. The researcher established that she struggled to read some of the messages and consequently encouraged her to ask if she needed help from the researcher. The researcher also reassured her that spelling was not important, which appeared to aid good rapport and Naleli thereafter indicated whenever she was uncertain. At the start of the second interview, it was apparent that Naleli wanted to discuss the WhatsApp focus group and the researcher thus began with the follow-up questions prior to the member checking. During this interaction, Naleli stated that she had not been able to understand all of the discussions in the WhatsApp focus group and that this had made her feel foolish. The researcher had not anticipated this response and was glad to have the opportunity to discuss it with her. According to Naleli, the focus group differed from the interview as the researcher was not present to explain when she did not understand the written text. It was important that Naleli was able to voice the reasons for her lack of participation in the group discussion and to be reassured of her important contributions to the study. She nonetheless reported enjoying the group and said that she would

like to remain part of it. The initial interview lasted approximately three hours and the follow-up interview two hours.

3.5.5 Interviews with Tapiwa (P5)

Tapiwa was contacted by the researcher via WhatsApp and Tapiwa suggested meeting at a mall close to his home. The researcher liaised with several people at the mall and was granted permission by a mall administrator to use their meeting room. Tapiwa selected a suitable date and time for both interviews. Tapiwa was accompanied by his grandmother on both occasions. Tapiwa's grandmother spoke to Tapiwa only once during the interview whilst the researcher struggled to establish a mobile hotspot. Tapiwa and the researcher were seated at right angles to each other at one end of the conference table. The researcher experienced Tapiwa as friendly yet formal during the interviews. During the breaks Tapiwa was comfortable with the researcher helping him with his drink. The initial interview lasted approximately three hours and the follow-up interview just less than two hours.

3.5.6 Interviews with Mayowa (P6)

Mayowa was interviewed at her school for both interviews. A quiet room was organised by the senior speech therapist in the speech therapy department and Mayowa admitted that she felt comfortable in the surroundings. The dates and times for the interviews were selected by Mayowa and the appropriate arrangements were made with the school. The interviews were conducted seated at right angles at a table. She appeared to be confident in the interviews and was eager to express her opinion about the topics under discussion. The initial interview lasted roughly two and a half hours and the follow-up interview one and a half hours.

3.5.7 Interviews with Boipelo (P7)

Both interviews were conducted at the home for persons with disabilities where Boipelo resided. She was contacted by the researcher via WhatsApp and Boipelo selected an appropriate day and time for the interviews. These arrangements were confirmed with the staff of the home. Upon arrival, the researcher looked for a space that was not disruptive or noisy. The initial interview was held in an activity room that was empty at the time and the second interview in

Boipelo's bedroom, after no other suitable setting could be found. Boipelo appeared very outgoing and friendly and seemed to enjoy participating in the interviews. The initial interview lasted approximately three hours and the follow-up interview one and a half hours.

3.6 Material and Equipment

In the following three subsections, the materials and equipment used are discussed. Firstly, the materials and equipment used for the screening of the potential participants are discussed, followed by that used for describing the selected participant's level of functioning. Lastly, the materials and equipment used for the data collection are explained.

3.6.1 Materials and equipment used for screening

The following materials and equipment were used for the screening of the potential participants.

3.6.1.1 Messaging Screening Checklist and corresponding activity material

A custom-designed Messaging Screening Checklist (Appendix I) was used to establish if the potential participants met the selection criteria regarding language and WhatsApp use, as well as if they had the necessary independent operational skills and functional literacy skills to communicate via messaging on their mobile phones in order to participate in the study. The operational skill included the skill to access the messaging application, select the right contact, type and send a message on the mobile phone. The literacy skills included the ability to read and comprehend the question, and to type a message that was understandable and appropriate. Spelling errors were not regarded a selection criterion, nor was simplified or incorrect syntax, as long as the message was understandable. The Messaging Screening Checklist was designed to be used during any messaging interactive task. The researcher chose a question-and-answer format using a stimulus picture and five W-questions relating to the picture (Appendix H). This screening format was selected as the study entails asking the participants to respond to a set of questions. The picture that was used was an illustration from the Test of Ability to Explain for Zulu-speaking Children (TATE-ZC) (Solarsh, 2001) and depicted people waiting for a bus that was running late. This picture was selected as it was developed to be contextually relevant to South Africa. The five

questions mirrored the type of questions used for the data collection, and included a who, what, when, where and why question with a Flesh-Kincaid grading age of 6.6 years (<https://www.webfx.com>). The wording of the questions was checked by two Fofa trainees who did not participate in the present study and were second language English speakers with CCN. Both trainees considered the wording of the *when* question to be unclear and it was therefore changed from “When will the taxi leave?” to “When do people usually take the bus to work?”.

3.6.1.2 Assessment of Intelligibility of Dysarthric Speech Test

The Sentence Intelligibility Task of the Assessment of Intelligibility of Dysarthric Speech Test (Yorkston & Beukelman, 1981) was used to measure speech intelligibility. This specific task was used as sentences more closely approximate the demands of an ordinary speaking situation (Yorkston et al., 1996). The task consists of 22 unrelated randomly generated sentences varying in length from 5 to 15 words per sentence (two sentences per sentence length). In the subsequent Sentence Intelligibility Test (SIT short test) (Yorkston et al., 1996), the number of sentences were reduced to 11 as there was no significant difference between the 22-sentence and the 11-sentence version (Yorkston et al., 1996). Because of the amount of speaking effort for the specific population, the 11-sentence version was used for each participant. The use of standardised measures to objectively measure the intelligibility of speech is noted in the literature (Beukelman & Mirenda, 2013) and speech intelligibility is often used clinically as an index of the overall severity of a communication disorder (Yorkston et al., 1996). The speech samples were recorded by the researcher using a stereo digital voice recorder and transferred and stored to her Dell laptop. An example of the sentences used is shown in Appendix J.

3.6.2 Materials used for participant description

The following materials and equipment were used to describe the participants.

3.6.2.1 Participant Background Information Script

A custom-designed Participant Background Information Script (Appendix K) was used to gain insight into the participants’ general background as well as factors that could influence their use of messaging. The Participant Background Information Script included questions about each participant’s means of communication with friends, family and strangers; each participant’s

physical abilities and educational background; and each participant's mobile phone ownership and use. (Refer to Table 3.3 for the theoretical justification for the inclusion of this information.)

3.6.2.2 Gross Motor Function Classification System & Manual Ability Classification System

The Gross Motor Function Classification System Expanded and Revised (GMFCS-E&R) (Palisano et al., 2007) and the Manual Ability Classification System (MACS) (Eliasson et al., 2006) are complementary classification systems that were used to describe the participants' gross and fine motor skills. These classification systems were selected as they look at self-initiated movements of daily life, as advocated by the World Health Organization's International Classification of Functioning, Disability and Health. Even though the classification systems were designed for youth up to the age of 18 years, they were considered appropriate for the present study – which aimed to describe the participants according to natural behaviours in everyday settings and wished to emphasise abilities rather than limitations (Palisano et al., 2007). The participants were classified according to their ability to walk or move independently, as this may influence their opportunities to engage in face-to-face communication versus mobile communication. Furthermore, the participants were classified according to manual abilities regarding messaging and not general manual abilities (as recommended by the classification system). This was because the study specifically focused on participants' use of messaging.

3.6.2.3 Kaufman Brief Intelligence Test

The Nonverbal subtest of the Kaufman Brief Intelligence Test, Second Edition (KBIT-2) (Kaufman & Kaufman, 2004) was used to obtain the participants' nonverbal intelligence scores. This subtest consists of matrices of pictures and abstract designs and measures individuals' ability to perceive relationships and complete visual analogies. The subtest is suited for individuals with speech or language challenges (Kaufman & Kaufman, 2004) and provided a measure to determine the participants' reasoning abilities without giving instructions in a language that is not their first language or that requires a verbal response. These cognitive measures were obtained for purely descriptive purposes in conjunction with the language tests. Their inclusion was considered relevant, as English was not the first language of the majority of the participants and this may have influenced their scores in the language tests.

3.6.2.4 Peabody Picture Vocabulary Test & Clinical Evaluation of Language Fundamentals

The Peabody Picture Vocabulary Test, Fourth Edition (Dunn & Dunn, 2007) was used to describe the participants' comprehension of single words, while the Sentence Comprehension Subtest of the Clinical Evaluation of Language Fundamentals (CELF 5) (Semel et al., 2013) was used to describe the participants' comprehension of core basic sentence structures in English. These tests were selected as they did not require a verbal response from the participants and gave the researcher an indication of how to phrase the questions used to obtain the data. Since the Sentence Comprehension subtest of the CELF 5 is meant for children (5 to 8 years), it was not administered in a standardised manner (Beukelman & Mirenda, 2013). Instead, it was used to obtain general information about the participants' capabilities of understanding basic sentence constructions as the interviews in the present study used questions with simple sentence constructions. The use of administering standardised tests in a non-standardised manner is also advocated by Goldstein (2000) when assessing children from culturally and linguistically diverse populations and was considered relevant to the population used in the study.

3.6.2.5 Western Aphasia Battery Reading Comprehension Subtests

The reading comprehension subtests of the Western Aphasia Battery (Kertesz, 1982) were also used in a non-standardised manner to obtain a descriptive measure of reading comprehension at sentence level that did not require a verbal response. The subtest Reading Commands required an action response to reading basic one-, two- and three-part commands, whereas the subtest Reading Comprehension of Sentences required the selection of a written word that shows the comprehension of sentences of increased length. Even though the response format was suitable for the participants, they indicated that they were unfamiliar with the vocabulary of the sentences of increased length. A more suitable reading assessment tool for the specific population in the South African context would have been desirable but is unfortunately not available currently.

3.6.2.6 Researcher Observation Form

The Researcher Observation Form (Appendix L) was used to record field notes, including observations providing descriptive information about each participant, the interview setting and the mood. The information was documented on the forms during the face-to-face interactions between the researcher and the participants, and information was added to these forms by the

researcher whilst analysing the video recordings of these interactions. As the Researcher Observation Form was also used for data collection, it is discussed in more detail in Section 3.6.3.4. (See Table 3.11 for the theoretical justification for the inclusion of the information on the form.)

3.6.3 Materials and equipment used for data collection

In addition to the Participant Background Information Script and a Researcher Observation Form, the researcher developed a Participant Interview Script (Appendix N), a Communication Partner Interview Script (Appendix O), and a WhatsApp Focus Group Script (Appendix P), to collect the appropriate data that would inform the aim and the subaims of the study. The theoretical justifications for including the various aspects in the Participant Interview Script, the Communication Partner Interview Script and the WhatsApp Focus Group Script are stated in Table 3.7, followed by a description of the layout of each of these scripts. All three scripts allowed the researcher to use probes when needing to clarify a response and prompts when more detailed reasoning was required (Doody & Noonan, 2013). Following the discussion of the abovementioned three scripts, the Researcher Observation Form as well as the Follow-up Interview Script and Member Checking Scripts are discussed.

Table 3.7

Development of the Aspects for Various Data Collection Materials

Aspects	Theoretical justification	Material
TOPIC 1: General considerations (WHY)		
Familiarity of messaging use	Individuals need to learn and develop skills for on-line interactions as they do for face-to-face communication (Alant, 2017).	Participant Interview Script (Appendix N)
Reasons for liking messaging interactions	Studies of the youth without CCN have documented various reasons why messaging is a popular means of personal communication. Some of these reasons include the fact that messaging is convenient (can be used any time and place) as well as fast and easy (e.g. use of predictive text) (Agosto et al., 2012). Individuals also feel that messaging gives them control over their communication interactions (Thurlow & Poff, 2011) and creates a sense of being connected (Ling, 2007). Furthermore, individuals like messaging because they feel that everyone else is messaging (Blair et al., 2015). This study aimed to establish if these affordances of messaging also apply to youth with CCN.	Participant Interview Script (Appendix N); Communication Partner Interview Script (O); WhatsApp Focus Group Script (Appendix P)

Aspects	Theoretical justification	Material
Reasons for disliking messaging interactions	Linguistic and operational demands, lack of immediate partner feedback (Light & McNaughton, 2014), reduced social contact, as well as other barriers such as economic or contextual barriers remain a reality that may have a negative impact on communication via messaging.	Participant Interview Script (Appendix N); Communication Partner Interview Script (Appendix O); WhatsApp Focus Group Script (Appendix P)
TOPIC 2: Communication Partners (WHO)		
Communication partners	Studies of individuals without CCN show that messaging is used to maintain and reinforce existing friendships (Ishii, 2006; Thurlow, 2003). It is important to establish who the youth with CCN have as communication partners, as social inclusion influences quality of life (Beukelman & Mirenda, 2013).	Participant Interview Script (Appendix N)
TOPIC 3: Interaction Place and Time (WHEN & WHERE)		
Time of day and place of messaging interactions	According to the literature, youth consider it convenient to message any time of the day and any place (Blair et al., 2015). The skills and location of the communication partner are as important as those of the participant, as messaging is an interactive process (Blair et al., 2015).	Participant Interview Script (Appendix N); Communication Partner Interview Script (Appendix O)
TOPIC 4: Communication Content/ Orientation (WHAT)		
Communication content	The messaging by youth without CCN generally has a relational orientation (Thurlow & Poff, 2011), whereas individuals with CCN reported using messaging for information transfer (Bornman et al., 2016). It is not really possible to determine the function of a message from the content (Thurlow, 2003); however, certain primary functional orientations can be deduced from what is communicated.	Participant Interview Script (Appendix N); Communication Partner Interview Script (Appendix O); WhatsApp Focus Group Script (Appendix P)
Depth of communication	Texting is considered tedious for longer and more in-depth conversations (Agosto et al., 2012). However, if individuals are familiar with each other or the context of the communication, short, abbreviated messages may communicate as much depth (Alant, 2017).	WhatsApp Focus Group Script (Appendix P)
Urgency of communication	According to the literature, youth will first consider the technological skills of the receiver before deciding to text (Blair et al., 2015). Thus they will not send urgent messages to others who do not use messaging regularly.	WhatsApp Focus Group Script (Appendix P)
Socio-emotional features	Thurlow and Poff (2011) state that paralinguistic restitution is one of the maxims that underpin texting. In this way, prosodic or socio-emotional features can be added to text (Thurlow & Poff, 2011; Shortis, 2001).	WhatsApp Focus Group Script (Appendix P)
TOPIC 5: Communication Maintenance and Repair (HOW)		
Maintenance and repair strategies	Individuals with CCN “need to develop strategies to allow them to communicate effectively within restrictions” (Light, 1989, p. 141), as well as to clarify misunderstandings (Von Tetzchner et al., 1996). Ease- and rate-enhancing factors associated with messaging could maintain and enhance effective communication but may also cause a communication breakdown. For example, the use of automatic spelling corrections to prevent a breakdown in communication or an unfamiliar shortening can cause a breakdown in communication.	Participant Interview Script (Appendix N); Communication Partner Interview Script (Appendix O); WhatsApp Focus Group Script (Appendix P)

Aspects	Theoretical justification	Material
TOPIC 6: Suggestions		
Support suggestions	As in the study by Caron and Light (2016), suggestions about the support that individuals with CCN need when using mainstream mobile technologies may yield beneficial information.	Communication Partner Interview Script (Appendix O); WhatsApp Focus Group Script (Appendix P)
Additional information	The study aims to describe the messaging practices of a population that have not been documented previously. It also aims to describe different aspects concerning messaging that have not been highlighted in the literature. Giving participants the opportunity to add additional information at the end of an interview may lead to new unanticipated information (Gill, Stewart, Treasure, & Chadwick, 2008).	Participant Interview Script (Appendix N); Communication Partner Interview Script (Appendix O); WhatsApp Focus Group Script (Appendix P)

3.6.3.1 Participant Interview Script

The researcher developed a Participant Interview Script to be used during the interview with the participants (Appendix N). The script includes an introduction, confirmation of informed consent, an explanation of the proceedings, a set of twenty questions and closing comments. The final development of the questions used in this interview script is presented in Table 3.8. The table includes the question numbers, the aspect addressed and the type of question as well as the reason for inclusion.

Table 3.8

Development of the Questions in the Participant Interview Script

Question number	Aspect	Type of question	Reason for inclusion	Theoretical justification
1 & 2	Length of messaging use	Open-ended question	To gain information on how long they have used messaging.	Refer to Table 3.6, Topic 1
3 & 4	Reasons for liking and disliking messaging interactions	Open-ended question	To determine why messaging is liked and/or disliked.	Refer to Table 3.6, Topic 1
6, 8, 10 & 11	Communication partners	Closed and open-ended questions	To determine who the frequent messaging communication partners of the participant are (including WhatsApp groups) and if the participants would like to WhatsApp with more communication partners.	Refer to Table 3.6, Topic 2
7, 9 & 15	Messaging content specific to various communication partners	Open-ended question	To explore what individuals with CCN communicate via messaging, and to try and establish if messaging by youth with CCN is relational or transactional oriented.	Refer to Table 3.6, Topic 4

Question number	Aspect	Type of question	Reason for inclusion	Theoretical justification
5 & 12	Messaging frequency	Open-ended question	To establish the number of persons with whom the participant interacted on WhatsApp over a period of three days and to estimate how frequently they interacted with their selected communication partner.	Refer to Table 3.6, Topic 1
13 & 14	Time of day and place of messaging interactions	Open-ended question	To describe when and where the youth with CCN are when interacting with their selected communication partners via WhatsApp.	Refer to Table 3.6, Topic 3
16, 17 & 18	Communication maintenance and repair	Closed and open-ended questions	To describe how the participant maintains and repairs the interaction with their selected communication partner.	Refer to Table 3.6, Topic 5
19	Convenient time of day to message	Open-ended question	To determine when it is an appropriate time to interact with the participant during the study.	For practical purposes to determine when the researcher should engage with the participants in the focus group
20	Additional information	Open-ended question	To determine if participants have any additional information regarding messaging that they would like to add to the discussion.	Refer to Table 3.6, Topic 6

3.6.3.2 Communication Partner Interview Script

The researcher developed a Communication Partner Interview Script (Appendix O) to be used in the interview with a familiar communication partner selected by the participants. The Communication Partner Interview Script mirrored the Participant Interview Script and reflected on the other partner of the communication dyad. The script included thanking the communication partners for their willingness to participate, instructions of the proceedings, a set of 12 questions and thanking them for their participation after answering the questions. Table 3.9 presents the question numbers, the aspects, the type of question and the reason for inclusion of the questions.

Table 3.9

Development of the Questions in the Communication Partner Interview Script

Question number	Aspect	Type of question	Reason for inclusion	Theoretical justification
1-2	Communication modalities	Open-ended question	To describe the various means of communication used by the communication partner to interact with the participant.	Communication partner skills and preferences are important to consider in interactions

Question number	Aspect	Type of question	Reason for inclusion	Theoretical justification
				(Beukelman & Mirenda, 2013).
3 & 4	Reasons for liking and disliking messaging interactions	Open-ended question	To describe how the communication partner experienced interacting with the participant via messaging.	Refer to Table 3.6, Topic 1
5	Messaging frequency	Open-ended question	To estimate how frequently the participant and communication partner communicate via messaging.	Refer to Table 3.6, Topic 1
6 & 7	Time of day and place of messaging interaction	Open-ended question	To establish when and where the communication interaction takes place.	Refer to Table 3.6, Topic 3
8	Messaging content	Open-ended question	To describe the content, as well as the functional orientation of the messages.	Refer to Table 3.6, Topic 4
9 & 10	Communication maintenance and repair	Closed and open-ended questions	To describe if timing of the responses influences the interaction and how communication breakdown is handled.	Refer to Table 3.6, Topic 5
11	Recommendations	Open-ended question	To determine if the communication partner has any recommendations regarding improvements that would ease the participant's ability to message.	Refer to Table 3.6, Topic 6
12	Additional information	Open-ended question	To determine if the communication partner has any additional information regarding messaging that they would like to add to the discussion.	Refer to Table 3.6, Topic 6

3.6.3.3 WhatsApp Focus Group Script

The researcher developed a WhatsApp Focus Group Script similar to a face-to-face focus group to be used as a guideline for the online WhatsApp focus group discussion (Appendix P). The script includes an introduction and ice breaker question, a set of five questions and probes to elicit data, a message of thanks to the group for their participation, and an exit strategy. Table 3.10 presents the question numbers of questions to elicit data, the aspects, the type of question and the reason for the inclusion of the questions.

Table 3.10

Development of the Questions in the WhatsApp Focus Group Script

Question number	Aspect	Type of question	Reason for inclusion	Theoretical justification
1.	Reasons for liking and disliking messaging interactions	Open-ended questions	To determine why messaging interactions are liked and/or disliked.	Refer to Table 3.6, Topic 1

Question number	Aspect	Type of question	Reason for inclusion	Theoretical justification
2.	Content as well as depth and urgency of messaging interactions	Open-ended questions	To further explore the content and deduced communication functions of the interactions, whether feelings can be expressed on WhatsApp, as well as exploring if WhatsApp can be used in emergency situations.	Refer to Table 3.6, Topic 4
3.	Ease-enhancing strategies associated with messaging	Open-ended questions	To determine what strategies the youth with CCN use to enhance the ease of messaging interactions	Refer to Table 3.6, Topic 5
4.	Maintenance and repair strategies	Open-ended questions	To determine if the pace of interactions affects communication maintenance and to establish how participants solve breakdowns in communication.	Refer to Table 3.6, Topic 5
5.	Support suggestions and additional information	Open-ended questions	To determine the type of support that may be needed and how technologies can improve to provide support. To determine what additional information regarding messaging they would like to add to the discussion.	Refer to Table 3.6, Topic 6

3.6.3.4 Researcher Observation Form

A Researcher Observation Form was developed by the researcher as a guideline to record the observations of the interaction between the researcher and participant within the interview contexts (Appendix L). The Researcher Observation Form included the five contextual description elements used to conceptualise and define the term *context*, namely people, place, activity, objects and time (King, Imms, Stewart, Freeman, & Nguyen, 2018). The Researcher Observation Form also included a section that allowed for the descriptive documentation of the various skills of the participant. The skills that were included were based on three of Light's (1989) initial components of communicative competence for individuals who rely on AAC, namely i) operation skills to describe how the participants physically message; ii) social skills to describe the general patterns of interaction; and iii) strategic skills used to address a breakdown in communication. Linguistic skills relating to linguistic competence could not be observed due to the nature of the interaction, but the researcher asked the participants if they used certain linguistic features that aided the ease and rate of interactions. These were recorded on the form. The Researcher Observation Form furthermore allowed for the documentation of ease- and rate-enhancing device features used by the participants when interacting via messaging. The aspects included in the Researcher Observation Form and the reasons for their inclusion, as well as the theoretical justification for inclusion, are described in Table 3.11.

Table 3.11

Development of the Researcher Observation Form

Aspect	Reason for inclusion	Theoretical justification
Place of interaction	To describe the place where the interviews took place.	Communication is context bound (Beukelman & Mirenda, 2013).
Persons involved in interaction	To describe the persons who were present during the interview.	Communication is interactive (Alant, 2017) and is thus influenced by the persons involved in the interaction.
Activity	To record the activity observed.	Record to state that participants' use of messaging was observed during the initial and follow-up interview process (McMillan & Schumacher, 2014).
Objects	To record the size and the placement of the device used.	Device access for youth with CCN is an important consideration (Bryen & Pecunas, 2004) and warrants documentation.
Time	To record how much time was spent interacting.	The time that the researcher spent with the participants was recorded, as the duration of sessions may have an impact on the results (McMillan & Schumacher, 2014).
Independent operational skills	To describe how the participants physically message.	Certain operational skills are needed to operate an AAC system accurately and effectively (Beukelman & Mirenda, 2013), as is the case with mobile phones.
Social skills and mood of interaction	To describe the social interaction between the participant and the researcher.	Any form of communication requires certain social knowledge, judgements and skills (Beukelman & Mirenda, 2013). Messaging differs from certain other forms of communications like letters, face-to-face or telephone conversations, in that one can discuss a topic without preliminary small talk or greetings (Blair et al., 2015).
Strategic skills	To describe skills that facilitate communication maintenance.	Refer to Table 3.6.
Ease- and rate-enhancing features	To document which device features were used, as well as which linguistic features were used, to enhance interaction ease and rate.	Since human factors such as motor control and fatigue influence the communication rate (Beukelman & Mirenda, 2013), features and strategies to lessen the impact of these factors afforded by messaging were recorded.

3.6.3.5 Follow-up Interview Script and Member Checking Scripts

A Follow-up Interview Script (Appendix Q) was developed to be used in conjunction with an individualised Member Checking Script (see example in Appendix R) and to strengthen the validity of the data. The Follow-up Interview Script enabled the participants to reflect on how well they were able to express their views during the WhatsApp focus group discussion. The aspects included in the Follow-up Interview Script and the reason for their inclusion, as well as the theoretical justification for inclusion, are described in Table 3.12. The Member Checking Scripts contained the essence of each participant's responses to the topics discussed in the interview as well as focus group and provided the participants the opportunity to confirm the accuracy of the information. This enabled the researcher to add to or adjust this information.

Table 3.12

Development of the Follow-up Interview Script

Question number	Aspect	Type of question	Theoretical justification
1	Prior experience of participating in research	Closed and open-ended questions	A key characteristic of qualitative research is context sensitivity (McMillan & Schumacher, 2014). It is thus important to establish if certain members of the group were more familiar with the context of a group discussion than others.
2 & 4	Focus group experience	Open-ended questions	In a group environment, participants are stimulated by each other's perceptions and ideas. Furthermore, group participation may be influenced by a complexity of factors that should be taken into consideration when analysing the data (McMillan & Schumacher, 2014).
3	Ability to express views	Open-ended questions	Web-based platforms provide participants time and space flexibility (Creswell & Poth, 2018), which allowed the participants time for more in-depth responses.
5	Continued group participation	Closed and open-ended questions	In the initial interviews, a number of participants voiced that they would enjoy more social contact via WhatsApp.

3.6.3.6 Samsung Grand Prime Plus smartphone, iPad, Sony video recorder, Dell laptop

A Samsung Grand Prime Plus smartphone was used to ask the interview and focus group questions using the WhatsApp messaging application. The participants used their personal phones to respond to the questions, with the exception of Mayowa (P6) whose phone had been stolen at school and who used her brother's phone for the participant interview. A video recorder and iPad tablet were used to video-record the interviews. The devices were placed at different angles to video-record both the researcher and the participant. This made it possible for the researcher to add written notes to the digitally downloaded transcripts of the interview and to complete the observation form. The video recordings were also used by the independent coder to score the interview and focus group procedures for procedural integrity by using the scripts as procedural checklists. For analysis and storage purposes, the data was captured on the researcher's Dell laptop computer using the WhatsApp application on the computer.

3.7 Pilot Study

A pilot study was performed to test the clarity and length of the Participant Interview Script, as it formed the basis of all other data collection scripts (Jacob & Furgerson, 2012). It also served to

test the data collection procedures that were novel for the particular population, as well as the equipment. Pilot interviews were conducted with two volunteers who were approached by the researcher. The researcher selected a youth without CCN to obtain feedback regarding the use of age-relevant language as well as the clarity of the questions. An adult with upper limb impairments and CCN was also selected as she was an experienced mobile phone user and was able to provide guidance as far as possible relating to cultural, language and disability factors that had not been taken into account. A description of the pilot study participants is presented in Table 3.13.

Table 3.13

Pilot Study Participant Description (n=2)

Category	Pilot participant 1	Pilot participant 2
Age	15;0	31;1
Gender	Female	Female
Disability	None	Physical disability including loss of speech after an unidentified illness
Home language	English	Ndebele
Messaging language	English	Mainly English, some Sesotho
Type of phone	iPhone 5	Samsung Galaxy Note
Period of mobile phone use	3 years	About 12 years

The specific aims, materials and procedures used, as well as the results and recommendations for the main study are presented in Table 3.14. The Participant Interview Script was revised according to the recommendations that emerged from the pilot study before scheduling the interview appointments with the participants.

Table 3.14

Aims, Materials, Procedures, Results and Recommendations of the Pilot Study

Aims	Materials	Procedures	Results	Recommendations
1. Testing the measuring instrument				
1.1 To determine the clarity of the instructions of the scripted interview guide	Participant Interview Script	Participants were informed of the aim of the questions and what was expected of them. Observations were made on how the participants reacted to the initial instructions.	Both participants appeared to easily understand and follow the instructions. The researcher was uncertain if the word <i>texting</i> or <i>messaging</i> would be more appropriate for the population. When asked, the participants preferred the word <i>WhatsApp</i> for sending and receiving messages on WhatsApp.	As the word <i>texting</i> is used less frequently in South Africa than in certain other parts of the world, the researcher decided to check the terminology before each interview with each participant. Both participants felt that the word <i>WhatsApp</i> was the most appropriate term and the interview script was therefore amended accordingly.
1.2 To determine the clarity and appropriateness of the questions in the scripted interview guide	Participant Interview Script	Semi-structured interviews were conducted with the participants using the questions included in the scripted interview guide. Observations were made on how the participants reacted to the questions.	Participant 1 highlighted two problems: (i) The initial wording of a question on linguistic variations was unclear; (ii) The participants may not have five contacts to list. Participant 2 highlighted that the question about the types of messaging apps was unclear.	The unclear question highlighted by Participant 1 was removed from the interview, and the question about the number of contacts was reformulated and the number was left unspecified. The question Participant 2 highlighted was reformulated.
2. Testing the data collection procedure				
2.1 To determine the suitability of the data collection procedure	Researcher's mobile phone and video recorder	WhatsApp messages were received on the researcher's mobile phone and downloaded onto a computer; additional notes were added after consulting the video recording	The messages were easily collected and directly transferred for analysis. The transferred data contained the names of the persons messaging and the times the messages were sent. Adding additional notes was very time consuming.	The researcher should factor in the time it takes to add the notation of the speech and gestures to the downloaded text.
2.2 To determine the estimated time to conduct the interview	Video recorder	The interview was recorded on video. The recording indicated the time.	The interview took 15 minutes with Participant 1 and 1 hour 15 minutes with Participant 2.	As the participants might tire from the length and effort of the interview, certain questions, such as the use of linguistic variations, were moved to the WhatsApp discussion group. The researcher also included a question to ask if the participants needed a break and was observant of signs of fatigue during the individual interviews.

Aims	Materials	Procedures	Results	Recommendations
2.3 To ensure procedural reliability	Procedural checklist (part of Participant Interview Script)	The researcher completed the procedural checklist whilst watching the video recording.	All procedural steps were easily followed. Questions about use of different messaging languages surfaced during the discussion with Participant 2.	The additional questions that were not scripted provide greater depth to the interview and should be recorded to ensure all participants are asked the same questions.
3. Testing the suitability of the equipment (Participant 2)				
3.1 To determine the suitability of the interview equipment	Mobile phones	The researcher and participants were easily able to connect and communicate via their mobile phones.	Participant 2's phone was not charged when arriving at the interview. She had brought her charger and an extension lead was found in the room.	The researcher would have to bring extension leads and chargers to the interviews to ensure that the equipment would work.
3.2 To determine the suitability of the recording equipment	iPad and video recorder	An iPad and video recorder were used to record the interaction.	The recording was clear and suitable.	No recommendations.

3.8 Data Collection

One of the strengths of a case study design is the use of a variety of data collection methods (Creswell & Poth, 2018). In the current study, four different data collection methods were included. A schema of the different data collection methods is depicted below in Figure 3.2.



Figure 3.2. Four data collection methods used to address subaims of the study.

Each of these types of data collection is next described in more detail:

3.8.1 Data collection method 1: Participant interviews

3.8.1.1 Aim

The aim of the first face-to-face interviews was twofold. Firstly, the researcher aimed to gain the trust and respect of the participants (Braun & Clark, 2013; DiCicco-Bloom & Crabtree, 2006) by being sincere, listening actively, showing empathy (Doody & Noonan, 2013) and by explaining that their role in the research was collaborative. The researcher was also aware of aspects noted in a study on exploring the identities and life worlds of young people who used AAC, namely that they wanted to be treated as persons who have things to say, that they liked being listened to and talked to directly, that they needed time to respond, that they did not like other people completing their sentences, and that one should check if they have been correctly understood (Wickenden, 2011).

Secondly, the interview aimed to collect relevant background information and to explore five of the subaims of the study from the perspective of the youth with CCN, namely to establish why they like and/or dislike messaging interactions; with whom they interact using messaging; when and where the interactions take place; the content of these interactions; and how the interactions are maintained and repaired. By speaking directly to the participants, the researcher attempted to understand messaging in terms of the participants' own practices, experiences and motivations (Babbie & Mouton, 2009; Gill et al., 2008).

3.8.1.2 Method

Face-to-face interviews were selected, as this enabled the researcher to actively engage with the participants and to read social cues (Opdenakker, 2006). Furthermore, semi-structured interviews were chosen, as this method of information gathering allowed the researcher to formulate predetermined key questions about the messaging parameters that were to be explored. At the same time, it allowed the researcher some flexibility to elaborate when necessary (Babbie & Mouton, 2009; Gill et al., 2008). The questions were open ended to allow the participants to provide descriptive information according to their views (Jacob & Furgerson, 2012). The development of the questions included in the Participant Background Information Script is discussed in Section 3.6.2.1. The development of the questions included in the Participant Interview Script is discussed in Section 3.5.3.1 and the final Participant Interview Script can be seen in Appendix N.

3.8.1.3 Procedure

Individual face-to-face interviews were scheduled in advance with each individual participant. The researcher tried to schedule the interviews at a time and place that suited the participants and would be non-threatening to them (Gill et al., 2008; Jacob & Furgerson, 2012). Since the interviews took place across five of the nine provinces in South Africa (Western Cape, KwaZulu-Natal, Gauteng, Limpopo and North West), it took considerable time to organise the appointments and find suitable venues for participants who preferred not meeting at their home or school. The researcher also tried to limit any distractions at the venues, like asking that a television in the room be switched off (Creswell & Poth, 2018). Limiting distractions was however not

always possible in other persons' private homes, in the home for persons with disabilities, as well as in public settings.

The interviews began with an informal conversation (Jacob & Furgerson, 2012; Salkind, 2006) and an explanation of the procedures. The participants were also reminded that they had given their consent to be recorded on video and this consent was re-confirmed. Participants were again assured of confidentiality, which helped to build trust (Doody & Noonan, 2013). Although the interviews were conducted face to face, mobile messaging was used between the researcher and each participant. This enabled the researcher to document the participant's use of messaging. It also meant that both the sending and the receiving of messages were in the same modality, lessening the effects of bilinguality (Von Tetzchner et al., 1996).

The researcher created a Wi-Fi hotspot with her mobile phone and instructed the participant to log into the Wi-Fi hotspot on his/her phone. Once both parties were online, the researcher used the WhatsApp messaging application on her mobile phone to message the questions to the participants one question at a time. The researcher then waited for the participant to respond on WhatsApp before asking a follow-up or the next question. As previously noted, Naleli (P4) occasionally indicated that she did not understand the researcher's question sent via WhatsApp, in which case the researcher would try and clarify using WhatsApp or speech. The use of other modalities (e.g. gestures) was also allowed during the interview, as multimodality contributes to effective and efficient communication (Loncke, 2014).

It was important to give the participants enough time to respond because of the physical effort to compose responses. Their responses were anticipated to be short. Pauses were used to encourage the sharing of information (McMillan & Schumacher, 2014). Participants were also asked if they were becoming tired and needed a break. The interviews generally followed the order of the Participant Interview Script.

As certain questions in the Participant Interview Script required the participant to answer questions about a specific communication partner, these interviews were completed via WhatsApp once the participants had identified a specific communication partner who consented to participate in the study. The participants were provided data to cover the cost of these interactions. At the end of the interviews, the participants were thanked for their participation and asked if they had any questions or would like to add anything (Salkind, 2006). Field notes were made by the researcher

during and directly after the interview to guide data analysis (Gill et al., 2008) and give more descriptive information. The initial face-to-face interviews lasted about three hours.

The interviews were downloaded using the WhatsApp application on the researcher's laptop computer and electronically transferred to a Word document, thereby eliminating transcription errors (Creswell, 2014). Correct transfer of data was spot checked by an independent professional researcher who checked 20% of randomly selected data. The researcher added additional speech, gestures and facial expressions to the transcripts whilst consulting the field notes and video recordings, so as to record all modalities of communication used during the interview. Naturally spoken speech was italicised and the meaning of unaided communication was marked by single quotation marks as well as a description in brackets, e.g. 'no' (nods head), as outlined in Chapter 1. In the transcripts, the WhatsApp messages were left in the format in which they had been electronically transferred (e.g. [19:05, 1/29/2018] Tapiwa: Ohk, thinx). Messaging data segments that are used as examples in this thesis are marked by an asterisk, for example *Ohk,thinx*.

The Participant Interview Script (Appendix N) was furthermore used as the procedural checklist to ensure procedural reliability. The same independent professional researcher was asked to observe three of the videos and to score the procedural reliability according to the script. To calculate procedural reliability, the number of correctly completed steps (agreements) was divided by the total number of steps (agreements + disagreements) and then multiplied by 100 to express the percentage of procedural reliability (McMillan & Schumacher, 2014). Each interview involved a total of 30 procedural steps. An overall procedural reliability score of 98,7% was obtained.

3.8.2 Data collection method 2: Communication partner interviews

3.8.2.1 Aim

As communication is a joint activity, it is important to consider the roles of communication partners to enhance the outcomes of a study such as the present one (Blackstone et al., 2007). A familiar communication partner of each participant with CCN was thus interviewed to describe their views on messaging communication with the participant with CCN. The interview questions aimed to explore four of the subaims of the study, namely to establish why they like and dislike interacting via messaging with the participant; when and where the interactions usually take place;

the frequency of the interactions; the main content of these interactions, and how the interactions are maintained and potential breakdowns repaired.

3.8.2.2 Method

Semi-structured remote interviews via messaging were conducted with one selected communication partner of each participant with CCN by using a predetermined custom-designed Communication Partner Interview Script as a guide. Remote interviews were selected because of the physical distance and availability of the communication partners (King, Horrocks, & Brooks, 2019). Messaging allowed for near-synchronous interactions, which resembled real-time ‘chat’. The fact that the interactions were online also facilitated an openness from the communication partners (King et al., 2019). The same ethical sensitivities and biases discussed under Participant Interviews were considered during the interviews with the communication partners. The development of the questions used in the interview are presented in Section 3.6.3.2 and the script can be viewed in Appendix O.

3.8.2.3 Procedure

During the individual interview, each participant with CCN was asked to select a familiar communication partner with whom they enjoyed regular WhatsApp contact and who they thought would be willing to participate in the study. Letters were sent to these communication partners via the participants to explain the purpose and nature of the research and ask for their participation (Appendix H). If they agreed to participate, the reply slips were sent to the researcher via WhatsApp. The interviews were scheduled at a convenient time for the communication partners and took place via WhatsApp. The communication partners were given data to cover the cost of the data collection via WhatsApp and were thanked for their willingness to participate. Each interview lasted between 15 and 30 minutes. The interviews were downloaded using the WhatsApp application on the researcher’s laptop and electronically transferred to a Word document for analysis. The previously mentioned independent professional researcher checked three randomly selected completed interview data sets for procedural reliability using the Communication Partner Interview Script as a procedural checklist. Each interview involved a total of 17 procedural steps. A procedural reliability score of 100% was obtained.

3.8.3 Data collection method 3: WhatsApp focus group

3.8.3.1 Aim

The aim of the WhatsApp focus group was to explore specific aspects of messaging in greater depth and to provide rich descriptive information. The different perspectives of the group members highlighted similarities and differences of opinions in a dynamic and enriching discussion. The aspects included why the participants like or dislike interaction via messaging; the content, depth and urgency of the messages; the features and strategies used that increase the ease and rate of interactions; the strategies used to maintain interactions and repair possible communication breakdowns, as well as the suggestions and recommendations by the participants regarding the use of messaging for individuals with CCN.

3.8.3.2 Method

The WhatsApp focus group was set up as an asynchronous online focus group scheduled over five days using a predetermined interview script that consisted of open-ended questions and probes. The fact that the focus group was asynchronous provided the participants the opportunity to express their ideas in their own time, which is an important consideration for individuals with disabilities (Blackstone et al., 2007). It also allowed for accommodating different schedules, which was important as some of the participants worked or were busy with their studies (Creswell & Poth, 2018; Morgan & Lobe, 2011). This was thought to outweigh the possible negative consequence of participants losing interest in contributing in asynchronous focus groups because of the length of time between comments (Morgan & Lobe, 2011). Online focus groups had the additional advantage of eliminating transport challenges, which was an important consideration for the participant population (Bornman et al., 2016). Although online focus groups mostly eliminated concerns about personal appearance (Morgan & Lobe, 2011), it was not established whether personal appearance was a factor in the present study. WhatsApp allowed the researcher to see if and when the participants were online, which helped with the timing of the questions. The complete set of questions used in the WhatsApp focus group are shown in Appendix P. Leading or loaded questions were avoided, and probes were used to clarify responses (Gill et al., 2008), for example “Can you think of any other reasons?”. Ground rules were also set to inform the participants that they were free to disagree with each other as long as they did so in a respectful

manner. Thus, the participants were encouraged throughout to express their opinions freely. (See Appendix Q for an excerpt of the interaction.)

3.8.3.3 Procedure

A WhatsApp focus group was formed after the interviews had been conducted, and it consisted of the researcher and the seven participants. The size of the focus group was regarded optimal for discussion purposes (Gill et al., 2008). It was scheduled for a period of five days. The participants were each given data at the start and near the end of the focus group to ensure that they incurred no personal financial costs. The second smaller amount of data was necessary as two of the participants had run out of data because of other activities on their smartphones.

The researcher initiated the discussion by asking everyone to introduce themselves by stating their name and their favourite type of music as an ice breaker. Thereafter the conversation was facilitated by the researcher asking questions that the group had to discuss. The researcher was guided by the amount of responses as to when the next question would be asked. To ensure active participation, the researcher used prompts such as “We have not heard from some of you in a while, what are your thoughts on the topic?” The researcher thanked the group for their participation at the end of the discussion. The researcher’s exit from the WhatsApp group was communicated in advance and with the correct sensitivity towards the participants. Several participants wanted to continue with the group after the data collection had been concluded. They were given the option to continue and a new group administrator was appointed.

All responses were electronically transferred from the WhatsApp application on the researcher’s laptop to a Word document for analysis. The fact that online focus groups do not require any recording (audio and/or video) with subsequent transcription is a further advantage of online focus groups. Correct transfer of data was nonetheless checked by the researcher by a spot check of 20% of randomly selected data. The transferred data was also checked for procedural reliability by the independent professional researcher using the WhatsApp Focus Group Script as a procedural checklist. The WhatsApp Focus Group involved a total of 33 procedural steps. A procedural reliability score of 100% was obtained.

3.8.4 Data collection method 4: Researcher observations

3.8.4.1 Aim

The individual interviews with the participants were recorded on video to enable the researcher to observe and describe the interview setting and the manner in which the participants with CCN were messaging. The main emphasis was on providing a description of the interaction process, their physical access of messaging, as well as the social and strategic aspects of the interaction. As mentioned in the literature chapter, it is difficult to separate some of these skills, as all the skills influence one another. For example, the timing of turn taking is influenced by social culture, physical restrictions as well as the nature of the interaction.

3.8.4.2 Method

A Researcher Observation Form was custom designed for the purpose of this study. This allowed for the documentation of contextual aspects, as well as of specific skills and strategies used by the participants. The development of the form used for the observation is presented in Section 3.6.3.4 and includes a theoretical justification of all the aspects included. This form can be viewed in Appendix L.

3.8.4.3 Procedure

The video recordings of each participant's interview allowed the researcher to observe, document and analyse each participant's behaviour, using the Researcher Observation Form (Appendix P). The form was completed by the researcher whilst doing the transcriptions of the interviews. The same independent professional researcher was asked to watch 30% of the above-mentioned video footage to check the reliability of the findings recorded by the researcher on the Researcher Observation Form. Differences in the findings were discussed until an inter-rater reliability of 100% agreement was reached. While conducting the interviews, the researcher noted that it was difficult to observe the use of certain ease- and rate-enhancing features (e.g. whether the participant was using predictive text) and the researcher therefore asked the participants directly if they used these features, rather than attempting to observe them.

3.9 Reliability and Validation Strategies

Various reliability and validation strategies were used to ensure that the data obtained was credible and accurate. Lincoln and Guba (1985) (cited in Creswell & Poth, 2018; Shenton, 2004) advocate the use of the term *trustworthiness* in qualitative research, which includes the concepts credibility, authenticity, transferability, dependability and confirmability. In the present study, the researcher selected to use the term *validation strategies* as outlined by Creswell and Poth (2018, p. 259), as these authors stress that validation is a process. Table 3.15 lists the reliability procedures followed in the present study, while Table 3.16 lists the validation strategies outlined in the literature and the measures taken during the study to apply these strategies.

Table 3.15

Reliability Procedures and Their Application During the Data Collection and Analysis of the Present Study

Reliability procedure	Application of procedure in the present study
Using good-quality recording devices	A good-quality stereo digital voice recorder was used for recording the speech samples. A good-quality video camera and iPad were used for the observations and the researcher used a good-quality mobile phone for the interactions. The quality of the mobile phones used by the participants could not be pre-determined and technical issues had to be dealt with as they arose, e.g. running out of power.
Following a script	The interviews and focus group discussion questions were all scripted. A script enhanced the procedural integrity of the data and ensured comparable data collection across participants (McMillan & Schumacher, 2014). Three randomly selected data sets pertaining to each method of data collection were reviewed by an independent researcher who used the various scripts as a procedural checklist to establish if the correct procedures had been followed. A procedural reliability score of 98,7% was obtained for the participant interviews, 100% for the communication partner interviews, 100% for the WhatsApp focus group, 100% for the follow-up interviews and 97,9% for the member checking.
Accurate field notes during observations	The participants were recorded on video during the interview with the researcher and the videos were afterwards observed by the researcher to transcribe the interactions and to record various interactional aspects specified on a custom-designed observation form. The same independent researcher watched three of these videos to check the reliability of the observations recorded by the researcher.
Accurate transfer of data	The participants used their mobile phones to respond to the interview questions and participate in the discussion group. The data was thus collected on the researcher's mobile phone and was viewed, transferred and stored using the WhatsApp application on the researcher's laptop.
Intercoder agreement	Two independent coders with relevant experience in the discipline were used to code 20% of the data using a code-confirming strategy to ensure cross-checking of the codes and inter-coder agreement (Creswell, 2014).

Table 3.16

Validation Strategies Outlined in Creswell and Poth (2018) and Their Application During the Data Collection and Analysis of the Present Study

Validation strategy	Application/lack of strategy used in the present study
Corroborating evidence through triangulation of multiple data sources	The researcher used multiple methods and sources of data collection about the same phenomenon – messaging – including face-to-face interviews with the participants, online interviews with the communication partners, an online focus group with all the participants and the researcher’s observations. Method and source triangulation (Carter, Bryant-Lukosius, DiCenso, Blythe, & Neville, 2014; Lambert & Loisel, 2008) used in the current study enhanced the validity of the findings.
Prolonged engagement and persistent observation in the field	The researcher became acquainted and built up rapport with all the participants during the screening process. The researcher remained in contact with the participants over a period of several weeks in which time she had personal contact with the participants and communicated with them via WhatsApp.
Generating a rich, thick description	The open-ended questions of the interviews and focus group discussion ensured descriptive information. These discussions were supplemented with field notes taken during direct contact with the participants, as well as video observations in which the researcher documented participant interactions.
Discovering negative case analysis or disconfirming evidence	Although the interactional aspects explored in the present study were predominantly predetermined from literature on youth without disabilities, the researcher was attentive to the fact that the participants in the study may experience these aspects differently because of varying communicative competencies. The researcher was thus attentive to unexpected aspects arising from the data collection methods, as well as different interpretations by the participants of the various aspects.
Clarifying research bias or engaging in reflexivity	The researcher reflected on her own experiences of using messaging to ensure that she was aware of her personal biases. She also reflected on the influence she may have had on the participants’ responses to her questions because of age, cultural, gender or other differences. Participant reactivity to the recording devices was monitored.
Collaborating with participants	The researcher tried to forge an honest and open relationship with the participants and stressed the fact that each participant had a voice that needed to be heard.
Member checking or seeking participant feedback	Following the participant interviews and WhatsApp discussion group, the researcher consulted the participants in a follow-up interview to ensure that she had represented their viewpoints correctly and that the information was credible. The researcher also enquired if any information was missing. Questions regarding the linguistic variation noted in their texts were discussed with them.
Having a peer review or debriefing of the data and research process	Throughout the development of the questions and aspects for observation, peers from various professional backgrounds who were enrolled in the PhD programme at the Centre for AAC at the same university as the researcher were consulted via online discussion groups. These consultations led to the refinement of the materials used for the data collection.

3.9.1 Follow-up interview and member checking

To ensure the accuracy of the findings, the researcher organised to meet with all the participants at a time and place convenient to them to conduct follow-up interviews. The aim was to ensure that the correct information had been recorded and to provide participants the opportunity to report on how accurately they were able to share their views in the WhatsApp focus group discussion. At the follow-up meetings, the researcher used the custom-designed Follow-up

Interview Script to ask five additional questions to each participant, to receive feedback from them as to how they experienced the WhatsApp Focus Group. The researcher used WhatsApp to interact with the participants, thus using the same format as used in the participant initial interviews. The development of these questions is outlined in Section 3.6.3.5 and the script can be seen in Appendix R. Each follow-up interview involved a total of 10 procedural steps. A procedural reliability score of 100% was obtained.

A Member Checking Script was developed for each participant to ensure that the researcher had correctly captured their answers during the Participant Interviews and the WhatsApp Focus Group (see Appendix S for an example). The researcher arranged individual follow-up meetings with all the participants. At these meetings, the researcher read all of the participant's recorded responses as documented on the Member Checking Script and the participant was asked to confirm whether the information was accurate or not and if they wished to add anything. An average procedural reliability score of 97,9% was obtained for all checklists.

3.10 Data Analysis Procedures

The data that was collected was analysed using thematic analysis. This qualitative descriptive approach allowed the researcher to identify and describe the interactional aspects afforded by messaging for youth with CCN (Braun & Clark, 2006; Vaismoradi, Turunen, & Bonda, 2013). The researcher used the basic principles of thematic analysis outlined by King et al. (2019), as well as the six phases of thematic analysis outlined by Braun and Clark (2006), to guide the analysis process.

3.10.1 Thematic analysis of participant and communication partner responses

The data collected from the Participant Interviews, WhatsApp Focus Group, Communication Partner Interviews, Researcher Observation Forms and Member Checking and Follow-up Interviews were all analysed using thematic analysis. To begin, the researcher did her own transfers and transcriptions of the recorded material into text documents and thus familiarised herself with the data (King et al., 2019). Moreover, reading and re-reading the transcripts containing the data allowed the researcher to familiarise herself intimately with the data, which is an essential first phase of the analysis (Braun & Clark, 2006).

Next, the researcher uploaded all the transcripts onto ATLAS.ti 8, a computer-aided qualitative data analysis software (CAQDAS) on her laptop. The use of this software aided the researcher to organise, manage and display the data effectively (Friese, 2012). This improved efficiency, and at the same time permitted the researcher to do everything that she would have done manually (Saldaña, 2016). Once the data was saved in ATLAS.ti 8, the researcher began the next phase of the analysis, namely the coding of the data.

Coding is a cyclical process that aims to capture the essence of the data through a refinement process of coding and recoding (Saldaña, 2016). The researcher used an abductive approach to coding (a combination of a top-down and bottom-up approach), which meant that she used *a priori* themes or main thematic areas prepared in advance as a starting point for the coding (King et al., 2019). These main thematic areas were used as broader themes within which the data was analysed and linked to the subaims of the study. The main thematic areas were i) benefits and challenges; ii) communication partners; iii) convenience of interaction; iv) communication content; v) communication maintenance and repair of breakdown; vi) interaction ease and rate; vii) recommendations for youth with CCN; and viii) focus group experiences (see Appendix T). Within each main thematic area, the researcher highlighted the data pertaining to the thematic area and then used open coding for the first cycle of coding. This allowed for the identification of codes as they were presented in the data instead of imposing pre-conceived codes on the data (Blair, 2015). The wording of the code names in the first cycle of coding stayed close to the data and were purely descriptive (King et al., 2019). For example, the data segment **It's basically designed for conversation** was given the code 'Designed for conversation'. By staying close to the data, the researcher ensured that the participants' voices were heard, even if they contradicted certain assumptions regarding messaging (Saldaña, 2016).

In the subsequent cycle of coding, two independent coders with relevant experience in the discipline were used to code 20% of the data using a code-confirming strategy (King et al., 2019). They critically scrutinised the initial codes and made recommendations about redefining certain codes. An example of a code alteration included changing the code 'No data' to 'Access limited by data'. One new code was added by the independent coders, namely the code 'Language switching' for data concerning the use of a word in a home language. The independent coders made use of coding by list as similarities and repetitions emerged across the data (Friese, 2012). The independent coders furthermore collated or merged certain codes under an umbrella code if

they reached consensus with the researcher that these different codes represented the same essence (Saldaña, 2016). An example of collated codes was collating the codes ‘No data’ and ‘Run out of data’ into the code ‘Access limited by data’. In the third cycle of coding, the researcher reread all the transcripts and recoded the remaining 80% of the data to ensure consistency across data codes.

Once the data had been consistently coded, the codes were categorised by the researcher (Saldaña, 2016). King and colleagues (2019) refer to this categorisation or grouping of descriptive codes as interpretive coding (see Appendix T). An example of this grouping was placing the codes ‘Home’ and ‘Own room’ in the category ‘Private setting’. The researcher applied these interpretive codes or categories to the full data set, keeping in mind the broader contextual aspects that were noted during the individual interviews and ensuring that the meanings offered by the text were captured (King et al., 2019). The categories were again checked by the same two independent coders. The process of reflecting on the data and distilling the codes and categories took place over an extensive period of six months.

The next three phases of thematic analysis include searching for themes, reviewing themes and defining and naming themes (Braun & Clarke, 2006). In this study two levels of themes were identified, namely the pre-determined main thematic areas listed above that relate to the subaims of the study, as well as the themes constructed by the researcher from the codes and categories within each main thematic area. To view this process clearly, the researcher presented the steps in a table format according to each main thematic area (similar to the matrix format discussed in King et al., 2019). These tables present the following from left to right: Examples of the data from all the analysed transcripts; the codes resulting from the coding of all the data; the categories under which the codes were grouped; and the themes that were constructed.

3.10.2 Thematic analysis of text message features

A similar abductive approach using thematic analysis was used to highlight examples of linguistic variations of conventional language (textisms) and other texting features used by participants in their WhatsApp messages pertaining to the theme *ease- and rate-enhancing features and strategies* and the theme *expressive features*. To begin, the researcher used categories that were identified in previous studies and that examined the features of text messages – including the studies by Thurlow (2003), Crystal (2008), Farina and Lyddy (2011) and Durkin et al. (2011). The categories that were identified in these studies and that were relevant to the present study

included shortened word forms (including contractions like *abt*; initialisms like *lol*; letter and number homophones like *u* and *4got*); typographic symbols like ‘&’; emojis; non-conventional spellings, misspellings and typos; accent stylisation and punctuation. The data was coded using these categories and additional codes that were identified that did not belong to these categories were categorised by the researcher into the additional categories named: exclamatory spelling and features for adding prosodic impact; capitalisation; and language switching. The researcher was aware during the coding that there may be generational differences in the words and emojis used by the participants. Therefore, during the coding, she familiarised herself with the emojis she did not know by googling the meaning of unfamiliar emojis such as 🍑🍆. She also asked the participants to explain unfamiliar shortened word forms such as *jc*, meaning *just chilling*, and asked for a translation of unfamiliar words such as *hayibo* which is an exclamation of surprise meaning *wow! really? can it be*. Table 3.17 gives a description of each of these categories, as well as an example from the data.

Table 3.17

Description and Examples of Messaging Features

Feature category	Description	Example
Shortened words and symbols	Shortened word forms and symbols	*abt* (meaning <i>about</i>) (P1)
Omitted punctuation	Omission of conventional written punctuation	No full stop at the end of a message.
Omitted capitalisation	Omission of conventional written capitalisation	*nomsa* (P7) (name of participant)
Emojis combined with text	Emojis used in conjunction with text	*Cool 😎👍👍😁* (P1)
Emojis without text	Emojis used as a response without text	*😂* (P3)
Punctuation: (,) Separate ideas	Punctuation used in the middle of a sentence.	*I love RnB, I love to hanging out with my friends* (P2)
Punctuation: (.) Separate ideas	Punctuation used in the middle of a sentence.	*I 4got some of the things that I like. I like to talk to people no matter who you are* (P7)
(?) After question	A question mark used after a question	*Can I ask you guys something?*(P2)
Emphatic capitalisation	Capital letter used non-conventionally and for emphasis	*It's a big NO* (P5)
Accent stylisation	Words written in a manner that they would be spoken (emphasising style)	*Yeah* (P4)
Exclamatory spelling & features for adding prosodic impact	Words written in a manner that they would be spoken (emphasising prosodic features)	*Hell no* (P3)

Feature category	Description	Example
Language switching	Using two different languages in one response	*Hayibo* (P2)

3.11 Conclusion

This chapter focused on the aims of the study and the research design used. It also described the participants who were recruited and selected to participate in the study; the material and equipment used in the study (which was largely custom designed); the findings of the pilot study; how the data was collected using a variety of data collection methods; if the data can be considered reliable and valid; and how it was analysed. The results that emerged from the data are discussed in the next chapter.

CHAPTER 4

Results

4.1 Introduction

The main aim of the study is to explore and describe the interactional aspects (related to the why, who, when, where, what and how of communication) afforded by messaging for youth with CCN. To address this aim, Chapter 4 presents the results according to each of the thematic areas pertaining to the subaims of the study as shown in Table 4.1. First, the benefits and challenges of messaging use are explored (subaim i). Next, themes pertaining to the main thematic areas relating to subaims two to six are discussed. These thematic areas include the following: communication partners (subaim ii); convenience of interaction (subaim iii); communication content (subaim iv); communication maintenance and repair of breakdown (subaim v); and interaction ease and rate (subaim vi). This is followed by a discussion of the recommendations that were made by the participants and their selected communication partners regarding the use of messaging (subaim vii). Thereafter participants' reflections regarding their experience of the WhatsApp focus group are discussed to increase the validity of the findings. Chapter 4 concludes with a summary of all the themes that were highlighted throughout.

As previously mentioned, there are numerous messaging applications that vary in popularity in different countries and the present study used the messaging application WhatsApp, as it was popular at the time of the study. It must also be noted that all the quotes used in this chapter are verbatim quotes and thus contain spelling and grammatical errors. Spelling errors that may be confusing are indicated by the abbreviation [*sic*] from the Latin *sic erat scriptum* meaning *thus was it written*. Examples of spoken utterances from the transcripts are italicised and examples of messaging data from the transcripts are indicated by an asterisk and a different font (as outlined in Chapter 1.)

Table 4.1

Chapter Layout of the Results According to the Subaims of the Study

Subaims	Method of data analysis	Chapter layout
i. To explore and identify the benefits as well as challenges associated with the use of messaging according to youth with CCN and their selected communication partners.	<ul style="list-style-type: none"> Thematic analysis of responses gathered from <ul style="list-style-type: none"> - participant interviews; - communication partner interviews; - WhatsApp focus group. 	4.2 Reported benefits and challenges of messaging use
ii. To describe who the messaging communication partners of youth with CCN are.	<ul style="list-style-type: none"> Thematic analysis of responses gathered from <ul style="list-style-type: none"> - participant interviews. 	4.3.1 Communication partners
iii. To describe where and when messaging interactions take place.	<ul style="list-style-type: none"> Thematic analysis of responses gathered from: <ul style="list-style-type: none"> - participant interviews; - communication partner interviews; - WhatsApp focus group. 	4.3.2 Convenience: place and time
iv. To describe what the functional orientation of the messaging content is, as well as the expressive features used.	<ul style="list-style-type: none"> Thematic analysis of responses gathered from <ul style="list-style-type: none"> - participant interviews; - communication partner interviews; - WhatsApp focus group. Thematic analysis of expressive features identified in the text messages of youth with CCN. 	4.3.3 Communication content
v. To describe how youth with CCN maintain interactions and repair potential communication breakdowns when using messaging.	<ul style="list-style-type: none"> Thematic analysis of responses gathered from <ul style="list-style-type: none"> - participant interviews; - communication partner interviews; - WhatsApp focus group. Thematic analysis of the repair strategies observed by the researcher when interacting with the participants using messaging. 	4.3.4 Communication maintenance and repair
vi. To describe how youth with CCN use messaging to increase the ease and rate of these interactions.	<ul style="list-style-type: none"> Thematic analysis of responses gathered from <ul style="list-style-type: none"> - participant interviews; - communication partner interviews; - WhatsApp focus group. Thematic analysis of ease- and rate-enhancing features identified in the text messages of youth with CCN. Thematic analysis of ease- and rate-enhancing strategies observed by the researcher when interacting with the participants using messaging. 	4.3.5 Interaction ease and rate
vii. To report the recommendations made by the participants and their selected communication partners on the use of messaging for individuals with CCN.	<ul style="list-style-type: none"> Thematic analysis of responses gathered from <ul style="list-style-type: none"> - participant interviews; - communication partner interviews; - WhatsApp focus group. 	4.4 Recommendations for use of messaging

4.2 Reported Benefits and Challenges of Messaging Use

The first subaim of the study was to explore and identify the benefits and challenges of using messaging according to the perspectives of the participants and their selected communication partners. The results were gathered by asking the participants and their communication partners what they liked and disliked about using WhatsApp. This served as an exploratory introduction to the main aspects associated with the use of messaging and thus includes frequency counts. The data was gathered by the researcher using participant interviews, communication partner interviews and the WhatsApp focus group. It was subsequently analysed under the exploratory thematic areas **Benefits** (Section 4.2.1) and **Challenges** (Section 4.2.2).

4.2.1 Benefits

The exploratory thematic area **Benefits** contained 27 collated codes that were further refined into categories and then grouped into nine themes as shown in Table 4.2. The table also includes one or more illustrative examples from the data. Five of the themes were considered interactional benefits, namely interaction ease and rate; convenience of interaction; expressive benefits; communication partners; and maintenance. Four of the themes were considered related benefits, namely financial benefits; literacy and academic benefits; social benefits; and leisure benefits. These themes are presented in Figure 4.1.

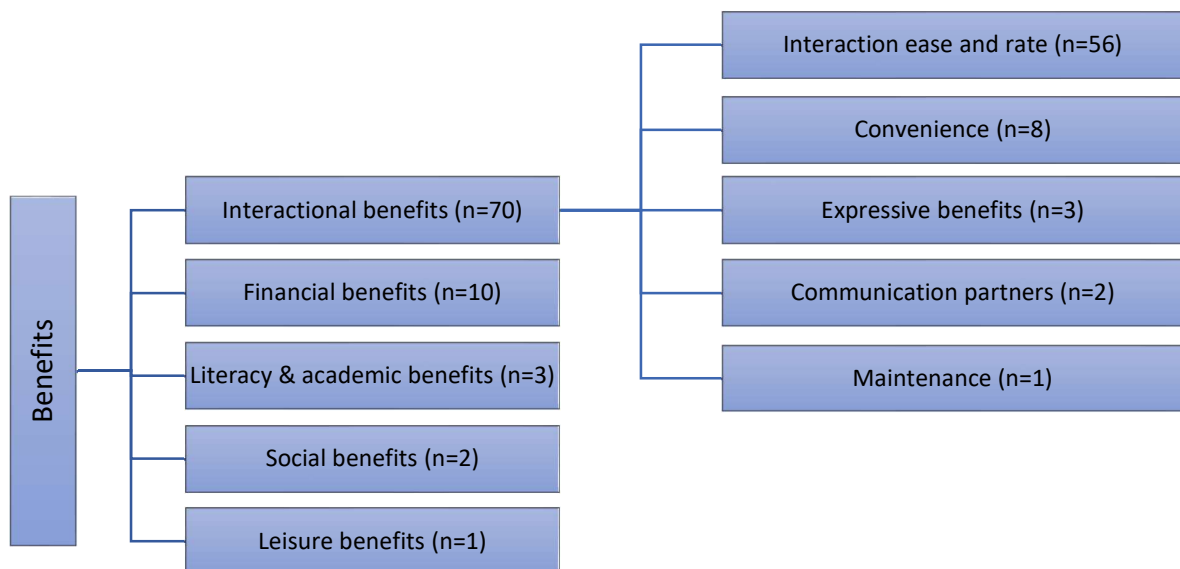


Figure 4.1. Benefits of messaging.

4.2.1.1 Interactional benefits

Participants listed many benefits associated with interacting on WhatsApp. All participants described WhatsApp as easy and all participants, besides P4, described WhatsApp as quick or fast. Participant comments included **What I like about whatsapp is its easy** (P3); **Coz is easy to talk** (P4) and **Well whatsapp for me it's easy** (P5). The word *easy* was also used by several communication partners (P2P, P3P, and P5P) when stating what they liked about interacting on WhatsApp with the participants. More specifically, WhatsApp was said to make **communication easy for people with disabilities** (P3). Participants (P1, P3, and P6) felt that they were more easily understood when using WhatsApp compared to speech and that fewer repetitions were needed to clarify messages. For example, they said that **I can always chat other people without me have to repeat myself when ppl don't understand when I talk** (P1) and **WhatsApp helps me to communicate better with people without them struggling to understand what I am saying** (P6). Communication partners (P4P, P5P) also stated that WhatsApp was beneficial as the participants were more easily understood. WhatsApp was considered not only to be easier than speech, but also easier than email (P1). Furthermore, spelling was not regarded important when interacting on WhatsApp (according to P3), which also contributed to the ease of interactions.

Both P1 and P1P remarked that WhatsApp was convenient. P3, P5 and P4P also commented that they liked the convenience of not being restricted by your own specific setting, as well as being able to communicate with others in a different setting. For example, P4P commented on how WhatsApp helped her stay in contact with P4 as they don't live together, and P3 commented on how he enjoyed interacting on WhatsApp with people in the United States of America whom he had not met in person. A further benefit was the fact that mobile phones are small and can thus be used anywhere (P3).

P1 remarked that WhatsApp was beneficial as he was able to express himself better, stating that **Through Whatsapp i get to express myself more than I would in front of the people** and that WhatsApp allowed him to **conveyed my emotions and and feelings to people then I were to speak by myself**. P6 liked the WhatsApp status feature, which allows the user to share texts, photos, videos and animated GIFs that disappear after 24 hours (<https://www.whatsapp.com>). Two participants highlighted that they liked the fact that they could interact with numerous communication partners. P7 stated that she liked the fact that WhatsApp enabled her to interact with her boyfriend, family and friends. A feature that was regarded as beneficial for maintaining

interactions was the feedback that was provided when interacting on WhatsApp, referring to the blue ticks (read receipt feature) when a message has been received and read by a communication partner (P3). All these benefits are well summarised in P1's observation that WhatsApp is **designed for conversation** and by the fact that P1, P2, P3 and P7 used the word *chat* when describing their WhatsApp interactions.

4.2.1.2 Related benefits

The financial benefits of WhatsApp interactions were mentioned by P1, P3, P5 and P7. WhatsApp was described as cheap and affordable (depending on the service provider). WhatsApp was said to be cheaper than SMS and to use less airtime than SMS. Furthermore, data was said to last longer than airtime. P4 commented that she practised her writing skills when using WhatsApp and P7P also liked the fact that her daughter could practise her writing skills whilst using WhatsApp. P1 commented that his WhatsApp study group was helpful for understanding university work. Social benefits associated with the use of WhatsApp were highlighted. WhatsApp was said to strengthen friendships (P1) and connect the participant with others (P4P). The leisure benefits of using WhatsApp were also mentioned by P7 who said that WhatsApp helped her to keep busy when she was bored.

Table 4.2

Benefits of Messaging

Example(s) from the data	Codes	Category	Themes
I like WhatsApp because it's helps me to chat to my boyfriend, family and friends (P7)	Boyfriend, family and friends (n=2)	Types of partners	Communication partners (n=2)
convenient way of communicating (P1) *I like the fact that it is convenient* (P1P)	Convenient (n=3)	Convenience	Convenience of interaction (n=8)
to close and distance individual (P1) *It's also international thing meaning I can chat with someone in USA.* (P3) *I like that she can reach me whenever she wants to talk as we don't live together... it makes me feel closer to her* (P4P)	Interact with someone who is physically close or far (n=4)	Remote communication	
<i>The reason was, it is very big to fit in my pocket</i> (P3 commenting on why he changed from a tablet to a smartphone)	Size of smartphone more portable (n=1)	Device size influences convenience	
It's basically designed for conversation (P1) *I can chat with someone* (P3)	Designed for conversation/ chat (n=7)	Increased communication ease	Interaction ease and rate (n=56)
I like WhatsApp because it's helps me to chat (P2) *helping her to communicate better* (P4P)	Aids communication (n=6)	Increased communication ease	
Coz is easy to talk (P4) *What I like about whatsapp is its easy* (P3) *Well whatsapp for me it's easy* (P5) *It's an easiest way of communicating with her* (P2P) * and easy to communicate through it* (P3P)	Easy (n=12)	Increased communication ease	
WhatsApp helps me to communicate better with people without them struggling to understand what I am saying (P6) *It's easy to understand him* (P5P)	Heightened ease of understanding (compared to speech) (n=16)	Increased communication ease	
Its a easy path than emails (P1)	Easier than email (n=1)	Increased communication ease	
& fast (P3) *quick* (P5)	Fast/quick (n=11)	Increased communication speed	
it's a much quicker way of communicating compared to other social networks (P1)	Fast/quick (compared to other social networks) (n=1)	Increased communication speed	
And so like it because I can always chat other people without me have to repeat myself when ppl don't understand when I talk (P1)	Avoids/reduces repetition (n=1)	Increased communication ease/speed	

Example(s) from the data	Codes	Category	Themes
Yeah cos whatsapp have its own language. We usually use short to some and it's doesn't matter about the spelling of words. As long as the next person understand what you trying to say (P3)	Short text Spelling does not matter (n=1)	Increased communication ease/speed	
I mean, through Whatsapp i get to express myself more than I would infront of the people (P1)	Express more than face to face (n=1)	Increased expression	Expressive benefits (n=3)
WhatsApp has made my voice more clear. Has conveyed my emotions and feelings to people then I were to speak by myself (P1)	Convey feelings and emotions better (n=1)	Expression of feelings/emotions	
The status feature is very useful because you can see more details one picture (P6)	Status feature shows more detail (n=1)	Expression through pictures	
it's show when the person have read the message by two blue right mark (P3)	Shows when message is read (n=1)	Device feedback feature	Maintenance (n=1)
Yes, regarding my friendship with Bandile it's one of the best and through using Whatsapp to chat with him, it has made it so strong each, as we are able to encouraging one another (P1)	Strengthen friendships (n=1)	Social	Social benefits (n=2)
I don't think it can get any better as it is right now really... it already connects her with friends and family (P4P)	Connects her (n=1)	Social	
I can chat with my family and friends and that saves a lot of money (P7) *we both on watsapp so its cheap* (P3P)	Low cost (n=3)	Cost	Financial benefits (n=10)
It is a cheap and affordable depending on your service provider (P1)	Low cost (depending on service provider) (n=1)	Cost	
* and cheap than sms* (P5)	Low cost (compared to SMS) (n=2)	Cost	
And Whatsapp use less airtime than SMS (P5)	Less airtime than SMS (n=2)	Cost	
Data last longer than airtime (P3)	Data lasts longer than airtime (n=2)	Cost	
yeah it makes me to remember how to write (P4) *Because she can use English word an writing correct word keep her brain good* (P7P)	Practise writing (n=2)	Literacy	Literacy and academic benefits (n=3)
Well they quite helpful because I get to understand a little more better than I work individual (P1)	Helps with studies (n=1)	Academic	
Even if I am bored I can keep myself busy (P7)	Keep busy when bored (n=1)	Leisure	Leisure benefit (n=1)

4.2.2 Challenges

The exploratory thematic area **Challenges** contained 14 codes that were further refined as categories and then grouped into six themes. These are financial challenges, social challenges, literacy challenges, disability-related challenges, and challenging environments and feedback challenges (grouped together as interactional challenges), all shown in Figure 4.2. Table 4.3 presents examples of the data that was coded, the collated codes that pertained to this thematic area, the categories and the themes constructed from the categories.

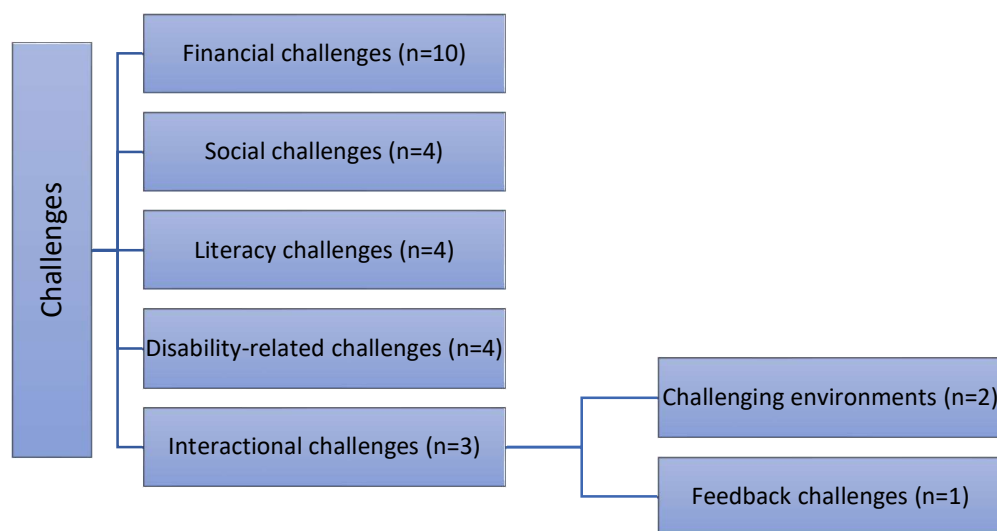


Figure 4.2. Challenges of messaging.

The participants and their communication partners reported certain interactional and related challenges when using messaging, with the exception of two participants who reported experiencing no challenges (*There is nothing that I don't like about whatsapp* (P7); *I don't have no problem with my WhatsApp 😄❤️😞👤* (P2)). Likewise, two communication partners also reported no challenges when interacting with the participants (*She writes very well, I don't have any challenges with her writing skills* (P2P); *He doesn't struggle with it* (P1P)).

Data cost was regarded as participants' biggest challenge (P3, P4, P2P, P3P and P5P) and the frustration of running out of data in the middle of an important conversation was highlighted (P7 and P3). At the time of the interviews, none of the participants reported having access to Wi-Fi. Social challenges that were reported by participants (P2, P4 and P6) included unwanted contact

from others showing a romantic interest in them, disrespectful messages (insults) and inappropriate content (like pornography) on group chats. One communication partner (P6P) voiced her concern that WhatsApp interactions would result in P6 interacting less face to face. P4 raised concerns about her own literacy levels and this was echoed by her communication partner (P4P). P5 also voiced his concern about the literacy levels of his communication partners when trying to find a communication partner who could participate in the study.

Disability-related challenges and device feature challenges were highlighted by P3 P1, P1P and P6. Challenges included for example the issue of typing long messages because of the physical effort, especially in winter (P3); the fact that individuals with speech difficulties are unable to use the voice note function on WhatsApp (P1 and P1P); and that the size of a bigger phone makes it more difficult to operate (P6). One communication partner (P7P) disliked it when her daughter (P7) used short messages as it meant that she did not exercise her fingers. The interactional challenges mentioned by participants included environment challenges and feedback challenges. Environment challenges included being afraid to use messaging in certain environments because of the risk of device theft (P3 and P6) and the possibility of certain environments not having network coverage, thus preventing interaction in certain places (P3). The feedback challenge noted by one participant (P5) was not liking the fact that others can see when he was online.

Table 4.3

Challenges of Messaging

Example(s) from the data	Codes	Category	Themes
Sometimes you can be in a place where there is no network so you can't whatsapp (P3)	No network (different service providers) (n=1)	Challenging environment	Challenging environments (n=2)
'...watching you and then they rob you' (P3)	People may rob you on the street (n=1)	Challenging environment	
People can see when I was online (P5)	People see when online (n=1)	Device feedback feature	Feedback challenges (n=1)
It's needs data. Sometimes I don't have money to buy data so I can't communicate with the people I want to (P3) *Sometimes I need him urgently or he needs me urgently but we are unable to communicate because I either don't have data or he doesn't have it* (P3P)	Access limited by data (n=9)	Data cost	Financial challenges (n=10)
They can insult you (P2)	Insults (n=1)	Social	Social challenges (n=4)
people are irritating me...*Some guys who want to date with me* (P4)	Unwanted messages (n=1)	Social	
Because I don't like when they send bad things on the group (P6)	Inappropriate messages (chat groups) (n=2)	Social	
I just feel that she will be afraid to communicate with people at the outside world (P6P)	Limit face-to-face interaction (n=1)	Social	
She is not that good when it comes to the spelling of words, that can throw me a bit off. Though that can always improve with time (P4P)	Participant literacy (n=3)	Literacy	Literacy challenges (n=4)
So the person who is going answers that questions about me can read also? (P5)	Communication partner literacy (n=1)	Literacy	
Well, it becomes a disadvantage to me when I sent a voice note (P1)	Can't send voice note (n=4)	Physical	Disability-related challenges (n=4)
'Cos I'm disabled, especially in winter' (P3 elaborating why he does not like typing long messages)	Typing long messages (especially in winter) (n=2)	Physical	
Fast msg as participant then does not get *Exercise for finger to type* (P7P)	Fast messaging doesn't exercise fingers (n=1)	Physical	
Member Checking (P6): New bigger phone is more difficult to handle	Bigger phone is difficult to handle (n=1)	Device size influence	

(R) represents the researcher

4.2.3 Benefits versus challenges

It was interesting that certain aspects of messaging use were regarded as both a benefit and a challenge, as illustrated in Table 4.4. It must be noted that the themes social benefits and interactional benefits were difficult to separate. For example, a comment such as **helps me to chat to my boyfriend, family and friends** was considered an interactional benefit but could also be considered a social benefit. The social benefits of interactions are thus not disputed; however, the focus of the study was on the interactional affordances of messaging that facilitate social connections.

Table 4.4

Benefits and Challenges of Messaging Use

Benefits	Challenges
Interactional benefits (n=70) <ul style="list-style-type: none"> ➤ Convenience of interaction (n=8) ➤ Device feedback features (n=1) 	Interactional challenges (n=3) <ul style="list-style-type: none"> ➤ Challenging environments (n=2) ➤ Device feedback features (n=1)
Financial benefits (n=10)	Financial challenges (n=10)
Literacy and academic benefits (n=3)	Literacy challenges (n=4)
Social benefits (n=2)	Social challenges (n=4)

4.3 Results pertaining to the Main Thematic Areas

In addition to exploring the aspects of messaging that were regarded as beneficial and challenging (subaim i), data was gathered and analysed according to the thematic areas pertaining to subaims ii to vi. These thematic areas include the following: communication partners; convenience: place and time; communication content; communication maintenance and repair of breakdown; and interaction ease and rate. The data was gathered using participant interviews, communication partner interviews, a WhatsApp focus group, observations of messaging interactions, as well as an analysis of the messages sent on the WhatsApp focus group. The data was analysed using thematic analysis and the results from the analysis are presented according to each of the above thematic areas as depicted in Figure 4.3. All information was regarded as imported and thus my analysis does not include a frequency count.

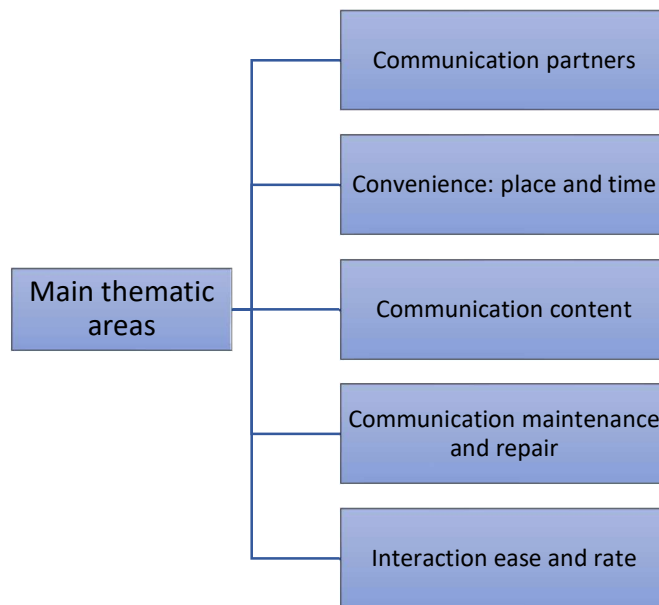


Figure 4.3. Main thematic areas used to report results.

4.3.1 Communication partners

The main thematic area **Communication partners** contained 23 codes. These codes were refined into categories and in turn led to the development of the following three themes: types of partners; partner symmetry; and barriers excluding persons. Examples of the data that was coded, the collated codes that pertained to this theme, and the categories and themes constructed from the codes are presented in Table 4.5. Figure 4.4 summarises the themes pertaining to the thematic area Communication partners.

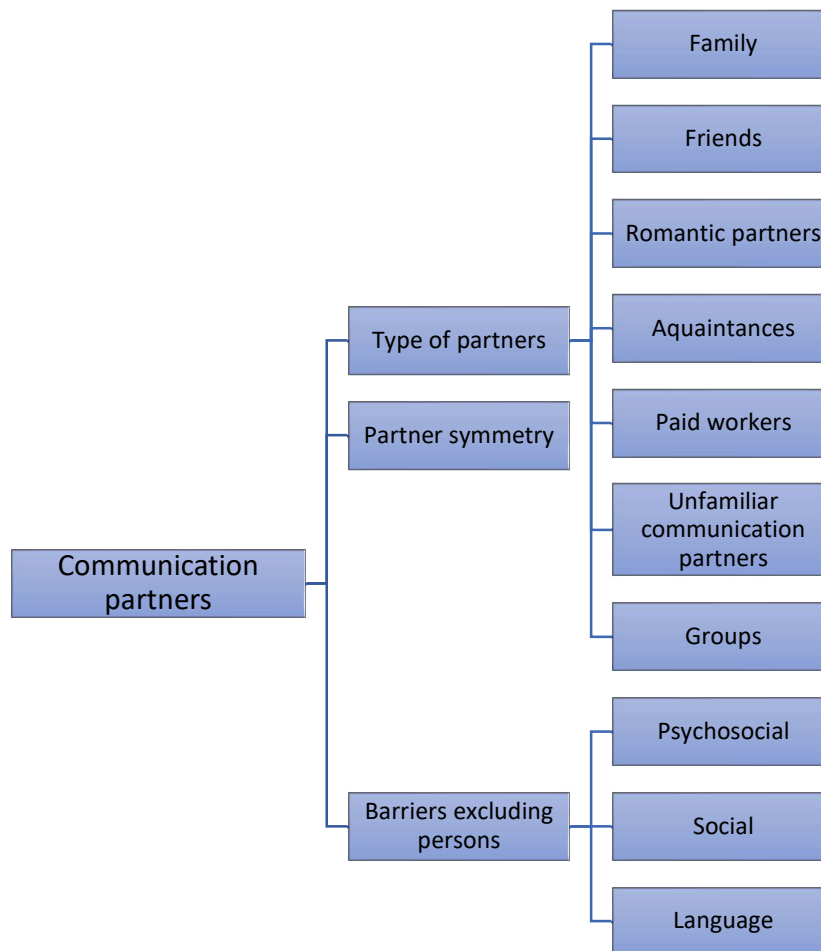


Figure 4.4. Themes pertaining to communication partners.

The number of communication partners varied greatly across the participants. One participant (P7) generally only had WhatsApp contact with her mother, whereas another (P6) stated that she had a *long list* of communication partners on WhatsApp. P2 in turn commented that she had many other WhatsApp contacts besides her selected communication partner. Participant responses also varied on the topic of whether they would like to have additional WhatsApp communication partners. Five participants expressed a desire to have more communication partners as they enjoyed interacting with others (P2, P4, P6 and P7) or to keep busy (P5), whereas P1 and P3 were not interested in more partners at the time of the interviews. The following section discusses the types of communication partners with whom the participants interacted on messaging, as well as those with whom they preferred not to interact on messaging.

4.3.1.1 Types of communication partners

Participants' WhatsApp communication partners varied in familiarity. Although most communication partners were familiar (typically friends and family), WhatsApp was also used to communicate with a wide range of other communication partners. These included school and work-related acquaintances such as colleagues, classmates and teachers (P1, P3, P5, P6), as well as intimate communication partners such as boyfriends (P2 and P4). It was interesting to note that P2 asked the researcher not to tell her parents about her boyfriend with whom she interacted on WhatsApp, raising the notion of having a *secret* communication partner. Another participant (P1) said that he interacted with a girl he had **a crush on**, highlighting the possibility of courting a romantic interest using messaging. P3 commented that he enjoyed interacting with partners whom he had not met personally and relied on the advantage of anonymity in these interactions (**The nice part is none knows each other so we are free to talk**). Two other participants (P4 and P6) considered interacting with unfamiliar persons on WhatsApp as problematic because of the unwanted or inappropriate messages sent by certain unfamiliar persons.

The participants used WhatsApp not only for one-on-one communication, but also for group interactions. P1, P2, P4 and P5 belonged to church groups and P3 belonged to a disability support group (which P5 also joined after the initial interviews). One participant (P6) noted that she belonged to different social groups (started by school friends), but that she wanted to leave these groups as unfamiliar persons had joined these groups and they communicated inappropriate content. P1 and P5 both belonged to study groups consisting of school or university classmates. These study groups were viewed as **quite helpful because I get to understand a little more better than I work individual** (P1). The dynamic nature of groups was pointed out by P5 who commented that groups *come and go*.

4.3.1.2 Partner symmetry

An important remark made by P1 was that WhatsApp allows **verbal and non-verbal** individuals to interact with each other. He believed WhatsApp would thus be a beneficial means of communication between him and his lecturer.

4.3.1.3 People who do not use messaging or are excluded from messaging interactions

During the focus group, a discussion arose around certain friends and in particular certain family members who do not use WhatsApp. P1, P3, P5, P6 and P7 remarked that they had family or friends who did not use WhatsApp and agreed that **some of these family members believe that WhatsApp it's for the new generation** (P1) and that **most of them are not willing to learn about it because they think it's a waste of time and makes the new generation lazy to communicate with people physically** (P6). According to P1 it was challenging that his parents selected not to use WhatsApp and that they contacted him using phone calls, which he regarded as problematic. These remarks highlight certain psychosocial barriers influencing the use of messaging. P1 also said that he used email instead of WhatsApp to interact with his lecturers (even though he would prefer using WhatsApp as it would be easier for him) because of the position his lecturer held at the university. This suggests that social barriers influence the use of various computer-mediated communication.

According to P4 and P6, unwanted persons who gain access to the participants via WhatsApp can be blocked by participants to avoid interactions. Alternatively, participants can remove themselves from a group containing unwanted persons (P6). Certain individuals, however, are excluded from messaging interaction by barriers, for example language barriers. P3 commented on being excluded from church WhatsApp groups as these group interacted in a language that was not his first language and in which he had never learned to read or write. A point of discussion is therefore the degree of control that participants have over group members' inclusion in or exclusion from messaging, and the possible implications of such control for influencing aspects such as safety or social exclusion.

Table 4.5

Communication Partners

Example(s) from the data	Codes	Category	Themes
My family (P6)	Family	Family	Types of partners
My friends (P5)	Friends	Friends	
My best friend (P4); *Closest friends* (P1)	Close friend	Friends	
My Boyfriend (P2); *👦 and my boyfriend* (P4)	Boyfriend	Romantic partners	
a girl that I have a crush on 🍷	Girl he likes	Romantic interest	
classmates (P1)	Classmates	Friends/acquaintances	
My colleagues (P3)	Colleagues	Acquaintances	
My teachers (P5)	Teachers	Paid worker	
P5 showed R that he had WhatsApp contact with his PA from school	Personal assistant	Paid worker	
The nice part is none knows each other so we are free to talk (P3)	Free to talk	Support groups	
Just a chatting group (P6)	Chatting groups	Social groups	
Yeah we have a group chat at church (P4)	Church groups	Religious groups	
It's called disabled share ideas (P3)	Disabled share ideas group	Support groups	
It's gr 12 group from school it was for exams (P5)	Study groups	Learning groups	
<i>They come and go</i> (P5)	Groups: dynamic nature	Groups: dynamic	
It is quite important for lectures to have WhatsApp because it's a platform for for verbal and non-verbal to interect and engage together (P1)	Platform for verbal & nonverbal to interact	Partners use same platform	Partner symmetry
<i>I don't read Tswana</i> (P3)	Not Tswana group	Language barriers	Barriers excluding persons
Some of these family members believe that Whatsapp it's for the new generation (P1) *Yes I agree and most of them are not willing to learn about it because they think it's a waste of time and makes the new generation lazy to communicate with people physically* (P6)	Not family (older generation)	Psychosocial barriers	
Yes I do, but my lectures it's a different story (P1)	Not lecturer (position)	Social barriers	
<i>There is a new feature on WhatsApp that anyone can join your group you don't, I don't have to have your number for you to join my group</i> (P6)	Unfamiliar persons join group	Lack of social barrier	
Yes but I'm going to leave the group (P6 referring to social group containing inappropriate remarks)	Going to leave group	Participant control over social barrier	
I sometimes block them (P4)	Block unwanted persons	Participant control over social barrier	
Let's carry on please, he blocked me (P2)	Blocked by boyfriend	No control over social barrier	

4.3.2 Interaction convenience: Place and time

The main thematic area **Interaction convenience** contained 37 codes that were further refined into categories and then into themes. Table 4.6 presents examples from the data that was coded, the collated codes that pertained to this main thematic area, and the categories and themes constructed from the codes. A summary of the pertinent themes is shown in Figure 4.5.

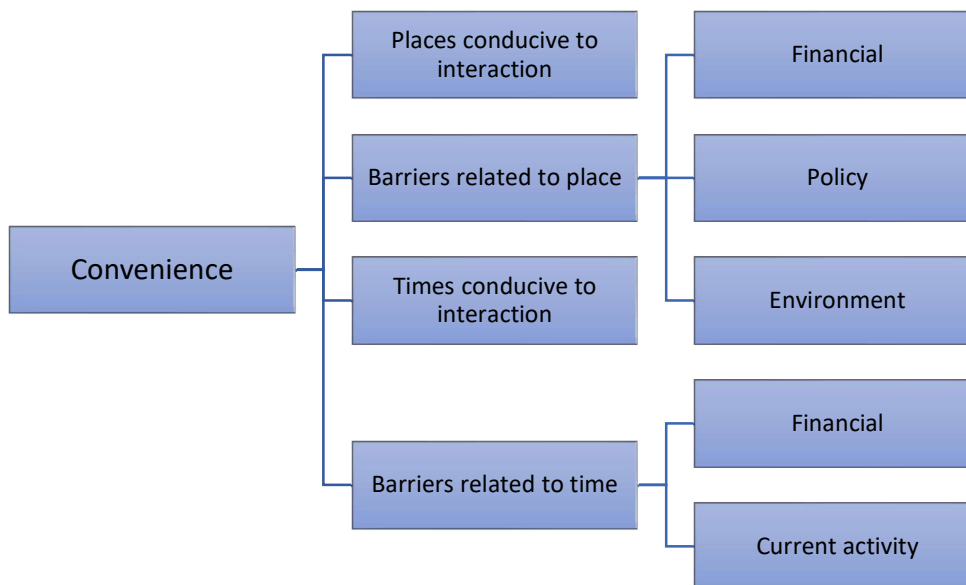


Figure 4.5. Themes pertaining to interaction convenience.

4.3.3.1 Places where participants did and did not interact on WhatsApp

All participants and their communication partners reported that they mainly interacted on WhatsApp when they were in the privacy of their home. Certain participants also used WhatsApp in public places such as at church (P2), at school (P5), on a taxi (P2), as well as in the same room as a communication partner (P2 and P4; and occasionally P3). P1 and P1P reported no restrictions in terms of where they interacted on WhatsApp. P2 and P4 commented on the advantage of using WhatsApp to interact with individuals in the same room as themselves as **It's makes things easy** (P4). The benefit of being able to interact with someone who was not in the same setting was also highlighted. P1 commented on how one can use WhatsApp for **communicating to close and distance individual** and P3 said that he enjoyed interacting with others *all over the world* (distant partners). The fact that persons using messaging are not bound by their immediate setting but can

create a communication environment removed from their setting is an important aspect that is expanded upon in Chapter 5.

However, certain challenges were also highlighted by participants who stated that WhatsApp could not be used at church (P1, P3, P5, P7), on a taxi (P5 and P7), in a meeting (P1, P5 and P7), at school (P6 and P7), at work (P3 and P7) or in the same room as their communication partner (P5). P5 did not use WhatsApp to communicate with a partner in the same room as himself, as he felt it was a waste of data and time. Policy and environment challenges were noted by participants. P6 did not use her phone at school as it was against the school policy. As previously mentioned, P3 and P6 also commented on the theft risk of using their phones to WhatsApp in certain places (such as at school or on the street, especially at night). P3 preferred not to use WhatsApp when he was on the street. P7 agreed with P1 who said that he was unable to use WhatsApp in the bathroom (possibly because of physical restrictions).

4.3.3.2 Times when participants did and did not interact on WhatsApp

P4 remarked that she would WhatsApp her friend *any day, any time*, while P7 used WhatsApp **any time except at night**. All participants, as well as their respective communication partners, preferred using WhatsApp in the afternoons and especially in the evenings, except for P7 and P7P who also interacted in the mornings. Data was again mentioned as a challenge and P3, P4, P5, P7, P3P and P7P commented on not being able to use WhatsApp when they had run out of data. P3 added that data was especially a problem around the middle of the month. Interaction times also depended on the work schedules of participants and communication partners. P1, P5, P1P, P2P and P3P did not use WhatsApp when they were busy. Participant opinions differed around the use of WhatsApp during times of emergency. P5 thought that WhatsApp would be useful in an emergency, however P6 expressed her concern that someone may not get the message in time in the case of an emergency.

When interacting with the participants during the interviews, the researcher observed that certain participants (P1, P2, P3 and P6) interacted with other communication partners at the same time as interacting with the researcher. These interactions would take place while the researcher was composing a question, making notes or checking the recording equipment. These interactions were very brief and did not distract the participants from the interview process.

Table 4.6

Interaction Convenience: Place and Time

Example(s) from the data	Codes	Category	Themes
Anywhere but I prefer being in my room (P1)	Anywhere	No place restrictions	Places conducive to interaction
	Own room	Private setting	
At home (P6)	Home	Private setting	
At home, last year it was home and school (P5)	School	Educational setting	
Church (P2)	Church	Religious setting	
<i>And did you also agree with (not) on a taxi?</i> (R) 'No' (P1)	Taxi	Public setting	
I forgot something when I am not around my friend but I want a song from he or she, he or she can send it with via whatsapp to me (P5)	When partners are not in the same setting	Separate settings	
Life an her self when I'm not around (P7P)			
Yes *It's makes things easy* (P2)	Same room as communication partner	Same setting	
Sometimes (P4)	In the same room	Same setting	
Also when you are in the bathroom 🚽 😊 (P1)	Not in the bathroom	Not in private setting	Places non-conductive to interaction
<i>Actually it would</i> (be useful to have phone at college) (P6)	Not at college	Not in educational setting	
(not) *school* (P7)	Not at school	Not in educational setting	
The place I can't use whatsapp is at work (P3)	Not at work	Not in professional setting	
(not) *meetings* (P5)	Not in meetings	Not in professional setting	
Places where I can't use Whatsapp is church (P5)	Not in church	Not in religious setting	
(not) *in the taxi* (P5)	Not in a taxi	Not in public setting	
I don't like to walk on the street & texting especially at night (P3)	Not on the street	Not in public setting	
No (P5)	Not in the same room	Not in same setting	
And I feel like we waste data (P5)	Not in the same room (wastes time and data)	Financial restriction	
I feel it's wast of time & data (P3)		Policy restriction	
P6 reported that it was against school policy to use phones at school	Not at school (school policy)	Environment restriction	
<i>'I do not like if I walk in the street, I do not use it'</i> (P3)	Hostile communication environment		
<i>Any day</i> (P4)	Any day	No restrictions	Times conducive to interaction
<i>Anytime</i> (P4)	Any time	No restrictions	
Afternoons (P6)	Afternoons	After working hours	
and evenings (P6)	Evenings/night	After working hours	

Example(s) from the data	Codes	Category	Themes
The most of the time I whatsapp at the evening (P3) *I Whatsapp him in evening* (P5) *Most of the time at night* (P1)			
On weekends (P4)	Weekends	After working hours	
That I don't waste any time I use Whatsapp for help (P5)	Emergency: Yes (quick)	Emergency	
Researcher observed P1, P2, P3, P6 interacting with other communication partners during interviews	Interactions with others during interview	Parallel interactions	
I don't think WhatsApp will in an emergency because the person you sent the text to might not get to read the message on time (P6)	Emergency: No (may not get message)	Not in emergency	Times non-conductive to interaction
Cause I don't Whatsapp during the day (P5)	Not during the day	Not during working hours	
as I said earlier, I'm too busy with school work and the only time I get to chat is actually at night (P1) *...don't Whatsapp...when I am busy* (P5)	Not when busy	Participant's current activity	Barriers related to times of use
And on top of that he's also working during the day (P1)	Communication partner is busy during the day	Communication partner's current activity	
Yes the are times when you both or sleeping 😴 (P7)	Not when both sleeping	Current activity	
or I don't have data (P5)	Not when no data	Financial restriction	
When I have data (P4)	When participant has data	Financial restriction	
<i>When she has data</i> (P4)	When communication partner has data	Financial restriction	
When we have data is almost the hole day (P7P)	Both have data	Financial restriction	

4.3.3 Communication content

As it was not possible to ask the participants or the communication partners directly about communicative functions, the researcher asked them what they talked about when using WhatsApp (the content of their messages). Their responses were grouped into 46 codes that were further refined into the categories as shown in Table 4.7. From these categories the following themes shown in Figure 4.6 were developed: range of topics; functional orientation of topics; privacy of interactions; and expression of feelings/emotions.

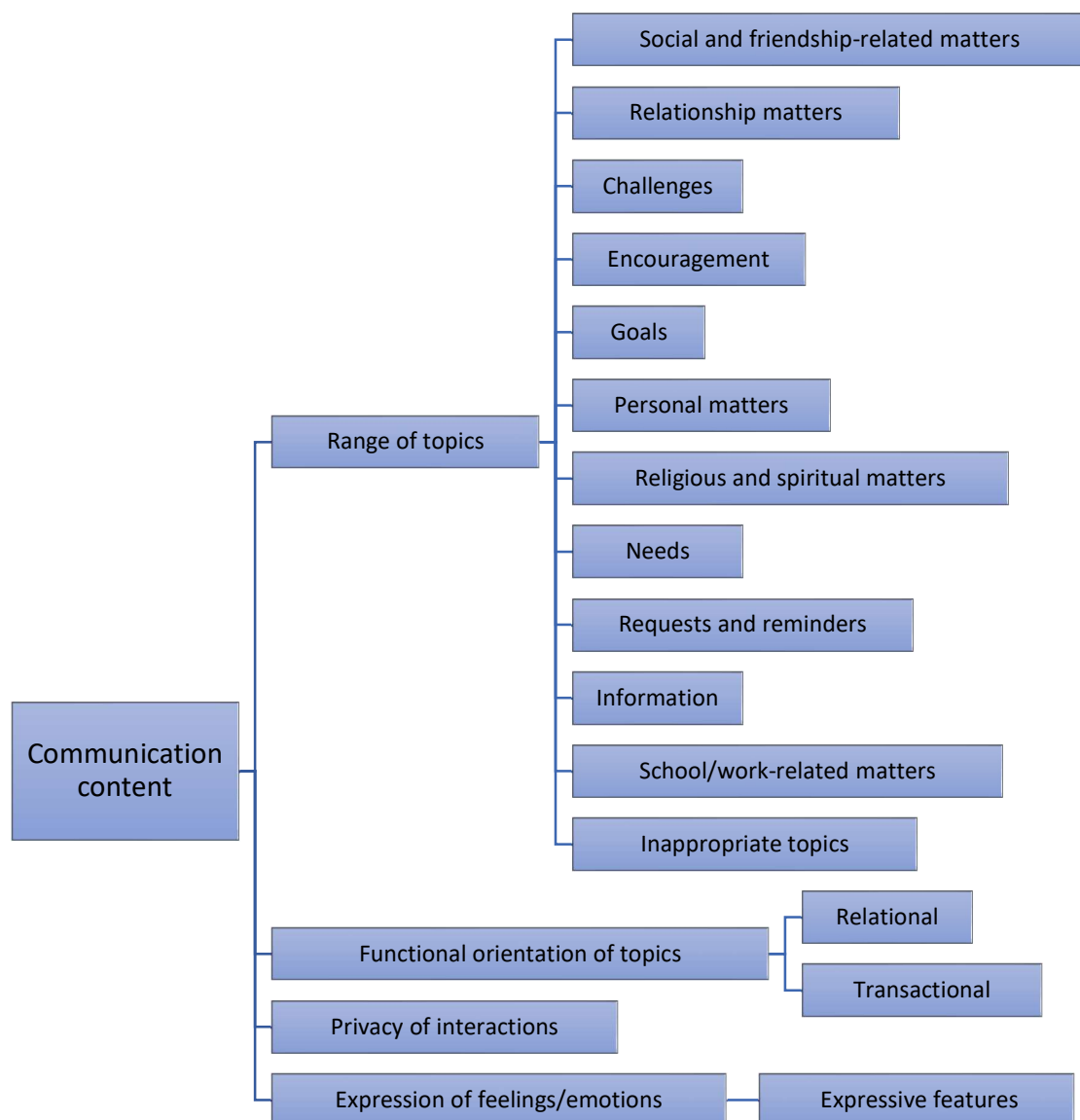


Figure 4.6. Themes pertaining to communication content.

4.3.3.2 Range of topics and functional orientation of messages

Participant's responses to what they talked about on WhatsApp included: *a lot* (P6) **Many things** (P4); **You can talk about anything on WhatsApp** (P2); **U can talk about anything you want no matter what** (P7); **I talk about anything on WhatsApp** (P5); **There are no restrictions in terms of what you can talk abt on WhatsApp** (P1); **Life** (P3). P1, P2, P3 and P5 felt that one could discuss any personal matter on WhatsApp. However, P3 qualified that it depended on the topic, P1 felt that one had to be comfortable with the topic, and P5 commented that he could talk about anything besides another person's matters, as well as what was happening at home. As previously mentioned, P2, P4 and P6 commented on not liking the content of certain messages. These included messages with inappropriate content such as pornography (P6), hurtful messages (P2) and unwanted messages from unfamiliar persons (P4).

Certain topics listed by the participants as well as their communication partners could be divided into having either a transactional orientation or a relational orientation, while some topics could fall into either or both of the two categories. Most topics listed by the participants and their selected communication partners were interpreted as having a relational orientation, including the categories: social and friendship-related matters; relationship-related matters; and challenges and encouragement. Participants commented that they speak about general **friends stuff** with friends (P5), including their **social life** (P1). Participants (P1, P1P and P5) also stated that they shared their hobbies such as poetry and music as well as jokes (P1 and P6P) on WhatsApp. According to P1 his friendship with his selected communication partner had been strengthened through the use of WhatsApp: **through using Whatsapp to chat to him, it has made it so strong each, as we are able to encouraging one another**. Participants also speak about relationship-related matters on WhatsApp, for example P4 remarked that she and her friend **like to give each other ideas. Like what would happen if you get a guy from church**. P4P and P1P reported speaking to the participants about romantic interests on WhatsApp (**bout women 😊** (P1P); **and boys 😊** (P4P)). P3, however, remarked that he would not **flirt with another man's girlfriend** on WhatsApp. Little was said about social etiquette besides P5P commenting that he asks P5 **How is things going on his side**. Participants (P1, P3 and P6) discussed the challenges they experience, including personal, family, work, school, faith, disability and relationship-related problems. The participants also used WhatsApp to motivate and encourage their individual communication

partners (P1 and P3), and to talk about their goals in life. Furthermore, both participants and their selected communication partners (P1, P1P, P2, P2P, P3, P3P, P4 and P7) said that they spoke about religion and their spiritual life on WhatsApp. P1 and P3 stated that they used WhatsApp to motivate people to believe in God. Members of WhatsApp groups were also said to encourage and pray for each other when group members encountered spiritual problems (P1).

Certain topics had a transactional orientation. Participants sent requests (P6 and P7) as well as reminders (P6). WhatsApp was also used by participants to transfer information. According to P5, he discussed **information stuff** with his family and used WhatsApp to **ask for information** from his teachers. P6 also used WhatsApp to inform her teachers when she would be absent. WhatsApp was furthermore used to communicate information about what was happening at church (P4) and to organise church events (P2P). The orientation of certain topics could be either relational or transactional. For example, participants as well as their communication partners (P1, P1P, P3, P3P, P6, and P4P) said that they spoke about school and work on WhatsApp. These interactions could have a transactional function such as exam preparation work (P5) and class assignments (P1), or they could have a more relational orientation such as discussing the social aspects of school or work.

4.3.3.2 Privacy of interactions and expression of feelings and emotions

Participants felt strongly about the privacy of their messages, and responses to whether other persons could look at their messages included: **It's a big NO** (P5); **Hell no** (P1); **My phone is my privacy** (P2); **No because my messages is part of my private life and my secrets** (P6); ** No my phone is my private property** (P3). P2 deleted certain personal chats on her phone and commented that it was too personal to give examples of personal topics discussed on WhatsApp. P2, P5, P6 and P7 felt that they could express their feelings and/or emotions on WhatsApp, **especially if I'm in bad situation I ask for advice from friends and family on WhatsApp** (P6) or **when you're charting [sic] with the lover of your life** (P2).

Table 4.7

Communication Content

Example(s) from the data	Codes	Category	Themes
A lot (P6) *Many things* (P4)	Many things	Wide range of topics	Range of topics
We usually talk about things in life (P7) *I normal talk about life* (P3)	Life	Wide range of topics	
You can talk about anything on WhatsApp (P2) *U can talk about anything you want no matter what* (P7)	Anything	No topic restrictions	
There are no restrictions in terms of what you can talk abt on WhatsApp. U can talk about anything as long as you are comfortable with whatever you are taking about (P1)	Anything (you are comfortable with)	Topic: person dependent	
It's depend what it's (P3) *It depend what is it* (P5)	Personal matters: depend on topic	Topic: topic dependent	
*I talk about anything on WhatsApp but I can't talk what is happening at home or another person's matters on WhatsApp * (P5)	Not about home and other person's matters	Topic: topic dependent	
I feel it's OK (P2) *Personally* (P6P)	Talk about personal matters	Personal matters	
Because I don't like when they send bad things on the group (P6)	Bad things (pornography)	Inappropriate topics	
friends just friends staff (P5) *or just talk as friends* (P5)	Friends stuff	Social and friendship-related matters	
Our day (P6) *We talk anything concerning how our day was* (P3P)	Our day	Social and friendship-related matters	
We talk about everything that happened (P7)	Everything that happened	Social and friendship-related matters	
Social life (P1)	Social life	Social and friendship-related matters	
family, friends (P4)	Family and friends	Social and friendship-related matters	
as well as tracking jokes 😂😂😂 (P1) *sometimes we just tell each other jokes* (P6P)	Jokes	Social and friendship-related matters	
our hobbies which are music and writing poems (P1) *Music and Poetry* (P1P)	Hobbies	Social and friendship-related matters	
I forgot something when I am not around my friend but I want a song from he or she, he or she can send it with via whatsapp to me	Hobbies	Social and friendship-related matters	

Example(s) from the data	Codes	Category	Themes	
How is things going on his side (P5P)	Inquire about each other	Social and friendship-related matters		
plans to go somewhere (P1)	Social arrangement	Social and friendship-related matters		
We are talking about relationship and other snuff (P2)	Relationship stuff	Relationship-related matters		
We like to give each other ideas...*Like what will happen if you get a guy from church* (P4)	Give each other ideas	Relationship-related matters		
and sometimes bout women 😊 (P1P) *and boys 😊* (P4P)	Romantic interests	Relationship-related matters		
What I don't do on whatsapp is fitting with another man gf (P3)	Don't flirt with another man's girlfriend	Relationship-related matters		
The challenges we face in life & how to overcome them (P3) *The things we as disable people force in life & how to overcome that* (P3)	Challenges	Challenges		
and help each other with problems (P6) *Most important thing is we talk about the problems we force in life* (P3)	Problems	Challenges		
Yes especially if I'm in bad situation I ask for advice from friends and family on WhatsApp (P6)	Ask for advice	Challenges		
Like unfair treatment @ work (P3)	Unfair treatment at work	Challenges		
normally chat when their is family emergency (P3)	Family emergency matters	Challenges		
I also use WhatsApp to actually encourage and motivate individual (P1) *believe in yourself & you will overcome whatever storms that come in your way* (P3)	Encourage/motivate (one on one)	Encouragement		
I have a group where I can always refer to whenever I'm encountering spiritual problems. We pray and encourage one another (P1) *It's called disabled share ideas. It's group of disability people where we encourage each other to never give up* (P3)	Encourage/motivate (in group)	Encouragement		
nd what is his goals of life (P5P)	Goals	Goals		
Usually we talk about our Christian life (P1) *spiritual life* (P1)	Religious and spiritual life	Religious and spiritual matters		
I can also use it as a tool to preach the gospel of Christ (P1) *They must believe in God.* (P3) 2 Samuel 11:14-15 (P2)	Evangelism	Religious and spiritual matters		Topics with transactional orientation
Me and my Best friend we usually to talk about church (P4) *Church stuff (P2)	Church-related matters	Religious and spiritual matters		

Example(s) from the data	Codes	Category	Themes
We talk about church and youth structure programmes (P2P) *but most of the tym we talk church stuff* (P3P) *Yeah we have a group chat at church so we talk about what is happening* (P4)			
I talk about something that I need (P7)	Talk about needs	Needs	
it helps me to make requests and send reminders to my friends and family (P6)	Help make requests and reminders	Requests and reminders	
When I want information from someone (P5)	Ask for information	Information	
<i>If I'm absent, if I'm going to be absent</i> (P6)	Inform if absent	Information	
Yes, we create a group for assignments or projects in class (P1)	Class assignments	School/work-related matters	
It's gr 12 group from school it was for exams (P5)	Exam preparation	School/work-related matters	
school (P6)	School	School/work-related matters	Either relational or transactional orientation
her work (P4P) *We inform another's about work* (P3)	Work	School/work-related matters	
*No my phone is my private property (P3) *My phone is my privacy* (P2) *No because my messages is part of my private life and.my secrets* (P6) *Hell no... Unless you gave person a permission to do so* (P1)	Messages private	Privacy important	Privacy of interactions
I can't say (P2) *This is too personal* (P2)	Did not want to give examples	Privacy important	
I deleted it (P2)	Deleted certain chats	Privacy important	
Yes especially if I'm in bad situation I ask for advice from friends and family on WhatsApp (P6) *Yes especially when you're charting with the lover of your life* (P2)	Express feelings if in bad situations or when talking to lover	Possible to express feelings/emotions	Expression of feelings/emotions (also see Table 4.2)
Yes you can express your feelings. During you type on WhatsApp you have given Imojis like this 😊 (P7)	Can express feelings	Possible to express feelings/emotions	

4.3.3.5 Expressive features

Participants as well as their selected communication partners highlighted numerous expressive features used in messaging, as shown in Figure 4.7. Table 4.8 presents examples of the responses related to what expressive features participants say that they use, the eight codes identified, as well as the categories and the themes. Various expressive features were also noted in the text messages of the participants in the WhatsApp focus group discussion (although these cannot be viewed as representative of spontaneous interactions). The expressive features noted in the text messages of the participants can be viewed in Table 4.12. This table also shows the structural features pertaining to ease and rate enhancement discussed in Section 4.3.5.

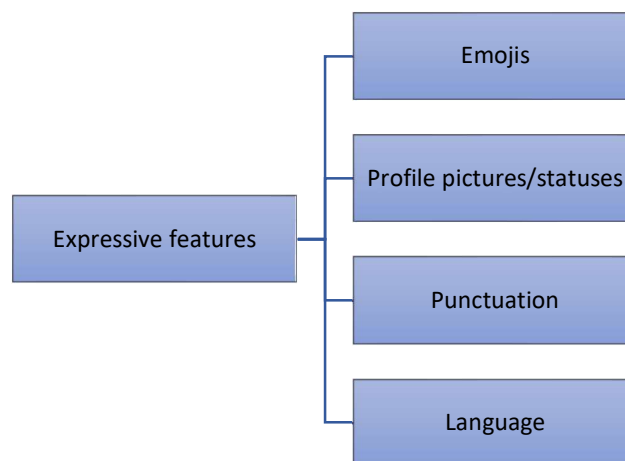


Figure 4.7. Expressive features.

4.3.3.5.1 Emojis

All participants besides P5 said that they enjoy using emojis and commented that emojis increase understanding and convey feelings or emotions. Some of the participants' comments included: *During you type on WhatsApp you have given Iemojis like this 😊* (P7); *I think emojis are wonderful but you can express yourself without type a long sentence emojis are a easier form of communication on WhatsApp* (P6); *Some people get the message better when see the pictures than through words*(P3); and *Rather than you to explain yourself how you feeling. As they say actions speak louder than words, same with emojis* (P1). The expressive nature of emojis was also reported by P2's communication partner, who commented that P2 *expresses herself by using animations as well*, giving the following examples as illustration:

* 😬 😬 👍 🙏 * (P2P). Emojis also influence the tone of a message and according to P6, her friends wonder if she is angry if she does not include an emoji in a message. She added *This is my favourite emoji 🤪🤪🤪 it's means laughing while falling over *. Other favourite emojis included laughing with tears 😂, sad face 😞, eye rolling 🙄, fist bump 👊 and thumbs up 👍. Emojis are specific to communication partners and P3 found the thought of sending the researcher or his pastor a fist bump very amusing. On the WhatsApp Focus Group, P2 commented that she knows all the emojis and listed a few examples: * 😍 means in love with you 😘 means kisses 😊 means smile 😇 means blessed 😏 means thinking 😂 means laughing*. She then asked the group *Who knows what does mean? 🍆 🍌*. These emojis have a sexual connotation and are frequently used in sexting. Other participants in the group did not respond to P2's question.

The text messages of the participants in the WhatsApp focus group discussion contained a variety of emojis, with the exception of messages sent by P5. Emojis were used to embellish text and add socio-emotional context to text, as illustrated in the messages *Cool 😎 👍 👍 😊* (P1); *I don't have no problem with my WhatsApp 😊 ❤️ 😏 🙏* (P2); *Also when you are in the bathroom 🚽 😂* (P1); *Yes yes lol Xolani me too lol 😂 😂 😏* (P7); *Guys I can't study 😭* (P4); *My phone was off last night so I couldn't be online so I am lost can ma'am ask the questions again please ma'am 😞 😞 😞* (P7). Emojis were also used without any text as response to other people's comments. These emojis serve as acknowledgement of a message and maintain or terminate an interaction, for example:

Thank you Mayowa for the explanation (P7)

Pleasure Boipelo (P6)

* 😊 * (P7)

Night good people (P3)

* 😭 😭 * (P7)

4.3.3.5.2 Profile pictures and statuses

Besides using emojis, the researcher observed that at times pictures expressing emotions were used as profile pictures. P5 also commented that he used statuses and pictures to express his feelings. Examples of such profile pictures used by the participants are shown in Figure 4.8.



Figure 4.8. Examples of profile pictures used by the participants.

4.3.3.5.3 Punctuation

Participants said that they used punctuation infrequently (P2, P4, P5, P6, and P7). One participant said he used full stops and commas to break up longer sentences (P5) and three participants said that they used question marks when it was necessary to indicate when it was a question (P5, P6 and P7). The use of punctuation to signal prosodic features (pauses and inflections) was also noted in the text messages of the participants, in which longer utterances contained full stops and commas, questions generally ended in a question mark and (...) was used as a pause after an exclamation (see Table 4.13). Participants (P1, P2, P3, P5, P6 and P7) said that they used capital letters for names as it was respectful, and one stated that capital letters were used for effect, like *WOW* (P7). The use of capital letters for effect was also noted in the text messages of the participants, for example *NO* (P5) and *OK* (P2 and P7).

4.3.3.5.4 Language

Despite the fact that P6 was the only participant who considered English to be one of her first languages, all participants said that they typed their messages in English. None of the participants reported Afrikaans as their first language, but P3, P4 and P6 said that they occasionally sent messages in Afrikaans. Only P1 reported also sending some messages in isiZulu, which he considered to be his first language. The fact that most participants communicated in a language

other than their first language is illustrated by P7's remark that *I can't type my own language*. She would, however, occasionally use a Setswana word within an English text to increase shared meaning (language switching). Examples of language switching were noted in the text messages of two participants. P2 and P3 used emphatic words in their first language within an English exchange of messages, including the exclamations **hayibo** (*wow! really? can it be*) and **iyeeeh** (a positive slang exclamation used in different African languages). In the participants' text messages it was noted that they also expressed themselves in other ways, for instance by using accent stylisations such as **yeah** and **nah** (P3, P4 and P7), as well as using emphatic words such as **hell no** (P1 and P3) and **big true** (P7). An asterisk (*) was used by P6 to signal that she was correcting a spelling mistake made in a previous comment.

Table 4.8

Expressive Features

Example(s) from the data	Codes	Category	Subthemes
<p>*I personally think that emojis convey your emotions to the person you are sending a text to. Rather than you to explain yourself how you feeling. As they say actions speak louder than words and so it is with emojis. 😊😂* (P1)</p> <p><i>I think the emojis actually show your emotions</i> (P6)</p> <p>*Me too like when I want to say "laughing out loud" I would say lol 😂* (P7)</p>	Emojis show emotion	Emojis convey emotions	Use of emojis
<p>*she expresses herself by using animations as well*...* 😊😂👍🙏* (P2P)</p>	Express herself	Emojis used for expression	
<p><i>Like when I say I've noticed (unintelligible word) when I send some a message without the emojis, my friend thinks I'm angry or something</i> (P6)</p>	Friends wonder if angry if no emojis	Emojis influence tone of message	
<p>*Some people get the message better when see the pictures than through words* (P3)</p>	Get message better with emojis	Emojis increase understanding	
<p>P3 explains that he uses a fist bump emoji <i>with my friends</i> and not with the researcher or his pastor</p>	Not use fist bump with researcher or pastor	Emojis: specific to communication partner	
<p>*I express my feelings with statuses and pictures* (P5)</p>	Express feelings with statuses and pictures	Statuses and pictures express feelings	Use of statuses and pictures
<p>*I use capital letters by people names*...<i>sign of respect</i> (P3)</p>	Capitals for names show respect	Capitals show respect	Use of punctuation
<p><i>I add a Tswana name</i> (P7)</p>	Using first language increases shared meaning	Language switching increases understanding	Use of language switching

4.3.4 Communication maintenance and repair of breakdown

The researcher recorded and analysed the maintenance strategies used by the participants. The researcher also analysed the responses offered by the participants and communication partners pertaining to the frequency and type of communication breakdowns that may occur when using messaging, as well as their use of repair strategies.

4.3.4.1 Communication maintenance

Certain interactional aspects that aided communication maintenance were documented during the interviews. A beneficial aspect documented by the researcher was that, shortly after the start of the interview, P1 posted a general message to all his WhatsApp contacts to say that he was busy and was not ignoring them. During the WhatsApp focus group discussion, participants also used the device reply feature that enables users to attach a response to a previous message to show which specific message they were responding to (see Figure 4.9). This function is particularly helpful during group chats so that one can respond to a specific person within the group. An example from the WhatsApp focus group is P5 asking the group who would like to remain in the group after the study had ended and P7 referring back to his question after there had been a change in topic.

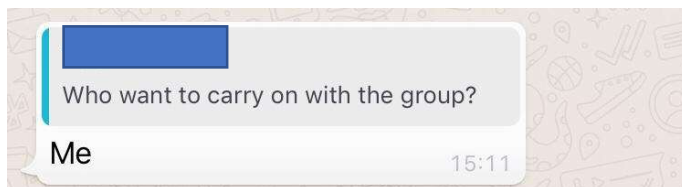


Figure 4.9. Example of the reply feature.

4.3.4.2 Communication breakdown and repair

The results from the thematic analysis of the thematic area **Communication breakdown and repair** are presented in Table 4.9 and summarised in Figure 4.10.

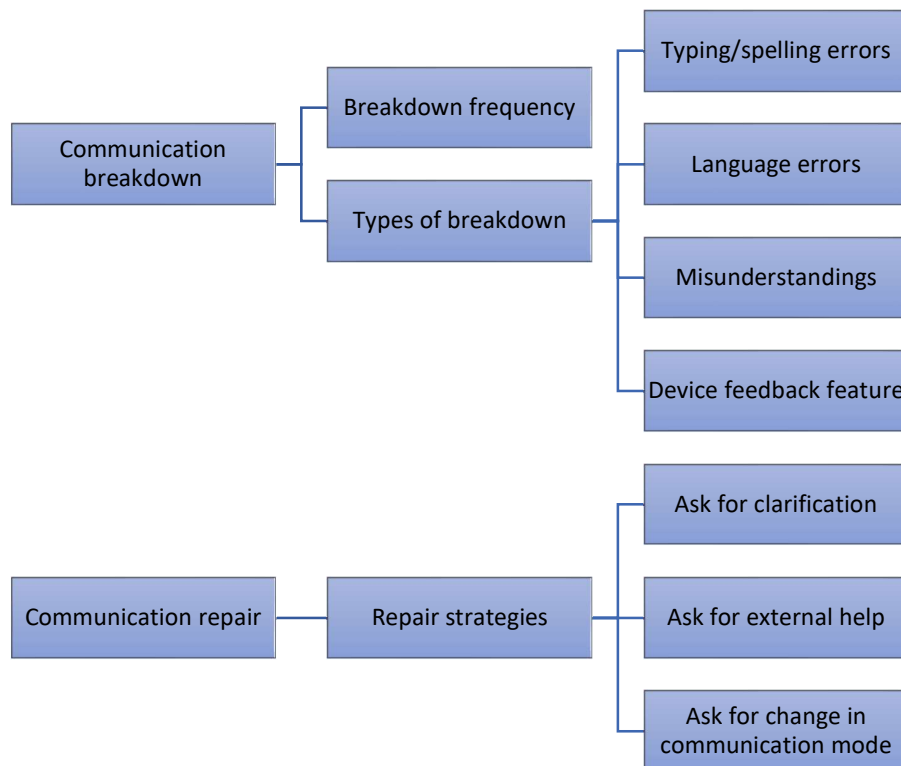


Figure 4.10. Themes pertaining to communication breakdown and repair.

Dyad 2 (P2 and P2P) reported experiencing no communication breakdowns whilst interacting with each other on WhatsApp. However, P5, P6 and P4P said that communication breakdowns do occasionally occur on WhatsApp. According to P6 *WhatsApp is more efficient because there's a minimum change (chance) of being misunderstood or misinterpreted instead of repeating yourself*. P6 also commented that breakdowns occur in WhatsApp communication because of language, spelling or typing errors. Misunderstandings because of ambiguity also lead to a breakdown in communication. A clear example of misunderstandings was given by P3, who wrongly interpreted a girl saying to him that she wanted to come over for some fun as meaning that she wanted to be intimate with him. Device features, such as the feedback feature showing when someone is online or has read your message (read receipts), can potentially also lead to a breakdown in communication, as documented in the interaction with P2. While P2 was interacting with the researcher during the follow-up interview, she explained that her boyfriend had broken up with her and then blocked her. He did this because he could see that she was online and interpreted the fact that she was not responding to him as deliberately ignoring him.

When communication breakdowns occur, both parties in the communication dyad reported that they would tell their communication partner that they don't understand or alternatively they would send a question mark (P1 and P1P; P3 and P3P; P5 and P5P; P6, and P6P). The breakdown in communication was then reportedly repaired by their communication partner clarifying their message (*I just tell them I'm lost, and they will explain whatever they are saying*). P4P also reported that she would tell P4 when she does not understand and that P4 then restructures her message. P4 and P7 said that they would ask their communication partner to send a voice note if they did not understand the typed message. P4 showed the researcher a recent chain of interactions between her and her close friend that consisted of typed messages by the participant and voice note messages from her friend. She commented that this made the interactions easier for her. Alternatively, P4 sought external help when a communication breakdown occurred and asked her younger brother or her mother to help her if she was unable to read a message from a communication partner: *I ask my little brother to tall [sic] me wat she say 🙊*.

Table 4.9

Communication Breakdown and Repair

Example(s) from the data	Codes	Category	Themes
That never happened but if it will happen I'll ask him what is he saying (P5 commenting on interactions with P5P) *I do understand* (P2) *She writes very well, I don't have any challenges with her writing skills* (P2P)	Never happens	No breakdowns	Breakdown frequency
Yes sometimes (P6) *Yes I sometimes don't understand message on WhatsApp it mean that I must ask that person what he or she is saying so that I can understand well* (P5)	Yes sometimes	Occasional breakdowns	
and WhatsApp is more efficient because there's a minimum change of being misunderstood or misinterpreted instead of repeating yourself (P6)	Minimum chance of misunderstanding	Minimum breakdowns	
Yes sometimes the person I'm texting can type a word incorrectly (P6) *or type the sentence incorrectly* (P6)	Type word incorrectly Type sentence incorrectly	Spelling/typing errors Language error	Type of breakdown
Yeah I was talking to someone about visiting me and she said when she come to my home she want to have fun. I misunderstand the words "fun". My mind was thinking of something else well she mean something else (P3)	Misunderstand word	Misunderstandings	
Nomsa's boyfriend breaks up and blocks her because he can see she is online and thinks she is ignoring him	Boyfriend can see when online	Device feedback feature	
I send her this ????? Then she knows that I don't understand (P6) *or I send question mark* (P3)	???	Ask for clarification	Repair strategies
I'll tell him I lost u (P3) *I just tell them I'm lost, and they will explain whatever they are saying* (P1) *I tell him I don't understand him den he clarify* (P3P) *I tell her I don't understand she will type again* (P6P) *I tell her and she tries to structure it in a way I'll understand* (P4P)	Tell communication partner that you don't understand	Ask for clarification	
<i>My mom</i> (P4)	Ask mother for help	Ask for external help	
I ask my little brother to tall me wat she say 🙋 (P4)	Ask sibling for help	Ask for external help	
I just tell her to use a voice note (P7) P4 shows messaging interaction consisting of own typed messages and voice note responses	Ask communication partner to send voice note	Ask partner to change communication mode	

4.3.5 Interaction ease and rate

As noted under benefits of messaging interactions in Section 4.2.1, all participants described messaging as easy and all, except for P4, described messaging as fast or quick. Nonetheless, when the participants and their communication partners were asked how long they typically took to respond to each other, their responses varied (see Table 4.10).

Table 4.10

Response Rate Between the Participants and Their Selected Communication Partners

Response rate of participant	Response rate of communication partner
It depends but I do not take more than 5 minutes (P1)	*It depends on what he is saying* (P1P)
Quickly (P2)	*I don't monitor that but as soon as I get her chats I respond especially if am not busy* (P2P)
2 min (P3)	*I usually use his same speed (quite fast), but I can be slow sometimes wen I'm busy with other stuff in de house* (P3P)
No to long (P4)	*A while... I'm actually bad at keeping track with my phone 🙈* (P4)
A hour (P5)	*If I'm at work that means I'll respond in the evening. If I'm off 2 min* (P5P)
Depends on what I'm doing at that moment (P6)	*2 minutes* (P6P)
<i>I am faster on typing</i> (P7)	*Fast* (P7P)

Figure 4.11 summarises the themes pertaining to the main thematic area **Interaction ease and rate** and includes the following three themes: variables influencing response rate; ease- and rate-enhancing strategies; and ease- and rate-enhancing device features. The themes were obtained by analysing the responses provided by the participants (see Table 4.11), the information documented on the researcher's observation forms, and the various ease- and rate-enhancing strategies in the text messages sent by the participants in the WhatsApp focus group (see Table 4.12).

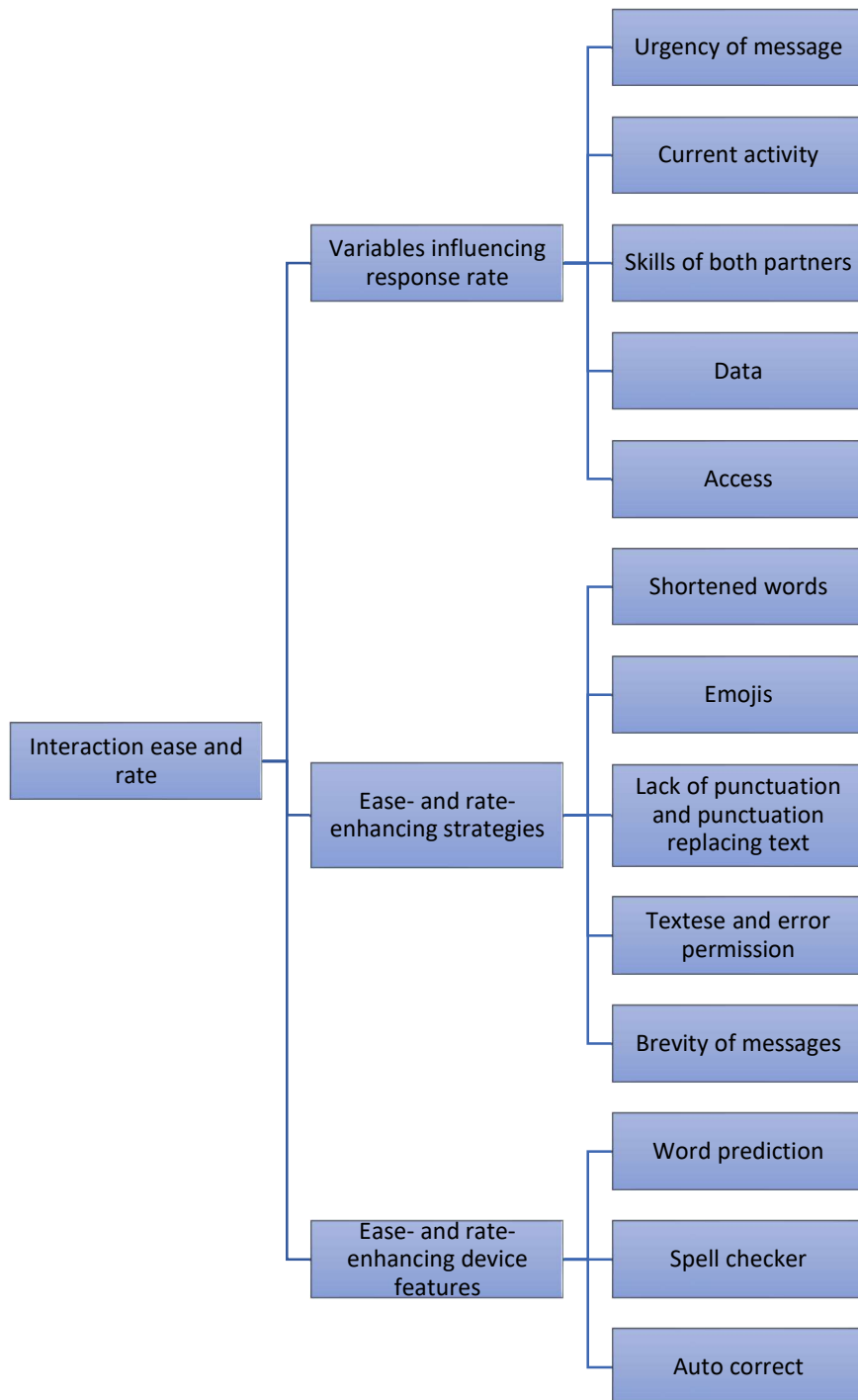


Figure 4.11. Themes pertaining to interaction ease and rate.

4.3.5.1 Variables influencing response rate

The response rate of the interactions between the participants and their selected communication partners was influenced by several variables, as presented in Table 4.11. P1 and P3 stated that response rate is important in an urgent situation like an emergency (*It's also depends on the topic we having like if I'm have emergency I want to respond immediately*). P1P and P2P also noted urgency as an important variable of response rate, saying that they will respond faster when they receive an urgent message from the participant. P6 commented that her response rate *depends on what I'm doing at the moment*. P6 and P7 also commented that they know that their communication partner is busy if they don't respond immediately. Current activity is thus a variable. Texting skills is a further variable, as P7 remarked that she is faster at responding compared to her mother because she types faster, and P2P said that she is aware of P2s special needs and thus is not concerned about response rate. P5 also reported that he was not concerned about how quickly someone responded because they *may not have data*. However, access limited by data is a concern if the interaction is urgent (P3). To save data, P3 and P5 switch off their data when not using WhatsApp and then they cannot be reached. P4 was not concerned about the rate of a response as she herself struggles with literacy and reported taking long to compose a message, which implies that literacy skills are another variable.

4.3.5.2 Ease- and rate-enhancing strategies reported by participants

The theme ease- and rate-enhancing strategies included the categories: i) shortened words; ii) emojis; iii) lack of punctuation; and iv) textese and error permission (see Table 4.11).

4.3.5.2.1 Shortened words

All participants said they like or love using shortened words, as shortened words reduce effort and enhance the ease and rate of interactions. Some of their comments included: *It works quick for me I like it* (P5); *It's save time & energy. I don't need to write the whole full sentence like how was your day. I can say Hwud* (P3); *I use them (shortened words) almost everyday it a shot [sic] cut for many words* (P7); and shortened words *work like a bomb* (P3). Some examples of shortened words given by participants included *huw* (*how are you doing*), *wud* (*what are you doing*), *jc* (*just chilling*) and *lib* (*lying in bed*).

4.3.5.2.2 *Emojis*

Emojis can be regarded as a device feature, but since the use of this feature varies within each message, they will be discussed as a strategy. All participants except for P5 said that they used emojis. According to P6, emojis are an **easier form of communication**. P3 responded to P2's question about what to do when too lazy to type by recommending that one uses emojis. P7 also said that she uses emojis when she is too lazy to type.

4.3.5.2.3 *Lack of punctuation*

Punctuation was not used by P1, seldomly used by P3 and P6, and occasionally used by P2, P4, P5 and P7. Participants reported not using a wide range of punctuation, as well as generally not using punctuation when interacting with friends. For example, P5 commented that he did not use much punctuation and that he only used the question mark for questions and the full stop and comma when typing longer sentences. P6 said she did not use a full stop and rarely used punctuation when interacting with her friends. P6 and P7 also used a single question mark or multiple question marks instead of text as it is quicker than typing words like *I don't understand*. P4 reported not using capitals in the middle of a message.

4.3.5.2.4 *Textese and error permission*

P3 highlighted the benefit of WhatsApp having its **own language** and the fact that spelling did not matter.

4.3.5.3 *Use of ease- and rate-enhancing strategies noted in participant messages*

The use of ease- and rate-enhancing strategies noted in the text messages of the participants corresponded with those reported by the participants, namely i) shortened words; ii) emojis; iii) lack of punctuation; and iv) brevity of messages (see Table 4.12).

4.3.5.3.1 *Use of shortened words and emojis*

A variety of shortened words and typographic symbols were noted in the text messages of all the participants, except for P6. These included contractions (e.g. abt; ppl; msg; gf), initialisms (e.g. lol), letter/number homophones (e.g. 4got; y; u) and the ampersand symbol (&). Emojis were also used instead of text. Examples include **😂😂😂** (P2) following the comment by P3 **I*

don't do on whatsapp is fitting [sic] with another man gf*; * 😊 *(P4) in response to *Nice to meet you all* (P6); and * 😞 😞 😞 *(P2) during a discussion on ease-enhancing features (this meant *thinking* according to the participant).

4.3.5.3.2 Lack of punctuation and brevity of spontaneous messages

It was noted that of the 306 participant turns during the WhatsApp focus group discussion, only four ended with a full stop. Furthermore, the participants asked 23 questions on the WhatsApp focus group and eight of the questions did not have question marks. Although the participants generally used capital letters for people's names and place names, as well as for the words WhatsApp and SMS (the data contained a total of 70 capitals excluding capitals at the beginning of a message or after a full stop or period), there were five examples of omitted capital letters.

Another ease- and rate-enhancing feature that was noted during the spontaneous interactions among participants on the WhatsApp focus group was the brevity of the interactions. Full sentences were not always used, giving the messages a conversational tone. Examples are participant responses such as *Cool* (P1); *I suppose* (P1); *Same here* (P2); *Me* (P2); *Go ahead* (P3); *Use the short cut* (P3); *Good u* (P4); *Sometimes* (P4); *Nothing from me* (P5); *I agree* (P6); *Me 2* (P7); and *Big true* (P7).

4.3.5.4 Ease- and rate-enhancing features afforded by device

All participants were familiar with the operational requirements of their respective smartphones. P6 used a different smartphone at the two face-to-face interactions with the researcher and was familiar with the operational requirements of both phones. The most prominent ease- and rate-enhancing device feature used by all participants was the use of the word prediction/suggestions feature. All the smartphones used in the study had a word prediction feature that predicts words while typing, giving the individual the option of at least three words to choose from (on certain model phones one can select an extension option that predicts nine possible words). These predictions are generated according to the initial letters of a word, as well as previous combinations of words used. P1 commented on the benefit of using predictive text and P6 commented that a larger phone handset provides one with more word prediction options. P6 also said that she had downloaded a keyboard application on her previous phone that made the letters easier to access and also gave a greater number of words to select. Word prediction not only

aids typing ease and rate, but also aids with the correct spelling of words. All participants also used the spell checker feature on their phones, which highlights mistakes and thus limits spelling concerns. The autocorrect feature, which corrects spelling or typing errors, was used by five of the participants (P4 did not use the feature and P5 only occasionally used the feature). None of the participants used the text replacement feature on smartphones, which allows the user to store messages according to abbreviations. These messages are then recalled as unabbreviated messages when typing the corresponding abbreviation. Not all participants were aware of this feature.

Certain challenges were also noted that reduced the rate of interaction. P4 reported that she was concerned about the spelling of certain words, which slowed down her messaging speed. The researcher observed that word prediction was useful in this regard, as she would begin typing a word, look at the options given and if she could not find it, she would try another way of spelling the word and see if the intended word appeared as an option. Financial concerns were noted when interacting with P5, who switched his data off whilst typing a message and back on to send the message. P5 also appeared concerned about the correct phrasing of responses and would erase and re-phrase messages typed on his smartphone. This may be a personality or language consideration, or it could have been because of interacting with the researcher.

Table 4.11

Interaction Ease and Rate

Example(s) from the data	Codes	Category	Themes
Nah as long as she respond (P3) *Nah it doesn't matter* (P1P) *No not at all* (P4P) *No ma'ma* (P6P)	Response timing does not matter	Timing: Not important	Factors influencing response rate
Well it depends.. But sometimes it does matter (P1)	Timing sometimes important	Timing: Sometimes important	
It's also depends on the situation am in. Example if I having emergency & I sending someone text after hour the person respond. I won't be happy (P3)	Timing important in emergency	Timing: Matters if urgent	
If it's something urgent he's in trouble ,maybe asking for help maybe it's interesting I'll respond as quick as i can (P1P) *I chat with her in the afternoon and evenings. Mostly after work. During the day, I just response to her urgent chats* (P2P)	Respond during working hours if urgent	Timing: Influenced by urgency of message	
Depends on what I'm doing at that moment (P6)	Timing depends on activity of participant	Timing: Influenced by current activity	
Not really because she sometimes busy so I don't ma mind (P7) *No because I know if she doesn't respond she is busy* (P6)	Timing depends on activity of communication partner	Timing: Influenced by current activity	
No it doesn't because I know she has special needs (P2P)	Timing does not matter because knows she has special needs	Timing: Influenced by skills	
I am faster on typing (compared to her mother) (P7)	Timing influenced by texting skills	Timing: Influenced by skills	
<i>I take long</i> (P4) *Coz I want to make sure* (P4)	Timing not important as participant takes long	Timing: Influenced by literacy skills	
* or he didn't receive my text* (P1)	Did not receive message	Timing: Influenced by access	
I normally which off my data if I'm not on whatsapp (P3) *When I am not on WhatsApp I don't switch my data on often* (P5)	Switch off data	Timing: Influenced by data	
Sometimes I need him urgently or he needs me urgently but we unable to communicate because I either don't have data or he doesn't have it (P3P).	No data	Timing: Influenced by data	

Example(s) from the data	Codes	Category	Themes
It's save time & energy. I don't need to write the whole full sentence like how was your day. I can say Hwud (P3) *It works quick for me I like it* (P5) *It becomes much easier to type quickly* (P1) *I use them almost everyday it a shot cut for many words* (P7)	Shortened words: quicker	Shortened words	Ease- and rate-enhancing strategies
It becomes much easier to type quickly (P1) *There is a shortly words that person can use* (P5 responding to P2s question what to do when lazy to type)	Shortened words: easier	Shortened words	
It's save time & energy (P3)	Shortened words: reduce fatigue	Shortened words	
👉 use pictures (P3 responding to P2s question what to do when lazy to type)	Emojis: easier	Emojis	
I think emojis are wonderful but you can express yourself without type a long sentence emojis are a easier form of communication on WhatsApp (P6)	Emojis: easier	Emojis	
<i>Yes cos this nowadays like I'm like, yo, lazy to type, ... (unintelligible speech) and the emoji (P7)</i>	Emojis: easier	Emojis	
I really don't care about those (P1) <i>Not really (P3) *I use its if I remember* (P3)</i>	Punctuation: not used often	Lack of punctuation	
I send her this ????? (P6) *like question mark I use it to ask someone like when I say who are you; what are you doing* (P7)	(?)/ (????) instead of words	Use of punctuation instead of text	
and it's doesn't matter about the spelling of words. As long as the next person understand what you trying to say (P3)	Spelling does not matter	Error permission	
I have a funny predictions which make it easier for me to type faster (P1) *And the bigger your phone is the more word suggestions you get* (P6)	Word prediction: easier (more if larger phone)	Word prediction	
the App is called my photo keyboard it gives you more than three suggestion words it gives you seven suggestion words and you can change the setting to make the words on the keyboard bigger or smaller or you can change the font (P6)	Keyboard app provides greater word prediction	Word prediction	

Table 4.12

Structural Features Related to Ease- and Rate-Enhancement and Expressive Features

	P1 (24 turns)	P2 (50 turns)	P3 (48 turns)	P4 (30 turns)	P5 (39 turns)	P6 (25 turns)	P7 (90 turns)
Shortened words and symbols	abt (about) ppl (people) becoz (because) j (yes)	lol (laugh out loud) ok (okay)	cos (because) gf (girlfriend) u (you) x6 & (and) x7	lol (laugh out loud) u (you) msg (message)	u (you) x6 nd (and) ohk (okay) x2 thx (thanks)	None	lol (laugh out loud) x3 4got (forgot); 1 (one) 2 (too); y (why); u (you) x4; ur (your) x2 ok (okay) x5
Omitted punctuation	(.) not used at end of message	(.) used 1x at end of message	(.) used 3x at end of message	(.) not used at end of message	(.) not used at end of message	(.) not used at end of message	(.) not used at end of message (?) not used 2 questions
Omitted capitalisation							No capital for name *Is nomsa ur second name*
Emojis combined with text	🤔👍👍😄; 👉😄; 😄😄	❤️❤️; 😄😄; 😄❤️😄😄; ❤️😄👩	🚗	🤔😄; 😄👉; 😄		😊	🤔; 😄; 😄; 😄 x4; 😄😄😄😄😄😄; 😄😄😄😄😄😄; 😄😄; 😄😄;
Emojis without text	😊, 😄	😊😊😄😄😄; 😄😄😄😄; 😄😄😄; 😄😄; ❤️	😄	🤔 x2, 😄😄 😄😄			😄 x2; 😄😄; 😄😄; 😄😄😄😄😄😄; 😄😄; 😄😄;
Punctuation: (.) Separate ideas	In 2 turns	In 3 turns			In 5 turns		In 1 turn
Punctuation: (.) Separate ideas	In 4 turns	In 1 turn	In 13 turns		In 1 turn	In 2 turns	In 6 turns
(?) After question		In 6 turns		In 2 turns	In 4 turns		In 3 turns
(...)	In 1 turn						In 1 turn
(*) Error indication						In 1 turn	
Emphatic capitalisation		*OK*			*It's a big NO*		*OK* x3
Accent stylisation			*yeah* x2, *nah*	*yeah* x3			*yep* x1
Exclamatory spelling & features for adding prosodic impact	*Hell no*		*Hell no* *lyeeeh* x2 *It's work like a bomb*	*Mm ok* *Mmm*	*big NO*		*Yes yes*; *oh yes*; *big true*; *big one*
Language switching		*Hayibo*	*lyeeeh* x2				

4.4 Recommendations

Recommendations were made by the participants and their respective communication partners regarding the use of WhatsApp (see Table 4.13). These recommendations can potentially also apply to similar messaging platforms or applications. Additional general suggestions made by the participants are shown in Table 4.14.

4.4.1 Recommendations by participants for other individuals with CCN

P4 and P5 felt that individuals with CCN needed a smartphone and P2 agreed with P7 who commented that **I would make a plan for them who struggles to speak. I would make sure that they get whatsapp very quick**. WhatsApp was recommended to other individuals with CCN as participants felt it could be used despite access limitations and literacy limitations. Participant comments included the following: **I suggest they use WhatsApp to communicate better with people and so it saves them time and energy trying to explain what they want to say and WhatsApp is more efficient because there's a minimum change [sic] of being misunderstood or misinterpreted instead of repeating yourself** (P6); and **because on WhatsApp you can type by just pressing the letters of the word you want to spell which is easier than write and the word prediction feature makes its faster than writing** (P6). P3 furthermore recommended WhatsApp to others with CCN because **whatsapp have its own language. We usually use short to some and it's doesn't matter about the spelling of words. As long as the next person understand what you trying to say**.

4.4.2 Recommendations for participants by their communication partners

P1P, P2P, P4P and P7P commented that they had no suggestions as they felt that the participants already interacted as effectively as possible on WhatsApp. (P4P had previously commented that P4s literacy skills were sometimes problematic but that they would improve over time.) P5P and P6P commented that P5 and P6 would benefit if typing was easier. P3P also stated that it would be helpful if P3's interactions were not limited by data.

Table 4.13

Recommendations

Example(s) from the data	Codes	Category	Themes
I suggest they use WhatsApp to communicate better with people and so it saves them time and energy trying to explain what they want to say and WhatsApp is more efficient because there's a minimum change of being misunderstood or misinterpreted instead of repeating yourself (P6)	WhatsApp improves communication	WhatsApp: Enhances rate Reduces fatigue Reduces misunderstandings Reduces repetition	Reasons for recommending WhatsApp to individuals with CCN
Yeah cos whatsapp have its own language. We usually use short to some and it's doesn't matter about the spelling of words. As long as the next person understand what you trying to say (P3)	Own language: spelling does not matter	WhatsApp can be used despite literacy limitations	
Yes because on WhatsApp you can type by just pressing the letters of the word you want to spell which is easier than write and the word prediction feature makes its faster than writing (P6) *Yes because another phones when u start type a word it give u a full word* (P5)	Word prediction	WhatsApp can be used despite literacy limitations	
Typing (P6P) *The phone that use bigger letters. It's will make its easier for him to type* (P5P)	Improve ease of typing	Enhanced device features	Recommendations for improved WhatsApp use for individuals with CCN
If we can phone with a robe punch to protect its when it's fall. (P5P)	Improve phone protection	Enhanced device feature	
If he always has data, would be much easier coz he loves watsapp (P3P)	Always have data	Unlimited data	

4.4.3 General suggestions

Various general suggestions were made by the participants. Participants commented on how understanding could be enhanced by using different means of communication, such as typing on their phones using the SMS function or the Notes function and showing the typed message to the listener (P2, P5 and P7); using body language (P3) and communication boards (P2); as well as using the video feature on WhatsApp (P2 and P1). P6 also discussed how the voice note feature on WhatsApp could be used by individuals whose access to texting was limited by literacy or physical difficulties. P1 used the email function on his phone to communicate with his lecturers. P3 used a speech application that converted text to speech. P5 and P6 expressed their wish for a speech application that could convert their current speech to intelligible speech. P7 said that one could maintain contact with others by just reading and not typing. To save data, P3 and P5 recommended switching off the data when not on WhatsApp. P3 also recommended having one's parents on speed dial in case of emergencies. P3 and P5 furthermore recommended safety tips for P4 who asked the group what she should do when she was asked disconcerting questions, *Like were [*sic*] are you going were [*sic*] is your mum questions*.

Table 4.14

General Suggestions

Example(s) from the data	Codes	Category	Themes
Use body language (P3)	Use body language to heighten understanding	Different modes of communication	Multiple modes of communication
I'm going to type on my phone (P2) *I am going to type on my phone too* (P7) *Yes I type on my phone when I am with people who not stay with me full time to understand me better* (P5)	Typing on phone to heighten understanding/use as communication device	Different modes of communication	
We went to campus to buy lunch for ourselves because X wanted to test us with our communication boards, we had to use our communication boards to order lunch by our down, and they understood (P2)	Communication boards to heighten understanding	Different modes of communication	
For emergency situation, I think you can use a video call, but most case you can not get help as soon as possible (P1)	Video note/call to heighten understanding	Different modes of communication	
Hayibo the video note is a wonderful thing (P2)	Video note wonderful	Different modes of communication	
The voice note is a disadvantage to people with speech difficulties but it is a advantage to people who can't read or write properly and those who don't have hands (P6)	Accessibility for different disabilities (voice note if can't type)	Different modes of communication	
	Accessibility for different disabilities (voice note if illiterate)	Different modes of communication	
Unless they won't mind. But I think sending an email is more professional due to their positions (P1)	Other media: Email (formal)	Different modes of communication	
Lol then don't type just read (P7)	Maintain contact by reading	Different modes of communication	
The is app can they can download on their phone. The app is called "speak assistance ". Any thing u type their it's speak for u. What I like about the app is u can add some words u usually use everyday like "How are you "" (P3)	Communication app (text to speech)	Different modes of communication	
In that situation u put your parents on speed dial (P3)	Parents on speed dial for emergencies	Different modes of communication	
If they can make phones that can hear what we are saying then tells people what we want to say (P5)	Phone communication interface (speech to speech)	Different modes of communication	
When I am not on WhatsApp I don't switch my data on often (P5)	Switch off to save data	Data	
I come that question a lot. I answer them by saying one men die alone (P3) *I just leave them alone without answer* (P5)	Safety tips for inappropriate questions	Safety tips	Safety

4.5 Participant Reflections on Participating in the WhatsApp Focus Group

Participants were asked to reflect on their experiences of participating in the WhatsApp focus group discussion. None of the participants, except for P2, had previously been part of a research group. A summary of their experiences of the group interactions are documented in Table 4.15. Participants described their experiences of the group interactions as follows: *It was quite an interesting groups with amazing views and responses* (P1); *It's was wonderful. I learn a lot from anothers* (P3); *It was a wonderful experience because I learnt a lot of new information and gain a better prospective on speech difficulties* (P6). P5 commented that he liked the group interactions as *they talk things that I face every day nd I can see that it not only me that I get problems because I am disabled*; however, he disliked it when others in the group spoke about personal matters on the group. P2 enjoyed asking the other participants questions on the group but was not influenced by their views, which she described as *boring*. P7 said that she *was very happy because we used to get know each others lives and we had fun*. P4 said that she enjoyed the group because she experienced the other participants as kind and it made her realise that she is not alone, although she struggled to follow the interactions *Coz I can't read so well*. This meant that she struggled to interact on the group and this made her *feel like I was a fool*. All participants, besides P1, wished to continue with the group once the researcher had exited the group. P1 preferred to not continue with the group as *I didn't like groups it's just becomes more complicated to me*.

Table 4.15

Participant Reflexions on WhatsApp Group Interactions

Participant	Able to express own views	Disliked	Influenced by others' views	Wished to remain in group
1	Yes	Nothing	Yes	No
2	Yes	Nothing	No	Yes
3	Yes	Nothing	Yes	Yes
4	No	Experiencing literacy challenges	Yes	Yes
5	Yes	Others discussing personal matters	Yes	Yes
6	Yes	Nothing	Yes	Yes
7	Yes	Nothing	Yes	Yes

4.6 Conclusion

This study aimed to explore the interactional affordances of messaging for youth with CCN by looking at the following areas: with whom they are able to communicate; when and where they are able to communicate; what they communicate about; how this communication is maintained and repaired after a potential breakdown had occurred; and what ease- and rate-enhancing features and strategies are used during these interactions. The themes constructed within each of these areas show the many interactional benefits of messaging for youth with CCN, but also highlight specific challenges/barriers that need to be considered. These themes are summarised in Figure 4.12.

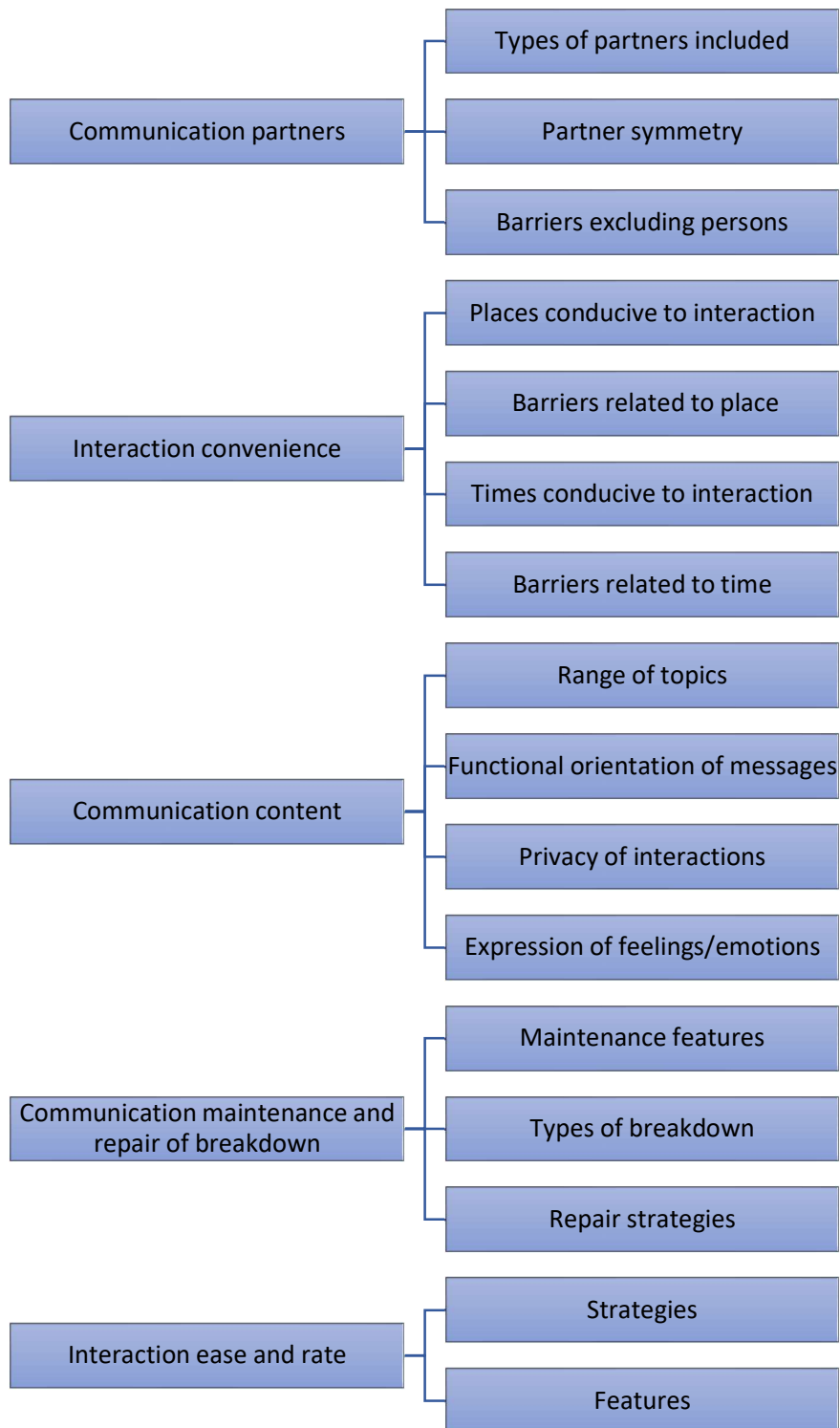


Figure 4.12. Summary of themes.

CHAPTER 5

Discussion

5.1 Introduction

This chapter focuses on discussing the results pertaining to the main aim of this thesis, namely to explore and describe the interactional aspects afforded by mainstream mobile messaging for youth with CCN. These aspects were considered in terms of the HAAT model, which emphasises the interplay between the human (youth with CCN) and the AT (smartphone) used in the activity (messaging) in the South African context. As messaging is a joint activity, the HAAT model was supplemented to include a communication partner (or group of partners). This communication partner(s) use(s) the same type of technology (smartphone) during the interaction with the youth with CCN.

Although messaging has many affordances for both/all communication partners involved in this interaction, the results of the present study focus on what these affordances offer for youth with CCN. The interactional aspects were explored from the perspectives of the youth with CCN, their selected communication partners, and the researcher's observations of youth with CCN's use of messaging on their smartphones. The affordances discussed in this chapter include: i) circles of partners; ii) partner symmetry; iii) absent presence; iv) recognised anonymity; v) expressive control; vi) control over partner inclusion/ exclusion; vii) convenience; viii) synchronicity; ix) privacy; x) ease- and rate-enhancing features and strategies; xi) maintenance features and strategies. See Figure 5.1 for a visual representation of these affordances.

The chapter concludes with the notion that, despite the existence of challenges for youth with CCN who use messaging (including challenges specific to the South African context), the interactional affordances of messaging enable these youths to interact with individuals and groups in a manner that differs from their usual face-to-face interactions and that enhances their social connectedness.

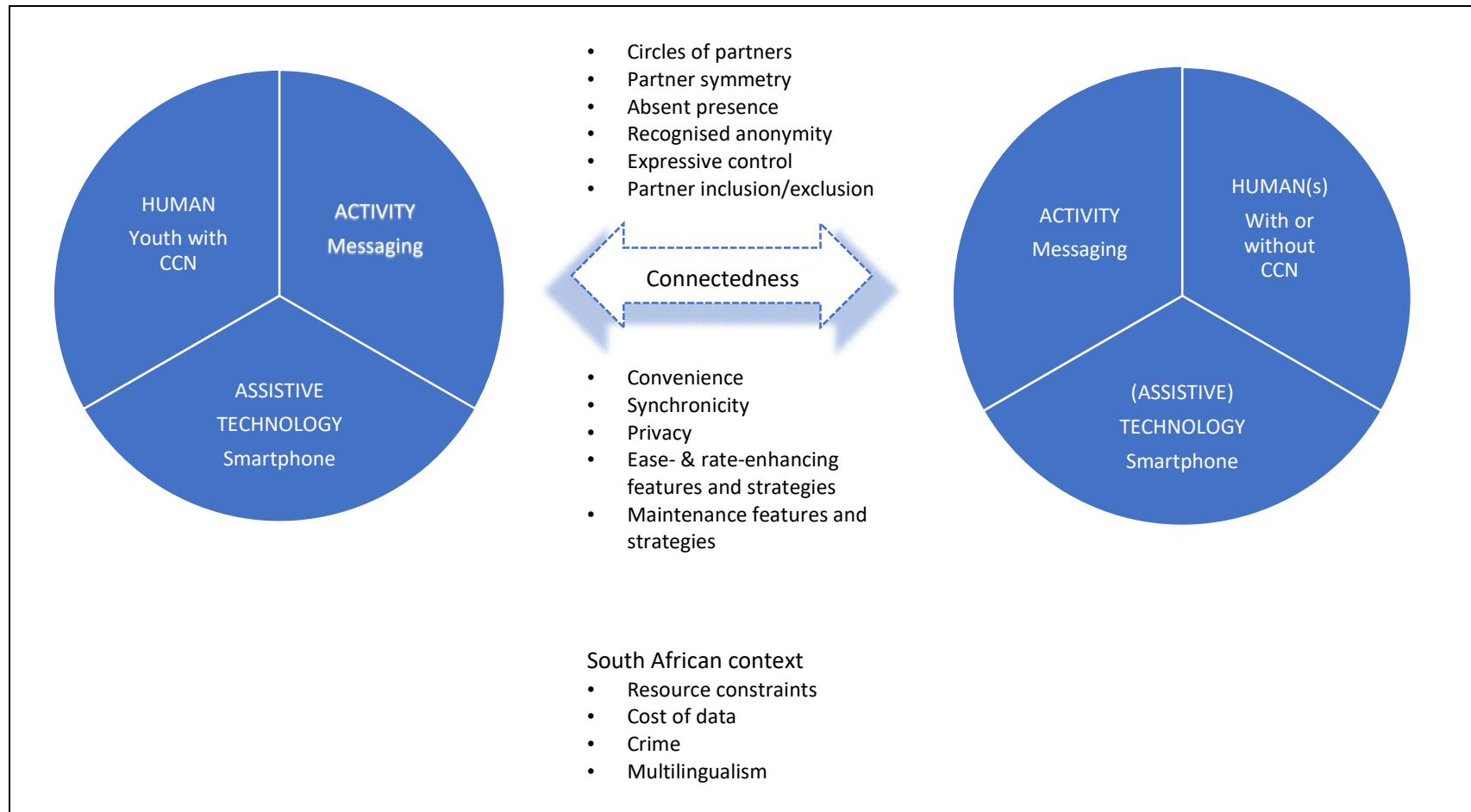


Figure 5.1. Visual representation of affordances of messaging.

5.2 Affordances of Mainstream Mobile Messaging

Behind every product decision is our desire to let people communicate anywhere in the world without barriers.

WhatsApp Mission Statement (<https://www.whatsapp.com>)

Communication is a basic human right and essential to the human experience. It allows individuals to express their unique personalities and to participate in activities within various contexts (Blackstone & Hunt Berg, 2003). Communication, including messaging, via mainstream technologies has become an integral part of the youth's lives (Alant, 2017) The following sections discuss the interactional affordances of messaging for youth with complex communication needs. The discussion includes the circles of partners with whom the youth with CCN interact using messaging; the symmetries (and differences) that exist between the youth with CCN and their communication partners (with or without CCN); the absent presence of a communication partner who is physically absent; the anonymity afforded for youth with CCN; the expressive control afforded by messaging; the control over the inclusion and exclusion of others; the convenience, synchronicity and privacy of messaging; the ease- and rate-enhancing features and strategies; as well as the maintenance features and strategies. All the youths in the present study used WhatsApp, a mobile instant messaging application. This specific application was the most popular application in South Africa at the time of the study (Kim, 2018).

5.2.1 Circles of partners

My family (P6) *My friends* (P5) *😘 and my boyfriend* (P4) *classmates* (P1) *My colleagues* (P3) *My teachers* (P5) *a group chat at church* (P4)

(Youth with CCN)

Communication involves the exchange and sharing of messages among communicants (Alant, 2017) and it is thus essential to consider the role of all communication partners involved in interactions (Blackstone et al., 2007; Light & McNaughton, 2015). A key consideration in AAC is the range of communication partners with whom the individual with CCN is able to interact. This is especially important since individuals with CCN may have fewer communication partners compared to peers without CCN. Moreover, these partners are often family members or paid

workers (Blackstone et al., 2007). A study on the training of youth with CCN using social media showed that the majority of online communication partners were immediate family members and paid communication partners (Grace et al., 2014). Similarly, research showed that 10- to 15-year-olds with CCN had fewer acquaintances and friends than their peers with typical development (Raghavendra et al., 2012). Young adults (between 24 and 30 years of age) emphasised the importance of having a wide range of communication partners, including family, but in particular friends, and stated that a wide range of support networks decreases their feelings of loneliness (Cooper, Balandin & Trembath, 2009).

The results from the present study show that messaging may provide interaction with a wider range of partners across the circles included in Blackstone and Hunt Berg's Social Networks model (2003) (see Figure 5.2). Besides interacting with family and paid workers (e.g. personal assistants), the results show that youth in the study particularly use messaging to interact with friends and romantic interests/partners, similar to the messaging practices of typically developing youth (Harrison & Gilmore, 2012). The youth in the current study emphasised how one-on-one relationships with their friends were strengthened through the use of messaging and how messaging enabled them to pursue romantic interests. The fostering and maintenance of relationships using a means of communication other than speech may be particularly important to these youth who do not have the functional speech to foster friendships and romantic relationships through verbal interactions. The results of the study show that these youths also use messaging to interact with acquaintances and unfamiliar partners (discussed in more detail in Section 5.2.4).

Furthermore, the results of the present study show that messaging allowed the youth in the study to participate in group interactions. These group interactions give youth with CCN the opportunity to simultaneously interact with all the other members in the group using the same means of communication. Group interactions allow for experience sharing with more than one partner and provide individuals with a sense of social connectedness (Counts, 2007). This is particularly poignant for youth with CCN who may otherwise not have the opportunity to participate regularly in group-based activities (Raghavendra et al., 2012). Various authors stress the importance of individuals with disabilities participating in meaningful and age appropriate activities (McNaughton et al., 2012; McNaughton & Kennedy, 2010). According to Alant (2017), the Internet can be viewed as a meaningful life activity. The current study notably showed that messaging support groups enabled youth in the study to connect with individuals who face similar

challenges. Various church groups also connect them to the community in which they live. School, study or work groups connect them to their peers. The WhatsApp focus group established in the present study gave youth with CCN the opportunity to connect with other youth with CCN, which they experienced as positive. Whereas young adults in an Australian study reported that they found it difficult to develop friendships with other individuals with CCN (Cooper et al., 2009), the focus group in the present study was considered an effective way of introducing the individuals in the study to each other.

The distinction between familiar and unfamiliar partners is often used for face-to-face interactions (also referred to as offline or real-world interactions), but the lines become blurred for online interactions. According to the Blackstone and Hunt Berg (2003), individuals with whom one shares mutual interests and in whom one confides are considered close friends/relatives. Yet one may know very little about an online communication partner besides having a shared interest or need. During online interactions, individuals can communicate with others (e.g. a member of an international support group), even though they have never met in person. Also, due to the nature of online interactions, such communication partners may well become more than unfamiliar partners or acquaintances. One participant in the current study remarked that he enjoyed interacting on a WhatsApp group with individuals he had not met in person, as it gave him more expressive freedom. Participants also reported giving and receiving support in their online church groups, despite these groups consisting of individuals the participants may not know in person. Such online communication partners may be considered as (un)familiar communication partners (this resonates with the notion of recognised anonymity discussed in Section 5.2.4). In an article on online communication and adolescent relationships, Subrahmanyam and Greenfield (2008) discussed several advantages and disadvantages of online communication, including instant messaging and text messaging. For example, they stated that online interactions allow individuals to stay in touch with friends and may limit the effects of social rejection in the physical world. They nevertheless also warned that online interactions may endanger individuals or expose them to cyber bullies. Unfortunately, this topic lies beyond the scope of this study and will not be explored in more detail.

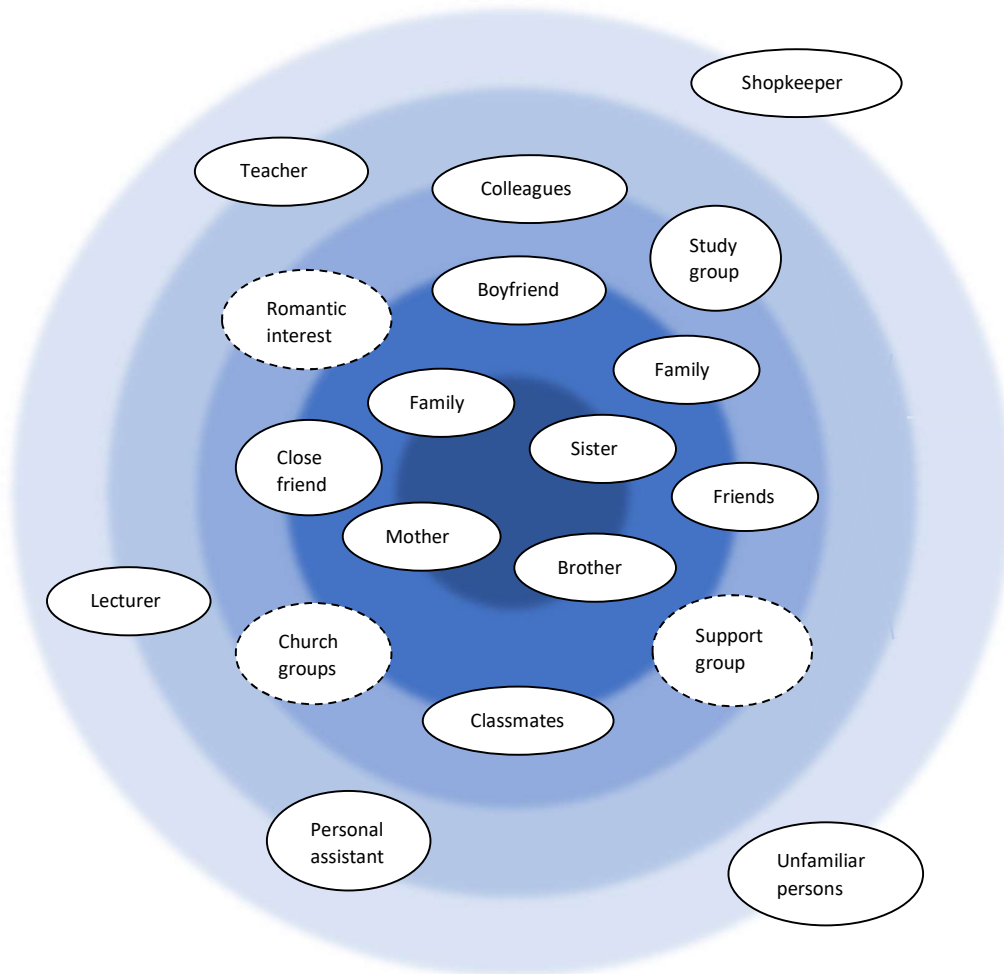


Figure 5.2. Communication partners listed by the participants.

It is important to keep in mind that meaningful and regular opportunities for social participation are necessary to build relationships with a range of communication partners (Carter & Draper, 2010; Raghavendra et al., 2012). For example, youth who work or receive in-service training or further education have a greater number of communication partners (Turkstra, Ciccio & Seaton, 2003). This fact was confirmed in the current study. One of the participants had a limited number of messaging communication partners as she was living in a group home for mainly older persons with various disabilities, which limited her contact with peers. The benefit of having more social contact through work was highlighted by another study participant who reported interacting via messaging with his colleagues and persons he met in his work environment. Most participants

also commented on the benefits of belonging to church WhatsApp groups, which gave them spiritual support and offered social contact with like-minded individuals in their community.

5.2.2 Partner symmetry

Messaging is a *platform for for verbal and non-verbal to interect and engage together [sic]*

Xolani (Youth with CCN)

According to the literature, asymmetries in interactions may exist between individuals with CCN who use aided communication and those who use speech to communicate (Ratcliff & Cress, 1999). Because of this asymmetry, speaking individuals may withhold *speakership* from the individuals with CCN (McConkey, Morris & Purcell, 1999). Symmetry, on the other hand, is possible if both (or all) communication partners have access to the same technology used in the interaction, if all communication partners are able to present or express themselves as they wish (discussed in Section 5.2.5), and if they can compose their messages in their own time (discussed in Section 5.3.2) (Blackstone et al., 2007). The results of the current study highlight the symmetry that is facilitated between communication partners when they interact via messaging, despite differences in their physical and literacy abilities. Although the present study did not aim to analyse interactive turns, it was noted during the WhatsApp focus group discussions that the participants initiated and maintained the interaction by asking their own questions and responding to the comments made by others. These youths also asked others in the group for clarification and then responded with revised and expanded messages. This showed that messaging allowed youth in the study to play an active role in interactions and not assume a passive role, as some individuals with disabilities have been noticed to do (Feeley & Jones, 2012). Participants in the study also used the words *each other*, *one another* or *together* when describing their interactions, which denotes symmetry and equality.

Online interactions have been referred to as an equaliser by AAC interventionists (Alant, 2017). Professionals highlight the notion that the equality afforded by text message interactions contributes to feelings of safety and security experienced by adolescents and adults with cognitive and communicative disabilities (Buchholz, Mattson Muller & Ferm, 2013). Adults who use AAC furthermore report that social media provide a common pathway between interactants, which makes individuals feel typical (Caron & Light, 2016). The feelings of equality experienced in the

present study – and in studies using similar means of interaction – may be particularly important for younger youth who try to fit in with their peers (Carter & Draper, 2010; Turkstra, 2000).

It is important to note, however, that the choice of communication mode is partner-dependent (Blackstone et al., 2007; Blair et al., 2015). Messaging interaction can only take place if it is used by both (or all) partners and it excludes individuals who do not have the technology (device) and share the specific messaging application used by the other partners. The results of the present study highlighted that older individuals tend to not use messaging. This correlates with the notion of a digital divide between younger and older individuals who do not have Internet access or use other means of remote communication (Buchholz, 2019).

The results that emerged from the current study also show that asymmetries may exist in the literacy skills of the communication partners, which influence messaging interactions. One participant in the study regarded her own literacy skills as limited and therefore as limiting, whereas other youth in the study reported their literacy skills to be more advanced than those of some of their typically developing communication partners without CCN. Although literacy development for individuals with CCN is on the increase in high-income countries (Loncke, 2014) and not all individuals who use aided communication experience difficulties acquiring literacy skills (Dahlgren Sandberg, 2016), literacy skills of persons with disabilities have been noted to be a concern in South Africa as well as abroad (Bornman, 2017; Foley & Wolter, 2010). Young people who use AAC may thus present with a range of literacy skills (Hynan et al., 2014), and research has shown that communication partners of individuals with CCN often have limited literacy skills too (Cooper et al., 2009). In the present study, it was noteworthy that messaging interactions occurred despite the varying literacy skills of the participants and their communication partners. Additionally, youth with CCN in the present study believed messaging could be used by persons with limited literacy skills as it *had its own language* and *allowed for mistakes*. Asymmetry in literacy skills therefore did not prohibit the use of messaging.

The various social asymmetries that were highlighted in the present study also had an impact on the use of messaging. Results show that social conventions dictate that it is more appropriate to use specific types of computer-mediated communication with certain communication partners. This finding is supported by the ICT literature that highlights differences in the use of various technologies and applications, and argues that youth navigate between these, depending on the conversational content or communication partner. For example, email and SMS

are regarded as more formal than messaging (Agosto et al., 2012; Church & de Oliveira, 2013). In the present study, a youth admitted that it felt more appropriate to interact with his lecturer using email, but that it would be easier using messaging. He also reported that it would be beneficial if his parents used messaging. According to various authors (Ball, Stading & Hazelrigg, 2010; Dattilo, Benedek-Wood & McLeod, 2010), communication partner support and training can enhance interactions for all parties involved. It is vital to consider the communication partner in messaging interactions and to bear in mind that intervention may need to look at whether the communication partner is able to adapt to the choice of communication preferred by the youth with CCN.

Specific language barriers were also noted in the present study, where one individual was excluded from a church group as he could not read the language used in the group interactions. These barriers are not specific to individuals with CCN but are foregrounded because South Africa is a multilingual country (Statistics South Africa, 2015). Language switching is a commonly observed phenomenon in multilingual communities and may serve different functions – including a social function (Moodley, 2007; Uys, 2010). In the present study, the phrase language switching is used as a broader term for the use of two languages in one utterance or exchange of utterances. This is because code switching and borrowing (as well as code mixing) necessitate an in-depth linguistic analysis of the data, which is beyond the scope of the study at hand (Poplack, 2013). One of the participants commented that language switching during messaging was useful to increase understanding among individuals who speak the same language, and it was also used as an expressive feature (discussed below).

5.2.3 Absent presence

I like that she can reach me whenever she wants to talk as we don't live together... it makes me feel closer to her

Amahle (Youth with CCN Communication Partner)

In the present study, the researcher observed that the restricted mobility of certain participants confined them to their homes (which included a home for persons with disabilities in the case of one participant). One of the youths in the study also reported being restricted to her home and school due to safety considerations and a lack of transport possibilities. Transport barriers for individuals with disabilities have been reported in other South African studies

(Masuku, Mophosho, & Tshabalala, 2018). Messaging allows participants to interact with individuals in other parts of the world, as well as in close proximity. The affordance of being able to communicate with others who are not physically present is referred to as remote communication (Buchholz, 2019) or distance communication (McNaughton & Bryen, 2007). Messaging is a type of remote communication that enabled youth in the present study to create a communication environment that transcends physical boundaries and connects them with individuals outside of their often-restricted settings. Thurlow and Poff (2011) speak of an absent presence (also referred to as connected presence), whereby individuals engage with each other without physically being in each other's company. The fact that a mainly home-bound participant was able to interact with her boyfriend, whom she kept secret from her parents, illustrates the notion that messaging allows for the creation of an absent presence.

The affordance of having contact with someone who is not physically present may have safety implications for youth with CCN who are regarded as a vulnerable population (Loncke, 2014). More so, for individuals who live in South Africa with its alarmingly high crime rate (Statistics South Africa, 2016). In a US study on the use of mobile technologies, one of the male participants who uses AAC remarked that texting gives him more confidence and a greater sense of security, and he feels that he has someone with him at all times (Bryen & Chung, 2018). Similarly, in a Swedish study, the ability to use remote communication such as text messaging also made adolescents and adults with cognitive and communicative disabilities feel safer and this feeling of safety increased their participation and contributed to their independence (Buchholz et al., 2013). Increased independence was also reported by participants who used text messaging (and voice calls) on their mobile phones via their speech-generating device (Nguyen, Garrett, Downing, Walker & Hobbs, 2008). In a South African study, 26,7% of the participants reported that they had been in an emergency where having their wireless device really helped (Bornman et al., 2016). In the present study, however, the youth with CCN could not agree on whether messaging is useful in emergency situations. According to them, the main reason for not using messaging in emergency situations was that there was no guarantee that the communication partner would receive the message in time, as they may for example not have data.

The risk of individuals with disabilities having less face-to-face contact as the result of a dependency on mobile communication has been highlighted as a concern in earlier research (Chib & Jiang, 2014). In a study on social media use, lack of direct or physical contact with others was

also raised as a concern by individuals who use AAC (Caron & Light, 2016). One communication partner in the present study reported that she was afraid that messaging would deter her friend with CCN from having more direct personal contact with others. According to Alant (2017), individuals differ in their use of online interactions and individuals who enjoy interacting with others offline tend to also enjoy having a social presence online. Likewise, the youth in the current study reported using both face-to-face interactions and messaging.

5.2.4 Recognised anonymity

*The nice part is none [*sic*] knows each other so we are free to talk*

Elijah (Youth with CCN)

The results of the present study show that interactions with (un)familiar partners, such as members of support groups, allow youth with CCN to express themselves freely as they do not know these communication partners in other contexts. According to the literature, a certain amount of anonymity is also afforded when messaging with familiar communication partners – referred to as recognised anonymity (Thurlow & Poff, 2011). In a sense, interactions that take place via information and communication technologies shield the communication partners and allow them to choose what they wish to disclose to each other. Although this notion applies to all messaging users, Alant (2017) states that individuals with disabilities can choose to conceal their disabilities during online interactions. This provides them a different type of expressive freedom than face-to-face interactions, as they can choose how they define themselves (Alant, 2017). This finding links with a Singaporean study in which the individuals with disabilities reported that they were able to manage their own personal identities on mobile phones, thereby allowing them to escape the stigma of disability (Chib & Jiang, 2014).

It was evident during the WhatsApp group discussion that differences in the physical abilities of the participants were not noticeable. At one of the follow-up interviews, one of the participants was surprised to hear that the others in the group had little functional speech. Another interesting aspect noted in the present study is that one youth with restricted literacy abilities stated that she enjoyed being in the group, even though she felt that she was not able to contribute much. She was thus able to keep her limited literacy hidden from the group and yet remain present in the discussion. This links with the notion that individuals can be engaged with one another, without

participating in an activity (Alant, 2017), and that passive participation roles also need to be considered (Noren et al., 2013).

The negative consequence of such anonymity is that it may also result in individuals sending unfiltered messages (referred to as *text-related disinhibition* by Harrison and Gilmore, 2012) that can be hurtful or offensive to the receiver of the message, regardless of whether they have CCN or not. Messaging is regarded as a more protected way of interacting than social media (Agosto et al., 2012). Nonetheless, messaging may also bring youth with CCN into contact with communication partners who send hurtful messages or pose a threat to them – thus, they need to be educated as do all youth who use social media (Caron & Light, 2016). In a study on social media, young people who use AAC reported that they had been aware of these threats and received information about Internet safety at home and at school (Hynan et al., 2015).

5.2.5 Expressive control

through Whatsapp i get to express myself more than I would in front of the people [sic]
Xolani (Youth with CCN)

Reid and Reid (2010) use the term *expressive control* (originally used by Goffman in 1969) to highlight the affordance of expressing yourself as you wish when using messaging. Although this affordance may be regarded as beneficial for all individuals, is particularly relevant for individuals who are unable to fully express themselves through speech. The value of the ability to effectively express yourself using messaging is especially important for youth with CCN in South Africa, as the provision of appropriate assistive technologies in South Africa may not always be affordable, available or accessible (Van Niekerk, Dada & Tönsing, 2019).

Youth in the study at hand commented on the challenges of not being understood during face-to-face communications, due to poor speech intelligibility. Most of the youth in the study tried using repetition of spoken utterances and natural gestures to make themselves understood with more familiar communication partners or would show an unfamiliar communication partner a typed message on their smartphone to supplement the spoken message. Two of the seven participants had a speech-generating application on their mobile device, but it was used infrequently. For these youths, messaging, and specifically instant messaging, was considered a far more effective means of self-expression than face-to-face interactions.

The importance of independent self-expression was highlighted by adolescents and adults in a study on text messaging with pictures and speech output (Buchholz et al., 2013). When using messaging, youths in the present study reported being able to converse about school or work-related matters; about disability-related challenges and how to overcome these; about religious and spiritual matters, about relationships and private matters, and in particular, about social and friendship-related matters. According to Reid and Reid (2004) and Pierce (2009), messaging also allows individuals who are socially anxious or lonely to feel more comfortable and to express their real self. This type of self-expression was documented in the present study, which reported that pictures denoting loneliness were used as profile pictures on occasion. This ability of greater self-expression was also reported by young people who use AAC when interacting on social media (Caron & Light, 2016; Hynan et al., 2014).

Expressive control links with the concept of self-representation, which contributes to a sense of equality (Hynan et al., 2015). Self-representation or self-advocacy also aids the transition to self-sufficient adulthood (McNaughton, Rackensberger, Wehmeyer & Wright, 2010). Furthermore, self-expression is important for adolescents and young adults with CCN as far as their health and medical care is concerned (Baladin & Waller, 2010). Hingsburger (2010) also discusses the importance of the power of language regarding the topic of sexuality and how individuals who use AAC should have the freedom of controlling this aspect of their lives. One of the participants in the current study made use of her expressive control during the WhatsApp focus group by asking the others in the group if they knew certain sexting emojis. The ability of self-expression afforded by messaging may also allow individuals with CCN (who run a greater risk of being abused (Loncke, 2014)) a means of reporting inappropriate or unwanted behaviour.

Many expressive features are specific to computer-mediated communication (including messaging and similar communication platforms), they allow for the expression of feelings and emotions, and they are typically used by younger individuals (Fannin, 2016). These expressive features may convey nuances that are usually communicated via other modes in face-to-face interactions, and they may not be that obvious in messages consisting only of text (McNaughton & Bryen, 2007). The current study showed that youth with CCN use emojis and, to a lesser extent punctuation and expressive words, as expressive features. One of the youths in the study said that her favourite emoji was eye rolling 🙄, which is a difficult emotion to convey in words.

Wickenden (2011) states that young people who use AAC are more concerned about their similarities to their peers without disabilities than about their differences. According to Bryen and Moolman (2015), an important device feature for adolescents is that they can express themselves in the language and style of their peers. Smith (2005; 2015) also reports the importance of slang and language switching for in-group identification. Although the youth in the present study used more formal language to interact with the researcher (as they felt it was more appropriate and respectful), they highlighted the fact that messaging has its own language and that they enjoyed using emojis and shortenings when interacting with their peers (like the fist-bump emoji 🤝). Examples of language switching and informal expressions such as *hayibo* and *yeah* were also noted. A content analysis of the messages sent by youth with CCN and those without CCN should shed more light on whether any differences exist between the two groups, and if so, what these differences are.

5.2.6 Control over partner inclusion or exclusion

I sometimes block them

Naleli (Youth with CCN)

Collier and Self (2010) discuss the high rate of physical, mental and sexual abuse that individuals with disabilities face, as well as the importance of personal safety. The control over the inclusion and exclusion of communication partners afforded by messaging is thus an important consideration. Control over online environments contributes to empowerment and independence (Alant, 2017). Youth with CCN in the present study commented that they can exit from an interaction or block an unwanted communication partner. Three of the female participants in the study mentioned having received inappropriate messages from unwanted communication partners but added that they had control over allowing this contact or blocking it. The power to do something is referred to as agency (Nealson & Searls Giroux, 2012), and being able to choose whom to interact with and whom not, may afford youth with CCN greater agency over their social interactions than they would typically have had during face-to-face interactions because of physical limitations or restricted physical environments. However, the negative consequences of individuals having control over the inclusion of others were also witnessed during the study, as one of the youths with CCN was blocked by her boyfriend whilst interacting with the researcher.

5.2.7 Convenience

When we have data is almost the hole [sic] day

Amogelang (Communication Partner of Youth with CCN)

A major challenge of aided communication is portability of the relevant device to ensure availability at all times (Loncke, 2014). One of the popular affordances of mobile messaging highlighted in the ICT literature is the fact that it can be used in any location and at any time (Harrison & Gilmore, 2012), thus it is regarded as very convenient (Yoon et al., 2014). This convenience is attributed to the portability (Goggin, 2016) and unobtrusiveness of mobile devices (Reid & Reid, 2010). The convenience of messaging was also highlighted by youth with CCN in the present study. They particularly liked the fact that mobile phones were small and portable and that they could always have them on their person to use, unlike larger dedicated communication devices or larger mainstream mobile devices such as tablets.

However, youth in the present study objected to the fact that their use of messaging was restricted by certain barriers – two contextual barriers, and a policy barrier. The first contextual barrier highlighted by participants was the high cost of data in South Africa, which they felt limited their interactions. Without data, interactions cannot take place and unlike certain countries where free Wi-Fi is readily available, many of the participants complained that they were struggling with the cost of data (even though it is cheaper than airtime). According to Research ICT Africa (2017), data in South Africa is the most expensive out of several leading African economies, which has led to the South African #DataMustFall campaign (<https://businesstech.co.za>). Participants highlighted the fact that both partners in the communication dyad needed data to participate, which might cause a data barrier on the sender or receiver side of the dyad. This is an important consideration in times of emergency for individuals with CCN who need to use a means of aided communication to request help and support.

A second contextual barrier that also influences the convenience of using messaging is the high risk of theft in South Africa. The Victims of Crime Survey Statistics South Africa for the years 2017/2018 reports that mobile phone theft dominated the list of stolen personal property in South Africa (69,1%), with 458 700 incidents of mobile phone theft reported for the year (Statistics South Africa, 2018b). In addition to the high crime rates, persons with disabilities are a vulnerable

population (as previously mentioned) (Loncke, 2014). In the present study, one participant did not use his phone on the street, especially at night, because of the fear of theft, while another did not take her phone to school as her previous phone had been stolen out of her bag at school.

The third barrier pertains to policies that do not allow the use of mobile phones at work or at school, as reported by two of the youths in the current study. This links to a study by Collier, Blackstone and Taylor (2012), in which individuals with CCN also reported that text messaging was not accepted in most businesses even though it is a useful feature for individuals with CCN. As messaging is an internet-based means of communication (<https://www.whatsapp.com>), it operates on a platform through which many other sites are accessed. According to a youth in the study, Internet access at school can lead to youth accessing illegal or inappropriate sites such as pornographic sites. Although blocking and filtering software may in part aid in this regard, additional strategies need to be put in place to educate individuals about use of the Internet (Chetty & Basson, 2006; Kritzinger, 2017). With the correct safety measures in place and adequate training, institutions may be able to reconsider the use of mobile phones during work or school hours, as it will enable youth with CCN with a convenient means of interacting with others.

5.2.8 Synchronicity

Nomsa responded to other communication partners while waiting for the next question.

Researcher's Observation Notes

Face-to-face interactions require an immediate response and timing delays can cause conversational interactions to become discontinuous (Clarke, 2016). Having enough time to craft a message is an important consideration for individuals with disability-related challenges (Paterson, 2017). Asynchronous media, such as messaging or email, allow individuals to interact in their own time, placing less temporal pressure on communication partners (Blackstone et al., 2007). In a study on text messaging using pictures and speech synthesis, adolescents and adults with cognitive and communicative disabilities highlighted that having enough time to interact was an important factor (Buchholz et al., 2013).

Messaging can be used either in a near synchronous way or in an asynchronous way (Durkin et al., 2011). The advantage of asynchronicity was not mentioned by the youth in the present study, but may have been implied by the fact that most of them preferred interacting when

they were in their own home environment. However, in the present study it was noted that youth with CCN were able to interact with the researcher in a synchronous manner during the interviews and that messaging afforded youth with CCN to have near synchronous interactions with various other communication partners whilst interacting with the researcher. This multi-communication option is also noted in the ICT literature (Battestini, Setlur & Sohn, 2010) and illustrates that several communication environments can be created at more or less the same time. Youth in the present study were able to easily navigate between these communication environments. Thus, although youth with CCN did not report multitasking whilst using messaging (in fact most participants stated that they did not perform another activity while they were messaging), they were, in fact, able to multitask in the sense that they were able to simultaneously have overlapping conversations with various communication partners (Grinter & Eldridge, 2003).

It must be noted that there is also a negative aspect to asynchronous communication. In a study by Caron and Light (2016), some of the adults with cerebral palsy who use AAC felt that not receiving an immediate response or reaction was disadvantageous. In the present study, certain participants reported that response timing was not important as long as the communication partner did respond. However, certain youths in the study felt that response timing was an important issue in an emergency or urgent situation.

5.2.9 Privacy

*My messages is part of my private life and my secrets [*sic*]*

Mayowa (Youth with CCN)

Youth with CCN in the present study generally enjoyed little physical privacy because of disability-related challenges and socio-economic factors. This was clear from the home visits performed by the researcher, and from the reports by the youth in the study who lived in a home for persons with disabilities and the youth residing in a shared apartment. In 2007, Deruyter, McNaughton, Caves, Bryen and Williams highlighted the need for future communication technologies to be unobtrusive and also to protect privacy. In a study by Cooper et al. (2009), young adults who use AAC talked about the importance of using mainstream technologies but reported that lack of privacy was an issue, as they needed assistance to talk on the phone or use text messages on a mobile phone. The results of the present study have shown that the participating

youth with CCN were able to independently operate their touch-screen smartphones (although some needed help charging the devices) and the majority of the youth in the study stressed that other individuals were not allowed to see their messages (unless given permission), as messaging interactions were generally regarded as private. The study also showed that even when communication partners were in the same physical environment, a private communication environment may be created. This affordance enabled youth with CCN to talk about private matters, like a secret boyfriend, in the presence of others and amid a busy home environment. The private nature of messaging also enabled the researcher to conduct an interview in a public space such as a library and clearly illustrates the discreet nature of texting (Peslak et al., 2010; Reid & Reid, 2010). Despite the fact that the lack of physical privacy was evident for youth with CCN in the study, messaging allowed for private interactions within these environments.

5.2.10 Ease- and rate-enhancing features and strategies

It's save time & energy. I don't need to write the whole full sentence like how was your day. I can say Hwud and it's doesn't matter about the spelling of words. As long as the next person understand what you trying to say [sic]...*Some people get the message better when see the pictures than through words [sic]*

Elijah (Youth with CCN)

The affordance of ease of use is highlighted as one of the most important reasons for the adoption of messaging (Yoon et al., 2014). Ease of use considerations are particularly important for all individuals who have physical limitations (Bryant & Bryant, 2012) and 73,3% of South Africans with severe communication disabilities reported that their wireless devices (including mobile phones and tablets) were “very easy to use” or “easy to use” (Bornman et al., 2016, p.5). The results of the present study highlight various messaging features that enhance the ease and rate of interactions. Word prediction, auto correct and spell checker features were considered helpful ease- and rate-enhancing features by the youth in the study. Message prediction increases the overall rate of communication (Johnston & Feeley, 2012) and the word prediction feature allows youth with CCN to select a whole word after using a few keystrokes (less than the number of keystrokes required to type the entire word). Keystroke saving as a result of word prediction accelerates the speed of expression (Loncke, 2014) and limits physical effort, which is regarded as beneficial for all users. Limited physical effort is particularly important for individuals with poor

motor control who fatigue easily, such as individuals with cerebral palsy (Beukelman & Mirenda, 2013). Besides physical access considerations, localisability and navigability are important considerations in aided interactions (Loncke, 2014). In the present study, it was observed that the participants easily navigated their devices, locating and responding to a specific contact within the messaging application without difficulty. Similarly, iPods, iPads and related devices have a potential advantage over other types of assistive technology, *inter alia* because they are intuitive to operate (Kagohara et al., 2013). Two of the youth in the present study used new phones that differed from their previous model when first interacting with the researcher, and both demonstrated good operational skills. It must again be noted that these participants were part of Generation Z, who are considered the first generation of true digital natives (Francis & Hoefel, 2018).

As mentioned previously, literacy limitations were raised as a concern in the present study. Furthermore, participants reported receiving schooling in English, which was not necessarily their first language, and that they used English to write when using messaging. In the present study it was noted that features such as word prediction, spell checking and auto correct were important aids and strategies that reduce literacy and language demands during messaging. Youth in the present study also reported that they used language switching to increase understanding, thereby enhancing the ease of interactions. It is interesting to note that the word prediction function of newer technologies allows for prediction of recurrently used words (Henry, 2014) and frequently used words in different languages will thus be predicted with use. Messaging also allows for the use of emojis, and youth with CCN in the present study reported that this feature greatly enhanced their ease of communication (although the iconicity of emojis was not investigated in the present study). In a multi-cultural context such as South Africa with reported low general literacy (Howie et al., 2017), and low literacy for persons with disabilities (Bornman, 2017), reducing literacy demands is an important feature when communication is the desired outcome.

Youth with CCN in the present study also emphasised that ease- and rate-enhancing strategies were key features of messaging, similar to those reported by youth without CCN (Thurlow & Poff, 2011). They found it very beneficial to use word shortenings, little punctuation and shortened sentence constructions, stating that these strategies save time and energy. The youths also found it particularly advantageous that language and spelling errors in the messages were not frowned upon by others, as was found by Hemsley et al. (2015) who investigated the use of Twitter

by persons with disabilities in Australia. These are important aspects in the light of youth with CCN's physical and literacy restrictions.

5.2.11 Maintenance features and strategies

it's show [sic] when the person have read the message by two blue right mark

Tapiwa (Youth with CCN)

The results of the present study showed that certain device features, as well as specific application features enhance communication maintenance. The study also showed that youth with CCN were able to use various interaction maintenance strategies when using messaging. An example of a maintenance feature is the fact that the messages remain on the device and create a thread that enables participants to follow the discussion (Morgan & Lobe, 2011). Another maintenance feature highlighted by one of the youths in the study was the feedback feature provided by the WhatsApp application, which indicates when messages have been delivered and read. Further features noted by the researcher when observing the youth with CCN included the feature/strategy of notifying all contacts when not available by posting a Broadcast (<https://www.whatsapp.com>), and the reply feature, which enabled participants to reply to a particular message by re-inserting the previous message together with their response (<https://www.whatsapp.com>). Although these features and strategies can be viewed as beneficial for all users, they can be regarded as particularly beneficial for youth with CCN who may need more time to compose a message.

Strategic competence is an important consideration during aided communication (Light & McNaughton, 2014) and youth with CCN displayed the necessary competence to participate in extended interactive messaging exchanges or so-called conversational involvement (Reid & Reid, 2010). For example, in the current study, youth with CCN generally did not use a full stop at the end of a message, which conveys pragmatic and social information (Gunraj et al., 2016) and encourages interaction maintenance. The youth with CCN also reported using various repair strategies to ensure that the interactive exchanges were maintained. These repair strategies included informing their communication partner of a communication breakdown and asking them for clarification. Another strategy was asking their communication partner to change their communication mode to respond with a voice note via the same messaging application. Even

though this meant that the message output between the communication partners varied, it helped to bridge linguistic disparities between the partners. One youth with CCN in the study also reported asking for help from her family when a communication breakdown occurred via messaging. Even though this is not ideal for the autonomy or privacy of the youth with CCN, it did allow the youth continued engagement in these interactions. Certain newer mobile technologies have a text-to-speech accessibility feature and various applications have also been developed that read text out loud (Messieh, 2017). Although originally designed for individuals with visual difficulties, these features may also be beneficial for individuals with limited literacy skills.

5.3 Social connectedness

I don't think it can get any better as it is right now really... it already connects her with friends and family

Amahle (Communication Partner of Youth with CCN)

Social interactions online are not merely optional for young people with severe communication problems, they are “an inherent part of daily living” (Alant, 2017, p. 254). Mobile phones are also said to enhance their self-confidence to engage in conversation and social interactions (Morris & Bryen, 2015). Instant messaging in particular offers students with and without learning disabilities social support (Eden & Heiman, 2011). In the present study, a noticeable word during the coding of the data was the word *chat*, which was used by the participants and their selected communication partners to describe their messaging interactions. Unlike more formal means of electronic communication like email or more public means of expressing views using social media (Agosto et al., 2012), messaging is a tool for chatting. The conversational nature of messaging means that messages have a relational rather than a transactional orientation, connecting individuals and fostering social closeness (Church & de Oliveira, 2013). Engagement is a key consideration in participation and the youth with CCN in the present study all engaged in messaging because it connected them with others. Thus, when considering all of the above affordances, it was evident that social connectedness was the overarching affordance that messaging affords youth with CCN.

5.5 Conclusion

This chapter discussed the affordances of messaging for youth with CCN according to the themes identified in the present study and based on the current literature pertaining to these themes. In conclusion, messaging is considered to offer youth with CCN many interactional affordances that enable them to connect with others, despite numerous barriers.

CHAPTER 6

Conclusion and Recommendations

6.1 Introduction

In Chapter 5 the interactional aspects that allow social connectedness afforded by messaging for youth with CCN were discussed. Chapter 6 commences with a summary of these findings. A critical evaluation of the study is presented in which the strengths and limitations of the study are explored and thereafter the clinical implications are highlighted. Chapter 6 concludes with recommendations for future studies related to the use of messaging by youth with CCN.

6.2 Summary of the Findings

The results of the study highlight the interactional affordances of messaging for youth with CCN. The data was gathered using various data collection methods and sources, including face-to-face participant interviews, online-communication partner interviews, an asynchronous WhatsApp focus group, and observations of youth interacting through messaging. The data was then analysed and interpreted by a thematic analysis of the information provided by the participants and their communication partners, the observations documented by the researcher, and specific messaging features noted in the messages sent by youth with CCN. The results revealed that messaging afforded youth with CCN who participated in the study new communication possibilities, despite certain limitations and challenges.

Messaging enabled these youths to interact with a wide range of communication partners from all the circles included in Blackstone and Hunt Berg's Social Networks model (2003). In addition to interacting with individuals, messaging groups allowed the youth in the study to interact with acquaintances and relatively anonymous people with whom they shared the same social or work-related interests or disability-related challenges. Messaging interactions also afforded a degree of symmetry between the youth in the study and their communication partners, despite stark differences in physical and literacy skills. (Further research is needed to establish the scope of these differences.) However, these youths also reported social, financial and contextual barriers

that prevented them from using messaging to interact with certain individuals. As messaging facilitates remote communication, youth in the study were able to stay in contact with others, regardless of their settings. This absent presence afforded by messaging enabled individuals who function in restricted settings because of physical and contextual restrictions, to create communication environments beyond their physical environments. Furthermore, messaging also granted the youth in the study a certain amount of recognised anonymity, which enabled them to represent themselves as they chose, resulting in interactions where disability-related aspects were not necessarily the focus (Alant, 2017).

Youth with CCN in this study regarded the ability to have a means of expressing themselves as particularly important because of the challenges they faced when trying to express themselves in face-to-face interactions. Messaging enabled these youths to express themselves in a manner that was easier to understand than face-to-face interactions and was quick and easy to use, despite their physical limitations. This is because messaging interactions consist of brief messages containing shortened words and little punctuation, and they make use of emojis (which also add expression to these interactions). Device features such as predictive text, the spell checker and auto correct furthermore enhanced the ease and rate of communication interactions. The multi-media function of messaging also enabled the youths to send music or photos, which aided self-expression. Besides expressive control, messaging afforded the study participants a certain measure of control over the inclusion and exclusion of communication partners, thus giving these youths more agency over their communication environments. A valuable benefit of messaging, as highlighted by the youth in this study, was that messaging was convenient to use and it enabled near-synchronous and private interactions. Device features furthermore aided the maintenance of interactions, and youth in the study reported being able to repair communication breakdowns when they used messaging. All of the above affordances gave these youth – who experienced challenges to make themselves understood in verbal interactions – other means to meaningfully connect with others.

6.3 Critical Evaluation of this Study

Table 6.1 presents a critical evaluation of the study by focusing on its strengths and limitations. The table is set out according to the different components of the study.

Chapter 6: Conclusion and Recommendations

 Table 6.1
Critical Evaluation of the Study

Strengths of the study	Limitations of the study
Research design	
<ul style="list-style-type: none"> • A qualitative research design suited the aims of the study as it allowed for the gathering of descriptive data. • A case study design was used as it enabled the researcher to use different data sources, including interviews with youth with CCN and their communication partners, an asynchronous focus group, observations and textual analyses. 	<ul style="list-style-type: none"> • Although the participants were not directly involved in the formulation of the research question, peer participation patterns were identified in the literature, which guided the research questions. The importance of identifying peer participation patterns is highlighted in Beukelman and Mirenda's Participation model (2013).
Ethical considerations	
<ul style="list-style-type: none"> • The researcher followed ethical protocol when visiting the sites from where the participants were recruited and interviewed. The researcher ensured that the data collection sites were convenient for the participants (which meant the researcher had to travel extensively). • The researcher was sensitive to the needs of the participants, for example the participants were given time to rest to reduce fatigue. • The researcher ensured that participants' confidentiality was maintained by using pseudonyms instead of real names. 	<ul style="list-style-type: none"> • Research costs were increased due to travel, but it was felt that cost considerations were secondary to ethical implications. • The analysis of messages between the participants and their communication partners would have provided additional information about the use of messaging; however, given the private nature of these interactions, this was thought to be a breach of privacy.
Participants	
<ul style="list-style-type: none"> • The specific target population for the study, namely youth with CCN, responded with enthusiasm to be included in the study and were eager to share their experiences of using messaging as it was relevant to their life worlds. • The youth with CCN who participated in the study were involved in different life activities at the time of the study, such as studying, working or staying at home, which increased the richness of the findings. • The inclusion of communication partners enriched the findings by providing information regarding their experiences of interacting with the youth with CCN via messaging. 	<ul style="list-style-type: none"> • The sample of participants may not be completely representative of the larger population with CCN as <ol style="list-style-type: none"> i) potential participants with very limited literacy skills were not included in the study as a different method of data collection would have been required; ii) potential participants who were not able to directly access their mobile devices were not included (future research can aim to include the latest switch technology); iii) participants needed a smartphone to participate in the study. Two potential participants were not recruited for screening as they did not use a mobile phone for messaging and two potential participants were not selected to participate in the study as they did not use WhatsApp. Further investigation is necessary to

Chapter 6: Conclusion and Recommendations

Strengths of the study	Limitations of the study
	<p>determine the reasons for this, including determining the role of data or of the digital divide.</p> <ul style="list-style-type: none"> The research design and sample size did not allow for generalisation of the findings.
Participant assessment material	
<ul style="list-style-type: none"> The researcher used an extensive assessment battery that described a variety of skill areas, including gross and fine motor skills, cognitive skills, literacy skills, and receptive language skills. The fact that the number of formal assessments was limited to include only the most essential assessments, was beneficial, as participants tired easily. The custom-designed material based on both international and local literature was designed for the South African context. 	<ul style="list-style-type: none"> The formal language tests were not developed specifically for the South African context, which could affect the achieved scores. A normed in-depth literacy assessment suited to the specific population would have been beneficial. Although the assessment of literacy at a sentence level predicted that all participants would be able to participate in the interviews, the prior assessments did not indicate that one participant would struggle with the literacy demands of the WhatsApp group discussion. The inclusion of this participant, however, enriched the findings, as she reported ways in which she used messaging despite her literacy limitations.
Data collection	
<ul style="list-style-type: none"> A combination of methods (interviews, a focus group and observations), as well as a combination of sources (the participants, their communication partners and the researcher) were used to triangulate the findings (Carter et al., 2014). The researcher collected and recorded all the information, which meant that she was closely familiar with the data collected. 	<ul style="list-style-type: none"> Combining individual interviews and a focus group discussion could potentially threaten the trustworthiness of the findings (Lambert & Loiselle, 2007). However, in the present study the combination of the two data sources enriched the findings, because the initial interviews introduced the topics to the participants and the focus group discussion gave the participants time to reflect on and discuss the topics in more detail.
Method 1: Participant interviews	
<ul style="list-style-type: none"> The initial personal contact with the participants was crucial for developing rapport with the participants and forging a reciprocal relationship. It also allowed the researcher to ensure that the participants understood the aims and procedures of the study, such as the fact that the response style was informal. The researcher felt that the personal contact and prolonged engagement resulted in the participants feeling comfortable to share their thoughts with her. The personal contact with the participants also helped to clarify potential misunderstandings between the researcher and the participants. 	<ul style="list-style-type: none"> The age and background of the researcher differed from that of the participants and may potentially have influenced their responses; however, the researcher addressed these differences with the participants, and this encouraged them to give her insight into their worlds. A potential limitation of the study was that the participants tried to please the researcher with their responses (Doody & Noonan, 2013). However, this was not noted by the researcher, since their responses appeared to be frank.

Chapter 6: Conclusion and Recommendations

Strengths of the study	Limitations of the study
<ul style="list-style-type: none"> • The interviews were, on the whole, held in contexts unfamiliar to the researcher but familiar to the participants. Visiting these contexts aided the researcher to take contextual factors into consideration when interpreting the results. • The data collected was extensive, which suggests that the open-ended questions format worked effectively to elicit participant opinions. • The youth with CCN involved in the study reported that it was positive that they were asked to give their opinions. According to McNaughton et al. (2010), it is important for individuals who use AAC to demonstrate to others that they are capable of speaking their minds. 	<ul style="list-style-type: none"> • Individual interviews were time consuming and costly as the participants resided in different parts of the country. However, a face-to-face interview was regarded as the only viable option to obtain the relevant information, which included direct observation of all communication modes used in the interactions.
Method 2: Communication partner interviews	
<ul style="list-style-type: none"> • Online interviews using messaging was an effective method of reaching individuals in different parts of the country. This method of interviewing also meant that the respondents could reflect on the questions and respond in their own time. • The communication partners received mobile data, which meant that they did not need to incur any costs to participate in the interviews. 	<ul style="list-style-type: none"> • Face-to-face interviews may have provided more in-depth information, as messaging is a brief means of interaction and thus not ideal for elaboration. However, as the communication partners interacted with the participants via WhatsApp, it was thought to be appropriate for the researcher to interact with the communication partners in the same way.
Method 3: WhatsApp focus group	
<ul style="list-style-type: none"> • The WhatsApp focus group was asynchronous and thus enabled the participants to reflect and respond to the questions or comments in their own time. • The number of participants in the group (n=7) allowed for a fruitful discussion among participants • The group composition generated an effective group dynamic and the participants' feedback about their experiences of the group indicated that it was beneficial to interact with others who have similar challenges. • The researcher found it beneficial that she could see when the participants were online during online interactions and thus she tried to interact with the participants at suitable times. The conversational thread was well maintained during the discussion. The message reply function of attaching a previous question to 	<ul style="list-style-type: none"> • The timing of the delivery of the questions was challenging within the WhatsApp focus group, as the participants interacted on the group at different times. • Two of the participants reported running out of data during the focus group discussion, which took place over five days, resulting in the researcher buying more data for all the participants. Data is also used for other internet-based applications on smartphones (such as Facebook, YouTube, etc.) and budgeting for use of a single application is thus not possible. • Online focus groups have the disadvantage of not including body language (Morgan & Lobe, 2011). The use of emojis partially addressed this concern.

Chapter 6: Conclusion and Recommendations

Strengths of the study	Limitations of the study
<p>the response pertaining to that particular question aided the maintenance of the interactions.</p> <ul style="list-style-type: none"> The fact that the focus group was online meant that the participants did not need to travel to one place for the data collection. This was an important consideration, because travel would have been difficult due to the participants' motor disabilities, the cost of travelling vast distances (including the cost of an assistant) and because of the work and study schedules of certain participants. 	
Method 4: Messaging observations	
<ul style="list-style-type: none"> Observing the participants' use of messaging enabled the researcher to document interactional aspects, such as the use of ease- and rate-enhancing features. 	<ul style="list-style-type: none"> The researcher was unable to see whether participants had activated certain device features (such as a spell checker) and instead of just observing, she needed to ask the participants whether they used these features.
Follow-up interviews and member checking	
<ul style="list-style-type: none"> The follow-up face-to-face interviews were crucial, as they allowed the researcher to ensure that she had the correct information and allowed the participants the opportunity to discuss their experiences of interacting in a group with the researcher. This was particularly important for the participant who reported struggling with the literacy demands of the group discussion, as it gave the researcher the opportunity to reassure the participant and to learn from the feedback for future studies. The member checking provided participants the opportunity to correct the researcher when necessary and to add additional relevant information. 	<ul style="list-style-type: none"> Travel costs again had to be incurred; however, the benefits of personal contact outweighed the expenses.
Data analysis	
<ul style="list-style-type: none"> The data that was analysed, was gathered over a long period of sustained contact with the participants. The interviews were transcribed by the researcher, which meant that the researcher was familiar with the information when coding the data. Thematic analysis was used to successfully determine the affordances of messaging use for youth with CCN as well as aspects that limit the use of messaging. 	<ul style="list-style-type: none"> Thematic analysis is very time consuming and a minimum of six months was spent on coding all the data and constructing themes from the codes. However, the time spent analysing the combined data from the various sources enriched the findings.

Chapter 6: Conclusion and Recommendations

Strengths of the study	Limitations of the study
<ul style="list-style-type: none"> • The computer-aided qualitative data analysis software Atlas.ti was used, which aided the researcher to see themes across the various data sources. • The two independent coders were used to confirm the codes. Both independent coders had relevant experience in the discipline and had prior experience of thematic analysis. 	
Researcher	
<ul style="list-style-type: none"> • In a qualitative study, the researcher plays a vital role in the development of the material and the analysis of the data used. In the current study, the researcher was genuinely invested in interacting with each participant and she felt that this attitude limited possible age, cultural and language differences. • The researcher was trained to conduct background interviews in her work as SLP, which guided her interview style. • The researcher was careful to reflect on possible biases she might have regarding the use of messaging to ensure that she coded the data accurately. 	<ul style="list-style-type: none"> • The researcher at times found it difficult to gauge when it was necessary to probe for more in-depth information, as she had limited prior research experience.

6.4 Clinical Implications of this Study

The present study informs service providers of the reasons why messaging on smartphones is regarded as an effective means of communication by youth with CCN and also reports on the interactional connectedness afforded by messaging. This knowledge is particularly important in South Africa, as specialised assistive technologies may not always be readily available or affordable (Van Niekerk et al., 2019). It was evident in the present study that messaging on smartphones (including showing typed messages to communication partners or interacting via a messaging application) was the main means of AAC used by youth with CCN in the study, despite varying degrees of physical abilities. A study on the use of iOS as AAC showed that there was a shortage of knowledgeable service providers who can assist families with effective AAC use (Niemeyer, Donnellan, & Robledo, 2012). Furthermore, few service providers include the training of online interactions in their intervention goals (Alant, 2017). Meder and Wegner (2015) are of the opinion that it is essential for AAC service providers to have the knowledge and skills of how mobile technologies may be used as a means of AAC.

AAC service providers can use this information regarding the benefits of messaging to train individuals with CCN and their communication partners to use this technology. For example, they can aid an individual with CCN to use messaging to establish contact with unfamiliar communication partners who share the same disability challenges, and in this way they can help them to gain access to support structures. The study furthermore highlights the barriers influencing the use of mobile messaging. An awareness of these challenges may sensitise service providers towards addressing these aspects. Examples include improving the literacy skills of the youth with CCN or training communication partners to use the same means of communication. Light and McNaughton (2013) stress that the communication needs of the individual must be put first, and service providers must thus ensure that they are informed about the affordances and challenges of using a device and whether it suits the needs of the individual. Teamwork and collaboration can help service providers to keep abreast of developments in mobile technologies (Leighton, 2015).

The insights from the present study may help AAC service providers give support to the families of youth with CCN. McNaughton and Light (2007) highlight the need for partner training and support. Such support may involve explaining the potential benefits and limitations of messaging to the families or partners, as well as providing them with practical guidance and

facilitating the use of these interactions (Alant, 2017). Examples may include brainstorming solutions on how to ensure that the smartphone is always within reach of the individual with CCN, for example having a wireless charging station. As messaging tends to be learnt through observation and the demonstration of use (Elman, 2016), youth with CCN need to be exposed to messaging and supported by others who use messaging in their daily surroundings.

AAC service providers can furthermore liaise with the educational and work organisations of youth with CCN to explain the potential benefits of mobile messaging for youth with CCN in school, tertiary institutions and work settings. Policies regarding mobile phone use in these situations can be discussed and a means of allowing the use of mobile devices that act as AAC devices in these environments can be explored. In the case of messaging, security measures may be implemented by the organisations to prevent access to inappropriate internet sites (as already implemented by some organisations). Secondary school learners in South Africa feel that smartphones in schools are of great value. Yet, they also acknowledge the need for policies that regulate the use of smartphones (Mavhunga, Kibirige, Chigonga, & Ramaboka, 2016). By allowing the use of technologies in schools, schools can play an important role in facilitating the use of technologies to smoothen the transition from school to many spheres of life, for example by employing WhatsApp groups to source information about career opportunities.

The methodology used in the present study also informs service providers that messaging is an effective way for practitioners to interact with youth with CCN and for youths with CCN to interact with one another. For example, practitioners can explore the possibility of using messaging for groupwork, both in and beyond the therapy setting. Furthermore, the custom-designed material that was developed in the present study to gather data may aid service providers when they wish to assess if messaging is an appropriate means of AAC for an individual with CCN.

6.5 Recommendations for Future Research

The current study was conducted as an exploratory study to gain insight into the use of messaging by youth with CCN. The study serves as a frame of reference for further investigations that should consider the following suggestions:

Chapter 6: Conclusion and Recommendations

- Investigate the amount of physical effort that youth with disabilities exert when using messaging, including time taken to compose and send a message, and conduct a more in-depth study on mobile phone features that reduce physical effort. Mobile phones, in particular smartphones, have an increasing number of built-in accessibility features and the option to download accessibility applications. Examples include the feature to increase the size of text; text-to-speech features, and the option to use a switch. Although accessibility features are improving for individuals with disabilities, not all mobile phones have these features and the cost of the phones increase with more advanced features (Pearson, 2019). An investigation is required into which features are currently being used by participants with disabilities and how these features affect the amount of physical effort exerted. The need for further investigation was highlighted in the current study where it was established that the participants were either not aware of or chose not to use the text replacement feature that enables the user to store word or phrase shortcuts. The clipboard feature is another function that allows easy access to often-used phrases that may be potentially beneficial for individuals with physical disabilities. Johansen and Hansen (2006) also advocate linking the fields of AAC and research on mobile text input, stating that it will benefit both fields of research. It will furthermore be meaningful to explore who may be responsible for teaching youth with disabilities how to use accessibility features on their mobile phones, and whether older individuals with disabilities are aware of these features. The notion of shared design (discussed in Chapter 2) warrants further investigation to establish if this trend applies to youth with CCN.
- Explore the use of messaging by youth with CCN who have limited literacy skills. During the screening of participants for the present study it was noted that certain youths with CCN used messaging even though their literacy skills were too limited to participate in the current study. Screening assessments to identify these potential participants with limited literacy skills can be developed. An alternate method of data collection can also be used to investigate the use of messaging by these participants, such as using a verbal questioning format with a picture-based response format, or alternatively asking the participants to give a sample of their messages. The researcher hypothesises that these participants will use a greater number of emojis, pictures, photos, stickers, downloaded messages, gifting messages and brief greeting

exchanges to remain socially connected to others via messaging, despite their literacy limitations.

- Literacy development through the use of messaging warrants investigation, as one participant and one of the communication partners in the study reported this benefit. Wood, Kemp and Plester (2014) reviewed research on the impact of text messaging and literacy development and concluded that text messaging does not hamper literacy development. In their view, it may even have a positive impact (although the need for further research was indicated). The benefits of messaging highlighted in the present study may incentivise individuals with CCN to develop their literacy skills and therefore more research is needed to explore the effect of messaging on literacy development for individuals with disabilities.
- Perform a discourse analysis of the messaging interactions between a youth with CCN and various communication partners. This type of analysis will present data about the frequency and function of these interactions. An in-depth linguistic analysis of these messages will also provide information about the form of the interactions. Furthermore, a discourse analysis will shed light on interactions that use a combination of text messages and voice notes (as reported by one of the participants in the present study).
- Explore the use of emojis, pictures, photographs, videos, stickers, and GIFs used during messaging. These images can be used either within messages, as profile pictures, or within the status feature in messaging applications such as WhatsApp. Light and McNaughton (2014) discuss the trend of including photos and videos in new social media and highlight the fact that this new trend may have potential advantages for individuals with CCN. They caution, however, that the linguistic skills and operational demands of using such images need to be considered and argue that individuals need the social exposure to learn how to appropriately use such visual images.
- A messaging application such as WhatsApp has additional features that also warrant further investigation. One example is that it has a location function that can be used to share one's live location with another person for up to an hour. This function may have beneficial safety implications.

6.6 Conclusion

Technology is evolving at such a fast pace that it is almost impossible to keep up with investigating the use of new technologies. It is thus important to consider whether the research is relevant to a specific context. The use of mobile phones is ubiquitous in South Africa (Statistics South Africa, 2018a) and messaging is the most common activity for which these phones are used (Pew Research Center, 2015). The popularity of messaging can be ascribed to numerous affordances. Specifically, this study looked at the affordances of the mobile instant messaging application WhatsApp for youth with CCN. Youth with CCN in the study generally did not have or use aided AAC and therefore they reported experiencing difficulties when communicating during face-to-face interactions. On the other hand, interacting using messaging was regarded as easy and effective. It allowed youth in the study to independently and privately interact with different individuals and groups of individuals in a variety of settings. These interactions were asynchronous or near synchronous and had an informal register, which enabled the youths to *chat* to others about numerous topics. Youth with CCN emphasised the importance of messaging in their lives, and they stated that messaging on their mobile devices afforded them new communication possibilities and enabled them to engage and connect with others despite their disabilities.

REFERENCES

- AAC-RERC (2011). White paper on mobile devices and communication apps. Retrieved from <https://aac-rerc.psu.edu/index.php/pages/show/id/46>
- Agee, J. (2009). Developing qualitative research questions: A reflective process. *International Journal of Qualitative Studies in Education*, 22(4), 431-447.
doi:10.1080/09518390902736512
- Agosto, D., Abbas, J., & Naughton, R. (2012). Relationships and social rules: Teens' social network and other ICT selection practices. *Journal of the American Society for Information Science and Technology*, 63(6), 1108-1124. doi:10.1002/asi.22612
- Ahad, A. D. & Lim, S. M. A. (2014). Convenience or nuisance?: The 'WhatsApp' dilemma. *Science Direct*, 155, 186-196. doi:10.1016/j.sbspro.2014.10.278
- Ajodhia-Andrews, A. (2016). Reflexively conducting research with ethnically diverse children with disabilities. *The Qualitative Report*, 21(2), 252-287. Retrieved from <http://nsuworks.nova.edu/tqr/vol21/iss2/6>
- Alant, E. (2017). *Augmentative and alternative communication: Engagement and participation*. San Diego, CA: Plural Publishing.
- Alant, E., Bornman, J., & Lloyd, L. L. (2006). Issues in AAC research: How much do we really understand? *Disability and Rehabilitation*, 28(3), 143-150.
doi:10.1080/09638280500077986
- Amaghlobeli, N. (2012). Linguistic features of typographic emoticons in SMS discourse. *Theory and Practice in Language Studies*, 2(2), 348-354. doi:10.4304/tpls.2.2.348-354

- Babbie, E., & Mouton, J. (2009). *The practice of social research*. Cape Town: Oxford University Press.
- Baker, P. M. A, & Bellordre, C. (2004). Adoption of information technologies: Key policy issues, barriers and opportunities for people with disabilities. Proceedings of the 37th Hawaii International Conference on System Sciences. doi:0-7695-2056-1/04.
- Baladin, S., & Waller, A. (2010). Medical and health transitions for young adults who use AAC. In D. B. McNaughton & D. R. Beukelman (Eds.), *Transition strategies for youths & young adults who use AAC* (pp. 181-198). Baltimore, MD: Paul H. Brookes.
- Ball, L. J., Stading, K., & Hazelrigg, D. (2010). AAC considerations during the transition to adult life. In D. B. McNaughton & D. R. Beukelman (Eds.), *Transition strategies for youths & young adults who use AAC* (pp. 201-216). Baltimore, MD: Paul H. Brookes.
- Barlott, T., Adams, K., & Cook, A. (2016). Increasing participation in the information society by people with disabilities and their families in lower-income countries using mainstream technologies. *Universal Access in the Information Society: International Journal*, 15(2), 189-198. doi:10.1007/s10209-015-0418-z
- Battestini, A., Setlur, V., & Sohn, T. (2010). A large scale study of text messaging use. *MobileHCI'10, September*, 7-10. ACM 978-1-60558-835-3/10/09.
- Beukelman, D. R., & Mirenda, P. (2013). *Augmentative and alternative communication: Supporting children and adults with complex communication needs* (4th ed.). Baltimore, MD: Paul H. Brookes.
- Blackstone, S. W., & Hunt Berg, M. (2003). *Social networks: A communication inventory for individuals with complex communication needs and their communication partners*. Monterey, CA: Augmentative Communication, Inc.

- Blackstone, S. W., Williams, M. B., & Wilkins, D. P. (2007). Key principles underlying research and practice in AAC. *Augmentative and Alternative Communication*, 23(3), 191-203. doi:10.1080/07434610701553684
- Blair, E. (2015). A reflexive exploration of two qualitative data coding techniques. *Journal of Methods and Measurements in the Social Sciences*, 6(1), 14-29. doi:10.2458/v6i1.18772
- Blair, B. L., Fletcher, A. C., & Gaskin, E. R. (2015). Cell phone decision making: Adolescents' perceptions of how and why they make the choice to text or call. *Youth and Society*, 47(3), 395-411.
- Blom, W., Van Dijk, C., Vasic, N., Van Witteloostuijn, M., & Avrutin, S. (2017). Textese and use of texting by children with typical language development and specific language impairment. *Computers in Human Behavior*, 66, 42-51.
- Borg, J., Lantz, A., & Gulliksen, J. (2015). Accessibility to electronic communication for people with cognitive disabilities: A systematic search and review of empirical evidence. *Universal Access in the Information Society: International Journal*, 14(4), 547-562. doi:10.1007/s10209-014-0351-6
- Bornman, J. (2017). Developing inclusive literacy practices in South African schools. In C. Forlin (Series Ed.), *Inclusive Principles and Practices in Literacy Education Series: Vol. 11. International Perspectives on Inclusive Education* (pp. 105-122). doi:10.1108/S1479-363620170000011008
- Bornman, J., Bryen, D. N., Moolman, E., & Morris, J. (2016). Use of consumer wireless devices by South Africans with severe communication disability. *African Journal of Disability*, 5(1), 1-9. doi:10.4102/ajod.v5i1.202
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.

- Braun, V., & Clarke, V. (2013). *Successful qualitative research: A practical guide for beginners*. London, England: SAGE Publications.
- Brinkmann, S., & Kvale, S. (2008). Ethics in Qualitative Psychological Research. In C. Willig & W. Stainton-Rogers, *The Sage handbook of qualitative research in psychology* (pp. 263-279). London, England: SAGE Publications. doi:10.4135/9781848607927
- Bryant, D. P. & Bryant, B. R. (2012). *Assistive Technology for People with Disabilities*. Boston, MA: Pearson.
- Bryen, D. N., & Chung, Y. (2018). What adults who use AAC say about their use of mainstream mobile technologies. *Assistive Technology Outcomes and Benefits*, 12(1), 73-106.
- Bryen, D. N., & Moolman, E. (2015). Mobile phone technology for ALL: Towards reducing the digital divide. In Z. Yan (Series Ed.), *Encyclopedia of Mobile Phone Behavior: Vol. 3*. (pp. 1456-1470). Hershey, PA: IGI Global. doi:10.4018/978-1-4666-8239-9.ch115
- Bryen, D. N., & Pecunas, P. (2004). Augmentative and alternative communication and cell phone use: One off-the-shelf solution and some policy considerations. *Assistive Technology: The Official Journal of Resna*, 16(1), 11-7.
- Buchholz, M. (2019). *Let's stay in touch! Remote communication for people with communicative and cognitive disabilities* (Doctoral thesis, University of Gothenburg, Gothenburg, Sweden). Retrieved from <http://hdl.handle.net/2077/57718>
- Buchholz, M., Mattsson Muller, I., & Ferm, U. (2013). Text messaging with pictures and speech synthesis for adolescents and adults with cognitive and communicative disabilities- professionals' views about user satisfaction and participation. *Technology and Disability*, 25(2), 87-98. doi:10.3233/TAD-130370

- Bureau of Market Research (2012). Cellphone living and learning styles among secondary school learners in Gauteng. from www.unisa.ac.za/Default.asp?Cmd=viewContent+contentID=2359
- Businesstech (2017, July 18). South Africa has the highest data prices among Africa's biggest economies. Retrieved from <https://businesstech.co.za/news/mobile/185941/south-africa-has-the-some-of-the-highest-data-prices-in-africa/>
- Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., & Neville, A. (2014). The use of triangulation in qualitative research. *Oncology Nursing Forum*, *41*(5), 545-547. doi:10.1188/14.ONF.545-547
- Carter, E. W., & Draper, J. (2010). Making school matter: Supporting meaningful secondary experiences for adolescents who use AAC. In D.B. McNaughton & D. R. Beukelman (Eds.), *Transition strategies for youths & young adults who use AAC* (pp. 69-90). Baltimore, MD: Paul H. Brookes.
- Caron, J., & Light, J. (2016). "Social media has opened a world of 'open communication:'" experiences of adults with cerebral palsy who use augmentative and alternative communication and social media. *Augmentative and Alternative Communication*, *32*(1), 25-40. doi:10.3109/07434618.2015.1052887
- Ceccucci, W., Peslak, A., & Sendall, P. (2010). An empirical study of behavioral factors influencing text messaging intention. *The Journal of Information Technology Management*, *21*(1), 16-34. Retrieved 17 November 2017 from http://scholarworks.merrimack.edu/mgt_facpub/22
- Cenoz, J., & Bereziartua, G. (2016). Is instant messaging the same in every language? A Basque perspective. *Reading and Writing: An Interdisciplinary Journal*, *29*(6), 1225-1243. doi:10.1007/s11145-016-9634-z

- Chapple, D. (2011). The evolution of augmentative communication and the importance of alternative access. *SIG 12 Perspectives on Augmentative and Alternative Communication, 20*, 34-37. doi:10.1044/aac20.1.34
- Chetty, I., & Basson, A. (2006). Report on internet usage and the exposure of learners in South African schools. Film and Publication Board. Retrieved from https://www.gov.za/sites/default/files/gcis_document/201409/report-internet-usage-and-exposure-pornography0.pdf
- Chib, A., & Jiang, Q. (2014). Investigating modern-day talaria: Mobile phones and the mobility-impaired in Singapore. *Journal of Computer-Mediated Communication, 19*(3), 695-711. doi:10.1111/jcc4.12070
- Church, K., & de Oliveira, R. (2013). What's up with WhatsApp? Comparing mobile instant messaging behaviors with traditional SMS. *Mobile HCI*. Munich: Germany. Retrieved from <http://dx.doi.org/10.1145/2493190.2493225>
- Clarke, M. (2016). Co-construction, asymmetry and multimodality in children's conversations. In M. M. Smith & J. Murray (Eds.), *The silent partner? Language, interaction and aided communication* (pp 177-198). Surrey, UK: J&R Press Ltd.
- Clarke, M., & Wilkinson, R. (2013). Communicative competence in children's peer interactions. In N. Noren, C. Samuelsson, & C. Plejert (Eds.), *Aided communication in everyday interaction* (pp. 22-57). Guildford, United Kingdom: J & R Press.
- Collier, B., Blackstone, S. W., & Taylor, A. (2012). Communication access to businesses and organizations for people with complex communication needs. *Augmentative and Alternative Communication, 28*(4), 205-218. doi:10.3109/07434618.2012.732611

- Collier, B., & Self, H. (2010). Preparing youth who use AAC to communicate with their personal assistants. In D. B. McNaughton & D. R. Beukelman (Eds.), *Transition strategies for youths & young adults who use AAC* (pp. 163-180). Baltimore, MD: Paul H. Brookes.
- Conti-Ramsden, G., Durkin, K., & Simkin, Z. (2010). Language and social factors in the use of cell phone technology by adolescents with and without specific language impairment (sli). *Journal of Speech, Language, and Hearing Research*, 53(1), 196-208.
doi:10.1044/1092-4388(2009/08-0241)
- Cook, A. M., & Hussey, S. M. (2002). *Assistive technologies: Principles and practice* (2nd ed.). St. Louis, MO: Mosby Elsevier.
- Cook, A. M., & Polgar, J. M. (2008). *Cook & Hussey's assistive technologies: Principles and practice* (3rd ed.). St. Louis, MO: Mosby Elsevier.
- Cooper, L., Balandin, S., & Trembath, D. (2009). The loneliness experiences of young adults with cerebral palsy who use alternative and augmentative communication. *Augmentative and Alternative Communication*, 25(3), 154-164.
- Counts, S. (2007). Group-based mobile messaging in support of the social side of leisure. *Computer Supported Cooperative Work*, 16, 75-97. doi:10.1007/s10606-007-9040-9.
- Creswell, J. W. (2014). *Research design: qualitative, quantitative and mixed method approaches*. (4th ed.). London, England: SAGE Publications.
- Creswell, J. W., Hanson, W. E., Plano Clark, V. L., & Morales, A. (2007). Qualitative research designs selection and implementation. *The Counselling Psychologist*, 35(2), 236-264.
- Creswell, J., & Poth, C. (2018). *Qualitative inquiry & research design: Choosing among five approaches* (Fourth ed.). Thousand Oaks, CA: SAGE Publications.

- Crystal, D. (2008). Texting. *ELT Journal*, 62(1), 77-83. doi:10.1093/elt/ccm080
- Dahlgren Sandberg, A. (2016). Literacy learning and aided communication. In M. M. Smith & J. Murray (Eds.) *The silent partner? Language, interaction and aided communication* (pp. 159-173). Surrey, UK: J&R Press Ltd.
- Dahlgren Sandberg, A., Smith, M., & Larsson, M. (2010). An analysis of reading and spelling abilities of children using AAC: Understanding a continuum of competence. *Augmentative and Alternative Communication*, 26(3), 191-202. doi:10.3109/07434618.2010.505607
- Dalvit, L., Kromberg, S., & Miya, M. (2014). The data divide in a South African rural community: A survey of mobile phone use in Keiskammahoek, *Proceedings of the e-Skills for Knowledge Production and Innovation Conference 2014, Cape Town, South Africa*, 87-100. Retrieved from <http://proceedings.e-skillsconference.org/2014/e-skills087-100Dalvit842.pdf>
- Darcy, S., Maxwell, H., & Green, J. (2016). Disability citizenship and independence through mobile technology? A study exploring adoption and use of a mobile technology platform, *Disability & Society*, 31(4), 497-519. doi:10.1080/09687599.2016.1179172
- Datillo, J., Benedek-Wood, E., & McLeod, L. (2010). "Activity brings community into our lives": recreation, leisure, and community participation for individuals who use AAC. In D. B. McNaughton & D. R. Beukelman (Eds.), *Transition strategies for youths & young adults who use AAC* (pp. 131-144). Baltimore, MD: Paul H. Brookes.
- De Joode, E., van Heugten, C., Verhey, F., & van Boxtel, M. (2010). Efficacy and usability of assistive technology for patients with cognitive deficits: a systematic review. *Clinical Rehabilitation*, 24(8), 701-714. doi:10.1177/0269215510367551

- Burns, J., Jobson, J. & Zuma, B. (2015). Youth identity, belonging and citizenship: Strengthening our democratic future. In A. De Lannoy, S. Swartz, L. Lake, & C. Smith (Eds.), *South African Child Gauge 2015: Youth and the intergenerational transmission of poverty*. Children's Institute, University of Cape Town. Retrieved from <http://www.ci.uct.ac.za/ci/child-gauge/2015>
- Deruyter, F., McNaughton, D. B., Caves, K., Bryen, D. N., Williams, M. B. (2007). Enhancing AAC connections with the world. *Augmentative and Alternative Communication*, 23(3), 258-270. doi:10.1080/07434610701553387
- Deumert, A., & Masinyana, S. O. (2008). Mobile language choices. The use of English and isiXhosa in text messages (SMS): Evidence from a bilingual South African sample. *English World-Wide*, 29(2), 117-147. doi:10.1075/eww.29.2.02deu
- DiCicco-Bloom, B. & Crabtree, B. F. (2006). The qualitative research interview. *Medical Education*, 40(4), 314-321. doi:10.1111/j.1365-2929.2006.02418.x
- Doody, O., & Noonan, M. (2013). Preparing and conducting interviews to collect data. *Nurse Researcher*, 20(5), 28-32.
- Dresner, E., & Herring, S. C. (2010). Functions of the nonverbal in CMC: Emoticons and illocutionary force. *Communication Theory*, 20(3), 249-268. doi.org/10.1111/j.1468-2885.2010.01362.x
- Drouin, M., & Driver, B. (2014). Texting, textese and literacy abilities: a naturalistic study. *Journal of Research in Reading*, 37(3), 250-267.
- Dunn, L. M., & Dunn, L. M. (2007). *Peabody Picture Vocabulary Test-Fourth Edition (PPVT-4)*. Circle Pines, MN: AGS.

- Durkin, K., Conti-Ramsden, G., & Walker, A. J. (2011). Txt lang: Texting, textism use and literacy abilities in youths with and without specific language impairment. *Journal of Computer Assisted Learning*, 27(1), 49-57. doi:10.1111/j.1365-2729.2010.00397.x
- Eden, S., & Heiman, T. (2011). Computer mediated communication: Social support for students with and without learning disabilities. *Educational Technology & Society*, 14(2), 89-97.
- Edmonds, W. A., & Kennedy, T. D. (2013). *An applied reference guide to research designs quantitative, qualitative, and mixed methods*. Los Angeles, CA: SAGE Publications.
- Eliasson, A. C., Krumlinde-Sundholm, L., Rösblad, B., Beckung, E., Arner, M., Öhrvall, A-M., & Rosenbaum, P. L. (2006). The Manual Ability Classification System (MACS) for children with cerebral palsy [Resource]. Retrieved from:
https://www.macs.nu/files/MACS_English_2010.pdf
- Elman, J. (2016). Intuitive design vs shareable design. Retrieved from
<https://news.greyllock.com/intuitive-design-vs-shareable-design-88ff6bb184bb>
- Fannin, D. K. (2016). The intersection of culture and ICF-CY personal and environmental factors for alternative and augmentative communication. *Perspectives of the ASHA Special Interest Groups SIG12*, 1(3), 63-82.
- Farina, F., & Lyddy, F. (2011). The language of text messaging: “Linguistic ruin” or resource? *The Irish Psychologist*, 37(6), 145-149.
- Feeley, K. M., & Jones, E. A. (2012). Obtaining and maintaining communicative interactions. In S. S. Johnston, J. Reichle, K. M. Feeley & E. A. Jones (Eds.), *AAC strategies for individuals with moderate to severe disabilities* (pp. 279-310). Baltimore, MD: Paul H. Brookes.

- Foley, B. E., & Wolter, J. A. (2010). Literacy instruction for transition-age youth who use AAC. In D. B. McNaughton & D. R. Beukelman (Eds.), *Transition strategies for youths & young adults who use AAC* (pp. 35-68). Baltimore, MD: Paul H. Brookes.
- Forgays, D. K., Hyman, I., & Schreiber, J. (2014). Texting everywhere for everything: Gender and age differences in cell phone etiquette and use. *Computers in Human Behavior*, *31*(1), 314-321. doi:10.1016/j.chb.2013.10.053
- Francis, T., & Hoefel, F. (2018). True Gen': Generation Z and its implications for companies. Retrieved from <https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights/true-gen-generation-z-and-its-implications-for-companies>
- Friese, S. (2012). *Qualitative data analysis with ATLAS.ti*. Los Angeles, CA: SAGE Publications.
- Giesbrecht, E. (2013). Application of the human activity assistive technology model for occupational therapy research. *Australian Occupational Therapy Journal*, *60*(4), 230-240. doi:10.1111/1440-1630.12054
- Gill, P., Stewart, K., Treasure, E., & Chadwick, B. (2008). Methods of data collection in qualitative research: Interviews and focus groups. *British Dental Journal*, *204*(6), 291-295. doi:10.1038/bdj.2008.192
- Glass, R., & Li, S. (2010). Social influence and instant messaging adoption. *Journal of Computer Information Systems*, *51*(2), 24-30.
- Goggin, G. (2016). Disability and mobilities: Evening up social futures. *Mobilities*, *11*(4), 533-541. doi:10.1080/17450101.2016.1211821
- Goldstein, B. (2000). *Resource guide on cultural and linguistic diversity* (Resource guide). San Diego, CA: Singular Pub. Group.

- Goodglass, H., Kaplan, E., & Barresi, B. (2001). *The Boston diagnostic aphasia examination*. Baltimore, MA: Lippincott, Williams & Wilkins.
- Goumi, A., Volckaert-Legrier, O., Bert-Erboul, A. & Bernicot, J. (2011). SMS length and function: A comparative study of 13- to 19-year-old girls and boys. *Revue europeenne de psychologie appliquee*, 61, 175-184.
- Grace, E., Raghavendra, P., & Newman, L. (2014). Learning to use the Internet and online social media: What is the effectiveness of home-based intervention for youth with complex communication needs? *Child Language Teaching and Therapy*, 30(2), 141-157. doi:10.1177/0265659013518565
- Granlund, M., Björck-Åkesson, E., Wilder, J., & Ylvén, R. (2008). AAC interventions for children in a family environment: Implementing evidence in practice. *Augmentative and Alternative Communication*, 24(3), 207-19. doi:10.1080/08990220802387935
- Grinter, R. E., & Eldridge, M. (2003). Wan2tlk?: Everyday text messaging. *Chi -Conference-*, 441-448. Retrieved from <https://www.cc.gatech.edu/~beki/c24.pdf>
- Grinter, R. E., & Palen, L. (2002). Instant messaging in teen life. *Computer Supported Cooperative Work*, 20, 21-30. Retrieved from <https://www.cc.gatech.edu/~beki/c21.pdf>
- Grinter, R. E., Palen, L., & Eldridge, M. (2006). Chatting with teenagers: Considering the place of chat technologies in teen life. *ACM Transactions on Computer-Human Interaction*, 13(4), 423–447. doi:10.1145/1188816.1188817
- Gu, X., Zhu, Y. & Guo, X (2013). Meeting the “digital natives”: Understanding the acceptance of technology in classrooms. *Educational Technology & Society*, 16(1), 392–402.

- Gunraj, D. N., Drumm-Hewitt, A. M., Dahow, E. M., & Upadhyay, S.S.N. (2016). Texting insincerely: The role of the period in text messaging. *Computers in Human Behaviour*, 55, 1067-1075. doi:10.1016/j.chb.2015.11.003
- Gunzo, F., & Dalvit, L. (2012). *A survey of cell phone and computer access and use in marginalised schools in South Africa*. Proceedings of M4D 2012, New Delhi, India, 28(29), 232.
- Harrison, M. A., & Gilmore, A. L. (2012). U text when? College students' social contexts of text messaging. *The Social Sciences Journal*, 49(4), 513-518.
doi:10.1016/j.soscij.2012.05.003
- Heidari, M., & Alibabae, A. (2013). Linguistic and discursal features of text message language created by Iranian male and female SMS users. *Sheikhbahaee EFL Journal*, 2(1), 55-72.
- Hemsley, B., Balandin, S., Palmer, S., & Dann, S. (2017). A call for innovative social media research in the field of augmentative and alternative communication. *Augmentative and Alternative Communication*, 33(1), 14-22. doi:10.1080/07434618.2016.1273386
- Hemsley, B., Dann, S., Palmer, S., Allan, M., & Balandin, S. (2015). "We definitely need an audience": experiences of Twitter, Twitter networks and tweet content in adults with severe communication disabilities who use augmentative and alternative communication (AAC). *Disability and Rehabilitation*, 37(17), 1531-1542.
doi:10.3109/09638288.2015.1045990
- Henry, A. (2014). How predictive keyboards work (and how you can train yours better). Retrieved from <https://lifehacker.com/how-predictive-keyboards-work-and-how-you-can-train-yo-1643795640>

- Higginbotham, J., & Jacobs, S. (2011). The future of the android operating system for augmentative and alternative communication. *SIG 12 Perspectives on Augmentative and Alternative Communication*, 20(2), 52-56. doi:10.1044/aac20.2.52
- Hingsburger, D. (2010). The language of love. In D. B. McNaughton & D. R. Beukelman (Eds.), *Transition strategies for youths & young adults who use AAC* (pp. 145-160). Baltimore, MD: Paul H. Brookes.
- Howie, S. J., Combrinck, C., Roux, K., Tshele, M., Mokoena, G. M., & McLeod Palane, N. (2017). PIRLS Literacy 2016 Progress in International Reading Literacy Study 2016: South African Children's Reading Literacy Achievement. Pretoria: Centre for Evaluation and Assessment. Publisher: Centre for Evaluation and Assessment (CEA) Faculty of Education University of Pretoria ISBN 978-1-77592-161-5
- Hyatt, G. W. (2011). The iPad: A cool communicator on the go. *SIG 12 Perspectives on Augmentative and Alternative Communication*, 20(April), 24-27. doi:10.1044/aac20.1.24
- Hynan, A., Goldbart, J., & Murray, J. (2015). A grounded theory of Internet and social media use by young people who use augmentative and alternative communication (AAC). *Disability and Rehabilitation*, 37(17), 1559-1575. doi:10.3109/09638288.2015.1056387
- Hynan, A., Murray, J., & Goldbart, J. (2014). 'Happy and excited': Perceptions of using digital technology and social media by young people who use augmentative and alternative communication. *Child Language Teaching and Therapy*, 30(2), 175-186. doi:10.1177/0265659013519258
- Individuals with Disabilities Education Act, 20 U.S.C. § 1400 (2004).
- Ishii, K. (2006). Implications of mobility: The uses of personal communication media in everyday life. *Journal of Communication*, 56, 346-365.

- Jacko, J. A., & Vitense, H. S., (2001). A review and reappraisal of information technologies within a conceptual framework for individuals with disabilities. *Universal Access in the Information Society*, 1(1), 56-76. doi:10.1007/s102090100003
- Jacob, S. A., & Furgerson, S. P. (2012). Writing protocols and conducting interviews: Tips for students new to the field of qualitative research. *The Qualitative Report*, 17(42), 1-10.
- Johansen, A., & Hansen, J. (2006). Augmentative and alternative communication: The future of text on the move. *Universal Access in the Information Society: International Journal*, 5(2), 125-149. doi:10.1007/s10209-006-0033-0
- Johnston, S. S., & Feeley, K. M. (2012). AAC system features. In S. S. Johnston, J. Reichle, K. M. Feeley & E. A. Jones (Eds.), *AAC strategies for individuals with moderate to severe disabilities* (pp. 51-70). Baltimore, MD: Paul H. Brookes.
- Joubert, K. (2009). *Speech intelligibility and marital communication in motor neuron disease* (Doctoral thesis, University of Pretoria, Pretoria, South Africa). Retrieved from <https://univofpretoria.on.worldcat.org/oclc/956373059>
- Junco, R., Merson, D., & Salter, D. W. (2010). The effect of gender, ethnicity, and income on college students' use of communication technologies. *Cyberpsychology, Behavior, and Social Networking*, 13(6) 619-627. doi:10.1089=cyber.2009.0357
- Kagohara, D. M., van der Meer, L., Ramdoss, S., O'Reilly, M. F., Lancioni, G. E., Davis, T. N., Rispoli, M., Lang, R., Marschik, P. B., Sutherland, D, Green, V.A., & Sigafoos, J. (2013). Using ipods® and ipads® in teaching programs for individuals with developmental disabilities: A systematic review. *Research in Developmental Disabilities*, 34(1), 147-156. doi:10.1016/j.ridd.2012.07.027
- Kaufman, A. S., & Kaufman, N. L. (2004). *Kaufman brief intelligence test* (2nd ed.). Bloomington, IN: Pearson.

- Kertesz, A. (1982). *The Western Aphasia Battery*. New York, NY: Grune & Stratton.
- Kim, L. (2018). The top 7 messenger apps in the world. Inc.com. Retrieved from <https://www.inc.com/larry-kim/the-top-7-messenger-apps-in-world.html>
- King, N., Horrocks, C., & Brooks, J. (2019). *Interviews in qualitative research* (2nd ed.). Los Angeles, CA: SAGE Publications.
- King, G., Imms, C., Stewart, D., Freeman, M., & Nguyen, T. (2018). A transactional framework for pediatric rehabilitation: Shifting the focus to situated contexts, transactional processes, and adaptive developmental outcomes. *Disability and Rehabilitation*, 40(15), 1829-1841. doi:10.1080/09638288.2017.1309583
- Klang, N., Rowland, C., Fried-Oken, M., Steiner, S., Granlund, M., & Adolfsson, M. (2016). The content of goals in individual educational programs for students with complex communication needs. *Augmentative and Alternative Communication*, 32(1), 41-48. doi:10.3109/07434618.2015.1134654
- Khokhlova, I. (2015). Lingua Franca English of South Africa. *Pocedia – Social and Behavioural Sciences*, 214, 983-991. Retrieved from <https://doi.org/10.1016/j.sbspro.2015.11.689>.
- Kreutzer, T. (2009). Assessing cell phone usage in a South African township School. *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, 5(5), 43-57. Retrieved from <https://pdfs.semanticscholar.org/3006/f29cf0eaf70c117fff871e58f2a945ec067f.pdf>
- Kritzinger, E. (2017). Growing a cyber-safety culture amongst school learners in South Africa through gaming. *South African Computer Journal* 29(2), 16–35. doi:10.18489/sacj.v29i2.471

- Lambert, S., & Loiselle, C. (2008). Combining individual interviews and focus groups to enhance data richness. *Journal of Advanced Nursing*, 62(2), 228-237. doi:10.1111/j.1365-2648.2007.04559.x
- Leighton, J. A. (2015). Collaboration in this environment of mobile technology and change: One clinician's perspective. *SIG 12 Perspectives on Augmentative and Alternative Communication*, 24, 12-18. doi:10.1044/aac24.1.12
- Light, J. (1989). Towards a definition of communication competence for individuals using augmentative and alternative communication systems. *Augmentative and Alternative Communication*, 5(2), 137-144.
- Light, J. (1997). "Communication is the essence of human life": reflections on communication competence. *Augmentative and Alternative Communication*, 13(2), 61-70. doi:10.1080/07434619712331277848
- Light, J., & McNaughton, D. B. (2012). The changing face of augmentative and alternative communication: Past, present, and future challenges. *Augmentative and Alternative Communication*, 28(4) 197-204. doi:10.3109/07434618.2012.737024
- Light, J., & McNaughton, D. B. (2013). Putting people first: Re-thinking the role of technology in augmentative and alternative communication intervention. *Augmentative and Alternative Communication*, 29(4), 299-309. doi:10.3109/07434618.2013.848935
- Light, J., & McNaughton, D. B. (2014). Communication competence for individuals who require augmentative and alternative communication: A new definition for a new era of communication? *Augmentative and Alternative Communication*, 30(1), 1-18. doi:10.3109/07434618.2014.885080

- Light, J., & McNaughton, D. B. (2015). Designing AAC research and intervention to improve outcomes for individuals with complex communication needs. *Augmentative and Alternative Communication, 31*(2), 85-96. doi:10.3109/07434618.2015.1036458
- Lilienfeld, M. (2002). *The social interaction of an adolescent who uses augmentative and alternative communication: The evaluation of a peer training programme* (Doctoral thesis, University of Pretoria, Pretoria, South Africa). Retrieved from <https://univofpretoria.on.worldcat.org/oclc/956381522>
- Ling, R. (2007). Children, youth and mobile communication. *Journal of Children and Media, 1*(1), 60-67. doi:10.1080/17482790601005173
- Ling, R. (2010). Texting as a life phase medium. *Journal of Computer-Mediated Communication, 15*(2), 277-292.
- Lloyd, L. L., Fuller, D. F., & Arvidson, H. H. (1997). *Augmentative and alternative communication. A handbook of principles and practices*. Boston, MA: Allyn and Bacon.
- Lloyd, L. L., Quist, R. W., & Windsor, J. (1990). A proposed augmentative and alternative communication model. *Augmentative and Alternative Communication, 6*(3), 172-183.
- Loncke, F. (2014). *Augmentative and alternative communication. Models and applications for educators, speech-language pathologists, psychologists, caregivers, and users*. San Diego, CA: Plural Publishing Inc.
- Masuku, K., Mophosho, M., & Tshabalala, M. (2018). 'i felt pain. deep pain...': Experiences of primary caregivers of stroke survivors with aphasia in a south african township. *African Journal of Disability, 7*. doi:10.4102/ajod.v7i0.368

- Mavhunga, F. Z, Kibirige, I., Chigonga, B., & Ramaboka, M. (2016). Smartphones in public secondary schools: Views of matric graduates. *Perspectives in Education*, 34(3), 72-85. doi:10.18820/2519593X/pie
- McConkey, R., Morris, I., & Purcell, M. (1999). Communications between staff and adults with intellectual disabilities in naturally occurring settings. *Journal of Intellectual Disability Research*, 43(3), 194-205. doi:10.1046/j.1365-2788.1999.00191.x
- McLeod, L. (2011). Game changer. *SIG 12 Perspectives on Augmentative and Alternative Communication*, 20 (April), 17-18. doi:10.1044/aac20.1.17
- McMillan, J., & Schumacher, S. (2014). *Research in education: Evidence-based inquiry* (7th ed.). Harlow, England: Pearson.
- McNaughton, D. B., & Beukelman, D. R. (2010). *Transition strategies for adolescents & young adults who use AAC* (AAC series). Baltimore, MD: Paul H. Brookes.
- McNaughton, D. B., & Bryen, D. N. (2007). AAC technologies to enhance participation and access to meaningful societal roles for adolescents and adults with developmental disabilities who require AAC. *Augmentative and Alternative Communication*, 23(3), 217-229. doi:10.1080/07434610701573856
- McNaughton, D. B., Bryen D. N., Blackstone, S., Williams, M., & Kennedy, P. (2012). Young adults with complex communication needs: Research and development in AAC for a “diverse” population. *Assistive Technology*, 24(1), 45-53. doi:10.1080/10400435.2011.648715
- McNaughton, D. B., & Kennedy, P. (2010). Supporting successful transitions to adult life for individuals who use AAC. In D. B. McNaughton & D. R. Beukelman (2010). *Transition strategies for youths & young adults who use AAC* (pp. 3-15). Baltimore, MD: Paul H. Brookes.

- McNaughton, D. B., & Light, J. (2013). The iPad and mobile technology revolution: Benefits and challenges for individuals who require augmentative and alternative communication. *Augmentative and Alternative Communication, 29*(2), 107-116.
doi:10.3109/07434618.2013.784930
- McNaughton, D. B., Rackensberger, T., Wehmeyer, M. L., Wright, S. (2010). Self-determination and young adults who use AAC. In D. B. McNaughton & D. R. Beukelman (Eds.). *Transition strategies for youths & young adults who use AAC* (pp. 17-32). Baltimore, MD: Paul H. Brookes.
- Meder, A. M., & Wegner, J. R. (2015). iPads, mobile technologies, and communication applications: a survey of family wants, needs, and preferences. *Augmentative and Alternative Communication, 31*(1), 27-36. doi:10.3109/07434618.2014.995223
- Messieh, N. (2017, August 23). 3 ways to read text out loud on android – make use of. Retrieved from <https://www.makeuseof.com/tag/how-to-read-text-out-loud-android/>
- Mohr, K. A. J., & Mohr, E. S. (2017). Understanding Generation Z Students to Promote a Contemporary Learning Environment. *Journal on Empowering Teaching Excellence, 1*(1), 84-94.
- Montag, C., Blaszkiewicz, K., Sariyska, R., Lachmann, B., Andone, I., Trendafilov, B., Eibes, M., & Markowets, A. (2015). Smartphone usage in the 21st century: who is active on WhatsApp? *BMC Research Notes, 8*, 331-331. doi:10.1186/s13104-015-1280-z
- Moodley, V. (2007). Codeswitching in the multilingual English first language classroom. *International Journal of Bilingual Education and Bilingualism, 10*(6), 707-722.
doi:10.2167/beb403.0

- Morgan, D. L., & Lobe, B. (2011). Online focus groups. In S. N. Hesse-Biber (Ed.), *The Handbook of Emergent Technologies in Social Research* (pp.199-230). Oxford University Press. Retrieved from <https://www.researchgate.net/publication/273809338>
- Morris, J. T., & Bryen, D. N. (2015). *Use of mainstream wireless technology by adults who use AAC*. Paper presented at the International Technology and Persons with Disabilities Conference, San Diego, CA, March 21-26.
- Myrden, A., Schudlo, L., Weyand, S., Zeyl, T., & Chau, T. (2014). Trends in communication access solutions for children with cerebral palsy. *Journal of Child Neurology*, 29(8), 1108-1118. doi:10.1177/0883073814534320
- Nealson, J., & Searls Giroux, S. (2010). *The theory toolbox. Critical concepts for the humanities, arts, & social sciences* (2nd ed). Lanham, MD: Rowman & Littlefield Publishers, Inc.
- Nguyen, T., Garrett, R., Downing, A., Walker, L., Hobbs, D. (2008). An interfacing system that enables speech generating device users to independently access and use a mobile phone. *Technology and Disability*, 20(3), 225-239.
- Niemeyer, D., Donnellan, A. M., Robledo, J. A. (2012). Taking the pulse of augmentative and alternative communication on iOS. *AssistiveWare*. Retrieved from <http://www.assistiveware.com>
- Noren, N., Samuelsson, C., & Plejert, C. (2013). Dialogical perspectives on aided communication. In N. Noren, C. Samuelsson, & C. Plejert (Eds.), *Aided communication in everyday interaction* (pp. 1-22). Guildford, United Kingdom: J & R Press.
- O'Brien, M. (2015). Using mobile technology for communication in the educational setting. *SIG 12 Perspectives on Augmentative and Alternative Communication*, 24(April), 45-50. doi:10.1044/aac24.2.45

- Opdenakker, R. (2006). Advantages and disadvantages of four interview techniques in qualitative research. *Forum Qualitative Sozialforschung = Forum: Qualitative Social Research*, 7(4), 1-14. Retrieved from <https://search-proquest-com.uplib.idm.oclc.org/docview/869232974?accountid=14717>
- Ouellette, G. & Michaud, M. (2016). Generation text: Relations among undergraduates' use of text messaging, textese, and language and literacy skills. *Canadian Journal of Behavioural Science*, 48(3), 217-221. doi:10.1037/cbs0000046
- Owens, R. Jr. (1996). *Language development: An introduction* (4th ed.). Boston, MA: Allyn & Bacon.
- Palisano, R., Rosenbaum, P. L., Bartlett, D., & Livingston, M. (2007). Gross Motor Function Classification System Expanded and Revised (GMFCS - E&R) [Resource]. Retrieved from <http://www.canchild.ca/en/resources/42-gross-motor-function-classification-system-expanded-revised-gmfcs-e-r>
- Palmer, S. B., Wehmeyer, M. L., Davies, D. K., & Stock, S. E. (2012). Family members' reports of the technology use of family members with intellectual and developmental disabilities. *Journal of Intellectual Disability Research*, 56(4), 402-14. doi:10.1111/j.1365-2788.2011.01489.x
- Park, N., Chung, J., & Lee, S. (2012). Explaining the use of text-based communication media: An examination of three theories of media use. *Cyberpsychology, Behavior and Social Networking*, 15(7), 357-63. doi:10.1089/cyber.2012.0121
- Park, N., Kim, Y-C., Shon, H. Y., & Shim, H. (2013). Factors influencing smartphone use and dependency in South Korea. *Computers in Human Behavior*, 29(4), 1763-1770. doi:10.1016/j.chb.2013.02.008

- Paterson, H. L. (2017). The use of social media by adults with acquired conditions who use AAC: current gaps and considerations in research. *Augmentative and Alternative Communication, 33*(1), 23-31. doi:10.1080/07434618.2016.1275789.
- Paulson, A., & Vargus-Adams, J. (2017). Overview of four functional classification systems commonly used in cerebral palsy. *Children, 4*(4), 1-10. doi:10.3390/children4040030
- Pearson, M. (2019). Mobile phone accessibility improves, but gaps remain, study finds. Georgia Institute of Technology. Retrieved from <https://phys.org/news/2019-02-mobile-accessibility-gaps.html>
- Peslak, A., Ceccucci, W., & Sendall, P. (2010). An empirical study of text messaging behavioral intention and usage. *Journal of Information Systems Applied Research, 3*(3). Retrieved 20 November 2017 from <http://jisar.org/3/3/>. ISSN: 1946-1836.
- Pew Research Center (2010). Teens and mobile phones. Washington, DC: Pew Internet & American Life Project. Retrieved from <http://pewinternet.org/Reports/2010/Teens-and-Mobile-Phones.aspx>
- Pew Research Center (2012). Teens, smartphones & texting. Washington, DC: Pew Internet & American Life Project. Retrieved from <http://pewinternet.org/Reports/2012/Teens-and-smartphones.aspx>
- Pew Research Center (2013a). Teens and technology. Washington, DC: Pew Internet & American Life Project. Retrieved from <http://pewinternet.org/Reports/2013/Teens-and-Tech.aspx>
- Pew Research Center (2013b). Cell phone activities. Washington, DC: Pew Internet & American Life Project. Retrieved from <http://pewinternet.org/Reports/2013/Cell-Activities.aspx>

- Pew Research Center (2015). Cell phones in Africa: Communication lifeline. Retrieved from <http://www.pewglobal.org/2015/04/15/cell-phones-in-africa-communication-lifeline>
- Pew Research Center (2016). Smartphone ownership and internet usage continues to climb in emerging economies. Retrieved from <http://www.pewglobal.org/2016/02/22/smartphone-ownership-and-internet-usage-continues-to-climb-in-emerging-economies/>
- Pew Research Center (2019). Smartphone ownership in advanced economies higher than in emerging. Retrieved from https://www.pewresearch.org/global/2019/02/05/smartphone-ownership-is-growing-rapidly-around-the-world-but-not-always-equally/pg_global-technology-use-2018_2019-02-05_0-01/
- Pierce, T. (2009). Social anxiety and technology: Face-to-face communication versus technological communication among teens. *Computers in Human Behaviour*, 25(6), 1367-1372. doi:10.1016/j.chb.2009.06.003
- Poplack, S. (2013). 'sometimes i'll start a sentence in spanish y termino en español': Toward a typology of code-switching. *Linguistics*, 51(Jubilee), 11-14. doi:10.1515/ling-2013-0039
- Porter, G., Hampshire, K., Milner, J., Munthali, A., Robson, E., De Lannoy, A., . . . Abane, A. (2016). Mobile phones and education in sub-saharan africa: From youth practice to public policy. *Journal of International Development*, 28(1), 22-39. doi:10.1002/jid.3116
- Raghavendra, P., Olsson, C., Sampson, J. Mcinerney, R., & Connell, T. (2012). School participation and social networks of children with complex communication needs, physical disabilities, and typically developing peers. *Augmentative and Alternative Communication*, 28(1), 33-43. doi:10.3109/07434618.2011.653604
- Ratcliff, A., & Cress, C. (1999). Guidelines for enhancing reciprocal peer communication with adolescents who use augmentative/alternative communication. *Journal of Children's Communication Development*, 20(2), 25-35. doi:10.1177/152574019902000204

Reid, F. J. M, & Reid, D. J. (2010). The expressive and conversational affordances of mobile messaging. *Behaviour & Information Technology*, 29(1), 3-22.

doi:10.1080/01449290701497079

Reid, D. & Reid, F. (2004). *Insights into the Social and Psychological Effects of SMS Text Messaging*. Retrieved from

[https://s3.amazonaws.com/academia.edu.documents/32703207/SocialEffectsOfTextMessaging.pdf?response-content-](https://s3.amazonaws.com/academia.edu.documents/32703207/SocialEffectsOfTextMessaging.pdf?response-content-disposition=inline%3B%20filename%3DSocial_Effects_Of_Text_Messaging.pdf&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWOWYYGZ2Y53UL3A%2F20190702%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20190702T114420Z&X-Amz-Expires=3600&X-Amz-SignedHeaders=host&X-Amz-Signature=b49f1e987da9d736e4951eea7eea58bb077ec4a5d5040d9bae58239cb51c6913)

[disposition=inline%3B%20filename%3DSocial_Effects_Of_Text_Messaging.pdf&X-](https://s3.amazonaws.com/academia.edu.documents/32703207/SocialEffectsOfTextMessaging.pdf?response-content-disposition=inline%3B%20filename%3DSocial_Effects_Of_Text_Messaging.pdf&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWOWYYGZ2Y53UL3A%2F20190702%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20190702T114420Z&X-Amz-Expires=3600&X-Amz-SignedHeaders=host&X-Amz-Signature=b49f1e987da9d736e4951eea7eea58bb077ec4a5d5040d9bae58239cb51c6913)

[Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-](https://s3.amazonaws.com/academia.edu.documents/32703207/SocialEffectsOfTextMessaging.pdf?response-content-disposition=inline%3B%20filename%3DSocial_Effects_Of_Text_Messaging.pdf&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWOWYYGZ2Y53UL3A%2F20190702%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20190702T114420Z&X-Amz-Expires=3600&X-Amz-SignedHeaders=host&X-Amz-Signature=b49f1e987da9d736e4951eea7eea58bb077ec4a5d5040d9bae58239cb51c6913)

[Credential=AKIAIWOWYYGZ2Y53UL3A%2F20190702%2Fus-east-](https://s3.amazonaws.com/academia.edu.documents/32703207/SocialEffectsOfTextMessaging.pdf?response-content-disposition=inline%3B%20filename%3DSocial_Effects_Of_Text_Messaging.pdf&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWOWYYGZ2Y53UL3A%2F20190702%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20190702T114420Z&X-Amz-Expires=3600&X-Amz-SignedHeaders=host&X-Amz-Signature=b49f1e987da9d736e4951eea7eea58bb077ec4a5d5040d9bae58239cb51c6913)

[1%2Fs3%2Faws4_request&X-Amz-Date=20190702T114420Z&X-Amz-](https://s3.amazonaws.com/academia.edu.documents/32703207/SocialEffectsOfTextMessaging.pdf?response-content-disposition=inline%3B%20filename%3DSocial_Effects_Of_Text_Messaging.pdf&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWOWYYGZ2Y53UL3A%2F20190702%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20190702T114420Z&X-Amz-Expires=3600&X-Amz-SignedHeaders=host&X-Amz-Signature=b49f1e987da9d736e4951eea7eea58bb077ec4a5d5040d9bae58239cb51c6913)

[Expires=3600&X-Amz-SignedHeaders=host&X-Amz-](https://s3.amazonaws.com/academia.edu.documents/32703207/SocialEffectsOfTextMessaging.pdf?response-content-disposition=inline%3B%20filename%3DSocial_Effects_Of_Text_Messaging.pdf&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWOWYYGZ2Y53UL3A%2F20190702%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20190702T114420Z&X-Amz-Expires=3600&X-Amz-SignedHeaders=host&X-Amz-Signature=b49f1e987da9d736e4951eea7eea58bb077ec4a5d5040d9bae58239cb51c6913)

[Signature=b49f1e987da9d736e4951eea7eea58bb077ec4a5d5040d9bae58239cb51c6913](https://s3.amazonaws.com/academia.edu.documents/32703207/SocialEffectsOfTextMessaging.pdf?response-content-disposition=inline%3B%20filename%3DSocial_Effects_Of_Text_Messaging.pdf&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWOWYYGZ2Y53UL3A%2F20190702%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20190702T114420Z&X-Amz-Expires=3600&X-Amz-SignedHeaders=host&X-Amz-Signature=b49f1e987da9d736e4951eea7eea58bb077ec4a5d5040d9bae58239cb51c6913)

Research ICT Africa (2017). *Internet use barriers and user strategies: Perspectives from Kenya, Nigeria, South Africa and Rwanda*. Retrieved from

[https://researchictafrica.net/publications/Other_publications/2017_INTERNET%20USE](https://researchictafrica.net/publications/Other_publications/2017_INTERNET%20USE%20BARRIERS%20AND%20USER%20STRATEGIES-)

[%20BARRIERS%20AND%20USER%20STRATEGIES-](https://researchictafrica.net/publications/Other_publications/2017_INTERNET%20USE%20BARRIERS%20AND%20USER%20STRATEGIES-%20KENYA,%20NIGERIA,%20SOUTH%20AFRICA%20AND%20RWANDA%20.pdf)

[%20KENYA,%20NIGERIA,%20SOUTH%20AFRICA%20AND%20RWANDA%20.pdf](https://researchictafrica.net/publications/Other_publications/2017_INTERNET%20USE%20BARRIERS%20AND%20USER%20STRATEGIES-%20KENYA,%20NIGERIA,%20SOUTH%20AFRICA%20AND%20RWANDA%20.pdf)

Research ICT Africa (2013). *Mobile Apps at the base of the pyramid – South Africa, Vodacom, Cape Town*. Retrieved from

[http://www.researchictafrica.net/presentations/Presentations/2013%20RIA%20-](http://www.researchictafrica.net/presentations/Presentations/2013%20RIA%20-%20Mobile%20Apps%20at%20the%20Base%20of%20the%20Pyramid%20-%20South%20Africa.pdf)

[%20Mobile%20Apps%20at%20the%20Base%20of%20the%20Pyramid%20-](http://www.researchictafrica.net/presentations/Presentations/2013%20RIA%20-%20Mobile%20Apps%20at%20the%20Base%20of%20the%20Pyramid%20-%20South%20Africa.pdf)

[%20South%20Africa.pdf](http://www.researchictafrica.net/presentations/Presentations/2013%20RIA%20-%20Mobile%20Apps%20at%20the%20Base%20of%20the%20Pyramid%20-%20South%20Africa.pdf)

- Sadhir, M., Stockburger, S. J., Omar, H. A. (2016). Challenges of internet and social media use in youths. *Dynamics of Human Health*, 3(1). Retrieved from http://journalofhealth.co.nz/?page_id=759
- Saldaña, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). Los Angeles, CA: SAGE Publications.
- Salkind, N.J. (2006). *Exploring Research*. Pearson International Edition. (6th ed.). Upper Saddle River, NJ: Pearson.
- Sánchez-Moya, A., & Cruz-Moya, O. (2015a). “Hey there! I am using WhatsApp”; a preliminary study of recurrent discursive realisations in a corpus of WhatsApp statuses. *Procedia – Social and Behavioral Sciences*, 212, 52-60.
- Sánchez-Moya, A., & Cruz-Moya, O. (2015b). Whatsapp, textese, and moral panics: discourse features and habits across two generations. *Procedia – Social and Behavioral Sciences*, 173, 300-306.
- Sanders, D. A. (1971). *Aural rehabilitation*. Englewood Cliffs, NJ: Prentice Hall Inc.
- Wiig, E. H., Semel, E., & Secord, W. A. (2013). *Clinical Evaluation of Language Fundamentals–Fifth Edition (CELF-5)*. Bloomington, MN: NCS Pearson.
- Shahyad, S., Pakdaman, S., Hiedary, M., HasanZadeh, M., Miri, M., Asadi, M., & Alipour, A. S. (2011). A study of psychometric characteristics of the questionnaire on the type of usage of S.M.S (motivation, content, frequency). *Procedia Social and Behavioral Sciences*, 15, 932-936.
- Shatto, B. & Erwin, K. (2016). Moving on from millennials: Preparing for generation Z. *The Journal of Continuing Education in Nursing*, 47(6), 253-254. doi:10.3928/00220124-20160518-05

- Shatto, B. & Erwin, K. (2017). Teaching millennials and generation Z: Bridging the generational divide. *Creative Nursing*, 23(1), 23-28. doi:10.1891/1078-4535.23.1.24
- Shenton, A. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, 22(2), 63-75.
- Shortis, T. (2001). *The Language of ICT Information and Communication Technology*. London, UK: Routledge.
- Simons, H. (2017). Mobile in SA Report 2017: Vodacom, Samsung have handy lead. Retrieved from <https://memeburn.com/2017/05/latest-mobile-south-africa-stats/>
- Smith, M. M. (2005). The dual challenges of aided communication and adolescents. *Augmentative and Alternative Communication*, 21(1), 67-79.
- Smith, M. M. (2015). Adolescence and AAC: Intervention Challenges and Possible Solutions. *Communication Disorders Quarterly*, 36(2), 112-118. doi:10.1177/1525740114539001.
- Smith, R. O., Scherer, M. J., Cooper, R., Bell, D., Hobbs, D. A., Pettersson, C., Seymour, N., Borg, J., Johnson, M. J., Lane, J. P., Sujatha, S., Rao, P. V. M., Obiedat, O. M., MacLachlan, M., & Bauer, S., (2018) Assistive technology products: a position paper from the first global research, innovation, and education on assistive technology (GREAT) summit, *Disability and Rehabilitation: Assistive Technology*, 13(5), 473-485. doi:10.1080/17483107.2018.1473895
- Solarsh, B. (2001). *Verbal solutions of rural Zulu-speaking children to problems encountered in everyday life* (Doctoral thesis, University of Pretoria, Pretoria, South Africa). Retrieved from <https://univofpretoria.on.worldcat.org/oclc/956374879>

- Sotillo, S. M. (2012). Illocutionary acts and functional orientation of SMS texting in SMS social networks. *Aspects of corpus linguistics: Compilation, annotation, analysis*, 12(1), 1-14.
- Statistics South Africa (2012). *Census 2011 Provinces at a glance*. Pretoria: Government Printers. Retrieved from http://www.statssa.gov.za/census/census_2011/census_products/Provinces%20at%20a%20glance%2016%20Nov%202012%20corrected.pdf
- Statistics South Africa (2015). *Multilingual statistical terminology*. Pretoria: Government Printers. Retrieved from http://www.statssa.gov.za/wp-content/uploads/2015/11/Multilingual_Statistical_-terminology_2013.pdf
- Statistics South Africa (2016). *South African community survey 2016. Indicators derived from the full population Community Survey*. Pretoria: Government Printers. Retrieved from <https://youthexplorer.org.za/profiles/country-ZA-south-africa/>
- Statistics South Africa (2018a). *General household survey 2017*. Pretoria: Government Printers. Retrieved from <http://www.statssa.gov.za/publications/P0318/P03182017.pdf>
- Statistics South Africa (2018b). *Victims of crime survey, 2017/18*. Pretoria: Government Printers. Retrieved from <http://www.statssa.gov.za/publications/P0341/P03412018.pdf>
- Stephensen, J., & Limbrick, L. (2015): A review of the use of touch-screen mobile devices by people with developmental disabilities. *Journal of Autism and Developmental Disorders*, 45(12), 3777-3791. doi:10.1007/s10803-013-1878-8
- Stock, S., Davies, D., Wehmeyer, M., & Palmer, S. (2008). Evaluation of cognitively accessible software to increase independent access to cellphone technology for people with intellectual disability. *Journal of Intellectual Disability Research*, 52(12), 1155-1164. doi:10.1111/j.1365-2788.2008.01099.x

- Thinyane, H. (2010). Are digital natives a world-wide phenomenon? An investigation into South African first year students' use and experience with technology. *Computers & Education*, 55, 406-414. doi:10.1016/j.compedu.2010.02.005
- Thirumanickam, A., Raghavendra, P., & Olsson, C. (2011). Participation and social networks of school-age children with complex communication needs: A descriptive study. *Augmentative and Alternative Communication*, 27(3), 195-204. doi:10.3109/07434618.2011.610818
- Thurlow, C. (2003). Generation Txt? The sociolinguistics of young people's text messaging. *Discourse Analysis Online*, 1 (1). Retrieved from <http://extra.shu.ac.uk/daol/articles/v1/n1/a3/thurlow2002003-paper.html>
- Thurlow, C., & Poff, M. (2011). Text messaging. In S. C. Herring, D. Stein, & T. Virtanen (Eds.) *Handbook of the Pragmatics of computer-mediated communication*. Berlin: Mouton de Gruyter. Retrieved from <http://nl.ijs.si/janes/wp-content/uploads/2014/09/thurlowpoff11.pdf>
- Tossel, C. C., Kortom, P., Shepard, C., Barg-Walkow, L. H., Rahmati, A., & Zhong, L. (2012). A longitudinal study of emoticon use in text messaging from smartphones. *Computers in Human Behavior*, 28, 259-663. doi:10.1016/j.chb.2011.11.012
- Turkstra, L. S. (2000). Should my shirt be tucked in or left out? The communication context of adolescence. *Aphasiology*, 14(4), 349-364. doi:10.1080/026870300401405.
- Turkstra, L. S., Ciccia, A., & Seaton, C. (2003). Interactive behaviors in adolescent conversation dyads. *Language Speech and Hearing Services in Schools*, 34, 117-127.
- Turner, A. (2015). Generation Z: Technology and social interest. *The Journal of Individual Psychology*, 71(2), 103-113.

- United Nations Department of Economic and Social Affairs (2013). *Fact Sheet Definition of Youth*. Retrieved from <http://www.un.org/esa/socdev/documents/youth/fact-sheets/youth-definition.pdf>
- United Nations Educational, Scientific and Cultural Organization (2016). *What do we mean by "youth"?* Retrieved from <http://www.unesco.org/new/en/social-and-human-sciences/themes/youth/youth-definition/>
- Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing and Health Sciences*, 15(3), 398-405. doi:10.1111/nhs.12048
- Valkenburg, P. M., & Peter, J. (2009). The effects of instant messaging on the quality of adolescents' existing friendships: A longitudinal study. *Journal of Communication*, 59, 79-97.
- Van Cleemput, K. (2010). "I'll see you on IM, text, or call you": A social network approach of adolescents' use of communication media. *The Bulletin of Science, Technology & Society*, 30(2), 75-85.
- Van Niekerk, K., Dada, S., & Tönsing, K. (2019) Influences on selection of assistive technology for young children in South Africa: perspectives from rehabilitation professionals, *Disability and Rehabilitation*, 41(8), 912-925. doi:10.1080/09638288.2017.1416500
- Van Volkom, M., Stapley, J.C., & Malter, J. (2013). Use and perception of technology: Sex and generational differences in a community sample. *Educational Gerontology*, 39(10), 729-740.
- Von Tetzchner, S., & Basil, C. (2011). Terminology and notation in written representations of conversations with augmentative and alternative communication. *Augmentative and Alternative Communication*, 27(3), 141-149. doi:10.3109/07434618.2011.610356

- Von Tetzchner, S., Grove, N., Loncke, F., Barnett, S., Woll, B., & Clibbens, J. (1996). Preliminaries to a comprehensive model of augmentative and alternative communication. In S. Von Tetzchner & M. H. Jensen (Eds.), *Augmentative and Alternative Communication European Perspectives* (pp. 19-36). London, England: Whurr Publishers Ltd.
- Weed, J. M., Wendt, O., & Lloyd, L. L. (2011). Universal principles and guidelines for using assistive technology. In O. Wendt, R. W. Quist, & L. L. Lloyd (Eds.), *Assistive technology principles and applications for communication disorders and special education* (pp. 95-122). Bingley, England: Emerald Group Publishing Limited.
- Wendt, O., & Lloyd, L. L. (2011). Definitions, history, and legal aspects of assistive technology. In O. Wendt, R. W. Quist, & L. L. Lloyd (Eds.), *Assistive technology principles and applications for communication disorders and special education* (pp.1-22). Bingley, England: Emerald Group Publishing Limited.
- Wickenden, M. (2011). Talking to teenagers: Using anthropological methods to explore identity and the lifeworlds of young people who use AAC. *Communication Disorders Quarterly*, 32(3), 151-163.
- Williams, M., Beukelman, D., & Ullman, C. (2012). AAC text messaging. *SIG 12 Perspectives on Augmentative and Alternative Communication*, 21(2), 56-59. Retrieved from https://www.academia.edu/1942878/Perspectives_of_High_Tech_Augmentative_and_Alternative_Communication_Users_With_Cerebral_Palsy_at_the_Post-Secondary_Level
- Wood, C., Kemp, N., & Plester, B. (2014). *Text messaging and literacy: The evidence* (Routledge psychology in education). London, UK: Routledge. Retrieved from https://www.researchgate.net/publication/287248403_Text_messaging_and_literacy_-_The_evidence

- Yin, R. (1999). Health services research - enhancing the quality of case studies in health services research. *Health Services Research, 34*(5), 1209-1224.
- Yin, R. (2013). Validity and generalization in future case study evaluations. *Evaluation, 19*(3), 321-332. doi:10.1177/1356389013497081.
- Yoon, C., Jeong, C., & Rolland, E. (2015). Understanding individual adoption of mobile instant messaging: a multiple perspectives approach. *Information Technology Management, 16*, 139-151. doi:10.1007/s10799-014-0202-4
- York, C. S., & Fabrikant, K. B. (2011). In O. Wendt, R. W. Quist, & L. L. Lloyd (Eds.), *Assistive technology principles and applications for communication disorders and special education* (pp.221-264). Bingley, England: Emerald Group Publishing Limited.
- Yorkston K. M., & Beukelman D. R. (1981). *Assessment of Intelligibility of Dysarthric Speech*. Tigard, OR: C. C. Publications.
- Yorkston, K. M., Beukelman, D. R., & Tice, R. (1996). Sentence Intelligibility Test for Windows (Version 1.0). Lincoln: Institute for Rehabilitation Science and Engineering at Madonna Rehabilitation Hospital.

APPENDIX A: Ethics Approval Research Ethics Committee UP



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Humanities
Research Ethics Committee

22 February 2018

Dear Ms Wepener

Project: Mainstream mobile messages as Augmentative and Alternative Communication for youth with CNN in a developing country
Researcher: C Wepener
Supervisor: Prof J Bornman
Department: Centre for Augmentative and Alternative Communication
Reference numbers: 97298787(GW20161003HS)

Thank you for your response to the Committee's correspondence.

The **Research Ethics Committee** notes that the outstanding permission from the *Department of Education and the schools* were submitted as requested. Final **ethics approval** for the above application was granted at an *ad hoc* meeting on 22 February 2018. Data collection may therefore commence.

Please note that this approval is based on the assumption that the research will be carried out along the lines laid out in the proposal. Should the actual research depart significantly from the proposed research, it will be necessary to apply for a new research approval and ethical clearance.

We wish you success with the project.

Sincerely

Prof Maxi Schoeman
Deputy Dean: Postgraduate and Research Ethics
Faculty of Humanities
UNIVERSITY OF PRETORIA
e-mail: tracey.andrew@up.ac.za

APPENDIX B1: Ethics Approval Gauteng Department of Education


GAUTENG PROVINCE
 Department: Education
 REPUBLIC OF SOUTH AFRICA
 814141112

GDE AMENDED RESEARCH APPROVAL LETTER

Date:	07 February 2018
Validity of Research Approval:	05 February 2018 — 28 September 2018 2017/126A
Name of Researcher:	Wepener C
Address of Researcher:	[REDACTED]
	[REDACTED]
	Pretoria 0181
Telephone Number:	[REDACTED]
Email address:	[REDACTED]
Research Topic:	Mainstream mobile messaging as Augmentative and Alternative Communication for youth with Complex Communication Needs
Type of Degree:	PhD
Number and type of schools:	I-SEN Schools
District]s/HO	Ekurhuleni North, Ekurhuleni South, Johannesburg Central, Johannesburg East, Johannesburg North, Johannesburg South, Johannesburg West, Tshwane North, Tshwane South and Tshwane West

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior

Manager confirming that permission has been granted for the research to be conducted.

[Handwritten Signature] 08/02/2018

1

Making education a societal priority

Office of the Director: Education Research and Knowledge Management

 7th Floor, 17 Simmonds Street, Johannesburg, 2001 Tel: (011) 355 0488 Email: Faith.Tshabalala@gauteng.gov.za

APPENDIX B2: Ethics Approval North West Province Department of Education



Education and Sport Development

Department of Education and Sport Development
Departement van Onderwys en Sport Ontwikkeling
Lefapha la Thuto le Tihabololo ya Metshameko
NORTH WEST PROVINCE

cnr Kock and Heystek Street,
Rustenburg 0299
Private Bag X82110
Rustenburg 0300
Tel.: (014) 590-4800
Fax.: (014) 592-3247
e-mail: pmokhulle@nwpg.gov.za

OFFICE OF THE DIRECTOR: BOJANALA DISTRICT

Enq. Dr. ET Motshidiso

Attention: Mrs. Clara Wepener

From : Mrs. M.K.Z. Mosala
Acting District Director — Bojanala District

Date : 06 September 2017

Subject: Permission to conduct Research in Bojanala Platinum District

Reference is made to your letter regarding the above matter. The content is noted and accordingly, approval is granted to your kind self to conduct research as per your request, subject to the following provisions:-

- That you notify relevant Sub-District and Circuit Managers about your request and this subsequent letter of approval;
- That the onus to notify principals of your target schools about your intended visit and the purpose thereof rests with your good self;
- That participation in your research project will be voluntary;
- That as far as possible the general academic programme of the schools should not be interfered with;
- That the principle of confidentiality will be observed in the strictest terms in relation to information sourced from such schools; and
- That upon completion of your research, a report is avail to my Office detailing the major findings and recommendations of your research.

With my best wishes

Thanking you

M. K. Z. Mosala — Acting District Director cc All Sub-District Managers

APPENDIX C: School Request Letter and Permission Form



Faculty of Humanities

The Principal,

Date

Dear Sir/Madam

REQUEST TO PARTICIPATE IN RESEARCH PROJECT

I am currently a PhD student in Augmentative and Alternative Communication (AAC) at the Centre for Augmentative and Alternative Communication (CAAC) at the University of Pretoria. In partial fulfilment for the requirements of this degree, I am required to conduct a research project.

Research Topic: Mainstream mobile messaging for youth with complex communication needs.

Rationale for the study: The aim of the study is to gain an in-depth understanding of how youth with complex communication needs (CCN) use texting as a mode of communication. Many South Africans with CCN may not have the funds or support for dedicated devices but may have access to a mobile phone. Understanding of the strengths and limitations of texting as a mode of communication for individuals with CCN will aid role players who are involved in increasing the communicative competence of these individuals.

Who will participate in the study? Persons with CCN between the ages 15 and 24 who can communicate in English, have basic literacy skills and are able to use a mobile phone to text.

What will be expected of them? The selected participants will have various contact sessions with the researcher outside of school hours. These sessions will include screenings and interviews. They will also be expected to communicate with the researcher via a WhatsApp group on their mobile phones for a period of three months outside of school hours.

What will be expected of you? Your permission to identify potential participants via the therapists/ teachers of your school would be appreciated. I would furthermore appreciate it if the class teachers of the potential participants could forward a letter to the potential participants' parents asking for their consent to participate in the study. Thereafter the researcher will contact the participants directly and ask their assent to participate in an in-depth interview, complete a questionnaire and be part of the WhatsApp group. The researcher will not intervene or interrupt any academic or other activities of the school and no research will be done within school hours.

What are the risks and benefits? Participation in this project is voluntary and the participants will not receive any incentives to participate. The participants will be given a data bundle to

cover their data costs of participating in the mobile phone communication. Participants may withdraw at any time from the project without any negative consequences. The participants will at no stage during the interview and WhatsApp group be exposed to any harmful situations. It is hoped that the participants will find it enriching to share their own perspectives on texting as a mode of communication.

Confidentiality: The content of the data will be handled with confidentiality and used for research purposes, conference presentations, journal articles and to write a thesis. In the final report and during conference presentations, no identifying information of any of the participants will be published. Documents will be in safekeeping at the Centre for AAC, University of Pretoria for 15 years for archival purposes and as part of ethical requirements of the University.

Proposed date of study: It is proposed that the research will be conducted in the third term of 2017.

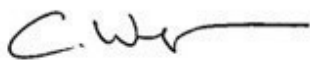
If you require further information after reading this document, please feel free to contact me or my supervisor:

Researcher: Mrs Clara Wepener (B. Speech Pathology and Audiology, MA AAC)

Contact details: Tel no: [REDACTED] Email address: [REDACTED]

I trust that you will agree on the importance of this research project and I would appreciate your willingness to approve the participation of a number of your learners in the project. If so, please complete the attached consent form. After completion of the project, the researcher will gladly make all results available to all interested parties at the school.

Kind regards



Mrs Clara Wepener
Researcher



Prof Juan Bornman
Supervisor



Dr Ensa Johnson
Co-supervisor

Centre for Augmentative and Alternative
Communication, Room 2-36, Com path
Building, Lynnwood Road
University of Pretoria, Private Bag X20
Hatfield 0028, South Africa
Tel +27 (0)12 420 2001
Fax +27 (0) 85 51 00641
Email saak@up.ac.za
www.osac.up.ac.za

Fakulteit Geesteswetenskappe
Lefapha la Bomotheo



Faculty of Humanities

SCHOOL PERMISSION FORM

Research Topic: Mainstream mobile messaging for youth with complex communication needs.

I, _____, (full names and surname)
principal of _____ (name of school) hereby:

- Give permission for the teachers at our school to help with the identification of potential participants for the study as outlined in the letter;
- Give permission for learners who met the selection criteria to participate in the study as outlined in the study;
- Understand that the learners will at no stage during the research process be exposed to any harmful situations;
- Agree that learners have the right to withdraw from this study should they wish to do so for any reason whatsoever without providing any explanation;
- Understand that the content of the data will be handled with confidentiality and used for research purposes, conference presentations, journal articles and to write a thesis;
- Understand that no identifying information will be given in the long term and that the data will be stored for a period of 15 years in a safe place at the CAAC, University Pretoria for archival purposes.

(Please tick appropriate box)

I give consent		I do not give consent	
----------------	--	-----------------------	--

Signature of principal

Date

School Stamp:

APPENDIX D: Parent Informed Consent Letter and Form



Faculty of Humanities

Dear Parents/Guardians

Date

LETTER OF INFORMED CONSENT

I am currently a PhD student in Augmentative and Alternative Communication (AAC) at the Centre for Augmentative and Alternative Communication (CAAC) at the University of Pretoria. As part of my degree, **I am doing a research project that looks at how young people with speech difficulties use cell phones to communicate.**

The principal at your son/daughter's school has kindly approved that learners from the school can participate in this research project outside of school hours. Your son/daughter has been identified as a potential participant. I would be grateful for their participation in this project.

Research Topic: Mainstream mobile messaging for youth with complex communication needs.

Who will participate? I am looking for persons between the ages 15 and 24 who have speech difficulties, who can communicate in English and use a cell phone to send and receive text messages (like SMS or WhatsApp messages).

What will be expected? Your son/daughter will need to have various contact sessions with the researcher outside of school hours. These sessions may include the following:

- tasks to describe your son/daughter's motor, language and reasoning abilities
- a video-recorded interview with your son/daughter to ask them about their views on cell phone messaging
- a WhatsApp discussion group (consisting of the researcher and a number of other participants) for a period of 6 weeks outside of school hours to discuss messaging on cell phones.

What are the risks and benefits? Participation in this project is voluntary and your son/daughter will not receive any incentives to participate. He/she will receive a data bundle to cover the costs of participating in the WhatsApp group. Your son/daughter may withdraw at any time from the project without any negative consequences and he/she will at no stage during the study be exposed to any harmful situations. It is hoped that your son/daughter will find it enriching to share their own views on cell phone messaging with the researcher and that young people with complex communication needs will benefit from the research findings.

Confidentiality: The content of the data will be handled with confidentiality and used for research purposes, conference presentations, journal articles and to write a thesis. In the final report and during conference presentations, no identifying information of any of the participants will be published. Documents will be in safekeeping at the Centre for AAC, University of Pretoria for 15 years for archival purposes.

Please complete and sign the attached consent form and send the form back to the school as soon as possible. I will collect the forms from the school on 4 September 2017. If your son/daughter may participate, I will arrange to meet your son/daughter at a time that will suit them.

If you require further information after reading this document, please feel free to contact me (see details below):

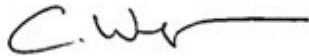
Researcher: Mrs Clara Wepener (B. Speech Pathology and Audiology, MA AAC)

Contact details: Tel no: [REDACTED]

Email: [REDACTED]

We trust that you will agree on the importance of this research project to improve our understanding of messaging on cell phones as a mode of communication for young persons with complex communication needs. We would appreciate your willingness to approve the participation of your son/daughter in this research project.

Kind regards



Mrs Clara Wepener
Researcher



Prof Juan Bornman
Supervisor



Dr Ensa Johnson
Co-supervisor

APPENDIX E: Participant Informed Assent/Consent Form











Faculty of Humanities

PARTICIPANT INFORMED CONSENT/ASSENT FORM

Name of participant: _____ D.O.B.: _____

Participant cell phone number: _____

Make a tick next to the one that you choose:

	Did someone read the letter to you and explain to you what you will have to do if you take part in this study?	Yes	Unsure	No
	Do you understand what was explained to you?	Yes	Unsure	No
	Do you understand that you may choose to help me?	Yes	Unsure	No
	Do you understand that you may stop if you want to?	Yes	Unsure	No
	Will you allow me to video record you?	Yes	Unsure	No
	Do you have any questions to ask me?	Yes	Unsure	No
	Are you happy with the way the questions were answered?	Yes	Unsure	No
	Do you want to be part of this study?	Yes	Unsure	No

Participant Signature

Date

APPENDIX F: Fofa Project Leader Request Letter and Permission Form



Faculty of Humanities

Dear FOFA Project Manager

Date

REQUEST TO PARTICIPATE IN RESEARCH PROJECT

I am currently a PhD student in Augmentative and Alternative Communication (AAC) at the Centre for Augmentative and Alternative Communication (CAAC) at the University of Pretoria. In partial fulfilment for the requirements of this degree, I am required to conduct a research project.

Research Topic: Mainstream mobile messaging for youth with complex communication needs.

Rationale for the study: The aim of the study is to gain an in-depth understanding of how youth with complex communication needs (CCN) use messaging on mobile phones as a mode of communication. Many South Africans with CCN may not have the funds or support for dedicated devices but may have access to a mobile phone. Understanding of the strengths and limitations of messaging on mobile phones as a mode of communication for individuals with CCN will aid role players who are involved in increasing the communicative competence of these individuals.

Who will participate in the study? Persons with CCN between the ages 15 and 24 who can communicate in English, have basic literacy skills and are able to use a mobile phone to message.

What will be expected of them? The selected participants will have various contact sessions with the researcher outside of school or work hours. These sessions will include screenings and interviews. They will also be expected to communicate with the researcher via a WhatsApp group on their mobile phones for a period of three months outside of school or work hours.

What will be expected of you? Your permission to identify potential participants who are participants or alumni of the Fofa project would be appreciated. This would entail circulating a letter explaining the research to the parents/ guardians of past and present Fofa participants who meet the selection criteria (see attachment), as well as a letter explaining the research to the potential participants (see attachment). I would furthermore appreciate it if you could forward a letter to the potential participants and their parents asking for their consent to participate in the study (see attachment). Thereafter the researcher will contact the participants directly. The researcher will not intervene or interrupt any academic or other activities of their school or work and no research will be done within school or office hours.

What are the risks and benefits? Participation in this project is voluntary and the participants will not receive any incentives to participate. The participants will be given a data bundle to cover their data costs of participating in the mobile phone communication. Participants may withdraw at any time from the project without any negative consequences. The participants will at no stage during the interview and

WhatsApp group be exposed to any harmful situations. It is hoped that the participants will find it enriching to share their own perspectives on messaging on mobile phones as a mode of communication.

Confidentiality: The content of the data will be handled with confidentiality and used for research purposes, conference presentations, journal articles and to write a thesis. In the final report and during conference presentations, no identifying information of any of the participants will be published. Documents will be in safekeeping at the Centre for AAC, University of Pretoria for 15 years for archival purposes and as part of ethical requirements of the University.

Proposed date of study: It is proposed that the research will be conducted in the third term of 2017.

If you require further information after reading this document, please feel free to contact me or my supervisor:

Researcher: Mrs Clara Wepener (B. Speech Pathology and Audiology, MA AAC)

Contact details: Tel no: [REDACTED] Email address: [REDACTED]

I trust that you will agree on the importance of this research project and I would appreciate your help in contacting potential participants. If so, please complete the attached consent form. After completion of the project, the researcher will gladly make all results available to all interested parties.

Kind regards



Mrs Clara Wepener
Researcher



Prof Juan Bornman
Supervisor



Dr Ensa Johnson
Co-supervisor



Faculty of Humanities

FOFA PROJECT LEADER PERMISSION FORM

Research Topic: Mainstream mobile messaging for youth with complex communication needs.

I, _____, (full names and surname) project leader of Fofa hereby:

- Give permission to help with the identification of potential participants for the study as outlined in the letter;
- Understand that the Fofa participants will at no stage during the research process be exposed to any harmful situations;
- Agree that the Fofa participants have the right to withdraw from this study should they wish to do so for any reason whatsoever without providing any explanation;
- Understand that the content of the data will be handled with confidentiality and used for research purposes, conference presentations, journal articles and to write a thesis;
- Understand that no identifying information will be given in the long term and that the data will be stored for a period of 15 years in a safe place at the CAAC, University Pretoria for archival purposes.

(Please tick appropriate box)

I give consent		I do not give consent	
----------------	--	-----------------------	--

Signature of project manager

Date

APPENDIX G: Fofa Participant Informed Consent Letter



Faculty of Humanities

Dear Fofa Participant

28 August 2017

LETTER OF INFORMED CONSENT

I am currently a PhD student in Augmentative and Alternative Communication (AAC) at the Centre for Augmentative and Alternative Communication (CAAC) at the University of Pretoria. As part of my degree, **I am doing a research project that looks at how young people with speech difficulties use cell phones to communicate.**

Research Topic: Mainstream mobile messaging for youth with complex communication needs.

Who will participate? I am looking for persons between the ages 15 and 24 who have speech difficulties, who can communicate in English and use a cell phone to send and receive text messages (like SMS or WhatsApp messages).

What will be expected? You will need to have various contact sessions with the researcher outside of school/ work hours. These sessions may include the following:

- tasks to describe your motor, language and reasoning abilities
- a video-recorded interview to ask you about your views on cell phone messaging
- a WhatsApp discussion group (consisting of the researcher and a number of other participants) for a period of 6 weeks outside of school/ work hours to discuss messaging on cell phones.

What are the risks and benefits? Participation in this project is voluntary and you will not receive any incentives to participate. You will receive a data bundle to cover the costs of participating in the WhatsApp group. You may withdraw at any time from the project without any negative consequences and you will at no stage during the study be exposed to any harmful situations. I hope that you will find it enriching to share your own views on cell phone messaging and that young people with complex communication needs will benefit from the research findings.

Confidentiality: The content of the data will be handled with confidentiality and used for research purposes, conference presentations, journal articles and to write a thesis. In the final report and during conference presentations, no identifying information of any of the

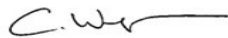
participants will be published. Documents will be in safekeeping at the Centre for AAC, University of Pretoria for 15 years for archival purposes.

Please complete and sign the attached consent form. If you wish to participate, I will arrange to meet you at a time and place that will suit you. If you require further information after reading this document, please feel free to contact me (see details below):


Researcher: Mrs Clara Wepener (B. Speech Pathology and Audiology, MA AAC)
Contact details: Tel no: [REDACTED] Email: [REDACTED]

We trust that you will agree on the importance of this research project and would appreciate your willingness to participate in this research project.

Kind regards



Mrs Clara Wepener
Researcher



Prof Juan Bornman
Supervisor



Dr Ensa Johnson
Co-supervisor

APPENDIX H: Picture and Questions used for Screening



1. Where are the people waiting?
2. When do people take the bus to work?
3. Why are they worried?
4. Who is looking at her watch?
5. What more can you tell me about the picture?

APPENDIX I: Messaging Screening Checklist

MESSAGING SCREENING CHECKLIST			
Potential Participant Name: _____			
Date of Birth: _____		Gender: _____	
<u>Section A</u>			
(Tick if potential participant meets criteria)			
Criteria	Meets criteria		
1. More than 6 months in school where English is LoLT:			
2. Uses WhatsApp			
<u>Section B</u>			
(Tick the appropriate box)			
Skill Demonstrated			
	Yes	No	With assistance
1. Operational Skills			
1.1 Accesses the messaging app			
1.2 Selects the correct contact			
1.3 Types a message			
1.4 Sends a message			
2. Linguistic Skills			
2.1 Reads questions			
2.2 Comprehends and answers questions			
2.3 Uses understandable spelling/ textese			
2.4 Uses understandable syntax			
3. Additional Comments			
Completed by: _____		Date: _____	

APPENDIX J: Example of Sentence Intelligibility Task

- 5.A There is such a program.
- 6.A The pair of shoes was new.
- 7.A I was wet from the neck down.
- 8.A My sister didn't get to see it.
- 9.A I don't know how I managed to get here.
- 10.A I looked for a roommate to help with the bills.
- 11.A He was the greatest ruler of men the workers had seen.
- 12.A It stays in place until the plants are pulled in the fall.
- 13.A For half the human race, it is as necessary as air or water.
- 14.A It needs a set of tires and a license before you can drive it.
- 15.A You can wrap up the cookies or serve them at the end of a meal.

APPENDIX K: Participant Background Information Script

PARTICIPANT BACKGROUND INFORMATION SCRIPT	
Participant Name: _____	
Participant DOB: _____	Gender: M/ F
What is your primary diagnosis? _____	
Do you have any hearing problems? Yes / No	
If yes, please explain: _____	
Do you have any problems with your sight? Yes / No	
If yes, please explain: _____	
Do you struggle to do things with your hands? Yes / No	
If yes, please explain: _____	
What year of schooling did you complete? _____	
What are you currently doing? _____	
What is your main language you use at home? _____	
What language do you mainly use for WhatsApp? _____	
Tell me about all the ways in which you communicate (probe: gestures, sounds, writing, AT):	

How do you communicate with friends and family? _____	
Do they always understand you? _____	
How do you communicate with strangers? _____	
Do they always understand you? _____	
What do you do when someone does not understand you? _____	

When did you get your first cell phone? _____	
What cell phone are you using at the moment? _____	
How long have you had this current phone? _____	
Have any changes been made to your phone to help you to use it? _____	
If yes: Please describe/ show me the changes: _____	
Do you need any help to use your phone? Yes / No	
If yes, what kind of help do you need? _____	
If yes, who helps you? _____	
Where do you keep your phone during the day? _____	
Can you reach it without help? _____	
Completed by: _____	Date: _____

APPENDIX L: Researcher Observation Form

RESEARCHER OBSERVATION FORM		
Participant Name: _____		<i>Participant No:</i>
Contextual factors	Initial interview	Follow-up interview
Place:		
People:		
Objects: Mobile phone screen size		
Objects: Mobile phone placement		
Activity:		
Time:		
Physical factors		
General mobility		
Mobile phone access (e.g. finger/ thumb)		
General description of typing		
Social factors and mood		
Communication maintenance and repair of breakdown:		
Rate and ease enhancing features	Does not use feature	Uses feature
1. Predictive text/ text suggestions		
2. Auto-correction		
3. Spell checker		
4. Text replacement		
5. No punctuation		
6. No capitalization		
7. Abbreviations/ shortenings		
8. Emojis		
Completed by: _____		Date: _____

APPENDIX M: Communication Partner Informed Consent Letter and Form



Faculty of Humanities

Dear Communication Partner

Date

LETTER OF INFORMED CONSENT

I am currently a PhD student in Augmentative and Alternative Communication (AAC) at the Centre for Augmentative and Alternative Communication (CAAC) at the University of Pretoria. As part of my degree, **I am doing a research project that looks at how young people with speech difficulties use cell phones to communicate.**

Research Topic: Mainstream mobile messaging for youth with complex communication needs.

Who will participate? I am looking for communication partners of the participants who were selected for the research project. These communication partners were chosen by the participants on the grounds that they know the participant well, that they have frequent WhatsApp contact with them and the participant enjoys interacting with them.

What will be expected of you? I will ask you some questions about your friend and how you communicate with them on WhatsApp.

What are the risks and benefits? Participation in this project is voluntary and you will not receive any incentives to participate. You may withdraw at any time from the project without any negative consequences and you will at no stage during the study be exposed to any harmful situations. I hope that you will find it enriching to share your own views with me and that young people with complex communication needs will benefit from the research findings.

Confidentiality: The content of the data will be handled with confidentiality and used for research purposes, conference presentations, journal articles and to write a thesis. In the final report and during conference presentations, no identifying information of any of the participants will be published. Documents will be in safekeeping at the Centre for AAC, University of Pretoria for 15 years for archival purposes.

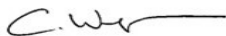
Please complete and sign the attached consent form. If you wish to participate, please WhatsApp me a photo of the completed consent form. If you require further information after reading this document, please feel free to contact me (see details below):

Researcher: Mrs Clara Wepener (B. Speech Pathology and Audiology, MA AAC)

Contact details: Tel no: [REDACTED] Email: [REDACTED]

We trust that you will agree on the importance of this research project and would appreciate your willingness to participate in this research project.

Kind regards



Mrs Clara Wepener
Researcher



Prof Juan Bornman
Supervisor



Dr Ensa Johnson
Co-supervisor

Centre for Augmentative and Alternative
Communication, Room 2-35, Com path
Building, Lynnwood Road
University of Pretoria, Private Bag X20
Hatfield 0028, South Africa
Tel +27 (0)12 420 2001
Fax +27 (0) 88 51 00841
Email saak@up.ac.za
www.caac.up.ac.za

Fakulteit Geesteswetenskappe
Lefapha la Bomotheo



Faculty of Humanities

COMMUNICATION PARTNER CONSENT FORM

Research Topic: Mainstream mobile messaging for youth with complex communication needs.

I, _____, (full names and surname):

- Give permission to help with the research project as outlined in the letter;
- Understand that I will at no stage during the research process be exposed to any harmful situations;
- Agree that I have the right to withdraw from this research project should I wish to do so for any reason whatsoever without providing any explanation;
- Understand that the content of the data will be handled with confidentiality and used for research purposes, conference presentations, journal articles and to write a thesis;
- Understand that no identifying information will be given in the long term and that the data will be stored for a period of 15 years in a safe place at the CAAC, University Pretoria for archival purposes.

(Please tick appropriate box)

I give consent		I do not give consent	
----------------	--	-----------------------	--

Signature of communication partner

Date

Centre for Augmentative and Alternative
Communication, Room 2-36, Com path
Building, Lynnwood Road
University of Pretoria, Private Bag X20
Hatfield 0028, South Africa
Tel +27 (0)12 420 2001
Fax +27 (0) 86 51 00841
Email saak@up.ac.za
www.caac.up.ac.za

Fakulteit Geesteswetenskappe
Lefapha la Bomotho

APPENDIX N: Participant Interview Script

PARTICIPANT INTERVIEW SCRIPT

Participant Name: _____

Date: _____

PROCEDURE	COMPLETED Yes/No	COMMENTS
Introduction:		
Set participant at ease: <i>Thank you that I could come and see you today. As you know my name is Clara and my study looks at how young people with speech difficulties use cell phones to communicate. I look forward to learning from you and I am hoping the information you give me will help others.</i>	1.	
Confirm informed assent/ consent: <i>You filled in this form the last time you saw me, are you still happy to continue?</i>	2.	
Describe the order of the proceedings: <i>I am going to ask you questions about your use of WhatsApp. First, you can log into the Wi-Fi zone I have created. Should I show you how? I will now ask you questions on WhatsApp and you can answer on WhatsApp. There are no right or wrong answers, you can tell me what you think. You are also welcome to ask me questions.</i>	3.	
Interview Questions: Predetermined interview questions were developed to obtain relevant information. Prompts were used for expansion and probes were used to obtain related information.		
Getting started (<i>Let us begin</i>):	4.	
1. <i>When did you start sending text messages on your phone? (How old were you when you started sending messages)</i>	5.	
2. <i>And when did you start using WhatsApp?</i>	6.	
3. <i>What do you like about WhatsApp?</i>	7.	
4. <i>What don't you like about WhatsApp?</i>	8.	
5. <i>Look at your list of WhatsApp Chats. How many people did you chat to the past 3 days?</i>	9.	
6. <i>Who do you WhatsApp often?</i>	10.	
7. <i>What do you usually talk about?</i>	11.	
8. <i>Who else do you WhatsApp?</i>	12.	
9. <i>What do you talk about?</i>	13.	
10. <i>Would you like to talk to more people on WhatsApp? Please explain.</i>	14.	

PROCEDURE	COMPLETED Yes/No	COMMENTS
11. Do you belong to any WhatsApp groups? If yes, please tell me more about these groups.	15.	
Would you like a break before we continue?	16.	
I now want to ask you to choose one person (X) who knows you well and who you like talking to on WhatsApp. It is important that I also ask them some questions. Can you think of someone? Please tell me a little about how you know X:	17.	
12. Look at the WhatsApp chats with X over the past 3 days. Please count how many times a day you WhatsApp each other.	18.	
13. Where are you usually when you and X chat on WhatsApp?	19.	
14. What time of the day do you and X usually chat on WhatsApp?	20.	
15. What do you talk about?	21.	
16. Does it matter how long X takes to respond to you? Please explain	22.	
17. How long do you usually take to respond to X?	23.	
18. What do you do if you don't understand a WhatsApp message from X?	24.	
19. When is a good time of the day for you to chat on the research WhatsApp group?	25.	
20. Is there anything else you would like to add?	26.	
Closing the session		
Thank the participant for their participation: Thank you very much for becoming part of my research group and answering all those questions. Please tell X that you have given me their number and that I will contact them. Please also ask them to sign this form indicating if they are willing to be a part of the research.	27.	
Ask the participant to confirm that they are still willing to be part of the WhatsApp focus group: I want to explain how the WhatsApp group will work. The group does not include X. - I will make a WhatsApp group with you and the six other young people I have selected for the research. - I will ask you questions about WhatsApp on this group. I would like all of you to tell the group what you think. - You can also ask the others on the group to explain their views. Everyone's opinion is respected. - You have a few days to discuss each question before I ask the next question. This will give you all enough time to answer.	28.	

Completed by: _____

Date: _____

APPENDIX O: Communication Partner Interview Script
COMMUNICATION PARTNER INTERVIEW SCRIPT
Communication Partner Name: _____ **Date:** _____

PROCEDURE	COMPLETED Yes/No	COMMENTS
Introduction:		
Set communication partner at ease and explain research purpose: <i>1. Thank you that you are willing to answer some questions today. As you know my name is Clara and my study looks at how young people with speech difficulties use cell phones to communicate. You were selected by X (participant name) as someone they enjoy talking to on WhatsApp. I look forward to also asking you some questions and getting your point of view.</i>	1.	
Confirm informed assent/ consent: <i>2. Thank you for also sending me the form to say that you understand what is expected of you and you voluntarily agree to participate? If you don't want to participate, you don't have to. There will be no negative consequences to either you or X.</i>	2.	
Describe the order of the proceedings: <i>3. I am now going to ask you questions about how you and Y communicate. There are no right or wrong answers, you can tell me what you think. Also ask me if you are unsure and I will try to explain.</i>	3.	
Interview Questions: Predetermined interview questions were developed to obtain information on the WhatsApp interaction between the participant with CCN and a familiar communication partner according to the familiar communication partner. Prompts were used for expansion and probes were used to obtain relevant and related information.		
<i>1. Can you describe all the ways in which you and X (the participant) communicate:</i>	4.	
<i>2. What is your preferred way of communicating with X?</i>	5.	
<i>3. What do you like about using WhatsApp to communicate with X?</i>	6.	
<i>4. What don't you like about using WhatsApp to communicate with X?</i>	7.	
<i>5. If you look at the WhatsApp chats with X over the past 3 days, how many times a day did you WhatsApp him/her?</i>	8.	
<i>6. Where are you usually when you WhatsApp X?</i>	9.	
<i>7. What time of the day do you usually WhatsApp X?</i>	10.	
<i>8. What are these WhatsApp messages usually about?</i>	11.	
<i>9.1 Does it matter how long X takes to respond to you? Please explain</i>	12.	
<i>9.2 How long do you usually take to respond?</i>	13.	

PROCEDURE	COMPLETED Yes/No	COMMENTS
<i>10. What do you do if you don't understand a WhatsApp from X?</i>	14.	
<i>11. What do you think would make WhatsApp easier for X?</i>	15.	
<i>12. Is there anything else you would like to add?</i>	16.	
Closing the session		
Thank the communication partner for their participation: <i>Thank you very much for answering all these questions.</i>	17.	

Completed by: _____

Date: _____

APPENDIX P: WhatsApp Focus Group Script

WHATSAPP GROUP SCRIPT

PROCEDURE	COMPLETED Yes/No	COMMENTS
Introduction:		
Welcome and introductions: <i>Welcome to the research group. Today and tomorrow we will get to know each other. Tell us where you are from, what you like doing, what music you like. As you know I am Clara 😊. I come from joburg. I love gardening and like listening to Johnny Clegg</i>	1.	
Describe the order of the proceedings: <i>I will start with the questions tomorrow after everyone has had a chance to tell us a little about themselves.</i>	2.	
Further proceedings: <i>The next few days I will ask you questions about WhatsApp. Please keep the data I have given you to answer the questions a be part of the discussion. I want you all to share your experiences of using WhatsApp</i>	3.	
Response format: <i>There are no right or wrong answers, everyone's answers are important! Please take part in the group every day!</i>	4.	
Getting started: <i>I look forward to our discussion. Here is the first question</i>	5.	
Encouragement of participation: <i>E.g. Great discussion; what do the rest of you think</i>	7.	
Giving prompts and probes: <i>E.g. Any other reasons? E.g. You are welcome to add something</i>	8.	
Focus group topics:		
Predetermined questions were developed to obtain information on various interactional aspects afforded by WhatsApp.		
Topic 1: Considerations for MIM interactions:		
<i>What do you like about WhatsApp?</i>	9.	
<i>What don't you like about WhatsApp?</i>	10.	
<i>Do any of you have family or friends who don't use WhatsApp?</i>	11.	
<i>Are there times when you can't WhatsApp? Why not?</i>	12.	
<i>Are there places where you are not able to WhatsApp? Where? Why?</i>	13.	
<i>Do you ever WhatsApp someone in the same room as you? Why?</i>	14.	
Topic 2: Content and functions of interactions:		
<i>Can you tell me more about what you talk about on WhatsApp?</i>	15.	

PROCEDURE	COMPLETED Yes/No	COMMENTS
<i>What could you not talk about on WhatsApp?</i>	16.	
<i>How do you feel about discussing something personal on WhatsApp?</i>	17.	
<i>Can you express feelings on WhatsApp? How?</i>	18.	
<i>Does anyone look at your phone and read your WhatsApp messages?</i>	19.	
<i>Please explain why you would or would not use WhatsApp in an emergency situation (e.g. you are alone at home and get hurt badly)</i>	20.	
Topic 3: Maintenance and repair of interactions:		
<i>Does it matter how quickly someone responds to your WhatsApp messages? Please give reasons</i>	21.	
<i>Do you think people sometimes don't understand your WhatsApp messages? Why?</i>	22.	
<i>What do you do when you don't understand a WhatsApp message?</i>	23.	
Topic 4: Structure of MIM interactions:		
<i>What do you do to make WhatsApp easier for you?</i>	24.	
<i>What about shortening words? Like u2 instead of you too</i>	25.	
<i>And emojis? 😊</i>	26.	
<i>What about punctuation, like full stops...; question marks??? Or exclamation marks!!!</i>	27.	
<i>What about capitals? Like clara instead of Clara</i>	28.	
Topic 5: Suggestions and Comments		
<i>Do you have any suggestions for others who struggle to speak and want to use WhatsApp?</i>	29.	
<i>Do you have any suggestions for the cell phone companies to make WhatsApp easier for persons with disabilities?</i>	30.	
<i>Is there anything else about WhatsApp you would like to add?</i>	31.	
Closing the session		
Exiting the WhatsApp discussion group: <i>I am going to leave the WhatsApp group at the end of the week so that I can write up all your valuable ideas. If you would like to still be a part of a WhatsApp group, you can contact each other and see who is interested in continuing the group.</i>	32.	
Thank the participant for their participation: <i>Thank you very much for discussing all my questions. It was wonderful learning from you!</i>	33.	

Completed by: _____

Date: _____

APPENDIX Q: Excerpt from the WhatsApp Focus Group

[19:21, 4/7/2018] Nomsa: I like WhatsApp because it's helps me to chat to my boyfriend, family and friends. The thing I don't like on WhatsApp is especially when someone who is trying to do bad things to people

[19:47, 4/7/2018] Xolani: I dislike the voice note becoz it's a disadvantage to a person who has a speech difficult

[19:49, 4/7/2018] Boipelo: Yes but what about the person who doesn't have hands to type?

[19:51, 4/7/2018] Nomsa: Hayibo the video note is a wonderful thing

[19:55, 4/7/2018] Boipelo: I am on Nomsa's side

[20:02, 4/7/2018] Mayowa: The voice note is a disadvantage to people with speech difficulties but it is a advantage to people who can't read or write properly and those who don't have hands

[20:04, 4/7/2018] Boipelo: Thank you Mayowa for the explanation

[20:05, 4/7/2018] Mayowa: Pleasure Boipelo

[20:06, 4/7/2018] Boipelo: 🙄

[20:12, 4/7/2018] Elijah: What I like about whatsapp is its easy & fast. I don't my voice. It's also international thing meaning I can chat with someone in USA. It's make communication easy for people with disabilities

[20:14, 4/7/2018] Elijah: What I don't like is sometimes I run out of data while I'm in the middle of important communication

[20:14, 4/7/2018] Boipelo: Yes that's true

[20:23, 4/7/2018] Tapiwa (Responding to Xolani 19:47, 4/7/2018): I agree cause when person with speech problem send voice note people won't understand him or she

[20:23, 4/7/2018] Nomsa: Can I ask you guys something?

[20:24, 4/7/2018] Elijah: Shoot

[20:26, 4/7/2018] Tapiwa: Yes

[20:26, 4/7/2018] Nomsa: What must someone do especially when he or she is lazy to type a long msg?

[20:28, 4/7/2018] Elijah: Use the short cut

[20:28, 4/7/2018] Boipelo: Lol then don't type just read

[20:31, 4/7/2018] Tapiwa: There is a shortly words that person can use

[20:32, 4/7/2018] Boipelo: Okay but let me say if you are in the hospital

[20:34, 4/7/2018] Elijah: 📷 use pictures

APPENDIX R: Follow-up Interview Script
FOLLOW-UP INTERVIEW SCRIPT
Participant Name: _____

PROCEDURE	COMPLETED Yes/No	COMMENTS
Introduction:		
1. Set participant at ease: <i>Ask the participant how they have been since our previous contact</i>		
2. Describe the order of the proceedings: <i>I am going to check if I have understood all your answers correctly. There are 10 themes. Please let me know if the information I have is right and if you would like to add anything. Afterwards I will ask you a few last questions. You can answer me on WhatsApp like last time. Again, it is your opinion, there are no right or wrong answers.</i>		
Member Checking and final Questions: A member checking checklist was developed for each participant. Predetermined questions were developed to establish how the participants experienced the focus group.		
A. <i>Let us begin by checking my information. I will read each item on the checklist and you can let me know if it is right and if you would like to add anything.</i>		
B. <i>I will now ask you about the WhatsApp group we had.</i>		
1. <i>Have you been part of a research group before? If yes, please tell me about it</i>		
2. <i>How did you experience our group?</i> 2.1 <i>Were there things you liked about the group discussion? Please explain</i> 2.2 <i>Were there things you did not like about the group discussion. Please explain</i>		
3. <i>How well could you express your views in the group?</i>		
4. <i>Did the others in the group influence your views? Please explain</i>		
5. <i>Are you still part of the group? Please explain why or why not</i>		
Closing the session		
Thank the participant for their participation: <i>Thank you very much for becoming part of the research group.</i>		

Completed by: _____

Date: _____

APPENDIX S: Example of Member Checking Script
MEMBER CHECKING SCRIPT: Xolani

Topics	Individual Response	Confirm	Response in Focus Group	Confirm	Expansion
1. MIM interactions likes and dislikes	1. Easy and convenient way of communicating to close and distant individuals. 2. Can chat without having to repeat himself. 3. Cheap and affordable. 4. Can express more than he would in front of people. 5. Only disadvantage is sending a voice note	5/5	1. Easy and convenient way of communicating to close and distant individuals 2. Can chat without having to repeat himself when people don't understand when he talks. 3. Designed for conversation and quicker way of communicating than other social networks 4. Does not like voice notes because it is a disadvantage for persons with speech difficulties	4/4	
2. Comm partners	1. Closest friends 2. Family members 3. Class mates 4. Girl he has a crush on 5 Teachers when he was at school 6. Church group.	6/6	1. He has family or friends who don't use WhatsApp. 2. Said some family members believe it is for the new generation 3. Agreed with Mayowa that they are unwilling to learn	3/3	Qualified that he used to have a crush on the girl. It is quite important for lectures to have WhatsApp because it's a platform for for verbal and non-verbal to interact and engage together. Its a easy path than emails
3. Comm Context	1. Usually chat at night because busy with studies during the day. 2. Selected communication partner also works during the day. 3. Were unsure what I meant by where you are when you text. Are you usually in your room at res or home or on campus where there is Wi-Fi or maybe somewhere else?	3/3	1. Can't WhatsApp in formal meetings 2. Can't on the toilet. 3. Agreed with Tapiwa that not in church 4. Or a taxi. 5. Said he supposes one could use it in an emergency situation. 6. Agreed with Boipelo that you could use a voice note in an emergency 7. Agreed with Mayowa who said that you can't use WhatsApp in an emergency as the person might not read it on time	6/7	Anywhere but prefers being in his room. Always has his phone om him. Can use it in a taxi. Felt that someone may not get a WhatsApp in time in an emergency situation.

Appendices

Topics	Individual Response	Confirm	Response in Focus Group	Confirm	Expansion
4. Content and functions of interactions	1. Social life 2. Spiritual life 3. Tracking jokes 4. Also speaks about music and poetry to his friend Bandile	4/4	1. No restrictions in terms of what you can talk about as long as you are comfortable with it. 2. Privacy: Private unless you give permission	2/2	Added: I also use WhatsApp to actually encourage and motivate individual. I can also use it as a tool to preach the gospel of Christ
5. Frequency of Interactions	1. Chats 4 or 5 times a week with comm partner	1/1	N/A		Interacts almost every day with comm partner. Most recent chat 29 turns in total.
6. Speed of Interactions	1. When communicating with Bandile you usually answer within 5 minutes. 2. It depends how long he takes to answer. 3. Sometimes it does matter how long he takes	3/3	N/A		WhatsApp is a quick way of communicating
7. Ease of interactions	1. Easy. 2. Does not have to repeat himself 3. Uses word prediction 4. Uses auto correct 5. Uses spell checker	5/5	1. Word prediction	1/1	Writing and typing are the easiest way of communicating
8. Structure of MIM interactions	1. Uses shortenings 2. Uses emojis 3. Does not care for punctuation 4. Uses capitals for names	4/4	1. Thinks emojis convey your emotions, rather than having to explain yourself how you are feeling. 2. Actions speak louder than words, same with emojis. 3. Shortenings make it easier to type quickly	3/3	Agreed that WhatsApp interactions are short
9. Maintenance and repair of interactions	1. Asks communication partner to rephrase	1/1	No response. Afterwards apologized and said his college work kept him busy	0/0	Said he will say he is lost and ask for clarification
10. Suggestions/ Comments	1. WhatsApp has strengthened his friendship with Bandile	1/1	No response a busy	0/0	Added: WhatsApp has made my voice more clear. Has conveyed my emotions and feelings to people then I were to speak by myself

Total: 52/53 = 98%

 Completed by: Clara Wepener

APPENDIX T: Coding Manual

Code Group Definitions

Code Group Name	Definition
Why: Benefits	What is liked about messaging.
Why: Challenges	What is disliked about messaging.
Who: Communication partners	Individuals who interact with the participants via messaging. And individuals with whom the participants interact who do not use messaging.
Where and when: Convenience	Where and when messaging is used and where and when not.
What: Content	Topics discussed via messages. Including depth and urgency of messages. Including expressive features and structural features in text that are unique to messaging.
How: Ease and rate	Features and strategies used to enhance messaging ease and rate (see category definition).
How: Communication maintenance, breakdown and repair	Maintenance features and strategies that keep the interaction in existence. Occurrence of ineffective interaction and features and strategies used to correct the failure.
Recommendations	Suggestions about messaging (and communication in general) for individuals with CCN.
Focus group experiences	Knowledge gained through involvement in focus group

Category Definitions

Category Name	Definition
Family	Person belonging to the same basic unit in society
Friends	Person attached to another by affection
Romantic partners	Persons involved in a romantic relationship
Romantic interest	Person that arouses special attention
Acquaintance	Person individual is familiar with but not considered a friend
Paid worker	Person paid to render a service
Support groups	Group of individuals with common concerns who provide each other with encouragement
Social groups	Group of individuals who socialize together
Religious groups	Group of individuals belonging to the same faith community
Learning groups	Group of individuals who offer each other learning support
Groups: dynamic	Changes that occur in groups
Partners use same platform	Communication partners using the same means of communication
Language barriers	Barriers because of language differences

Category Name	Definition
Psychosocial barriers	Barriers related to psychosocial differences such as motivation
Social barriers	Barriers related to social differences such as age
Lack of social barrier	Inappropriate social behaviour
No/control over social barrier	Control or lack of control over social involvement of others
No place restrictions	Activity not restricted by place
Private setting	Setting not open to the public
Educational setting	Place of learning, e.g. school, university
Religious setting	Place of worship, e.g. church
Public setting	Setting open to the public
Separate settings	Not in the same physical environment
Same setting	In the same physical environment
Not in private setting	Not used in setting not open to the public
Not in educational setting	Not used in place of learning
Not in professional setting	Not used at work
Not in religious setting	Not used in place of worship
Not in public setting	Not used in place open to the public
Not in same setting	Not used in same physical environment
Financial restriction	Use restricted by cost
Policy restriction	Use restricted by policies of an institution
Environment restriction	Use restricted by factors in the immediate environment
No restrictions	Use not limited
After working hours	Used after work (or place where work was performed)
Emergency	Serious unexpected situation
Parallel interactions	Interacting with more than one person at the same time
Not in emergency	Not used in a serious unexpected situation
Not during working hours	Not used during the hours spent working
Participant's current activity	Activity in which the individual is participating at a given time
Communication partner's current activity	Activity in which the communication partner is participating at a given time
Wide range of topics	Broad selection of topics
No topic restrictions	No limitations on types of topics discussed
Topic: person dependent	Type of topic discussed depends on the communicator
Topic: topic dependent	Type of topic discussed depends on the nature of the topic
Personal matters	Matters of personal concern
Inappropriate topics	Topics that are not deemed suitable by an individual
Social and friendship-related matters	Matters discussed by friends
Relationship-related matters	Matters concerning relationships
Challenges	Something with which an individual struggles
Encouragement	Action of giving someone support

Category Name	Definition
Goals	The object of someone's ambition
Religious and spiritual matters	Matters concerning a person's faith
Needs	Something that is essential
Requests and reminders	Asking for something and reminding someone
Information	Facts provided
School/work-related matters	Information regarding school or work
Privacy important	Essential that information is not made public
Possible to express feelings/emotions	Ability to share feelings and emotions
Emojis used for expression	Emojis that express emotions
Emojis influence tone of message	Emojis used as paralinguistic features
Emojis increase understanding	Understanding of message is increased by emoji
Emojis: specific to communication partner	The meaning of the emoji is determined by the user
Statuses and pictures express feelings	Using the status feature of pictures to convey a message
Capitals show respect	Capital letters used as a sign of respect
Language switching increases understanding	Other language used to improve the meaning of the message for the communication partner
No breakdowns	No communication breakdowns experienced
Occasional breakdowns	Communication breakdown experienced from time to time
Minimum breakdowns	Infrequent communication breakdowns experienced
Spelling/typing errors	Incorrect spelling or typing of a word in a message
Language error	Incorrect language use in a message
Misunderstandings	Understanding a message incorrectly
Device feedback feature	Characteristic specific to the technology
Ask for clarification	Request help to understand a message
Ask for external help	Request other individuals to help
Ask partner to change communication mode	Request communication partner to communicate in a different mode
Timing: Not important	Timing of response not seen as important
Timing: Sometimes important	Timing of response occasionally seen as important
Timing: Matters if urgent	Timing of response matters in times of emergency
Timing: Influenced by urgency of message	Response timing depends on content of the message
Timing: Influenced by current activity	Response timing depends on what the person is doing at the time of receiving the message

Category Name	Definition
Timing: Influenced by skills	Response timing depends on the person's messaging skills
Timing: Influenced by literacy skills	Response timing depends on the person's literacy skills
Timing: Influenced by access	Response timing depends on whether the person has access to the network
Timing: Influenced by data	Response timing depends on whether the person has data
Shortened words	Word that is shorter than the original word but retains the same meaning, e.g. abbreviations
Emojis	Image used in text fields in electronic communication
Lack of punctuation	Not using all standardized marks in written text
Use of punctuation instead of text	Using punctuation marks without written text
Error permission	Mistakes in text that are not regarded problematic
Word prediction	Technology feature that lists word possibilities thus reducing number of key strokes
Enhances rate	Increases speed
Reduces fatigue	Lessens tiredness resulting from activity of messaging
Reduces misunderstandings	Lessens chances of not being understood correctly
Reduces repetition	Lessens recurrence of action to clarify meaning
WhatsApp can be used despite literacy limitations	Reduced literacy skills do not prevent use
Enhanced device features	Technology features are improved to suit all
Unlimited data	Data is boundless
Safety tips	Precautions to ensure individual is not in danger
Physical aspects	Disability-related challenges.
Social aspects	Relationship-related information.
Literacy aspects	Reading and writing of messages. Includes academic aspects.
Financial aspects	Cost-related aspects.
Leisure aspects	Use of free time
Device features	Distinctive aspect of the technology
Communication ease	Effort with which activity is performed
Communication rate	Time taken between interaction turns
Communication speed	Rapidity with which activity is performed
Challenging environments	Problems experienced in specific surroundings