Young People Who Use Augmentative and Alternative Communication: Effects of a Peer E-Mentoring Intervention on Participation in Online Conversation

By

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Thesis

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List of Abbreviations

AAC	Augmentative and Alternative Communication
CA	Content Analysis
CFCS	Communication Function Classification System
CMDA	Computer-Mediated Discourse Analysis
COPM	Canadian Occupational Performance Measure
ESES	Electronic Socio-Emotional Support
ExPRT	Excel Package of Randomization Tests
FFCD	Feedback Using Confirmation or Denial
FPI	Provisions of Information
FPRC	Family of Participation-Related Constructs
GAS	Goal Attainment Scaling
GMFCS	Gross Motor Function Classification System
ICF	International Classification of Functioning, Disability and Health
MACS	Manual Ability Classification System
PND	Percentage Non-Overlapping Data
PODD	Pragmatically Organised Dynamic Display
SBREC	Social and Behavioural Research Ethics Committee
SCED	Single-Case Experimental Design
SEAS	Self-Reported Experiences of Activity Settings
SGD	Speech-Generating Device
TBI	Traumatic Brain Injury
WHO	World Health Organization

Abstract

Young people with complex communication needs are limited in their ability to use speech in everyday communication and may use augmentative and alternative communication (AAC) to support their interactions. Young people who use AAC participate less in face-to-face conversation and have reduced social participation compared with their typically developing peers. Evidence-based interventions targeting increased participation of young people who use AAC are important, because participation is linked to longer-term health and development.

Online conversation was identified as one real-world context for participation where young people who use AAC are not currently participating as much as they would like. Online conversation may offer advantages given its different expectations for turn adjacency and timing. To date, research has not applied discourse analysis to describe patterns of linguistic turns or pragmatic functions in online conversation or how these may reflect changes in participation in online conversation following intervention. Previous research has established the benefits of face-to-face social media use interventions to enhance social media use and social networks of individuals who use AAC. Mentoring was proposed as an alternative approach to providing social media interventions for this group. This study investigated the potential of a cross-age peer e-mentoring intervention to strengthen participation in online conversation of young people who use AAC.

A mixed methods study was employed to investigate the effectiveness of a 4-month cross-age peer e-mentoring intervention to enhance participation in online conversation by young people who use AAC (n = 4, aged 13;4–18;3 [years; months]). Quantitative and qualitative data were collected simultaneously from three groups; the mentees, mentee's care givers, and mentors. Emphasis was placed on quantitative

approaches in the data analysis, and a multiple-baseline single-case experimental design (SCED) was employed to report observed changes in participation in online conversation. Fidelity analysis of the intervention identified that the mentoring was provided according to the research definition.

The primary hypotheses were that improvements in participation in online conversation following the intervention would be observed by: (a) improvements in participants' perception of performance and satisfaction with performance, (b) increase in the total words transmitted in online conversation, (c) positive improvements in participants' self-reported experiences of participation, and (d) increase in optional linguistic moves taken in online conversation.

Mean changes in perceptions of performance and satisfaction with performance indicated clinically and statistically significant ($p < .05$) improvements following the intervention. Statistical analysis of the SCED data demonstrated increases in the number of words written ($p < .05$) and in the optional linguistic moves ($p < .001$) taken in online conversation. Participants rated their experiences of participation in online conversation positively, and their experiences of choice and control increased following the intervention.

This research demonstrated the feasibility of cross-age peer e-mentoring interventions. Findings confirmed that cross-age peer e-mentors provided mentoring support and both mentors and participants experienced positive mentoring relationships and adhered to the mentoring intervention. This study provided important evidence that online conversation can be a valuable real-world context for AAC intervention.

Declaration

I certify that this thesis:

1. does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and
2. to the best of my knowledge and belief, does not contain any material previously published or written by another person except where due reference is made in the text.

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7 February 2020

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Chapter 1: Introduction

1.1 Problem Statement

Communication is vital for human functioning and is acknowledged as a human right (McEwin & Santow, 2018). Although prevalence estimates vary considerably (1.3%–16%), many young Australians experience communication impairments, which affect their functioning in everyday life (People with Disability Australia, 2014). Improving communicative functioning in everyday life is an important goal of speech pathology interventions. However, we know that intervention outcomes in clinical settings may not always be integrated into complex real-world contexts (Adair, Ullenhag, Keen, Granlund, & Imms, 2015; O'Halloran & Larkins, 2009). The International Classification of Functioning, Disability and Health (ICF) provides a unifying framework that considers human functioning at biological, behavioural, and social levels; the framework outlines these levels using the domains of body structure and functions, activity, and participation (World Health Organization [WHO], 2001). A review of children's rehabilitation intervention research highlighted a focus of intervention research within the body structure and functions domain (51%). Less evidence is available for interventions targeting the activity (30%) and participation (5%) domains (Novak et al., 2013). It has been suggested that participation outcomes are most closely linked to quality of life (Cruice, 2008) and that gains in participation in everyday life activities are only achieved when interventions directly target participation (Adair et al., 2015). Together, these systematic reviews (Adair et al., 2015; Novak et al., 2013) indicate a critical gap in the evidence base for speech pathology interventions targeting participation (Novak et al., 2013).

Several of the following paragraphs are adapted from an excerpt of the pre-print version of "Cross-Age Peer E-Mentoring to Support Social Media Use: A New Focus for Intervention Research", by E. Grace and P. Raghavendra, 2019, *Communication Disorders Quarterly, 40*, 167–175. doi:10.1177/1525740118760216

1.1.1 Young people who use augmentative and alternative communication. People with complex communication needs experience restrictions in their communication skills and related limitations in their ability to participate in everyday life (Speech Pathology Australia, 2012; The State of Queensland, Department of Communities Disability Services and Seniors, 2018). Individuals who have complex communication needs are unable to use speech for everyday communication, have difficulties with speech intelligibility, or find it hard to understand other people (Speech Pathology Australia, 2016). These individuals and the people they interact with may use augmentative and alternative communication (AAC) to facilitate their communication skills and participation in everyday life (Speech Pathology Australia, 2012; The State of Queensland, Department of Communities Disability Services and Seniors, 2018). While Perry, Reilly, Cotton, Bloomberg and Johnson (2014) identify that 1 in 500 people in Australia have complex communication needs, People with Disability Australia (2014) reports that in 2008, approximately 1 in 1,600 people in Australia used AAC devices. Young people with complex communication needs require ongoing access to speech pathology interventions to support them in developing the use of alternative modes to express language (ISAAC Australia, 2014). AAC has been defined as, "any type of communication strategy for people with a range of conditions who have significant difficulties speaking" (Speech Pathology Australia, 2016, p. 1). They often use a range of AAC modes to communicate their message, such as speech-generating devices (SGDs), picture symbols, objects, manual sign language, gestures, facial expression and/or body language (Beukelman & Mirenda, 2013). Individuals who use AAC are likely to use more than one mode to communicate their message (Speech Pathology Australia, 2016). They are a diverse group, given that difficulties in communicating using speech alone can be linked to a wide range of developmental and/or acquired conditions, including cerebral palsy, autism spectrum disorder, brain injury, and motor neuron disease (Beukelman & Mirenda, 2013).

Young people who use AAC face difficulties in face-to-face conversation, have poorer literacy outcomes, and experience reduced social participation and friendships (Light & McNaughton, 2015; Raghavendra, Olsson, Sampson, McInerney, & Connell, 2012). The potential benefits of AAC interventions have been documented in a large body of research (Costantino & Bonati, 2014; Schlosser & Wendt, 2008; Therrien, Light, & Pope, 2016). New technologies, such as mobile and tablet technologies, offer even greater communication and participation opportunities for this group (Light & McNaughton, 2015; Shane et al., 2012). However, young people who use AAC participate less in face-to-face conversation, have smaller social networks compared with their typically developing peers, and are more likely to engage in social interactions with family members or paid communication partners than with friends or acquaintances (Bailey & Bunning, 2011; Raghavendra, Olsson, et al., 2012).

It has been well established in the literature that individuals who use AAC experience increased difficulties in face-to-face communication and social interactions compared with their communication partners who do not use AAC (DeRuyter, McNaughton, Caves, Nelson Bryen, & Williams, 2007; Harris, 1982; Light, 1988; Light, Collier, & Parnes, 1985a; Rackensperger, Krezman, McNaughton, Williams, & D'Silva, 2005; Raghavendra, Virgo, Olsson, Connell, & Lane, 2011). This evidence suggests that individuals who use AAC face barriers to participation in face-to-face conversation that are indicated by qualitatively different patterns in the discourse when compared with those of their communication partners.

Social interactions are important for quality of life, health, and communication outcomes (Eriksson, Hochwälder, Carlsund, & Sellström, 2012; Therrien et al., 2016). However, successful interactions with peers requires competence with a variety of modes of communication (Clarke & Kirton, 2003). Clinicians seeking to provide interventions to support individuals who use AAC must consider supporting them to increase their interactions with peers (Therrien et al., 2016). It is likely that interventions targeting interactions with peers will also indirectly target communicative competence, given this two-way relationship between communication skills and peer interactions (Therrien et al., 2016). Further, considering the two-way association between participation and self-perceptions (Imms et al., 2017), increases in interactions with peers may affect the self-perceptions of young people who use AAC, such as how they view themselves as communicators or their confidence when interacting with others. AAC interventions targeting increased interactions have been effective at increasing social participation in this group, but further research is needed to create a stronger evidence base and increase our understanding of the advantages of a social participation focus (Therrien et al., 2016). Social media, using web-based technologies, provides a means for individuals to interact with each other (Chadwick & Wesson, 2016) and could offer different opportunities for young people who use AAC to connect with their peers and others and enhance their social networks (Newman, Browne-Yung, Raghavendra, Wood, & Grace, 2017).

1.1.2 Social media use by young people. A wide variety of social media platforms is available, including photo-sharing applications (e.g., Instagram[1]), video conferencing technology (e.g., Skype[2]), and social networking sites (e.g., Facebook[3]).

Most young people in Australia view the Internet as very important (i.e., > 90% of 12–18-year-old individuals; Australian Communications and Media Authority, 2013). The Internet has a major role in assisting us to communicate with others (Cardoso & Araujo, 2009). Interactions on the Internet and interactions offline are becoming increasingly connected (Chadwick & Wesson, 2016).

A recent systematic review investigated the effects of social media use on the well-being of adolescents who are typically developing. The study found that social media use is associated with substantially increased social networks (Best, Manktelow, & Taylor, 2014). The authors proposed that connections between social media use and improved well-being may be related to the motivation and nature of use. Conclusions of their systematic review recommend that social media use interventions targeting increased well-being should focus on communicative purposes and not non-communicative purposes (e.g., information or entertainment), include platforms that allow for a communicative focus and ensure that individuals have resources and networks available to manage any potentially negative experiences. Related research has suggested that communicative social media use may be a potential intervention approach for individuals experiencing social participation limitations (Best et al., 2014; Brusilovskiy, Townley, Snethen, & Salzer, 2016; Indian & Grieve, 2014; Pittman & Reich, 2016).

Individuals who use AAC experience reduced social networks and may also benefit from using social media. Research focusing on young people with disabilities more broadly has suggested that online conversation with peers may also improve the quality and quantity of social interactions offline (Viluckiene, 2015). Conversely, a lack of access to social media may perpetuate already reduced social participation in individuals with disabilities (Chadwick & Wesson, 2016).

The environmental and social barriers to communication experienced by individuals using AAC are likely to be different when all communication partners in an interaction are interacting through the use of mobile and other technologies. Online conversation creates opportunities to communicate and interact that are not available in the offline world. For example, young people who use AAC may benefit from access to online conversation and interactions, given the reduced time pressure, ability to communicate from a distance and asynchronously, increased independence, ability to be viewed as people apart from their disabilities, increased access to recreational and social opportunities, and increased opportunities for conversation (Hemsley & Murray, 2015; Hynan, Goldbart, & Murray, 2015; Shpigelman, Weiss, & Reiter, 2009a). Young people who use AAC and social media have confirmed these advantages of online conversation and that they are not participating online as much as they would like (Caron & Light, 2017; Hynan et al., 2015).

Young people who use AAC have provided insight into common barriers to participating in online conversation and the supports that enable them. Relying on family members for help to access online platforms, lacking confidence and knowledge, having poor basic literacy skills, lacking available and trusted online communication partners, equipment availability, funding, attitudes, existing policies, and the time-intensive nature of face-to-face intervention to support social media are some of the reported barriers (Grace, Raghavendra, Newman, Wood, & Connell, 2014; Hynan et al., 2015). While individuals who use AAC are interested in support to increase their online activities, they often face restrictions imposed upon them (Caron & Light, 2017). Young people who use AAC and social media also highlight enabling factors, such as intervention support focusing on technological innovations and prior experience as well as support from family, friends, and paid partners (Caron & Light, 2017; Hynan et al., 2015). They are motivated to participate in online conversation such that social media may provide a valuable context for participation-based interventions in this group. Feasibility of this approach to intervention needs investigation.

1.2 Significance

Focusing on real-world contexts or participation-based AAC intervention (e.g., use of social media to connect with friends, order a taxi, or chat with peers at recess) rather than a discrete skill-based focus (e.g., to demonstrate comprehension of a list of words or develop requesting skills) has much support in the literature (Light & McNaughton, 2015). A recent systematic review of research investigating the effectiveness of participation-based interventions theorised a two-way relationship between participation and activity competence such that enhancing participation may predict and support improved skill development (Imms et al., 2016). For example, a focus on supporting participation in conversation may provide skill development outcomes that have traditionally been the direct goals of therapy, such as improved comprehension or literacy skills. In fact, a participation focus would ensure that these skills were developed within a real-world communication context and not as discrete, isolated goals.

Another advantage of learning to use social media might be the motivating context for communication (Light & McNaughton, 2015). Researchers have proposed that individual preferences and self-perceptions may also influence, and be influenced by, participation (Imms et al., 2017). Successful communication involves an amalgamation of skills that requires significant effort for young people who use AAC. The use of motivating real-world contexts enables young people to generate increased personal resources, such as deep concentration and involvement, that may support the success of interventions and generalisation of outcomes. Individuals who use AAC also highlight the important role of psychosocial factors, such as motivation and confidence to communicate, that need to be considered in interventions (Light & McNaughton, 2015; Rackensperger et al., 2005).

Conceptually, cross-age peer e-mentoring interventions may be a useful approach for supporting young people who use AAC to learn to use social media. Research with other populations has suggested that this might be an effective approach (Ahola Kohut et al., 2016; Stewart, Barnfather, Magill-Evans, Ray, & Letourneau, 2011; Stewart et al., 2013; Stinson et al., 2016), although its feasibility and effectiveness has yet to be tested in this population. Given the promising findings demonstrated by the emerging research in this field, further research exploring the benefits of online conversation for this group is a priority.

This study proposed that a cross-age peer e-mentoring intervention for young people who use AAC would enhance their participation in online conversation. This intervention may be an important strategy in enabling future generations of these individuals to take advantage of communication opportunities online.

This is the end of the excerpt from the pre-print version of “Cross-Age Peer E-Mentoring to Support Social Media Use: A New Focus for Intervention Research”, by E. Grace and P. Raghavendra (2019).

1.3 Outline of Thesis

This introductory section to the thesis outlines the need for research investigating participation-based interventions to support young people who use AAC. It presents an overview of online conversation and its potential benefits for individuals who use AAC. The second and following chapter reviews literature across the key areas of the thesis and establishes a framework for the research. Chapter 3 provides a systematic review of cross-age peer e-mentoring interventions for young people with communication disabilities. This systematic review was intended to inform the design of the mentoring intervention. Chapter 4 outlines the methods used in this research and provides a background and framework from the literature relevant to these methods. Chapter 5 outlines the e-mentoring intervention and treatment fidelity measures. Following from this, the results are presented across the next four chapters (Chapters 6–9), aligning with the four research questions. These lead to the discussion (Chapter 10) that provides an evaluation and interpretation of the results for each research question and highlights some key issues emerging from the results. Chapter 11 provides a conclusion summarising the key contributions of this thesis.

Chapter 2: Literature Review

The aim of this chapter is to provide the background and framework for understanding the importance of real-world contexts for intervention, the construct of participation, and the measurement of participation outcomes for young people with disabilities who use AAC with a focus on participation in online conversation. The chapter is presented in two main sections. The first section contextualises the research by providing background information on two key constructs, participation and online conversation. This contextualisation leads to a focus in the second section on participation-based intervention research in two areas: (a) on ways to increase online conversation and (b) on mentoring interventions.

2.1 Participation and Participation-Based Interventions

Participation is defined by the WHO (2001) as "involvement in a life situation" (p.6). This definition highlights how participation involves dynamic interactions between activity, real-life contexts, and the agency of the individual. The ICF Children and Youth Version (ICF-CY; WHO, 2007), developed after the ICF, provides further classifications relevant to infancy, childhood, and adolescence. The ICF-CY framework reinforces the importance of participation of young people in everyday life situations in a similar manner as their peers as an indicator of health and as a fundamental goal for all young people with disabilities (WHO, 2007). These situations include using social media to connect with friends, going on holiday with family, or attending an after-school activity. Participation in everyday life situations is essential for child development and learning, as emphasised by established social theories of development and learning (Bandura, 1977b; Vygotsky & Kozulin, 1986). Further, participation opportunities change as children develop such that development also influences participation (WHO, 2007). Children and young people need opportunities for personally meaningful experiences of participation in positive environments that provide them with a wide range of experiences and opportunities for socialisation, choice, challenge, acceptance, and belonging (Petrenchik & King, 2011). In the longer term, these participation experiences influence an individual's physical and mental health and competence. For example, it is through participation and interaction with the environment that children and young people develop skills, friendships, and their sense of self (Kang et al., 2014). However, mechanisms that influence longer-term developmental outcomes are not yet clearly understood (Palisano et al., 2012; Petrenchik & King, 2011).

Participation-based interventions are recommended based on the widely accepted association between enhanced participation and positive longer-term developmental outcomes (Palisano et al., 2012). Clients of health professionals have an expectation that interventions will influence their functioning in everyday life (O'Halloran & Larkins, 2009). Little research evidence exists to inform clinicians as to the feasibility and outcomes of participation-based interventions (Novak et al., 2013). Participation research has been hindered by differences in the criteria and language defining and operationalising the participation construct (Whiteneck & Dijkers, 2009). It has been suggested that the operationalisation of participation in research is often not consistent with the provided definition of participation, or that definitions are not clearly stated by the researcher (Maxwell, 2012). To clarify the understanding and operationalisation of participation in this research, the following section provides an overview of the ICF framework and identifies key components of participation.

2.1.1 Framework for understanding health, disability and functioning. The WHO (2001) model (Figure 2.1) acknowledges the complexity of biological, behavioural, social, and contextual factors that influence disability, health, and functioning. The ICF is a holistic framework across biological, behavioural, and social (participation) aspects (WHO, 2001). The ICF provides a framework, classification system, and common language that can be used in research. The components of the ICF framework allow for consideration of contextual factors that affect an individual's health and functioning without invalidating the role of body functions and structures (Ma, Threats, & Worrall, 2009; Shakespeare, 2014; WHO, 2001). The ICF proposes complex and interactive multidirectional relationships between the components of disability, health, and functioning (Figure 2.1).

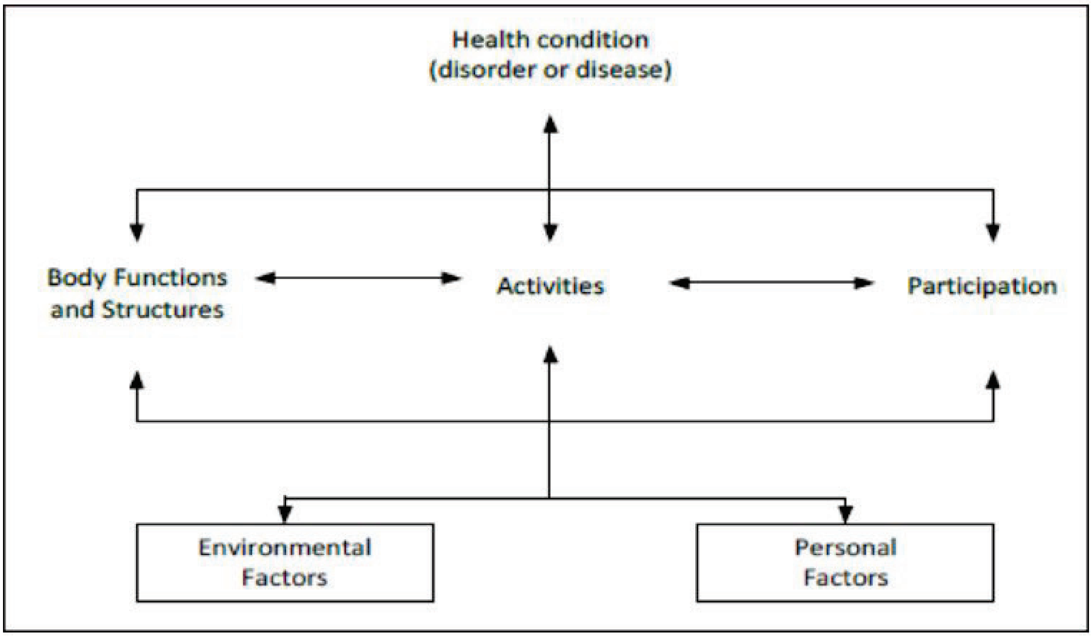


Figure 2.1. Interactions between components of the ICF. From "International Classification of Functioning, Disability, and Health", by World Health Organization, 2001, Geneva, Switzerland: Author, p.6.

This nuanced perspective stands in contrast to the medical, ablest model, which defines disability as biological or impairment based (Berger, 2013; Shakespeare, 2014). The ICF framework similarly counters the social model that proposes disability is defined solely by external factors, or socially imposed barriers (Berger, 2013;

Shakespeare, 2014). This significant framework has brought the construct of participation to the foreground as an important focus for researchers and clinicians.

2.1.2 Participation. Participation has been studied extensively, particularly since the publication of the ICF framework in 2001. In developing the ICF, difficulties arose in the attempt to operationalise participation (WHO, 2001). Activity and participation are represented as two constructs in the framework but are combined into one component of health and functioning. Only one single list of domains (for both activity and participation) is provided by the ICF (WHO, 2001). Further, the only possible indicator of participation included in the ICF is the performance qualifier, which describes the extent of participation restriction or activity limitation (WHO, 2001). For example, difficulty chatting with peers at recess could be rated using this qualifier from 0 (*no problem*) to 4 (*complete problem)*. The ICF-CY manual itself acknowledges this limitation and the need for increased clarity and depth in the definition and operationalisation of participation (WHO, 2007). Therefore, in addition to the definition offered in the ICF, further models of participation were used to inform the understanding and therefore operationalisation of participation in this thesis.

2.1.2.1 Participation: A multidimensional construct. It is widely agreed that participation is multidimensional and varies from context to context and across time (Adolfsson, Granlund, & Pless, 2012; Bedell, Khetani, Cousins, Coster, & Law, 2011; Kang, 2010; Kang, Palisano, King, Chiarello, 2014; Palisano et al., 2012; Seekins, Ipsen, & Arnold, 2007). Many dimensions and determinants have been proposed to shape the construct of participation. Table 2.1 provides a range of definitions that demonstrate these differences. For example, Bedell et al. (2011) and Maxwell (2012) argue that participation has two dimensions: psychological and social (Table 2.1, Figure 2.2). Other authors suggest a larger range of overarching dimensions, such as the five variables that Seekins et al. (2007) listed, namely, rate, variety, duration, intensity, and meaning, or the three dimensions Kang (2010), Palisano et al. (2012) and Kang et al. (2014) propose, namely, self (this was named as the psychological dimension in Kang's (2010) model), physical, and social (Table 2.1, Figure 2.3). Further, the language used to label these dimensions is inconsistent. For example, the term *intensity* is used by some to measure self-engagement or involvement (e.g., Maxwell, 2012) and, conversely, is used by others to measure physical engagement or attendance (e.g., Kang et al., 2014). This inconsistency in the proposed dimensions and terminology presents challenges in operationalising participation.

Figure 2.2. Maxwell's (2012) two dimensions of participation and five dimensions of the environment. From "Bringing More to Participation: Participation in School Activities of Persons With Disability Within the Framework of the International Classification of Functioning, Disability and Health for Children and Youth (Doctoral thesis, Jonkoping University, Jonkoping, Sweden)", by G. Maxwell, 2012, Retrieved from http://hj.diva-portal.org/smash/get/diva2:527984/FULLTEXT01.pdf, p.67. Reproduced with permission.

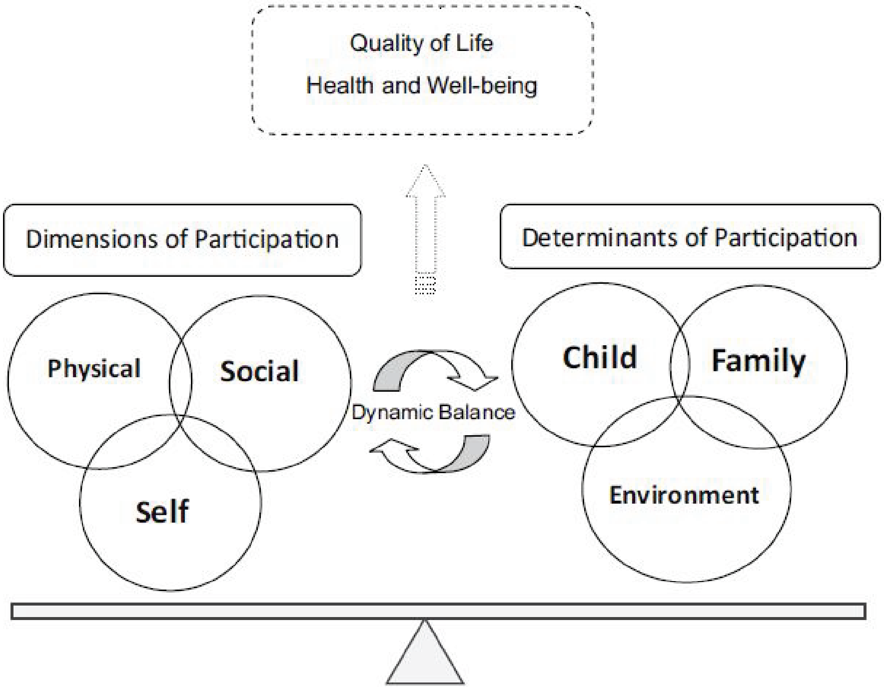


Figure 2.3. A conceptual model of optimal participation of children with physical disabilities. From "A Multidimentional Model of Optimal Participation of Children with Physical Disabilities", by L. Kang et al., 2014, *Disability and Rehabilitation, 36*, p. 1736. Reproduced with permission.

Table 2.1

Definitions of Participation

Quotations					
World Health Organization (2007)	Seekins, Ipsen, & Arnold (2007)	G. King, Rigby, & Batorowicz (2013)	Kang, Palisano, King, & Chiarello (2014)	Bedell, Khetani, Cousins, Coster, & Law (2011)	Maxwell (2012)
Participation is defined as a person's "involvement in a life situation" and represents the societal perspective of functioning. (p. xvi)	We define participation as a series of engagements between an individual and his/her environment, where engagements are instances of activity within an ecological context. (p. 321)	We take the view that optimal participation experiences involve the dynamic interaction of determinants (attributes of the child/youth and activity settings) and meaningful activity engagement. Engagement is a multifaceted construct comprised of affective, cognitive and behavioural aspects which are considered to be a critical mediating factor in development, and to underlie the positive outcomes resulting from activity participation. (pp. 1578–1579)	Optimal participation is defined as ''a personally determined construct, related to the meaning that is associated with and derived from an individual's physical, social, and self engagement in activity and life situations'' Participation involves objective outcomes and subjective experiences that arise from engagement in various activities, as well as the context and environment in which the person participates. (p.1735)	Parents used several terms to define participation, including involvement, being engaged, learning, interaction, competence, showing initiative, being proactive, being responsible for, being committed, persistence, reciprocity, connecting with others, feeling successful, empowerment, active inclusion, belonging, membership, and enjoyment. (p. 768)	Two aspects of participation (frequency of attending and intensity of involvement or engagement) exist as a spectrum of participation related to five environmental dimensions of conditions for participation. (p. 21) These are Availability, Accessibility, Affordability, Accommodability and Acceptability.

2.1.2.2 An activity setting focus for participation. Participation can be understood as a global concept that is measured across all major life areas. This global perspective provides the ability to explore correlations between increased participation and physical or mental health or well-being. For example, large surveys have been used to report participation across all life areas in a given time and investigate factors that may influence participation, such as exploring links between adolescent participation and depression (Desha & Ziviani, 2007). However, global measures of participation are unable to capture the dynamic interactions between specific contexts, the individual, and participation (Kang et al., 2014; G. King, Rigby, & Batorowicz, 2013; Seekins et al., 2007). For example, attributes of the young person and environment are likely to affect participation differently depending on the specific activity and purpose of participation. Further, an activity-specific setting allows the researcher to include both subjective and objective aspects of participation experiences. For this reason, activity-specific measures are proposed to be of most value to researchers investigating outcomes of interventions across time.

Activity settings provide a place and a purpose for participation to occur (e.g., playing netball at the sports centre or shopping at the local market). The physical and social properties of an environment influence an individual's interactions with that environment and consequent participation, and developmental outcomes. Petrenchik and King (2011) propose the importance of environmental affordances in enhancing participation. *Affordances* describe how people perceive that an environment can be used (J. Gibson, 1977). For example, a chair affords a seat or the photocopier room affords opportunities for informal social interaction. Affordances can be experienced differently by different groups of people such that a specific activity-setting may provide advantages for a specific group of people (J. Gibson, 1977). For example, a sensory garden affords individuals with autism spectrum disorder sensory stimulation, and opportunities to develop physical and social skills (Hussein, 2012).

Seekins et al. (2007) proposed an activity-specific measure of meaningful participation that includes eight categories, “place, activity, social contact, barriers, facilitators, secondary conditions, and personal meanings of community connectedness and fulfilment” (p. 321). Seekins et al.’s (2007) dynamic theory of participation proposes that activity leads to participation and that external factors (facilitators or barriers) and personal factors (secondary conditions) influence each instance of participation in that specific activity context (participatory engagement; Figure 2.4). Further, an individual’s feelings of connectedness and fulfilment are influenced by these determinants of participation. This theory highlights the complex dynamic interactions and consequent importance of an activity-specific context for measuring participation changes over time. To develop understanding of the impact of participation-based interventions, an activity-setting focus provides a measurable context for participation interventions and outcomes (G. King et al., 2013). An activity-setting focus provides the ability to measure change in participation over time and is therefore critical in research seeking to investigate participation-based interventions.

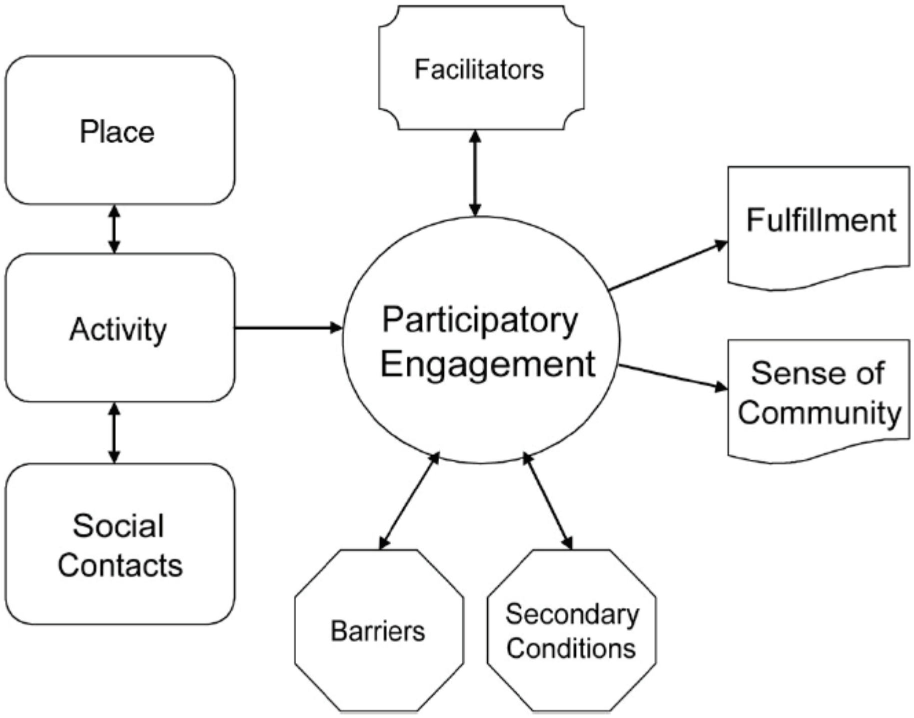


Figure 2.4. The Seekins, Ipsen and Arnold (2007) dynamic theory of participation. This theory proposes that activity leads to participation and that aspects of the environment can function as facilitators or barriers to participation. From "Using Ecological Momentary Assessment to Measure Participation", by T. Seekins, C. Ipsen and N. Arnold, 2007, *Rehabilitation Psychology, 52*, p. 321. Reproduced with permission.

2.1.2.3 Measurement of participation. Measurement of participation provides the ability to describe change in participation following intervention and for development in understanding this complex construct (G. King, 2013). Several approaches to the measurement of participation from an activity-setting perspective have been applied in research (Adair et al., 2015; Chang, Coster, & Helfrich, 2013). For example, approaches have included observation, self-report tools, professional or parent report, interviews, or ecological momentary assessment (Adolfsson et al., 2012; B. Gibson et al., 2014; G. King, 2013; G. King, Batorowicz, Rigby, McMain-Klein et al., 2014; McDougall, Bedell, & Wright, 2013; Seekins et al., 2007). Participation measurement often includes an element of recalling previous experiences, and it has been suggested that in-the-moment measures may provide another perspective on engagement and participation changes (G. King, 2013; Seekins et al., 2007). Ecological momentary assessment involves recording events as they occur through the use of personal computerised devices and is one suggested method of in-the-moment evaluation of participation (Seekins et al., 2007).

Participation can be measured by a count of how often and for how long an individual is present in an activity (Coster & Khetani, 2008). Focusing on the domain of physical engagement or attendance at an activity provides a concrete approach to measuring participation (Coster & Khetani, 2008). This is the most common measure of participation used in the literature to date (Chang et al., 2013). Other aspects of participation, such as social or self-engagement, involve the individual's perspective and are more complex to measure than frequency (Axelsson, Granlund, & Wilder, 2013; G. King, 2013). These dimensions of participation are more abstract than physical engagement but may be important in understanding an individual's participation (Axelsson et al., 2013; G. King, 2013). For example, the important role of social belonging, control, autonomy, working towards a goal, meaning, attention, motivation, fulfilment, and connectedness to the experience of participation may be more critical for developmental outcomes than just being present at an activity (Axelsson et al., 2013; Bedell et al., 2011; Hoogsteen & Woodgate, 2010; G. King, 2013).

Some researchers have conceptualised these domains of participation (outside of attendance) as subjective only (e.g., Maxwell, 2012; Palisano et al., 2011), whereas others have conceptualised participation as a combined objective–subjective phenomenon (e.g., G. King et al., 2013). For example, B. Gibson et al. (2014) used observation, self-report and physiological markers to measure participation and highlight the importance of incorporating rich qualitative data in such measurement. Self-report is important for the measurement of participation. However, authors have also acknowledged the importance and different perspectives of participation reported by parents (e.g., McDougall et al., 2013) or professionals (e.g., Adolfsson et al., 2012). It is clear from this discussion that, given the current understanding, no single measure or method can address all goals of researchers interested in the outcome of participation (Bedell et al., 2011; G. King et al., 2013). This is particularly so, given the limited understanding of how developmental benefits of participation are realised, and therefore, which are the salient aspects for measurement of intervention outcomes (Palisano et al., 2012).

2.1.2.4 Definition and measurement of participation used in this research. A range of approaches to the definition and measurement of participation are present in the literature (Table 2.1). In the context of this thesis, an activity-setting perspective of participation is preferable, rather than a global participation approach. Although it limits the ability to measure and understand global changes, this narrow focus enhances the ability to understand and measure change in participation that may arise from an intervention (G. King et al., 2013). Definitions that include an activity-setting focus (Kang, et al., 2014; G. King et al., 2013) provide a relevant foundation for this thesis since they are consistent with the interest in changes in participation following the implementation of participation-based interventions (Kang, et al., 2014; G. King et al., 2013).

The conceptual clarity provided by Kang et al. (2014) in specifically listing and defining physical-engagement, self-engagement, and social-engagement as the dimensions of participation provides a clear framework for operationalisation of participation. This is used in this thesis to add to the ICF and ICF-CY definitions

(WHO, 2001, 2007). Therefore, to allow for operationalisation across the dimensions of participation and to avoid possible confusion due to inconsistent terminology, the dimensions of participation defined by Kang et al. (2014) in the dynamic interaction model of optimised participation are utilised in this thesis (Table 2.1). **These include:**

- **the physical-engagement or attendance dimension, which can also be described as attendance or diversity of participation, for example, the hours spent in an activity;**
- **the social-engagement dimension, which can also be described as interactions with others (Figure 2.3), such as describing the number, type or nature of interactions with others involved in an activity; and**
- **the psychological or self-engagement dimension, which can also be described as the individual's subjective-experience-of-involvement, such as the sense of belonging or fulfilment when participating in an activity.** [4]

Building on Palisano et al. (2012) and consistent with the definition provided by Kang et al. (2014), a combined objective-subjective understanding of participation has been used in this study.

The literature is inconsistent in the use of the terms *engagement* and *involvement*. In this thesis, the term engagement refers to three types of engagement, as Kang et al. (2014) proposed: physical engagement, social engagement (used interchangeably with the term *social participation*), and self-engagement. The term *involvement* describes all three dimensions of engagement, in the sense that it is applied in the ICF definition: "involvement in a life situation" is participation (WHO, 2001, p. 6). In this research, the subjective-experience-of-involvement is considered interchangeable with the domain of self-engagement and is therefore referred to as self-engagement to avoid misunderstanding. This is consistent with the ICF-CY manual that notes that the subjective-experience-of-involvement is distinct from the overarching term involvement (WHO, 2007).

This approach is similar to that of Axelsson et al. (2013), who defined engagement as expressions of involvement: “engagement is closely related to involvement and can be seen as expressions of involvement within a situation” (p. 523). In summary, to strengthen the measurement of participation-based intervention and to avoid confusion in terminology, the Kang et al. (2014) definition that utilises an activity-setting focus has been chosen in this thesis. This provides an understanding of three types of engagement that when combined allow for measurement of participation or “involvement in a life situation” (WHO, 2001, p. 6) as an outcome of a participation-based intervention.

With respect to the relationship between activity and participation in this thesis, activities are understood as tasks and participation is understood as superordinate sequences of activity that occur in natural contexts and are meaningful for the child (Adolfsson et al., 2012). For example, participation in online conversation includes a series of activities, such as operating the computer, logging in to a social networking platform, browsing, reading a message, writing a message, taking a photo, attaching a photo, and sending a message. Participation is defined as activity-specific, involving objective and subjective elements across physical-engagement, social-engagement, and self-engagement domains (Figure 2.3). Based on this literature review, principles for measurement of participation in this research are proposed as listed in Figure 2.5.

- The ability to capture participation across a range of dimensions to adequately report on the full construct of participation (Kang, Palisaon, King, & Chiarello, 2014; G. King, Rigby, & Batorowicz, 2013; Maxwell, 2012)
- Allowing for an exploration of change over time to allow for describing the impact of the intervention (G. King et al., 2013; Seekins, Ipsen, & Arnold, 2007).
- Providing activity-specific participation data that will reflect the activity-specific intervention provided (Kang et al., 2014; G. King et al., 2013; Seekins et al., 2007)
- Providing self-report and proxy report to increase reliability (Adolfsson, et al., 2012; Bedell, Khetani, Cousins, Coster, & Law, 2011; McDougall, Bedell, & Wright, 2013)
- Providing real-time and retrospective reports to increase reliability (Granlund, 2013; G. King, 2013)
- Using a mixed methods approach to provide a rich source of data (Adolfsson, Granlund, & Pless, 2012; Bedell et al., 2011; G. King, 2013)

Figure 2.5. Principles for operationalising participation applied in this study.

2.1.2.5 Recent developments in definitions of participation. Discussion and theoretical modelling of participation has developed further since the design of this research in 2013–2014. For example, studies by B. Gibson, King, Teachman, Mistry and Hamdani (2017), Chiarello (2017), Imms et al. (2016, 2017), and Adair et al. (2015) were published during the implementation of this project. As identified in section 2.1, a systematic review of randomised controlled trials targeting improved participation for children with disabilities also showed a lack of consistency in the language used by researchers to describe participation (Adair et al., 2015). This finding led to a further systematic review (Imms et al., 2016) investigating the definitions and descriptions of participation used by researchers. The authors (Imms et al., 2016) proposed two key elements for the participation construct, attendance, and involvement. They proposed several other determinants of participation suggested to be related to, but outside of, participation, including preferences, sense of self, and activity competence (Figure 2.6). The interrelationships between activity and participation and other subthemes related to participation were discussed further in a later review (Imms et al., 2017). Researchers proposed the family of participation-related constructs (FPRC; Figure 2.6), which highlights the bi-directional relationships between participation and related constructs and emphasises the importance of understanding participation as both an intervention and an outcome. The view emphasised by this review of participation as an intervention and an outcome is consistent with the understanding of participation and aims of the present study. However, the terminology and definitions proposed by FPRC did not inform this research since these contributions were unavailable at the time the research questions and measures were designed. For example, the definition of involvement and engagement in the FPRC model (Imms et al., 2017) applies a different understanding to the term *engagement*, removing this to outside of the participation construct and defining involvement as a sub-domain of participation, within attendance (Figure 2.7). Therefore, the definitions of participation, involvement, and engagement originally devised have been retained in this thesis.

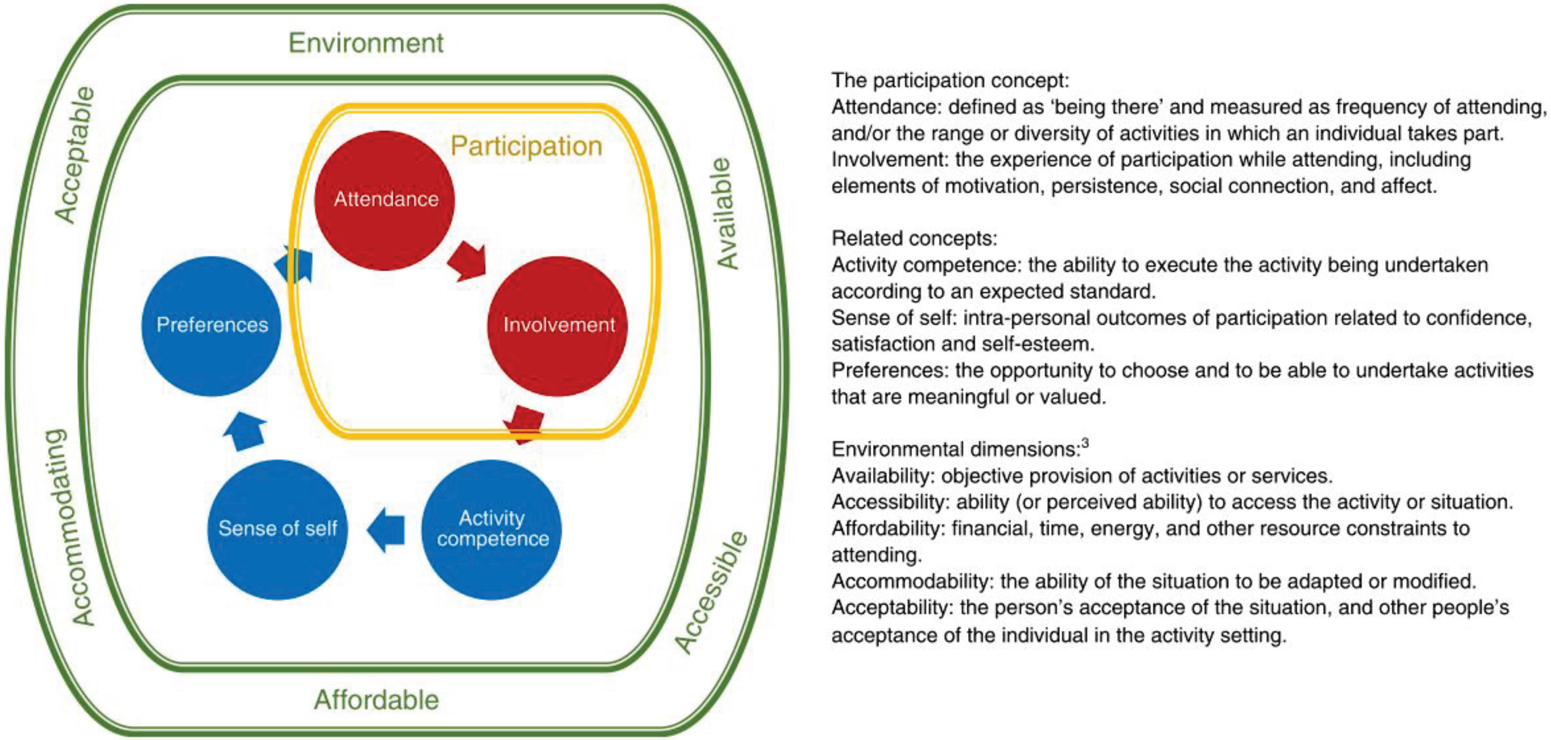


Figure 2.6. Earlier model of participation-related constructs*.* From "'Participation': A systematic review of language, definitions, and constructs used in intervention research with children with disabilities", by C. Imms, B. Adair, D. Keen, A. Ullenhag, P. Rosenbaum and M. Granlund, 2016, *Developmental Medicine and Child Neurology, 58*, p. 36. Reproduced with permission.

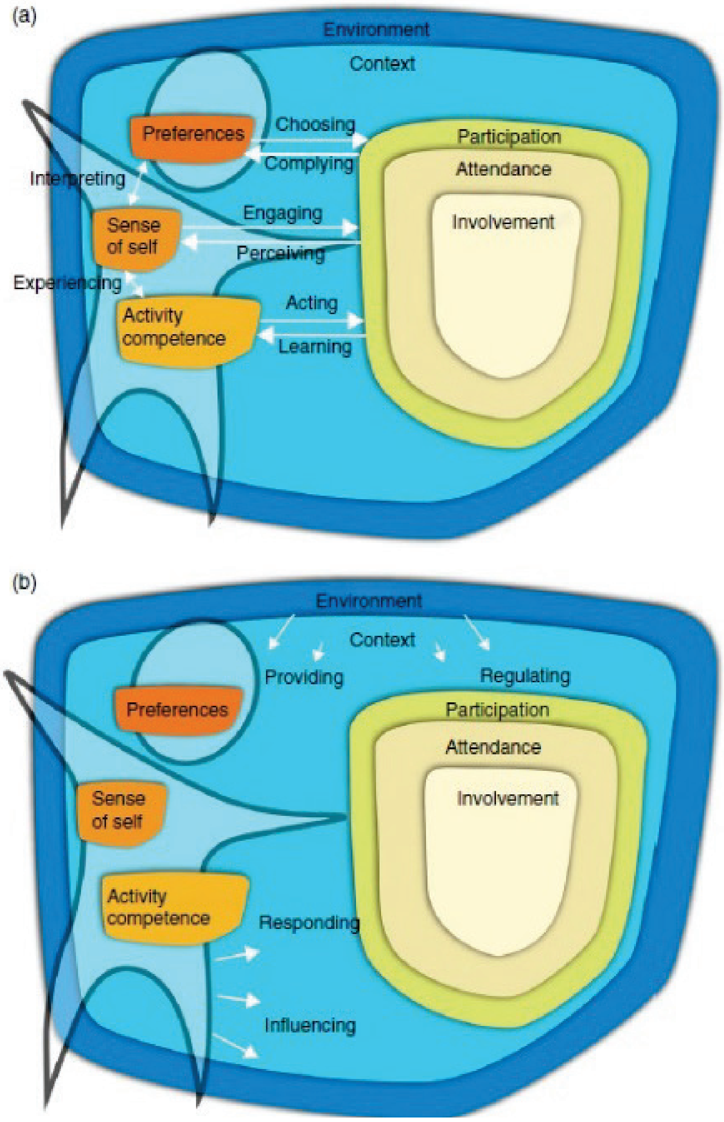


Figure 2.7. Later model of participation-related constructs. From "Participation, Both a Means and an End: A Conceptual Analysis of Processes and Outcomes in Childhood Disability", by C. Imms, M. Granlund, P. H. Wilson, B. Steenburgen, P. L. Rosenbaum and A. Gordon, 2017, *Developmental Medicine and Child Neurology, 59*, p. 19. doi:10.1111/dmcn.13237. Reproduced with permission.

2.1.3 Summary of participation and participation-based interventions. Gains in communication skills made by individuals who use AAC in clinical settings may not always translate to improvements in real-world contexts, such as ability to order food in a cafe, make a telephone call to arrange to meet a friend, or answer questions in the classroom (Adolfsson et al., 2012; Imms et al., 2017; O'Halloran & Larkins, 2009). Researchers and individuals who use AAC have highlighted the importance of focusing on participation-based AAC interventions and related participation outcomes (Anaby, Law, Feldman, Majnemer, & Avery, 2018; Rackensperger et al., 2005). For communication access, intervention targeting barriers to community participation may target increased social engagement in community activities. There has been extensive discussion in the literature regarding the definition and measurement of participation in intervention research. Several principles for the operationalisation of participation are proposed based on this discussion: that measurement of participation include mixed methods, have an activity-specific focus, include both self and proxy perspectives, and the capacity to demonstrate change over time (Figure 2.5). What is not yet clear is the impact of participation-based interventions on participation of young people who use AAC. Further research is needed to create a stronger evidence base and increase our understanding of the advantages of a participation focus for AAC interventions. Online conversation is a real-world context and provides a possible activity-specific focus for AAC intervention research.

2.2 Online Conversation & Social Media Use

Individuals with disabilities are known to experience reduced social participation and friendships compared with their age-matched peers without disabilities (Cooper, Balandin, & Trembath, 2009; Wolowiec-Fisher, 2014). The former group includes young people who use AAC (Raghavendra, Olsson, et al., 2012). Enhancing social participation is important because social activity and connection provide access to opportunities to develop communication, build relationships, and exchange resources (Bourdieu, 1986; Therrien et al., 2016).

Bourdieu's (1986) theory of society suggests that *capital* (economic, cultural, and social) can be understood as potential capacity for groups, such as young people who use AAC, to advance or maintain social position. Capital is embodied by an individual, takes time to accumulate, and reproduces itself (i.e., social capital provides a means to accumulate increased social capital); the distribution of different types of capital controls the distribution or unequal distribution of power and resources across different groups and individuals within society. Young people with disability have reduced access to social capital compared with their typically developing same-age peers (Cooper et al., 2009; Raghavendra, Olsson, et al., 2012; Wolowiec-Fisher, 2014). Social capital is important for quality of life, health, education, and communication outcomes (Eriksson et al., 2012; Olsson, McGee, Nada-Raja, & Williams, 2012; Therrien et al., 2016).

Sellwood (2011) suggests that individuals who use AAC can benefit from the use of telecommunications technologies to support their social interactions and to accumulate social capital. Social media may provide another method by which to accumulate social capital (Newman et al., 2016), particularly given that researchers have found that social media use enhances social capital in other groups who also experience social participation restrictions, such as individuals with intellectual disability (Shpigelman & Gill, 2014b).

2.2.1 A definition of online conversation and social media. A considerable amount of literature has been published on the role of the Internet in everyday life. More specifically, The World Internet Project, an extensive international study, suggests that over the past 20 years, Internet use has moved from a space for knowledge and information to a space for communication and interaction (Cardoso & Araujo, 2009; Ploug, 2009). Such use of the Internet can be broadly categorised as online interaction, which includes activities such as online banking or use of self-diagnostic tools; and online communication or conversation, which includes activities such as emailing or using Instagram (Ploug, 2009). In online conversation, both communication partners are capable of having intentions and it has a sequence of reciprocal responses (Ploug, 2009). An interest in conversation indicates a focus on interaction to maintain social relationships rather than to convey information (boyd, 2008; boyd & Heer, 2006; Brown & Yule, 1983). This approach is similar to understanding of offline conversation (Brown & Yule, 1983). In this thesis, the term *conversation* is used broadly to include multimodal interaction common to online interaction, which includes use of emojis, images, speech, and text for social interaction (Herring & Dainas, 2017). The term *social media* is used in a broad sense to include a variety of media including the following services: Facebook, Gmail,[5] i-message,[6] Instagram, Mail,[7] Snapchat,[8] Outlook.com,[9] Twitter[10], and Skype. Online conversation occurs across a range of technical and social contexts for a range of purposes, including the purposes of socialising, self-expression, and/or political participation (boyd, 2008; boyd & Ellison, 2007).

First, the significance of online conversation as an everyday life context is outlined, followed by a summary of the challenges of the face-to-face environment for conversation for individuals who use AAC and contrasting this with the affordances of the computer-mediated environment for conversation. Subsequently, computer-mediated discourse analysis (CMDA), an approach to researching online behaviour, is described as a tool to measure and increase our understanding of how young people who use AAC participate in online conversation.

2.2.2 Significance of the activity setting of online conversation. Young people in Australia report that online conversation is just as important as face-to-face conversation with their peers (Bartholomaeus, 2013). Online conversation is a common and frequent life situation for young people with typical development. For example, over 95% of all 15–24-year-old Australians use the Internet and 90% access social media (Australian Bureau of Statistics, 2016). A large body of research has investigated the advantages and risks of social media for typically developing adolescents and children. Suggested advantages include socialisation and communication, enhanced learning opportunities, and increased access to health information; risks include cyberbullying, sexting, and depression (Best et al., 2014; O'Keeffe, Clarke-Pearson, & Council on Communications Media, 2011). Other indirect influences and risks have also been the subject of research interest, such as a focus on privacy concerns or concerns regarding the influence of targeted advertising on young people (O'Keeffe et al., 2011).

In Australia, young people with disabilities are less likely to have access to the Internet (86% of individuals aged 15–24 years with a range of disabilities) than their typically developing peers (95% of individuals aged 15–24 years) (Australian Bureau of Statistics, 2011). Further, research has suggested that the ways in which young people with disabilities participate in online conversation are qualitatively different from those of their typically developing peers (Livingstone, Haddon, Görzig, & Ólafsson, 2011). Newman et al. (2016) confirmed that some young people with disabilities experience challenges when trying to increase their access to, and use of, the Internet. They proposed that Internet access and use is shaped by three levels of capital, offline capital, digital capital, and disability-specific digital capital. Young people with disabilities may require complex and personalised supports to access and use the Internet. Therefore, despite the possible advantages of online conversation it is unclear whether these advantages are realised by young people who use AAC.

Utilising the above definitions of online conversation and social media, some potential advantages of online conversation that may apply for individuals who use AAC are proposed in the following section. However, before the advantages of online conversation are described, the participation limitations experienced by individuals who use AAC in face-to-face conversation are outlined. Young people who use AAC are known to experience difficulties in face-to-face conversation; these barriers to conversation are described initially to allow for them to be contrasted against the possible advantages of the computer-mediated environment for conversation.

2.2.3 Participation limitations experienced in face-to-face conversation by individuals who use AAC. Discourse analysis of conversation transcripts has suggested barriers to participation in face-to-face conversation for individuals who use AAC indicated by reduced frequency and length of communicative turns, initiations of communication, and range of pragmatic functions (Harris, 1982; Light et al., 1985a; Pennington & McConachie, 1999). Discourse analysis describes a wide range of techniques used to discover patterns of language in conversation transcripts and describe them (Brown & Yule, 1983). Note that this language-focused approach to discourse analysis is primarily interested in the function and form of language and is distinct from critical discourse analysis, a form of discourse analysis that investigates links between language and social or political power (Seel, 2012). Research investigating these functional language patterns in face-to-face conversation of individuals who use AAC has focused on three primary variables: linguistic turns or conversation flow, pragmatic functions, and modes of communication (Clarke & Kirton, 2003; Light et al., 1985a; Light, Collier, & Parnes, 1985b, 1985c; Lund & Light, 2006, 2007; Pennington & McConachie, 1999). These terms are defined here:

- *Linguistic turns* or *Conversation flow*: Investigating how the participation of one speaker is effecting the participation of the other (Harris, 1982). The boundary of turns is defined by the pause and transfer between speakers (Sacks, Schegloff, & Jefferson, 1974; Sinclair & Coulthard, 2002). These include initiations, optional and obligatory responses, missed turn opportunities, and the rate at which these turns are taken (Light et al., 1985a). A speaker's turn can be affected by previous turns (backward linking; e.g., responding to a direct request) or can affect future turns (forward linking, for example, making a direct request; Sacks et al., 1974; Sinclair & Coulthard, 2002).
- *Pragmatic functions*: Functions represent the purpose or illocutionary force behind the speech act (Searle, Kiefer, & Bierwisch, 1980). The following four major categories of speech act functions have commonly been applied in the field of AAC: social, requests, informatives, and feedbacks (Clarke & Kirton, 2003; Light et al., 1985b; Pennington & McConachie, 1999).
- *Modes of communication*: Modes refer to the medium used to express the communicative act. For example, speech, SGD, and gesture (Clarke & Kirton, 2003; Light et al., 1985b; Pennington & McConachie, 1999).

Children who use AAC take less turns and forgo opportunities for turns in conversation to the extent that their participation in online conversation has been described as "minimal" when compared with their communication partners (Light et al., 1985a, p. 80). Participants in that study were observed to fulfil backward-linking obligations in conversations (e.g., taking obligatory turns when their communication partner has obliged a response) but were less likely to summon forward links (e.g., obliging a response from their partner; Light et al., 1985a). Given that these patterns have been observed in several other studies, communication partners have been described as commonly dominating face-to-face conversation and individuals who use AAC as taking a more passive role (Bailey & Bunning, 2011; Bunning & Ellis, 2010; Harris, 1982). Issues with timing and conservation of effort in face-to-face conversation may contribute to these patterns observed in linguistic turns (Harris, 1982; Higginbotham & Wilkins, 1999). Similar patterns have been observed in analysis of pragmatic functions in face-to-face conversation.

Children who use AAC have been observed to predominately use feedback functions, such as confirmation/denial functions (e.g., responding to yes/no questions) and to use a limited range of functions in face-to-face conversation (Harris, 1982; Pennington & McConachie, 1999). For example, communication partners produce a higher proportion of questions and informatives (Light et al., 1985a; Pennington & McConachie, 1999). Further, individuals who use AAC commonly contribute single turns over a sequence of turns through the process of collaborative construction (Waller & O'Mara, 2003). Light et al. (1985a) report that children who use AAC do not request information or clarification. These patterns in communicative functions may be attributed to issues of timing and conservation of effort; more complex functions may take both increased time and effort (Light et al., 1985a). The extent to which these patterns may be influenced by the conversation partners' behaviour and the purpose of the conversation and/or topics of conversations included in research designs is not yet clear (Clarke & Kirton, 2003; Light et al., 1985a; Pennington & McConachie, 1999). Researchers have suggested that communication partners may dominate not only the turns but also the communicative functions present in interactions (Light et al., 1985a; Pennington & McConachie, 1999).

Researchers have illustrated that during observations, children who use AAC have made infrequent use of SGDs in preference to vocalisation and gesture (Harris, 1982; Light et al., 1985c; Pennington & McConachie, 1999; Smith, 1996). Children who use AAC have been observed to select a range of modes depending on the environmental context and purpose of the communicative act (Light et al., 1985c). Light et al. (1985c) highlight the importance of multimodal interactions for individuals who use AAC. They suggest that these individuals may benefit from interacting with communication partners who also use their AAC modes (Light et al., 1985c). In this context, communication partners can act as a model for making appropriate mode choices (Light et al., 1985c).

Clarke and Wilkinson (2009) illustrate that individuals who use AAC experience unequal participation in face-to-face conversation. It is likely that the reduced discourse participation patterns and predominately responsive turns observed in individuals who use AAC affect their opportunities to develop communication skills and participate in social interactions. Young people who use AAC have been identified as at risk of increased loneliness, given the difficulties they experience in face-to-face conversation (Cooper et al., 2009). Studies investigating their participation in recreation have confirmed that children with who use AAC participate in fewer activities, with less people, in fewer locations than their typically developing age-matched peers (Raghavendra, Olsson, et al., 2012; Thirumanickam, Raghavendra, & Olsson, 2011). With these participation restrictions experienced by individuals who use AAC in face-to-face conversation in mind, the following section proposes some potential advantages of the affordances of online conversation for individuals who use AAC.

2.2.4 Affordances of online conversation. The ecological context of online conversation is different from that of face-to-face conversation, considering that the digitalisation of the interaction reduces the amount of information exchanged at a given time (Ploug, 2009). It has been proposed that affordances of the computer-mediated environment can be used to explain the rise in popularity of online conversation globally (boyd, 2014; Herring, 1999). Affordances in the environment can be linked to a range of outcomes, positive or negative, such that a single environmental condition may lead to a range of outcomes. For example, online conversation provides persistence where the transcript of the conversation remains permanently available over time. This affordance is distinct from the transient nature of speech in face-to-face conversation. This may be experienced as an advantage allowing conversations to take place over a longer time or aiding comprehension, or may be experienced as a disadvantage, reducing privacy. This perspective has been useful in computer-mediated-communication research to enhance understanding of how the computer-mediated environment can be viewed both as a restriction and as an improvement to social interaction (Fragoso, Rebs, & Barth, 2012; Herring, 1999).

2.2.4.1 Proposed affordances of online conversation for individuals who use AAC. The following section outlines how the features of the online environment may provide an advantage for young people who use AAC. Several affordances (Table 2.2) are proposed that may apply for individuals who use AAC when they participate in online conversation, including persistence, anonymity, linguistic economy, spreadability, searchability, locatability, and availability (boyd, 2014; Herring, 1999). The proposed affordances for these individuals are linked to the related technological features of the computer-mediated environment (Table 2.2).

Table 2.2

Suggested Advantages of the Computer-Mediated Environment for Individuals who use AAC

Technological Features[a]	Affordance	Proposed Advantage of the Affordance for Individuals who use AAC
Synchronicity Persistence of transcript Message format	Persistence	Young people who use AAC may not be logged on at the same time but can still participate in conversation at their own pace.
Message transmission (1-way vs. 2-way)	Control	Message transmission is often 1-way which means that it is impossible for the communication partner to interrupt while during message composition. Further, simultaneous feedback is lacking.
Anonymous messaging	Anonymity	Ability to be viewed without communication partner having knowledge of use of AAC, allowing for increased control over self-representation.
Private messaging	Privacy	The computer-mediated environment may provide some individuals who use AAC with increased opportunities to have a conversation with increased independence and privacy.
Size of message buffer	Economy/Flexibility of language	The linguistic expectations of online conversation increase economy and flexibility of language use. Communication with less keystrokes is an advantage for individuals who experience a reduced rate of communication.
Quoting	Spreadability	Forwarding messages means that individuals who use AAC can use content previously available to increase their presence in online conversation.
Filtering	Searchability	For example, searchability may make it possible to connect with other members of a small community regardless of geographical location.

Table 2.2. Continued

Technological Features[a]	Affordance	Proposed Advantage of the Affordance for Individuals who use AAC
Channels of communication	Multimediality	Individuals are able to augment text-based communication with other "channels" or modes of communication.
Linking	Visibility Communal Interactivity	Online conversation can include the use of friending, like or favourite linking. This provides a single-click option for participating in online conversation, creating or building connections with others.
Geo-tagging	Locatability	Individuals who use AAC can use location tagging to add information to their message without writing original content.
Mobile device access	Portability Availability	Mobile devices often present challenges in accessibility. However, mobile devices and unlocked AAC systems provide increased accessibility and availability to information and online conversation.

Note. Affordances of portability & availability may be linked more specifically to the nature of the Internet connection than the social media environment. [a]Technological features of the computer-mediated environment have been proposed in "Computer-Mediated Discourse 2.0.", by S. Herring and J. Androutsopoulos, 2015, in D. Tannen, H. Hamilton and D. Schiffrin (Eds.), *The Handbook of Discourse Analysis* (2nd ed, pp.127–151). Chichester, United Kingdom: Wiley.

Several affordances of the computer-mediated environment have been proposed to especially apply to individuals who use AAC. One approach to better understand online conversation is to investigate linguistic patterns in the discourse. A summary of research investigating approaches to discourse analysis of online conversation is provided in the following section.

2.2.5 Computer-mediated discourse analysis (CMDA). Researchers interested in investigating online conversation have developed new approaches for discourse analysis that allow for consideration of the computer-mediated context of the interaction. Early theorists suggest that the restricted computer-mediated environment accounts for differences in the use of language for online conversation as compared with language use in face-to-face conversation (e.g., Crystal, 2006; Murray, 1988). Investigation of interactions online resulted in conflicting findings, which has led to a focus on the influence of social and technical factors on online conversation. A socially situated perspective is useful in understanding discourse used in online conversation. In this approach, conversations in a computer-mediated environment are viewed not merely as technological transmissions of data but as interactions intertwined in social and cultural life (Chadwick & Wesson, 2016; Fragoso et al., 2012; Silverstone & Osimo, 2005). Herring's multifaceted approach is a socially situated classification scheme used in this thesis to assist in understanding the different types of computer-mediated discourse (Herring, 2007). In this approach, it is assumed that facets of the technical and social context influence the use of language in online conversation (Herring, 2007; see Appendix A). The classification approach recognises two overarching influences on discourse patterns in online conversation, technological or medium-related factors and situation or social factors (Table 2.3), and is discussed further in the method section of this thesis (Section 4.7.4). Both socially related factors and technologically related medium factors are more fluid than first purported by this classification framework (Herring & Androutsopoulos, 2015). For example, one medium can be used to engage in online conversation both synchronously and/or asynchronously making dichotomous classifications problematic. Regardless, this approach remains of value to researchers seeking to describe computer-mediated communication contexts (Bolander & Locher, 2014; Herring & Androutsopoulos, 2015).

Table 2.3

Faceted Classification Scheme for Computer-Mediated Discourse (Herring, 2007)

Medium-Related Factors	Situation Factors
Synchronicity	Participation structure
Persistence of transcript	Participant characteristics
Message format	Purpose
Message transmission	Topic or Theme
Anonymous messaging	Tone
Private messaging	Activity
Size of message buffer	Norms
Quoting	Code
Filtering	
Channels of communication	
Linking	
Geo-tagging	
Mobile device access	

2.2.5.1 Describing patterns in computer-mediated discourse. In online conversation, as in face-to-face conversation, language not only conveys meaning but also performs actions (Brown & Yule, 1983; Herring, Das, & Penumarthy, 2005). CMDA is a methodological tool used to investigate online conversation, including describing changes across time (Herring & Androutsopoulos, 2015). This approach to understanding discourse patterns in online conversation uses language-focused content analysis (CA) applying principles of traditional discourse analysis (Brown & Yule, 1983) used for face-to-face conversation to online conversation (Herring & Androutsopoulos, 2015). The basic assumptions of discourse analysis and CMDA, are that patterns are evident in conversations and that these can be viewed by applying a language-focused approach (Herring, 2004a). Given the traceable nature of online conversation and increasing uptake in everyday life, extensive research has been conducted to investigate discourse behaviours in online conversation across a broad range of fields, such as online learning environments, second language acquisition, journalism, management, and sociology (Herring & Androutsopoulos, 2015). Further, transcripts of online conversation are more accessible than face-to-face communication and provide increased opportunity for naturalistic linguistic analysis of conversation, which has been suggested as a revolution for linguistic-based discourse analysis (Hentschel, 2010; Herring, 2004a). CMDA can be applied across four levels of language: structure (form), semantics (meaning), interaction, and social (Herring, 2004b). Notably, this approach is distinct from critical discourse analysis, a form of discourse analysis that investigates links between language and social or political power (Seel, 2012). Critical discourse analysis and CMDA resemble each other only at the social level of CMDA analysis, for example, the influence of gender on dominance of the conversational floor in online chat (Herring, 2010).

In this thesis, the focus is on structure, meaning, and interaction and not on the social domain, which is appropriate, given the conception of the thesis within a clinical paradigm. Speech pathologists and health-based interventions typically focus on supporting communication outcomes within the meaning, structure, and/or interaction domains, and not social domain outcomes such as power dynamics or role of gender (Worrall & Egan, 2013). These levels of language have also been of interest to researchers investigating face-to-face conversation of individuals who use AAC, as described in the earlier section (Clarke & Wilkinson, 2007, 2008; Engelke & Higginbotham, 2013; Higginbotham & Wilkins, 1999; Pennington & McConachie, 1999; Robillard, 1994; von Tetzchner & Martinsen, 2008).

2.2.5.1.1 *Structure.* Several structural features are particular to online conversation and do not occur in face-to-face conversation, such as hashtags (Page, 2012), multimedia (Chen, Bentley, Holz, & Xu, 2015; Herring & Dainas, 2017), non-standard typography (Dresner & Herring, 2010; Dunlap et al., 2016), split turns, and improper grammar (Herring, 2012). It is proposed that these unique structural features of language in online conversation demonstrate an ability to adapt conversation to suit the medium (Condon & Čech, 2010; Herring, 2001). For example, these changes have been suggested to represent economy of effort (Cho, 2010), and a playful approach to language use (Dresner & Herring, 2010; Georgakopoulou, 2011; Herring, 2013b), or provide a representation of emotional and auditory information in online conversation (Herring, 2001). The expectations for the structure and syntax of language are relaxed in the online environment, and this also applies to other aspects of the interaction (e.g., expectations for relevance and coherence; Herring, 2013b) and vary according to the medium factors (e.g., expectations for the timing of a response; J. Anderson, Beard, & Walther, 2010; Ko, 1996). In online conversation, a range of multimedia modes (e.g., sending photos or hyperlinks) are integral to the narrative of the discourse and for this reason, it is recommended that all modes are included in the analysis of online conversation (Bourlai & Herring, 2014; Chen, Bentley et al., 2015).

The use of mean utterance or turn length can be problematic in online conversation analysis because linguistically transmissions may include one, or more, or less "utterances". Analysis of online multiparty chat transcripts by Baron (2010) identified that almost half (42%) of the sequences took place over more than one transmission.

For example:

Joan: "that must be nice"

Joan: "to be in love" (Baron, 2010, Table 2, p. 7)

As regards transmissions of college students participating in a synchronous online chat, approximately 20% were single words and just 21 words per minute were exchanged (Baron, 2010). This research, although investigating a synchronous medium, also reported on time lag with some transmissions occurring after a gap of 31 seconds to 5 minutes (Baron, 2010). Mean transmission length was 5.4 words. Similarly, Condon and Čech (2010) reported an average of 6.31 words per transmission. Users adapt their language to suit the online context. This affects not only the structure of the discourse but also the meaning and interaction patterns.

2.2.5.1.2 *Meaning.* In CMD, as in face-to-face interaction, individuals produce transmissions that aim to convey a particular meaning. A categorisation of pragmatic functions occurring in computer-mediated conversation has been proposed by Herring et al. (2005) using previously established categorisations of pragmatic functions in face-to-face conversation (Bach & Harnish, 1979; Francis & Hunston, 1992). This taxonomy lists 16 functions that can each be further defined as bona fide or non-bona fide (e.g., the latter includes the use of humour or irony; e.g., Das & Herring, 2015). Investigations of pragmatic functions in online conversation also include investigations of the role of non-standard orthography and humour in online conversation (Herring, Stein, & Virtanen, 2013). Several researchers have investigated the pragmatic role of emoticons, suggesting a role beyond expression of emotion or facial expression (Dresner & Herring, 2010; Vandergriff, 2014). This research has been extended to include other graphical means of computer-mediated-communication, such as stickers, GIFs, videos, and photos (Herring & Dainas, 2017). As in face-to face conversation, contextual factors and the overarching purpose of the communication shape the functions of text and graphical communication in online conversation (Dresner & Herring, 2010; Herring & Dainas, 2017; Vandergriff, 2014). Similarly, these technical and social factors influence turn-taking strategies and coherence in online conversation (Condon & Čech, 2010).

2.2.5.1.3 *Interaction.* In computer-mediated communication, the typical expectations for turn-taking patterns are adapted to suit the environment (J. Anderson et al., 2010; Condon & Čech, 2010). For example, in text-based computer-mediated communication, related utterances are not expected to be adjacent, particularly in group conversations (Herring, 1999). Disrupted adjacency typically does not disrupt the meaning of the conversation since multiple threads of conversation can occur within the one transcript, and participants can reconstruct these using the persistent transcript and speakers can use a range of strategies to improve coherence (Schönfeldt & Golato, 2003; Simpson, 2005). Further, in online social conversation disruptions to adjacency can provide an avenue for humour and a playful approach to conversation (Herring, 2013b). Quoting is one strategy that can improve coherence in group conversations where participants quote directly from the online transcript when responding (Herring, 1999). Quoting can be used for a range of purposes, such as sharing information quickly or increasing participation in conversation (boyd, Golder, & Lotan, 2010; Puschmann, 2015). In some contexts, online conversation may increase participation when compared with similar face-to-face contexts, such as classroom environments where turn-taking expectations are more clearly defined (Lobel, Neubauer, & Swedburg, 2005).

2.2.5.2 Significance for individuals who use AAC. It is unclear whether challenges experienced by individuals who use AAC in face-to-face conversation may be reduced in online conversation, given the different values about what constitutes an "ideal conversation" in the online environment (Herring, 2013b, p. 263). For example, online conversation offers possible affordances, given the different expectations for turn adjacency and reduced rate, and small number of words per transmission in online conversation. Additionally, online conversation offers the ability to use quoting, split turns, non-standard orthography and grammar, and multimodal modes for communication. Conversely, the online context may have disadvantages, such as the lack of contextual cues that in face-to-face conversation allow for informal contributions to the interaction (Clarke & Wilkinson, 2007). To date, no study has investigated online discourse behaviours of individuals who use AAC. Further, very limited research has investigated online discourse behaviours of individuals with communication disability or disability more generally. For this reason, the research summary below includes both speculative and observational studies investigating online conversation involving young people with disabilities and more specifically young people who use AAC.

2.3 Investigations of Internet use, social media use and online conversation of people with disability.

Researchers have utilised cross-sectional surveys (i.e., Lathouwers, de Moor, & Didden, 2009; Raghavendra, Wood, Newman, Grace, & Jose, 2011; Raghavendra, Wood, Newman, Lawry, & Sellwood, 2010) to explore the ways that individuals (aged 10–18 years) with cerebral palsy, muscular dystrophy, acquired or traumatic brain injury (TBI), and other physical disabilities use the Internet. Lathouwers et al. (2009) compared responses by Dutch adolescents with physical disability (*n* = 97) with those of adolescents who were typically developing (*n* = 1566) utilising a previously completed similar survey (Duimel & De Haan, 2007). This comparison suggested that individuals with physical disability use the Internet for a similar period as their typically developing peers (M = 2.05 hours per day, up to 8 hours a day). However, the report by Lathouwers et al. (2009) does not include comparison data for hours spent online. Raghavendra et al. (2010) surveyed adolescents with physical disabilities about their

Internet use, and all 50 respondents reported that they used the Internet. A later survey (Raghavendra, Wood, et al., 2011) of adolescents with acquired brain injury found that the rate of Internet use (96% of 29 respondents) was similar to that of the general population. These surveys suggest that individuals with physical disability are using the Internet, although the results reported may reflect a bias where respondents may have been more likely to use the Internet and participate in online conversation than non-respondents (Lathouwers et al., 2009; Raghavendra et al., 2010). Further, these surveys do not provide more specific information about the nature of social media use or participation in online conversation by adolescents with disabilities.

Cross-sectional surveys are unable to provide in-depth understanding of Internet use, social media use, and participation in online conversation. Nevertheless, the results of these early studies suggested some possible qualitative differences in the ways that adolescents with physical disabilities use the Internet when compared with their peers without disabilities (Lathouwers et al., 2009; Raghavendra et al., 2010). For example, Lathouwers et al. (2009) suggested that individuals with physical disabilities experience more parental restrictions on Internet use than their peers without disability. Raghavendra, Wood, Newman and Lawry (2012) conducted follow-up interviews with 15 survey respondents to explore patterns of Internet use further. Participants reported a range of facilitators and barriers to Internet use. The former included support from friends and family and assistive technology, and barriers included a lack of family resources, poor accessibility to the computer and social media sites, and parental rules. The authors concluded that respondents used the Internet to a lesser extent than the general population (Raghavendra, Wood, et al., 2012). Further research using methods that enable a deeper understanding of participation patterns is warranted. An understanding of participation on the Internet, social media, and in online conversation may inform interventions to support adolescents with physical disabilities in using the Internet and highlight the potential risks and benefits of these interventions.

Two reports have surveyed participation on a social network site specifically for individuals with disability (Third, Kelly-Dalgety, & Spry, 2013; Third & Richardson, 2009). Livewire connects young people (aged 10–21 years) with “serious illness, chronic condition, or disability”. The 2009 report included 52 members of the community and the later 2013 study included 73 members (Third et al., 2013, p. 8; Third & Richardson, 2009). The 2009 report found participants experienced advantages of participation in conversations via Livewire, including reduced social isolation, enriched friendships, and peer support. Participants used the Internet for a variety of activities but reported being online for up to 4 hours per day and identified chat, social networking, and email as the most important online activities (Third & Richardson, 2009). When compared with other young people their age, Livewire members were found to be very safety conscious and less “experimental” online and less likely to use mobile technologies for online conversation (17% never used a mobile phone and 39% less than once a day). Members of the community valued the ability to interact with peers who shared the same serious illness, chronic condition, or disability and could therefore “relate to their circumstances” (Third & Richardson, 2009, p. 2). Respondents reported being online to the same extent as the general population, although it is possible that members of the Livewire site have increased support to use the Internet compared with their peers with disabilities who are not accessing this site. The findings confirm that young people with disabilities perceived advantages to participation in online conversation. The evidence reviewed here suggests possible benefits of interventions to support young people who experience difficulties participating in online conversation.

Lewis (2010) interviewed adults with cerebral palsy to investigate their use of social media; 13 of the 14 interviewed used social media. Some of the participants in this study used AAC; however, information regarding the number of participants with communication disability is not provided. Participants interviewed reported using Facebook for up to 6 hours a day to keep in touch over distance and organise face-to-face meetings. They reported several advantages of online conversation, such as reduced isolation and increased independence and privacy than possible in face-to-face conversation. Conversely, participants also reported concerns with privacy and trust in online conversation. Facilitators to online conversation included family and friends, assistive technology, and troubleshooting support. Barriers included a lack of accessibility, training, confidence, slow text input, and the fast-paced changes common in Web 2.0 environments meaning that access via assistive technology was constantly changing. Shpigelman and Gill (2014a) surveyed 172 adults (aged 20–39 years) with a range of disabilities regarding their use of Facebook; very few (*n* = 6, 3.5%) indicated that they experienced communication disabilities. Respondents indicated that they use Facebook at least once per day for up to 30 minutes. They reported similar advantages and barriers of online conversation to those reported by adults with cerebral palsy interviewed by Lewis (2010); namely, that Facebook use enabled increased connections with existing friends and reduced loneliness, but they experienced difficulties and stress regarding the privacy and accessibility of Facebook conversations. A further online survey specifically included adults with intellectual disability (*n* = 58). Shpigelman and Gill (2014b) reported further barriers, including the need for increased visual supports to reduce literacy-based barriers. Shpigelman (2016) also interviewed and observed 20 adults with intellectual disabilities who reported that Facebook use contributed to their sense of belonging and well-being. These experiences reported by adults with disabilities are similar to the reports of young people with disabilities. However, it is unclear whether individuals with communication impairments or those who use AAC have similar experiences. Further, these studies have not directly investigated discourse patterns in online conversation.

Durkin and Conti-Ramsden (2014) investigated discourse patterns in email messages of 16–17-year-old individuals with language disorder and compared these with those of individuals without language disorder. Emails sent by the two groups were similar in structural features, such as number of words. However, they were qualitatively different; for example, emails written by individuals with language disorder included more spelling and grammatical errors and were rated by blind raters at a lower standard of language quality than the other emails. Similar research investigated text language of adolescents with and without language impairment and found that the former used shorter texts and less “textisms” than their typically developing peers and were less likely to send a response to a text message than their typically developing peers (Durkin, Conti-Ramsden, & Walker, 2011, p. 55). This finding confirmed that individuals with language disorder have unique discourse patterns in online conversation compared with individuals without language disorder. The findings are valuable in confirming the potential advantages of intervention programmes to facilitate participation in online conversation by adolescents with language disorder. The researchers focused on the ability to identify individuals with language disorder based on their online transcripts and on grammatical correctness in email conversations. Grammatical errors in online conversation may not be perceived negatively by communication partners, given the reduced expectations for grammatical correctness in the online environment (Herring, 2012), and therefore, although language disorder affected the grammatical correctness of the discourse, the potential impact of language disorder on participation in online conversation is unclear. Future research investigating patterns in online discourse with a focus on participation in interaction, rather than grammatical correctness, is warranted. For example, investigation of linguistic moves (e.g., initiations of topics) and functions (e.g., social functions, providing information and making requests) rather than focusing on grammatical correctness of the discourse.

A review by Kilov, Togher, Power, and Turkstra (2010) demonstrated a lack of research investigating online conversation of young people with TBI. The authors highlighted a need for studies to identify discourse patterns in online conversation of young people with and without TBI to assist the development of intervention programmes to facilitate participation in online conversation by youth with TBI. This review identified a PhD dissertation that developed a protocol and analysed email transcripts of an adult with TBI over three years (1995–1998; Prichard, 2000). The approach to analysis covered four areas: T-unit analysis, cohesion analysis, correct information analysis and communication behaviour ratings (Prichard, 2000). The relevance of grammatical error count or T-unit focus in analysis of online transcripts may not be as applicable in online conversation in social media environments, where there is a lack of focus on grammatically correct productions (boyd, 2014; Herring, 2012). A focus on transmissions as turns in interactions that are socially situated would place less emphasis on grammatical correctness of the contributions and instead focus on the function and flow of the turn in the conversational context.

From the above studies, it appears that young people with varying disabilities are using the Internet and perceive benefits from participating online. It has been suggested that even those who use the Internet at a similar rate to their peers without disabilities are experiencing qualitative differences in their participation online. Future research investigating patterns of participation in online conversation, facilitators and barriers is needed. Researchers investigating possible interventions to support online conversation in this group have highlighted the importance of including analysis of online discourse patterns. Further, specialised research investigating the experiences of individuals who use AAC is needed to understand whether these findings also apply to this group.

2.3.1 Investigations of online conversation of young people who use AAC. Early studies discussing and investigating the benefits of the Internet for young people who use AAC acknowledged several benefits of email and the Internet in increasing the ability for people who use AAC to access and use information (Atanasoff, McNaughton, Wolfe, & Light, 1998). Results of a survey by Atanasoff et al. (1998) reported young university students who use AAC found email was the most effective way to communicate with others. Early research suggested benefits of online conversation included support for social and academic interactions, increased control, improved self-image, employment opportunities, and the ability to participate in a wider range of activities (McNaughton, Light, & Arnold, 2002; M. Williams, 1995). Later, Rackensperger et al. (2005) highlighted the importance of developing digital independence in young people who use AAC. They proposed that access to the Internet had the potential to enhance education, independence, and future opportunities for young people who use AAC. Rackensperger et al. (2005) suggested that others with online skills were well positioned for developing strategies and resources to enable future generations of young people who use AAC to experience success online and develop their motivation for digital independence. The promise and opportunities of mobile devices, apps, and social media for young people who use AAC were again highlighted in a white paper on this issue (The Rehabilitation Engineering Research Center on Communication Enhancement, 2011). Further speculative papers have referenced the potential of online conversation to help overcome communication restrictions (Blackstone, Williams, & Wilkins, 2007; Cohen, Bryen, & Carey, 2003; Dattilo et al., 2008; DeRuyter et al., 2007; Rackensperger et al., 2005; Todis, Sohlberg, Hood, & Fickas, 2005). Observational and experimental research is needed to confirm these theoretical speculations regarding the potential advantages of online conversation for individuals who use AAC.

Cohen et al. (2003) reported on an employment skills programme for young people who used AAC that applied an e-coaching intervention over 1 year. This programme was developed to target skills to assist participants in achieving full-time employment. The project had a significant focus on coaching to develop skills in using the Internet and in self-promotion via the Internet. For example, technical skills in connecting an AAC device and computer, using email, posting a resume online, or registering for an online chat service. The authors commented that e-coaching appeared to be motivating, effective, and efficient for participants who found it difficult to access face-to-face training owing to difficulties accessing transport and the need to work at a slower pace. They confirmed that participants perceived advantages of using online conversation to communicate with an e-coach. Further research building on this work conducted by these authors is described in Section 2.5.3.2 of the thesis (Cohen & Light, 2000). The research did not include a focus on discourse patterns in online conversation or the potential of online conversation outside the e-coaching support, such as to increase social participation.

The Internet has been used as a tool for collecting research data from people who use AAC. For example, several studies have used email interviews or online focus groups as a methodology for gathering data from these people (e.g., McNaughton et al., 2002; Rackensperger et al., 2005). Numerous studies have begun to examine experiences of individuals who use AAC in online conversation (Caron & Light, 2016, 2017; Hemsley, Dann, Palmer, Allan, & Balandin, 2015; Hynan et al., 2015; Hynan, Murray, & Goldbart, 2014), and there have been further calls for intervention research in this important area (Hemsley, Balandin, Palmer, & Dann, 2017).

2.3.2 Studies of online experiences of individuals who use AAC. The majority of previous studies on experiences of individuals who use AAC report on the advantages and purposes of Internet use, barriers and facilitators to participation in online conversation (Caron & Light, 2016, 2017; Hynan et al., 2014, 2015). The findings of selected key studies are reported with respect to barriers and facilitators, and advantages and purposes of use (Table 2.4 and Table 2.5). Taken together, these studies suggest that the proposed affordances of the computer-mediated environment listed in Table 2.2 are confirmed in the experiences of individuals who use AAC.

Young people who use AAC report that they would like support to increase their participation in online conversation (Caron & Light, 2017; Hynan et al., 2015). They report participating in online conversation once a week through to everyday (Hynan et al., 2015). The frequency and intensity with which individuals engage in online conversation and how this compares with that reported for the typical population or individuals without communication disability remains unclear. Studies report that individuals participate in online conversation for a range of purposes, including for strengthening existing networks, creating new networks, dating, entertainment, political advocacy, and accessing information and/or employment (Caron & Light, 2016, 2017; Hemsley et al., 2015; Hynan et al., 2014, 2015). Participants report individual purposes and preferences for online conversation, such as a preference for using one social media platform over another (Hemsley et al., 2015; Hynan et al., 2015). These individual preferences and purposes highlight the need for a client-centred collaborative approach in supporting access to social media. This was confirmed by individuals who use AAC and social media who have recommended that individuals who use AAC need information about the options available so they can make decisions about online conversation based on their personal needs and desires (Caron & Light, 2016).

Participants in these studies (Caron & Light, 2016, 2017; Hemsley et al., 2015; Hynan et al., 2014, 2015) all used AAC and perceived a range of advantages to participation in online conversation (Table 2.4) including:

- personal advantages, such as increase in the following: control of self-representation, independence and self-determination, visibility and influence, and confidence with communication;
- social participation advantages, such as reduced isolation, enriched friendships, ability to keep in touch over a distance, and increased confidence of communication partners;
- communication/language-focused benefits, including decreased time pressure to construct a message, and increased ability to be understood by more communication partners; and
- other advantages, such as increased availability and access to information and increased employment.

Conversely, advantages such as privacy, social connection, and reduced time pressure listed above were also mentioned as disadvantages (Table 2.4). For example, experiencing (a) lack of privacy in online conversation when support is needed owing to technological or access barriers, (b) increased isolation despite increased interaction owing to lack of physical contact, and (c) increased time pressure in instant synchronous online group chat.

Table 2.4

Proposed Advantages of Online Conversation Reported by Individuals who use AAC

Advantages (Total Number of Studies Reporting Advantage)	Hynan, Murray, & Goldbart (2014)	Hynan, Goldbart, & Murray (2015)	Caron & Light (2015)	Caron & Light (2017)	Hemsley Damn, Palmer, Allan, & Balandin. (2015)
Increased control of self-representation (5)	X	X	X	X	X
Decreased time pressure (4)	X	X	X [a]	X	[a]
Being understood (4)	X	X	X	X	
Less linguistic demands: linking, less focus on spelling, brevity & quoting (4)	X		X	X	X
Independence/Self-determination (3)	X		X	X	
Reduced isolation (3)		X	X[b]	[c]	X
Keeping in touch over a distance (3)	X	X	X		
Enriched friendships (3)	X	X		X	
Privacy (2)	X	[d]	X		
Increased visibility and influence (2)			X		X
Increased confidence in communication (2)			X		X
Employment (2)			X		X
Access to information (2)			X		X

Note. Some reported advantages have also been reported as disadvantages: [a]Study reports also too fast at times. [b]Study reports also increased since no personal or direct physical contact. [c]Study reports also a lack of direct contact. [d] Study reports a lack of privacy when needing support to access.

A range of barriers and facilitators to online conversation reported are included in Table 2.5. The poor accessibility of social media sites and challenges with compatibility between required technologies have been highlighted in much of the literature reviewed here. Findings from studies across a wide range of disability groups have highlighted the poor accessibility of many social networking sites, which has been proposed to constitute a breach of human rights (Hynan et al., 2014). Support from family and establishing and training support were commonly reported as facilitators. Some facilitators and barriers were similar to those reported by individuals with physical and other disabilities, such as limited literacy skills and support from family. Other facilitators and barriers appear to be unique to this group, such as compatibility between technologies and communication partner training.

Table 2.5

Barriers and Facilitators to Online Conversation Reported by Individuals who use AAC

Barriers	Hynan, Murray, & Goldbart (2014)	Hynan, Goldbart, & Murray (2015)	Caron & Light (2015)	Caron & Light (2017)	Hensley, Dann, Palmer, Allan, & Balandin (2015)
Poor accessibility of social media sites	X	X	X	X	
Poor compatibility of different technologies required	X	X	X	X	
Mobile technologies/apps not available in other formats		X	X	X	
Limited literacy skills	X	X		X	
Restrictions from policy or parents	X	X	X		
Limited access to/knowledge of assistive technology	X	X			
Fast pace of synchronous online chat			X		X
Lack of family knowledge/support	X	X			
Lack of social cues				X	
Frequent social media site updates				X	
Lack of funding		X			
Facilitators					
Sibling, parent/other family support	X	X		X	X
Service provider support for set-up and training	X	X			X
Information about, and access to, assistive technology		X	X	X	
Being literate/having literacy supports		X		X	
Communication partner training			X		
Taking cyber-safety measures			X		

This research provides some contradictory evidence regarding the advantages and disadvantages of online conversation. Some studies suggested that social isolation and communication difficulties are only perpetuated online, whereas others suggested a potential role of online conversation to enhance friendship, reduce isolation, and increase independence in communication (Caron & Light, 2016, 2017; Hynan et al., 2015). Contradictory experiences were also reported by a study investigating adults with cerebral palsy with and without communication impairments (Lewis, 2010) and by other young people who are typically developing (boyd, 2014). These mixed findings confirm the affordances perspective, which focuses on the role of the computer-mediated environment as a facilitative context ready to be perceived or acted on and not as inherently good or bad outside of this socially shaped context (Best et al., 2014; J. Gibson, 1977). As suggested by some researchers in the field, there appears to be a role for interventions to support online conversation and maximise the potential positive outcomes they offer (Brunner, Hemsley, Palmer, Dann, & Togher, 2015; Caron & Light, 2017; Durkin & Conti-Ramsden, 2014).

Online conversation may provide a motivating real-life social interaction context for interventions, given these perceived affordances and advantages to practice communication in the online context (Brunner et al., 2015; Caron & Light, 2017; Durkin & Conti-Ramsden, 2014). Yet, young people who use AAC have reported that speech pathology interventions do not include support to participate in online conversation (Caron & Light, 2017). Despite the potential advantages of the computer-mediated environment for conversation for individuals who use AAC, participation in online conversation is lower among youth with communication disabilities and has not previously been targeted as a valuable means or outcome of speech pathology interventions in this group (Brunner et al., 2015; Hemsley et al., 2017). To date, there has been little response to these calls for research on interventions to develop online digital independence and social media use of young people who use AAC. Very few studies have focused on supporting social media use of individuals who use AAC

(Grace et al., 2014; Hemsley, Palmer, Dann, & Balandin, 2018; Robertson, 2008; Sundqvist & Rönnberg, 2010; A. Williams, Koppenhaver, & Wollak, 2007).

2.4 Interventions to Support Social Media Use and Participation in Online Conversation

2.4.1 A focus on individuals who use AAC. Research has demonstrated that young people who use AAC have fewer same-aged peers, friends and acquaintances compared with their peers and that this group experience increased loneliness (Cooper et al., 2009; Raghavendra, Olsson, et al., 2012; Thirumanickam et al., 2011). Given the potential affordances of the computer-mediated environment for conversation, one way to increase social participation and increase social interactions of young people who use AAC could be to target their participation in online conversation. A small number of studies have investigated the benefits of supporting individuals who use AAC to participate in online conversation. Investigations have focused on a range of areas, including supporting young people to send emails to each other, supporting students in a special class to use Skype, providing home-based intervention to support young people to achieve their individualised goals in Internet for social media use and delivering an online tutorial to increase use of Twitter by adults (Grace et al., 2014; Hemsley et al., 2018; Robertson, 2008; Sundqvist & Rönnberg, 2010; A. Williams et al., 2007). The potential benefits of increased participation in online conversation suggested by these studies and the valuable insights they provide for future research are outlined in the following paragraphs.

Sundqvist and Rönnberg (2010) recognised that “the Internet provides new participatory communication opportunities for people with disabilities” (p.256) and that this is especially important for people who use AAC, who face limited social networks and limited participation in social activities. In their qualitative study introducing six children (aged 6–12 years) who use AAC to email communication, they found that children were motivated to create text, could take their time to produce the message, were active participants, initiated and asked questions, and actively participated in opportunities to communicate (Sundqvist & Rönnberg, 2010). The researchers included analysis of the online conversation that focused on topics of conversation and the number of messages, phrases, and words. Children enjoyed, and were interested in, email communication (Sundqvist & Rönnberg, 2010). Changes in writing style were observed as friendships developed over time and language became more informal. Analysis of linguistic moves and pragmatic functions in the email conversations was not included owing to the focus on what children wrote about and their experiences of sending emails. The researchers concluded that participation in online conversation may promote active, independent participation in conversation, and increase social networks. Participants were given a range of specialised supports in the school environment: (a) Internet and email availability, (b) specialised software compatible with the participants' AAC systems, (c) training for the teacher assistant and participant, (d) a weekly lesson from the teacher about email, (e) weekly 1:1 teacher assistant support for email, and (f) ongoing support to troubleshoot problems with the Internet or software. Despite these extensive supports, participants sent less than one message per week over the 12 weeks of intervention. The extent to which participants were able to continue to participate in online conversation without this extra scaffolding following the intervention is unclear. Future research should consider intervention strategies to support continued use of social media following the intervention period. To date, research has focused on providing intervention within the school environment. Two additional school-based studies are discussed in the following paragraphs.

A preliminary report by Robertson (2008) provided background information and preliminary results of a study introducing young people who use AAC to Skype at school to facilitate communication with good friends, acquaintances, and unfamiliar partners. Preliminary feedback from staff and students was positive, and the report indicated that the informal pilot supports the development of a more formal research project (Robertson, 2008). The researchers concluded that online conversation has potential to increase peer interactions, develop communication skills, and expand social networks of individuals who use AAC, which is similar to the conclusions of Sundqvist & Rönnberg (2010). This conference abstract provides limited information regarding this preliminary research and suggests that further research will be ongoing, although no further publications regarding this work were found. They proposed that online conversation with peers may provide more equal turn-taking patterns than face-to-face conversation with adults, although the researchers did not include analysis of the online discourse patterns or participation patterns of participants in this report. Further research incorporating more rigorous research methods is needed to ascertain the approaches that are key to interventions to support increased participation in online conversation and the ways the potential benefits may apply more broadly to the population of individuals who use AAC.

A. Williams et al. (2007) reported on an informal programme where two young people who use AAC (aged 17 years) were paired with student teachers and encouraged to communicate via email over a three-year period. The focus of this research was to teach writing skills to individuals who used AAC. The authors recommended that email continue to be used with young people who use AAC. They highlighted some of the reasons the intervention may have supported beginning writers who use AAC, including that email was written and digital, which allowed frequent and accessible opportunities for writing practice, the messages were written by the young people themselves and they were motivated by a real audience for their writing, and that the nature and quantity of writing improved overtime (A. Williams et al., 2007). The participants who used AAC were observed to participate with more equal turns than has been reported in studies of face-to-face teaching interactions. They initiated discussions, asked questions, and provided responses. A systematic analysis of the pragmatic functions and turns taken in the online conversation was not conducted. The extent to which the communication partners continued with online conversation or connected with peers online is not known, given the focus on emails sent during school time and on education and literacy outcomes in this study. Given the potential of interventions targeting email and Skype use suggested by these school-based descriptive case studies (Robertson, 2008; Sundqvist & Rönnberg, 2010; A. Williams et al., 2007), it is recommended that future research investigate the feasibility of providing support for social media use in other environments and across other social network sites (e.g., Twitter and Facebook). Two studies have investigated interventions to increase use of these social networking sites, and the effects on social participation are described in the following paragraphs (Grace et al., 2014; Hemsley et al., 2018).

Five young people who use AAC (aged 10–18 years) were supported through a home-based face-to-face intervention programme to increase their use of social media, such as email, Facebook, and Skype (Grace et al., 2014). All participants demonstrated progress towards achieving their goals and increased the number of online communication partners (Table 2.6; Grace et al., 2014). Transcripts of online conversation were not collected in this research, and therefore, it is not possible to comment on the total words, linguistic turns, pragmatic functions, or other aspects of patterns in the discourse that may allow for observations of quantifiable changes in participation in online conversation. Although not formally measured, poor basic literacy skills and technical difficulties were observed to be two significant barriers to social media use identified by this research (Grace et al., 2014). This research was part of a larger study by Raghavendra, Grace, Newman, Wood and Connell (2013) that identified the time-intensive nature of the intervention provided, with feedback from participants and caregivers requesting even further support. This finding is consistent with the reports of extensive support provided by Sundqvist and Rönnberg (2010) in their intervention study. This research demonstrated the feasibility of providing support for social media use in the home environment. The findings point to the need to consider possible avenues to provide further supports for social media use as requested by the participants and caregivers in this study. The increase in online communication partners described in this study confirms previous reports (Robertson, 2008; Sundqvist & Rönnberg, 2010) that supporting social media use in young people who use AAC can increase their social networks. This finding was further corroborated by a recent study supporting Twitter use in adults who use AAC (Hemsley et al., 2018).

Hemsley et al. (2018) reported on the outcomes of an educational tutorial aimed at increasing Twitter use by three adults (aged 35–50 years) who used AAC. The aim of the research was to increase Twitter use and consequently to increase participants' visibility, influence, and reach online. Data on use of Twitter were collected over 9 months, that is, 3 months prior and 6 months post the intervention. An analysis of participant Twitter networks revealed that for two participants, social connectedness increased following the training (including markers of greater reach and larger networks for these two participants). Interviews with participants were used to verify the quantitative analysis and confirmed that they experienced increased influence and networks, including strategic and operational competencies, following the intervention.

For example, increased opportunities for self-advocacy by using Twitter. The combination of quantitative and qualitative methods strengthened the findings, given the variability in the quantitative data. Nevertheless, the inclusion of language-focused discourse analysis and other measures of participation on Twitter may have provided further quantitative data to describe changes in such participation. It is recommended that in addition to frequency counts, future research should include further measures of language analysis. Statistical analysis of the SCED data were not provided by the researchers, but calculations from the graphs provided demonstrate that the intervention was not effective at increasing frequency of Twitter use (Participant 1 & 2 percentage non-overlapping data [PND] = 0%; Participant 3 PND = 3%). Considerable variability was present in frequency of tweets made by participants both before and after intervention. Since data were reported daily, it is likely that day-to-day variability in Twitter use affected the ability to understand the impact of the intervention. It may be possible to average social media use over longer periods (e.g., weekly reports) to reduce the variability observed in daily reports and increase the ability to observe overall effects and trends. Further, the intervention provided by Hemsley et al. (2018) was limited to a 2-hr online educational tutorial, which contrasts with the intensive support reported by the school-based interventions to support social media use in young people who use AAC described above. Similar to the findings of Cohen et al. (2003) who provided intervention via email exchanges, Hemsley et al. (2018) confirm the feasibility of providing online interventions for adults who use AAC over Skype. Increased intervention supports online and further offline supports may have increased the effectiveness of the intervention.

Research investigating increased participation in online conversation by individuals who use AAC has largely included descriptive case-study-based intervention studies. These studies consistently indicate that these individuals experience barriers to participation in online conversation and that patterns of participation can be highly variable (Hemsley et al., 2018) and limited (i.e., <1 email per week; Sundqvist & Rönnberg, 2010). The evidence reviewed here confirms the feasibility of professionals, for example, education staff or speech pathologists, providing social media use interventions to individuals who use AAC in school, home, and online environments. Findings indicate that interventions can enhance online social networks and social media use. Although not reported directly in the findings, researchers have suggested that interventions may enhance online conversation participation, such as enabling more equal turn-taking. To date, there has been only limited application of language-focused discourse analysis. For example, the studies reviewed here include reports of topics, words, phrases, and number of transmissions in online conversation (Cohen & Light, 2000; Hemsley et al., 2018; Sundqvist & Rönnberg, 2010; A. Williams et al., 2007). Despite the availability offered by online transcripts to conduct language-focused discourse analysis and suggested benefits of online conversation for turn-taking patterns in conversation, research reports are yet to include systematic investigation of linguistic turns or pragmatic functions in online conversation.

Despite the intensive nature of interventions provided in some studies, participants reported that they would like further supports and scaffolding to increase their participation in online conversation. Overall, these studies highlight the need for future research to: (a) investigate alternative intervention approaches that can provide continued support for online conversation, such as mentoring or other non-professional supports; (b) determine language-focused discourse patterns in online conversation (i.e., linguistic turns, pragmatic functions, and modes used); and (c) develop strategies to manage variability in frequency of use in daily data, such as averaging use over a weekly period rather than reporting daily.

The narrow focus on individuals who use AAC may have limited the review of the evidence concerning interventions to support social media use, particularly since only one study included statistical analysis in describing the outcomes and only two studies provided an alternative to the predominantly descriptive case-study designs. The small body of research reviewed in the above section suggests some potential benefits of social media interventions, which warranted further exploration of the literature more broadly. In the following section, this review of the literature is expanded to include social media interventions in young people with a wider range of disabilities.

2.4.2 Broader review on individuals with disabilities. Support to enhance participation in online conversation has been the focus of research involving individuals with a wider range of disabilities than included in the previous section, such as individuals with autism spectrum disorder, intellectual disability, hearing impairment, acquired brain injury, cerebral palsy, muscular dystrophy, and other physical disabilities. This broader review includes individuals with and without communication disabilities. For example, the larger study mentioned in the previous section by Raghavendra, Grace et al. (2013) included 18 young people (aged 10–18 years) with a range of physical disabilities, including cerebral palsy, muscular dystrophy, and acquired brain injury. In addition to this study, a similar project was conducted in rural South Australia (n = 17, mean age 16.3 years) (Raghavendra, Newman, Grace, & Wood, 2015). Together, these studies highlighted the importance of knowledge, skills, and training for parents or caregivers and disability service providers who are supporting young people to participate in online conversation. These studies all incorporated a collaborative approach to develop individual-participant goals for learning to use social media that utilised the Canadian Occupational Performance Measure (COPM; Law et al., 2005) and Goal Attainment Scaling (GAS; Kiresuk & Sherman, 1968) measures. In contrast to the majority of studies supporting young people who use AAC, these studies included statistical reporting on the effects of the interventions. These measures of the interventions are summarised below (Table 2.6) and one study from the previous section that included young people who use AAC and also incorporated these measures is included. All interventions demonstrated clinically and statistically significant changes in the participants' goals for learning to use social media following the intervention (Table 2.6; Grace et al., 2014; Raghavendra, Hutchinson, Grace, Wood, & Newman, 2018; Raghavendra, Newman, Grace, & Wood, 2013; Raghavendra, Newman, Wood, Grace, & Hutchinson, 2015). These studies did not include language-focused discourse analysis or reporting of frequency of participation in online conversation. The findings confirm the need for alternative intervention approaches that can provide continued support for online conversation, such as mentoring or other non-professional supports. One study (Raghavendra, Newman, Wood, et al., 2015) specifically included participants who had communication disability but did not use AAC. This study also included a separate mentoring component to the intervention provided which is described further in a later section of the literature review (Section 2.5.3.1).

Table 2.6

Summary of Previous Interventions Supporting Social Media Use

Description	Grace, Raghavendra, Newman, Wood, & Connell (2014)	Raghavendra, Newman, Grace, & Wood (2013)	Raghavendra, Newman, Grace & Wood (2015)	Raghavendra, Hutchinson, Grace, Wood, & Newman (2018)
Participants	5	18	8	9
Intervention				
Months (SD)	6.9	6.8	5.5 (1.79)	3.74 (1.03)
Visits (SD)	12.8 (2.5)	11 (3.61)	14 (3.48)	13 (2.06)
Minutes/Visit (SD)	74.6 (11.8)	75 (12.34)	55.5 (12.64)	75.3 (13.77)
Outcomes				
COPM Δ Performance	6.25	5.66	5.57	5.06
COPM Δ Satisfaction	5.75	5.98	3.62	5.21
GAS T-Score (SD)	69.2 (19.4)	60.27 (15)	58.14 (10.73)	60.46 (4.94)

Note. COPM = Canadian Occupational Performance Measure (COPM, Law et al., 2005), GAS T-score = Goal Attainment Scale T-score (as described in Kiresuk & Sherman, 1968; Turner-Stokes & Williams, 2010).

A study of 64 young people with disabilities (aged 8–20 years) carried out in Israel also recognised the large amount of time and support involved in providing a combined computer, Internet, and social media use intervention (Schreuer, Keter, & Sachs, 2014). Some participants were provided an individual tutor who was available to give extra support, and the research findings demonstrated that youth who were allocated 1:1 support were more likely to start using social media in new ways following the intervention. This finding supports the need for intensive individual support to enable young people with disabilities to participate online. Similar to the findings of research involving young people who use AAC (Hemsley et al., 2018;

Robertson, 2008; Sundqvist & Rönnberg, 2010), Schreuer et al. (2014) reported that increased access to the Internet and social media had improved participants' social connections with existing friends.

Schirmer and Ingram (2003) demonstrated that writing skills of one young person with a hearing impairment improved following participation in scaffolded online conversation over three weeks. In this study, the participant connected with a typically developing age-matched peer for 10 minutes each day and a teacher also participated in the conversation recasting the participants' conversational turns. Recasting is a common technique used in communication interventions where the trained communication partner models speech or language in conversational context by using utterances produced by the learner in corrected and/or elaborated forms. Transcripts of online conversation were not collected in this research, and therefore, it was not possible to comment on the linguistic turns, pragmatic functions or other aspects of patterns in the discourse. The study included three participants, but results were only reported for one owing to scheduling and technology difficulties, which is reported as a further limitation of this study. Interviews with all participants demonstrated that students found online conversation fun and they enjoyed the change from the typical school environment (Schirmer & Ingram, 2003). The focus of this research, similar to the research by Durkin et al. (2011), was on syntax and writing instruction rather than increasing social media use to investigate the impact on social networks.

To date, several studies have reported on interventions to enhance participation in online conversation. Interventions have used face-to-face (e.g., Grace et al., 2014), mixed online and face-to-face (e.g., A. Williams et al., 2007), and online-only methods to provide intervention (e.g., Hemsley et al., 2018). The extension of the review to include individuals with a wide range of disabilities provided increased statistical support for the benefits of this focus for intervention (Table 2.6; Grace et al., 2014; Raghavendra et al., 2018; Raghavendra, Newman, et al., 2013; Raghavendra, Newman, Wood, et al., 2015). There remains a need for future research investigating language-focused discourse patterns in online conversation (i.e., linguistic turns, pragmatic functions, and modes used). Two studies suggested that non-professional approaches to intervention may be beneficial in supporting online conversation in individuals with disabilities (Raghavendra, Newman, Grace, et al., 2015; Schreuer et al., 2014). Given the potential of these approaches to enhance participation in online conversation of young people with a wide range of disabilities, these may be applicable more specifically for young people who use AAC. One possible approach to social media use intervention is cross-age peer e-mentoring, a particular type of mentoring that does not rely on professionals' support.

2.5 Mentoring and Cross-Age Peer E-Mentoring

2.5.1 Mentoring. Mentoring is universally recognised as a support strategy for young people and has been applied widely to include a wide range of interventions. The construct of mentoring is often traced back to Greek mythology (DuBois & Karcher, 2014a). To a certain degree, as described by David Shapiro in his foreward, this "magical" understanding of mentoring has hindered the definition, scientific evaluation, and development of mentoring interventions (Dubois & Karcher, 2014b, p. ix). Nevertheless, a scientific approach to mentoring is thought to have been founded approximately 25 years ago (Dubois & Karcher, 2014b; Garringer, Kupersmidt, Rhodes, Stelter, & Tai, 2015). MENTOR, an American organisation perceived as an international leader in the field, published initial standards for mentoring, entitled *Elements of Effective Practice for Mentoring* in 1990 (Garringer et al., 2015). Although the initial edition was based on clinical evidence and expert opinion, the latest edition

(4th ed) has benefited from the large body of research evaluating mentoring interventions that has developed over two and a half decades (Garringer et al., 2015). The mentoring literature provides recommendations for the design, implementation, and measurement of outcomes in mentoring interventions (DuBois, 2014).

Traditionally, youth mentoring is conceptualised as social interactions between a more experienced mentor and a younger mentee, intended to benefit the mentee in one or more areas of their development (DuBois & Karcher, 2014a). Theoretical models of mentoring interventions have been described as developmental or instrumental according to the emphasis placed on the mentor–mentee relationship. Developmental models emphasise the importance of the relationship where as instrumental models place the emphasis on goal-directed activity (Karcher & Hansen, 2014). It has been argued that a strongly instrumental model of intervention may undermine the unique strengths of mentoring as an intervention (Karcher & Nakkula, 2010). Conversely, adolescent mentees may prefer interventions that include collaboratively constructed goal-directed activities according to their abilities (Noam, Malti, & Karcher, 2014). It has been suggested that interventions which balance developmental and instrumental activities are more effective (Karcher & Hansen, 2014; Lyons, McQuillin, Henderson, 2019). However, the relative contributions of these two models to the overall effectivenss of mentoring interventions is still poorly understood (Lyons et al., 2019).

Meta-analysis of the outcomes of 73 youth mentoring interventions established that programmes incorporating best practice features, and/or those in which strong relationships were formed between mentors and mentees, provided the most favourable outcomes (DuBois, Portillo, Rhodes, Silverthorn, & Valentine, 2011). One systematic review of mentoring interventions (DuBois, Holloway, Valentine, & Cooper, 2002) suggests that the following best practice features may be particularly important for positive outcomes of mentoring interventions:

- ongoing training for mentors;
- structured activities for mentors and youth;
- clear expectations regarding frequency of contact;
- structures for support and involvement of parents; and
- monitoring of the overall programme implementation.

The authors highlight the importance of a structure to support the formation of mentoring relationships, such as training and orientation for mentors (DuBois et al., 2002). They also draw attention to the potential importance of relationship features for positive mentoring outcomes, such as frequency of contact, emotional closeness, and longevity of relationship. However, because these relationship features are rarely reported in the literature it was not possible to draw any specific conclusions regarding relationship features from the meta-analytical review (DuBois et al., 2002). Mentoring interventions have been found to provide academic skill development, increase social competence, and reduce risk-taking or problem behaviours, as well as provide psychosocial benefits, such as building social and emotional support (Dubois & Silverthorn, 2005; Herrera, Grossman, Kauh, Feldman & McMaken, 2007). The literature suggests that one group who stand to benefit from mentoring are individuals at risk of negative economic, health, or educational outcomes who have limited social support (DuBois et al., 2002). Given that individuals with communication disorders have been identified to be both at risk (Snow & Powell, 2012) and to experience reduced social participation (Raghavendra, Olsson, et al., 2012), it is argued that individuals with communication disabilities may benefit from mentoring interventions. Some mentoring practices incorporate a peer-support approach to intervention.

2.5.2 Peer support. Peer-support interventions are provided by lay individuals who are selected to provide intervention because they share a similar characteristic with the target population. These interventions often include the provision of emotional support, affirmation, and/or information that can be provided to the target population through a range of modes, such as in groups or one-to-one, in the community or at a health service.

The ICF framework substantiates the importance of social relationships in the maintenance of health and functioning (WHO, 2001). Therefore, unsurprisingly, recognition in the literature has been increasing as regards the important role of peer support as a health-based intervention (C. Dennis, 2003). The concept of peer support as an intervention has incorporated a wide focus over a range of health disciplines (C. Dennis, 2003; Litchman, Rothwell, & Edelman, 2018; Peterson, Rintamaki, Brashers, Goldsmith, & Neidig, 2012; Skea, MacLennan, Entwistle, & N'Dow, 2011). A systematic review of peer-support interventions found that its effects are varied depending on the mode of delivery and targeted outcomes (Ramchand et al., 2017). For example, dyadic peer-support interventions were found to have positive effects on behaviour change (Ramchand et al., 2017).

Peer-support interventions are widely applied in interventions to support adults with acquired language impairments following stroke, such as aphasia (Coles & Snow, 2011; Tregea & Brown, 2013). Peer-support interventions in this population have been suggested to increase social networks and provide real-world contexts for the development of communication skills (Tregea & Brown, 2013). Despite widespread use, systematic reviews of the literature have identified the need for more research to investigate the advantages of the peer-support approach (Ramchand et al., 2017; VandenBerg, Campbell, Cail, & Brady, 2015).

In children with disabilities and children who use AAC, the term *peer support* is more commonly used to refer to interventions targeting increased interactions with same-age peers who use speech (Biggs, Carter, & Gustafson, 2017; Wolowiec-Fisher & Shogren, 2012) or are typically developing (Carter, Moss, Hoffman, Chung, & Sisco, 2011; Chapin, McNaughton, Boyle, & Babb, 2018; Shukla, Kennedy, & Cushing, 1998). The term has also been used to describe support from one parent of a child who uses AAC to another (K. Anderson, Balandin, & Stancliffe, 2015). Relatively little has been reported regarding the benefits of *peer support* when defined as support from one individual who uses AAC to another. A small number of studies discuss and investigate the potential benefits of peer support for individuals who use AAC (although the term *mentoring* has been preferred; Ballin, Balandin, Togher, & Stancliffe, 2009; Cohen & Light, 2000; Light et al., 2000; McNaughton et al., 2008; Rackensperger et al., 2005).

Two qualitative studies have highlighted that adults who use AAC (Rackensperger et al., 2005) and parents of children who use AAC (McNaughton et al., 2008) report that peer support would be beneficial for young people who use AAC. In interviews conducted by Rackensperger et al. (2005), four of seven participants who used AAC reported that they would have liked to meet another individual who used AAC for peer support but had not been given this opportunity, although five reported using listservs, email interest group mailing lists, as a form of peer support (Rackensperger et al., 2005). Cross-age peer mentoring is one type of peer-support intervention that could be used to target increased participation in online conversation by young people who use AAC.

2.5.2.1 Cross-age peer mentoring. In a cross-age peer-mentoring intervention, the term *peer* does not refer to an age match but to a shared characteristic of a particular community of interest (Karcher, 2014). For example, peer matching may be based on ethnicity, health concern, or another stressor (C. Dennis, 2003). A concept analysis of peer-support interventions conducted by C. Dennis (2003) proposes that the assumption of peer-support interventions is that the peer status of the relationship provides understandings that would not otherwise be present between the mentor and mentee (C. Dennis, 2003). A review of STEM mentoring of young people with disabilities suggested that some young people prefer to be matched to a mentor with a disability similar to their own disability (Sowers, Powers, & Shpigelman, 2012). It has been suggested that the mechanism for change in cross-age peer-mentoring interventions is relationship-based functioning through the provision of regular meetings over time, informational support, emotional support and guidance, and role-modelling opportunities that promote self-evaluation and increased motivation (C. Dennis, 2003; Karcher, 2014; Figure 2.8) The peer mentor has some training and support and, as such, is neither a lay helper, such as a family member, nor a professional with extensive formal training (C. Dennis, 2003). A comprehensive definition of the cross-age peer mentor is as follows:

1. The mentee and mentor will share a similar characteristic/s (C. Dennis, 2003).
2. As defined by Rhodes, 1994, there is “an older, more experienced mentor and an unrelated, younger” (p.188) mentee.
3. The mentor provides “ongoing guidance, instruction, and encouragement aimed at developing the competence” of the mentee (Rhodes, 1994, pp. 188–189). Specifically, instruction is focused around the mentee’s goals to develop the use of social media.
4. As defined by Jacobi (1991), mentoring will include:
    a. supports and help to the mentee more broadly;

b. a mentor who has more experience and skills in the area of mentoring focus; and
c. provision of role modelling (i.e., an example in the area of mentoring focus that is intended to effect the mentee's attitudes, skills, or knowledge).

The focus of the definition is on emphasising the mentoring relationship as the primary mechanism for change and on the mentor being an older cross-age peer (Karcher, 2014). Similar definitions are provided by Atanasoff et al. (1998), Ballin, Balandin and Stancliffe (2013b), C. Dennis (2003), and Karcher (2014). Although peer-mediated approaches to therapy are commonplace, for example, in approaches to management of children with autism, where same-age peers that are typically developing are matched to target children, this approach is not included within the above definition. Traditionally, mentoring occurs face-to-face, although several mentoring interventions are now being conducted partially or totally online (Shpigelman, 2014). This variation in the mediums used for mentoring fits within the above definition for cross-age peer e-mentoring, and as described below, may have some advantages for individuals who use AAC.

2.5.3 E-mentoring. Compared with the literature reporting on face-to-face mentoring, less is known about the design, implementation, and measurement of effectiveness of e-mentoring interventions (Shpigelman, 2014). It has been suggested that e-mentoring may have increased application for geographically and/or socially isolated populations and/or for minority populations, such as youth with disability (Shpigelman, 2014). Further, it is suggested that young people with disabilities may benefit from reduced physical and attitudinal barriers in the online environment (Bowker & Tuffin, 2007; Shpigelman & Gill, 2014b). An online approach to mentoring may enhance mentoring interventions, given the freedom of location and time, greater access to information, potential for anonymity, and disinhibition that may increase self-disclosure (Shpigelman, Weiss, & Reiter, 2009b). However, the authors highlight the importance of extra requirements or preconditions specific to e-mentoring interventions, such as access to hardware and software, computer literacy skills, and a reliable Internet service (Shpigelman et al., 2009b). Shpigelman, Reiter and Weiss (2009) proposed a conceptual framework of the mechanisms of e-mentoring intervention for young people with disabilities (Figure 2.8).

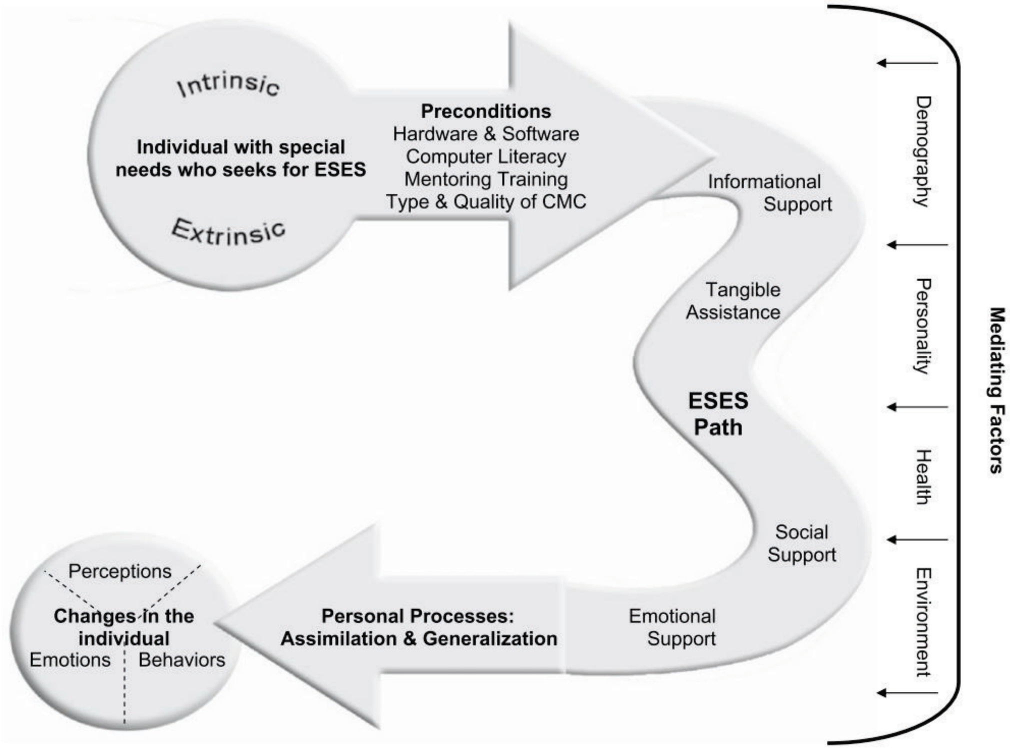


Figure 2.8. The electronic socio-emotional support (ESES) process highlights the role of preconditions specific to e-mentoring intervention. From "A Conceptual Framework for Electronic Socio-Emotional Support for People With Special Needs", by C. Shpigelman, et al., 2009, *International Journal of Rehabilitation Research, 32*, p. 2629. Reproduced with permission.

The following paragraphs are adapted from an excerpt of the pre-print version of the manuscript entitled, "Cross-Age Peer E-Mentoring to Support Social Media Use: A New Focus for Intervention Research", by E. Grace and P. Raghavendra (2019).

2.5.3.1 Cross-age peer e-mentoring and young people with disability. Cross-age peer mentoring delivered via social media has shown promising outcomes in a range of populations (Table 2.7). Mentee participants (*n* = 145) in these studies ranged from 7–21 years of age and cross-age peer e-mentors (*n* = 21) from 13–39 years of age. Where reported, training provided to mentors varied from 3–20 hours of pre-match training. Expectations for frequency of contacts between mentors and mentees were varied across programmes. However, most programmes expected at least weekly online contact from mentors to mentees. In some programmes, mentors were reimbursed for expenses, such as travel (Ahola Kohut et al., 2016). No studies have reported payments provided to mentors for their mentor time.

Given the preliminary nature of research in this area, most studies included primary outcomes investigating the successful delivery of the programmes and acceptability of the support provided to the participants and mentors. Further, investigations included a wide range of outcomes, such as self-management, self-efficacy, reducing loneliness, sense of community, perceived social support, and ability to seek social support. In one study (Raghavendra, Newman, Wood, et al., 2015), mentors supported mentees in their goals to learn to use social media. For example, one individual mentee goal for the mentoring in the research was “Makes Skype calls independently and independently uses two other features of Skype (e.g., change her profile picture, add a contact, and find a friend)” (Raghavendra, Newman, Wood et al., 2015, p. 82). Although goal attainment was slightly below the expected level (mean T-score 45.57, SD 14.05), all mentees achieved at least one goal at the expected level (Raghavendra, Newman, Wood, et al., 2015).

Across the studies described in Table 2.7, participants provided positive feedback and reported satisfaction with the intervention. Parents and mentors reported that children had increased confidence and increased their communication in both online and offline contexts following e-mentoring support (Stewart, Letourneau, Masuda, Anderson, & McGhan, 2013). All groups had experienced social isolation, and in four studies, mentors, parents, and/or mentees reported that the mentees benefited from meeting someone else with the same disability (Ahola Kohut et al., 2016; Stewart, Barnfather, Magill-Evans, Ray, & Letourneau, 2011; Stewart et al., 2013; Stinson et al., 2016). Children with spina bifida and children with asthma and other allergies reported decreased loneliness following the cross-age peer-mentoring interventions (Stewart et al., 2011, 2013). The benefits and advantages of cross-age peer mentoring via social media observed in these populations may also apply to young people who use AAC, particularly since young people who use AAC also experience social isolation and have limited opportunities to interact with others who use AAC.

Some challenges have been experienced in the delivery of online cross-age peer-mentoring interventions in these populations. For example, challenges with technology or Internet access (Stewart et al., 2011; Stinson et al., 2016), difficulties scheduling online appointments and variability in frequency and length of online contacts (Raghavendra, Newman, Wood et al., 2015; Stewart et al., 2011; Stinson et al., 2016), and accessibility (Stewart et al., 2011). In some studies, participants connected via asynchronous online conversation, such as emails or video blogs, and reported a desire for face-to-face communication in addition to online contact with their mentor (Cook & Woodward-Kron, 2013; Shpigelman et al., 2009b). It has been suggested that synchronous online conversation may be beneficial for establishing and strengthening mentor–mentee relationships rather than asynchronous only-online contacts (Cook & Woodward-Kron, 2013; Shpigelman & Gill, 2013). These challenges may be relevant when designing similar interventions for individuals who use AAC. Thus, overall, the provision of cross-age peer mentoring through social media has been demonstrated as a feasible and positive intervention for other groups of young people and has potential to be applied to young people who use AAC.

Table 2.7

Cross-Age Peer E-Mentoring Studies for Youth with Chronic Illness or Disability

Study Characteristics	Shpigelman, Reiter & Weiss (2008)	Shpigelman, Weiss & Reiter (2009b)	Stewart, Barnfather, Magill-Evans, Ray & Letourneau (2011)	Cook & Woodward-Kron (2013)	Stewart, Letourneau, Masuda, Anderson & McGhan (2013)	Raghavendra, Newman, Wood, Grace, & Hutchinson (2015)	Ahola Kohut et al. (2016)	Stinson et al. (2016)
Mentees	5	13	22	28	27	6	14	30
Age range	12–18	15–20	12–18	N/A[b]	7–11	10–21	12–18	12–17
Mentors	3	7	5	N/A[d]	5	2	7	6
Age range	22–28	[a]M = 24.6	22–39	N/A[d]	13–20	19–23	18–25	16–25
Shared characteristic	Disability	Disability	CP/Spina bifida	Hearing impairment	Asthma or allergies	Disability	Chronic pain	JIA

Table 2.7 Continued

Study Characteristics	Shpigelman, Reiter & Weiss (2008)	Shpigelman, Weiss & Reiter (2009b)	Stewart, Barnfather, Magill-Evans, Ray & Letourneau (2011)	Cook & Woodward-Kron (2013)	Stewart, Letourneau, Masuda, Anderson & McGhan (2013)	Raghavendra, Newman, Wood, Grace, & Hutchinson (2015)	Ahola Kohut et al. (2016)	Stinson et al. (2016)
Aims of intervention	To reduce social isolation	To reduce social isolation	To provide peer support	To promote well-being	To provide accessible peer support	To develop social media skills and build social networks	To enhance self-management skills	To enhance self-management skills
Outcomes of interest	Mentoring evaluation questionnaire Transcripts of mentoring conversations used to investigate the mentoring process	Mentoring evaluation questionnaire Transcripts of mentoring conversations used to investigate the mentoring	Perceptions of the intervention's effects Interactions with peers Social networks Loneliness Coping Self-perceptions Sense of community	Transcripts of mentoring conversations Google analytics (to describe engagement and use) Questionnaire regarding the perspectives of participants	Perceptions of the intervention's impact Social support Support seeking Loneliness	Anticipated and perceived benefits of the intervention Thematic analysis of mentoring conversations Goal attainment	Feasibility and adherence Pain Social support Self-management skills Self-efficacy coping	Feasibility and adherence Pain Self-management Social support Self-efficacy Health-related Quality of life
Social media platform/s	Email	Email	Ability online[11]	You Tube[12]	Club Penguin[13] GoToMeeting[14]	Skype Facebook Google Hangouts[15] Email Snapchat	Skype	Skype

Table 2.7 Continued

Study Characteristics	Shpigelman, Reiter & Weiss (2008)	Shpigelman, Weiss & Reiter (2009b)	Stewart, Barnfather, Magill-Evans, Ray & Letourneau (2011)	Cook & Woodward-Kron (2013)	Stewart, Letourneau, Masuda, Anderson & McGhan (2013)	Raghavendra, Newman, Wood, Grace, & Hutchinson (2015)	Ahola Kohut et al. (2016)	Stinson et al. (2016)
Duration	3 months	8 months	6 months	4 weeks	8 weeks	4 months	8 weeks	8 weeks
Expected frequency	M = 2 messages per week	Weekly	25 sessions over 6 months Attendance average was 8.5 group sessions	Weekly	Weekly (45–120 minutes)	Weekly	10 sessions	10 sessions
Training for mentors		4 x 2 hour training sessions		not recorded; part of larger programme	Training occurred times not reported	3 hours training	2 hours of training	2.5 days

Note. JIA = Juvenile Idiopathic Arthritis. [a]Range not provided. [b]Ten teachers of the deaf and/or audiologists participated and are not included in this number. [c]Participants described as school age, university and working; no ages provided. [d]Mentors + actors + vocal trainers involved in this project.

2.5.3.2 Cross-age peer e-mentoring for individuals who use AAC. Cohen and Light (2000) demonstrated that cross-age peer e-mentoring can also be successful for young people who use AAC. Four young people (aged 14–25 years) were matched with four mentors (aged 33–42 years); mentors and mentees both used AAC. They were not provided training or specific instructions regarding the content or structure of online conversation, but were encouraged to make at least weekly contact via email. If no contact had occurred over a 2-week period, the researcher sent an email to prompt interaction. Participants exchanged 3.7–1.3 emails per week; technical problems for one pair coincided with reduced online contact. The duration of participation in the mentoring varied across participants, ranging from 10–21 weeks. Mentees that identified goals for the e-mentoring intervention reported greater satisfaction with the programme. The online approach to mentoring was important for successful matching of mentors with mentees, who lived great distances from each other (Cohen & Light, 2000). The authors found that identification of individualised goals and mentor motivation and commitment were likely to be important for the success of peer e-mentoring interventions. The conclusions of this pilot study highlighted several recommendations for future research, including ensuring commitment from mentors, rigorous mentor selection processes, detailed information from mentors and mentees to support matching, training for mentors, regular review of goals, clear expectations, minimum commitment to exchange at least one message each week, longer programmes, regular feedback to mentors and mentees, reliable technology and Internet connection, and inclusion of other online media. The importance of mentor training highlighted by this study led to the development of an online training programme for AAC mentors (Light et al., 2007; Light et al., 2000; McCarthy, Light, & McNaughton, 2007) and a larger AAC mentor project. The leadership training programme was found to be effective in preparing mentors and teaching problem-solving strategies. Training took mentors between 10–50 hours to complete. All mentors were successful in applying the problem-solving strategies: (a) “LAF = Listen and communicate respect, Ask questions, Focus on what your partner is saying”; (b) “DO IT!, Describe the specific problem or goal, Outline lots of ways to solve the problem or meet the goal, Identify the consequences of each plan and choose the best plan and Take action, celebrate success when your partner meets the goal”; and (c) “ASK, Answer the question yourself if you are sure that you know the correct answer, Send your partner to someone else who knows the correct answer, Know how to use the Internet to help your partner find the correct answer” (Light et al., 2000, pp. 9–11).

A website (Light et al., 2000) provides information about the experiences of a subsequent project, the Penn State AAC Mentor project, which included more than 60 mentors (aged 20–48 years) and mentees (aged 13–28 years) who used AAC and demonstrated functional literacy skills. Mentors and mentees exchanged 1–12 emails per week (M = 3–4) over 1 year. The project found that mentors who use AAC can provide positive role models, guidance and emotional, and information support to mentees who use AAC. They concluded that the mentors and mentees were highly satisfied with the programme and that the intervention was effective at supporting mentees to progress towards their goals. These investigations did not include an investigation of participation in social media, nor an analysis of discourse behaviours in online conversation.

This is the end of the excerpt from the pre-print version of ‘Cross-Age Peer E-Mentoring to Support Social Media Use: A New Focus for Intervention Research’ by E. Grace and P. Raghavendra (2019).

2.6 Summary of the Literature Review

Using real-world contexts for communication interventions is important, given that intervention outcomes are directly integrated into complex real-world contexts. Increasing participation has been acknowledged as a key strategy for increasing skill development in young people (WHO, 2007), and yet, there is a gap in the evidence base for interventions targeting participation in everyday life activities (Novak et al., 2013) and research in this area has been impeded by definition and operationalisation of the participation and related constructs (Maxwell, 2012; Whiteneck & Dijkers, 2009).

To add to the ICF and ICF-CY definitions (WHO, 2001, 2007) the definition by Kang et al. (2014) of participation as encompassing three dimensions, physical, social, and self-engagement dimensions, is applied in this research and thesis. The review of the literature provided in this chapter highlighted that researchers interested in measuring changes in participation following an intervention may benefit from including in their approach to measurement all dimensions of participation, the ability to measure change over time, a focus on participation within an activity-specific setting, the inclusion of both subjective and objective measures, in-the-moment reporting, and a mixed methods approach.

Using social media to interact with peers is an everyday activity and real-world context used ubiquitously but disproportionately more so by young people. Therefore, social media use may provide a valuable real-world context for speech pathology and communication interventions.

Young people who use AAC are socially isolated and face reduced opportunities to participate in conversations with others. They are known to experience difficulties in the timing of face-to-face conversation; for example, they may experience delayed sequence of turns (Engelke & Higginbotham, 2013; Higginbotham & Wilkins, 1999;

Robillard, 1994). These variations in conventional expectations for timing in face-to-face interaction can lead to misunderstandings, communication breakdown, and passive or low rates of participation in conversation for individuals who use AAC (Engelke & Higginbotham, 2013; Light et al., 1985a; Robillard, 1994). It is unclear whether these challenges in face-to-face conversation may be reduced in online conversation, given the different values about what constitutes the "ideal conversation" in the online environment (Herring, 2013b, p. 263). For example, online conversation offers possible affordances given the different expectations for turn adjacency, reduced rate, and small number of words per transmission in online conversation. Several authors have proposed information, recreation, social, increased independence, and participation benefits of online media for young people who use AAC (Hynan et al., 2014; Rackensperger et al., 2005; Shpigelman et al., 2009b). Additionally, previous intervention studies providing face-to-face support to young people who use AAC have suggested social and communication benefits of social media use interventions (Grace et al., 2014; Robertson, 2008; Sundqvist & Rönnberg, 2010; A. Williams et al., 2007). Research to date has not applied language-focused discourse analysis to describe linguistic turns or pragmatic functions in online conversation and how these may reflect changes in participation in online conversation following intervention.

Online conversation can benefit young people who use AAC; however, only a small body of research has investigated interventions to support their participation in online conversation. Mentoring may be a feasible approach to intervention to support young people who use AAC to increase their participation in online conversation, particularly given that mentoring interventions can be provided using cross-age peer mentoring, a peer-support approach. Peer support is an intervention approach recognised to provide real-world contexts for developing communication skills and increasing social networks for individuals with communication impairments (Tregea & Brown, 2013). Further, it has been proposed that mentoring interventions may have greater effectiveness for mentees who experience limited social support (DuBois et al., 2002), such as individuals who use AAC. Mentoring interventions are commonplace, with several summaries regarding recommendations for intervention design to improve positive outcomes for mentees (DuBois et al., 2002; Shpigelman et al., 2009b), including a guideline for the design of mentoring interventions (Garringer et al., 2015). Other studies specifically investigate e-mentoring for young people with disabilities and mentoring or e-mentoring for young people who use AAC (Ballin, Balandin, & Stancliffe, 2013a; Cohen et al., 2003; Cohen & Light, 2000; Light et al., 2007). However, there is no consensus yet regarding the application of mentoring best practice programme features to e-mentoring interventions for young people who use AAC. The potential of e-mentoring to support online conversation of young people who use AAC is not yet known.

The importance and originality of this study is that it investigates the effectiveness of a peer e-mentoring intervention to support online social media use and participation in online conversation of young people who use AAC. An understanding of participation, online conversation, and cross-age peer e-mentoring has been established in this chapter. The chapter also presents previous research investigating participation in online conversation as an outcome, and cross-age peer e-mentoring as an intervention. Previous research has identified the potential of cross-age peer e-mentoring and interventions to enhance online conversation, providing a foundation for this investigation that combines the focus on this intervention and outcome. A language-focused discourse-analysis approach has been applied to face-to-face conversation of young people who use AAC. To date, this approach has not been applied to online conversation transcripts of these young people.

This chapter has provided a summary of the literature related to participation-based interventions and specifically the focus on online conversation and cross-age peer e-mentoring. Several questions remain about the design and effectiveness of interventions to support online conversation in young people who use AAC. These questions have informed the basis of this thesis, and are presented in the next section.

2.7 Research Aims and Questions

This chapter demonstrated that no studies have investigated cross-age peer e-mentoring interventions to enhance participation in online conversation of young people who use AAC. This thesis will further previous knowledge by investigating the potential strengthening of participation in online conversation by young people who use AAC through a peer e-mentoring intervention. Several research questions are proposed in the following paragraphs to inform this gap in knowledge.

The research addresses the overall question: What is the impact of a cross-age peer e-mentoring intervention on social media use of young people who use AAC?

Specifically, the sub-questions have been listed and are structured to investigate aspects of activity competence and participation in online conversation:

Q1. What is the effect of a cross-age peer e-mentoring intervention (independent variable) on participant goals for online conversation (dependent variable)?

Q2. What is the effect of a cross-age peer e-mentoring intervention on the reported intensity of online conversation?

Q3. What is the effect of a cross-age peer e-mentoring intervention on social and self-engagement in online conversation?

Q4. What is the effect of a cross-age peer e-mentoring intervention on written online conversation of mentees when they communicate with partners other than their mentor on one targeted social networking platform?

Utilising a socially situated perspective, the principles of language-focused discourse analysis will be applied to investigate this aspect of social and self-engagement:

4.1 What is the effect on the total number of moves taken by mentees?

4.2 What is the effect on the type of linguistic moves taken (e.g., initiations of conversation, initiations of topic, obligatory responses, and optional responses that keep the conversation going) by mentees?

4.3 What is the effect on the type and range of modes used by mentees?

4.4 What is the effect on the type and range of pragmatic functions (e.g., informative, feedback, requests, and social) used by mentees?

The following chapter presents a systematic review of the literature, which establishes a gap in the literature regarding the implementation and effects of cross-age peer e-mentoring interventions for individuals with communication disability.

Chapter 3: Systematic Review: What are the Outcomes of Peer-Mentoring Interventions for Young People with Communication Disability?

This chapter presents a systematic review of the literature concerning cross-age peer-mentoring interventions for individuals with communication disability. This systematic review reports: (a) previous cross-age peer-mentoring interventions for individuals with communication disability, (b) features of these mentoring interventions, (c) outcomes investigated, and (d) effectiveness of these interventions. It was intended that the review would inform the design of the mentoring intervention included in this thesis. The cross-age peer-mentoring approach included in this research is defined in Section 2.5.

The literature review to this point has identified only a small number of papers specifically describing cross-age peer e-mentoring interventions for individuals who use AAC (Cohen & Light, 2000; Light et al., 2007). Given this limited research for individuals who use AAC, for the purposes of strengthening this systematic review of the literature, the scope of searching was expanded. The systematic review was conducted to include young people (mentees aged 10–25), with communication disability and not limited to those who use AAC, and included mentoring interventions conducted face-to-face, and/or online. The term *cross-age peer* reflects that the mentor and the mentee share a similar characteristic. In this study, the characteristic shared by mentors and mentees was that they both used AAC. To broaden the scope of the systematic review, the shared characteristic of the mentor–mentee pairs was required but not specified. Characteristics shared by the cross-age mentor–mentee pairs were dependent on the individual study definitions.

3.1 Systematic Review: Introduction

Communication disability results in a wide range of effects across the lifespan. Although therapy and research have traditionally focused on the impairment level, awareness is increasing in the literature and among clinicians of the importance of focusing on activity and participation of individuals with communication disability (Botting & Hilari, 2011). This shift in focus to consider the activity and participation impact of communication disability has been motivated by the need for treatments to result in functional gains in everyday communication skills. A focus on everyday life and participation has increased the potential application and role of cross-age peer-mentoring interventions for individuals with communication difficulties (Coles & Snow, 2011). Cross-age peer-mentoring models for these individuals may be a valuable addition to augment the current system. This systematic review was completed to inform the design of the mentoring intervention for this study. Therefore, the aim extended beyond reporting on the effectiveness of the interventions provided. The aim of this review was to identify and evaluate current information regarding mentoring interventions for individuals with communication disability including:

1. the effectiveness of interventions;
2. the outcomes investigated in previous interventions; and
3. the features used in previous interventions.

The terms used in this systematic review are defined below, followed by a presentation of the systematic review conducted, the method, results, discussion, and conclusions.

For the purposes of this review, the term *communication disability* includes individuals with speech, language and/or communication difficulties, including those who use AAC. Individuals with a hearing impairment as their primary disability who use alternate modes to communicate were included in this review. The scope does not include individuals with primarily learning disorders and associated written communication difficulties (e.g., dyslexia) or mental health disorders where communication difficulties may be highly variable based on the contextual factors (e.g., anxiety).

Cross-age peer mentoring was defined as meeting the following four criteria:

1. The mentee and mentor will share a similar characteristic/s (C. Dennis, 2003).
2. As defined by Rhodes, 1994, there was “an older, more experienced mentor and an unrelated, younger” (p. 188) mentee.
3. The mentor provided “ongoing guidance, instruction, and encouragement aimed at developing the competence” of the mentee (Rhodes, 1994, pp. 188-189). Specifically, instruction was focused around the mentee’s goals to develop their use of social media.
4. As defined by Jacobi (1991), mentoring will include:
    a. supports and help to the mentee more broadly;
    b. a mentor who has more experience and skills in the area of mentoring focus; and
    c. provision of role modelling (an example in the area of mentoring focus that is intended to effect the mentee’s attitudes, skills, or knowledge).

To date, little is known about the effectiveness of mentoring interventions specifically for individuals with communication impairments. Some authors have argued that peer mentoring has an important role in supporting individuals with communication disability where older, more experienced individuals with communication disability can share their unique learning experiences, knowledge and skills, and provide a positive role model. The relevance of peer mentoring to individuals with communication disability has been proposed in a range of sub-groups, such as those with hearing impairment (Watkins, Pittman, & Walden, 1998), aphasia (Coles & Snow, 2011) or who use AAC (Ballin et al., 2009). Findings have suggested that peer-mentoring support for individuals with communication difficulties may improve competence and confidence in conversations, such as the number of conversational turns, initiations, and/or pragmatic functions used (Ballin et al., 2012). Further investigation is required to describe the effectiveness and features of peer-mentoring studies for individuals with communication disability and to inform the potential application of these interventions to augment current therapies.

This aim of the systematic review was to investigate: (a) the effectiveness of peer mentoring provided to young people (10–25 years) with communication disability across a range of outcomes, (b) the outcomes measured, and (c) inclusion of the five best practice features, outlined below.

3.1.1 Best practice mentoring intervention features. This review includes quantitative (effectiveness) and qualitative investigation (outcomes measured; best practice features). This section describes the approach used to describe the elements of mentoring interventions in the included studies.

The fourth edition of *Elements of Effective Practice for Mentoring* provides an evidence-based standard for the design and evaluation of mentoring interventions and is based on the review of over 400 peer-reviewed journal articles and further grey literature (Garringer et al., 2015). However, at the time of conducting this systematic review the fourth edition was not available (published in 2015). The third edition was not as strongly linked to empirical research evidence and therefore systematic reviews of mentoring interventions (DuBois et al., 2002, 2011) were used to develop a framework for discussing best practice features of mentoring interventions included in this systematic review (see Section 2.5.1 for further information regarding the proposal of these principles for mentoring interventions):

- training for mentors;
- structured activities for mentors and youth;
- clear expectations regarding frequency of contact;
- structures for support and involvement of parents; and
- monitoring of the overall intervention implementation.

It is unclear whether these best practice features have been used in mentoring interventions with young people with communication disability. The DuBois et al. (2002) review identified five general categories of outcomes of mentoring interventions: "emotional/psychological well-being, problem/high-risk behaviour, social competence, academic/educational, and career/employment" (p. 171). It is unclear whether similar outcomes are of interest in mentoring interventions for young people with communication disability.

3.2 Systematic Review: Method

3.2.1 Design. Systematic reviews identify, evaluate, and aggregate studies relevant to a specific question using scientific method (Petticrew & Roberts, 2008). This systematic review targeted intervention research published from 1985 to August 2014 investigating the effectiveness and/or outcomes of peer mentoring (as defined above) for young people with communication disability. The review was carried out using a protocol (Appendix B).

3.2.2 Inclusion and exclusion criteria. Studies involving young people aged 10–25 years with communication disability (see definition above) were included. The term young people was defined with a broad age range to maximise the number of studies included in the review. Studies that (a) focused on mentoring for family members and not the young person or (b) on outcomes for mentors and not mentees, and (c) those published in a language other than English were excluded. Experimental studies and quasi-experimental studies were included for quality appraisal and reporting regarding the effectiveness of the interventions. Non-experimental studies were unable to inform effectiveness of interventions, but were retained to report the outcomes investigated and use of best practice intervention features.

3.2.3 Search procedures. Searches were completed between August to October 2014 according to a previously set protocol. The comprehensive search included database searches (Medline, CinAHL, PsycInfo, Eric (ProQuest), Eric (Ovid), Scopus, Web of Science) and searching through a range of other non-database sources: (a) grey literature (advanced Google search, Trove, Google Scholar); (b) hand searching of table of contents (Augmentative and Alternative Communication, Disability and Rehabilitation - Assistive Technology); and (c) snowballing from reference lists of included articles.

Search terms were identified and listed against the two main concepts, communication disability and peer mentoring (Table 3.1). Search terms were identified through review of previously identified relevant articles and in discussion with a librarian with significant experience in the field of communication disability and in systematic reviews. For each database, search terms were mapped to subject headings and database-specific terms were identified and selected by the researcher. Further, these searches were combined with a keyword search for all terms identified.

Table 3.1

Search Terms

Mentoring	Communication Disability
Mentor	AAC
Peer support	Alternative communication
Peer mediated	Augmentative communication
Mentee	Non-verbal
Protégé	Nonverbal
Support group*	Complex communication needs
Role model*	CCN
	Communication skill*
	Speech-generating device*
	SGD
	Communication aid*
	Sign language
	Communica* disorder*
	Speech disorder*
	Language disorder*
	Articulation disorder*
	Language delay
	Speech delay
	Speech impairment*
	Language impairment*
	Cerebral palsy
	Autism
	Hearing impairment*
	Deaf
	Developmental disabilit*
	Aphasia
	Dysphasia
	Dyspraxia
	Apraxia
	Brain injur*
	Voice Disorder*
	Stutter*

3.2.4 Screening and inclusion criteria. Results of searches were saved to Endnote ® (version 17). The titles and abstracts were reviewed against the inclusion criteria to identify clearly irrelevant (*n* = 3281) and potentially relevant articles (*n* = 440; Figure 3.1). A copy of the full text was retrieved for potentially relevant articles to determine inclusion or exclusion. The screening and eligibility process identified five experimental articles to be included in the systematic review and nine non-experimental articles. Non-experimental articles were not included in the calculations of effect size but were retained for the purpose of discussing outcomes of interest and features of mentoring interventions reported in the literature (Figure 3.1). Reasons for exclusion of full-text articles were recorded and are reported in Table 3.2. The largest proportion of articles excluded was because of differences in use and definition of the term peer mentoring in the literature (Table 3.2).

Table 3.2

Reasons for Excluding Full-Text Articles

Reason for Excluding	*n*
Not the target population	147
Not peer mentoring	261
Type of article not suitable (e.g., mentor recruitment, advertising a mentoring intervention, descriptive personal story of being a mentor).	18
Total	426

Note. n = number excluded

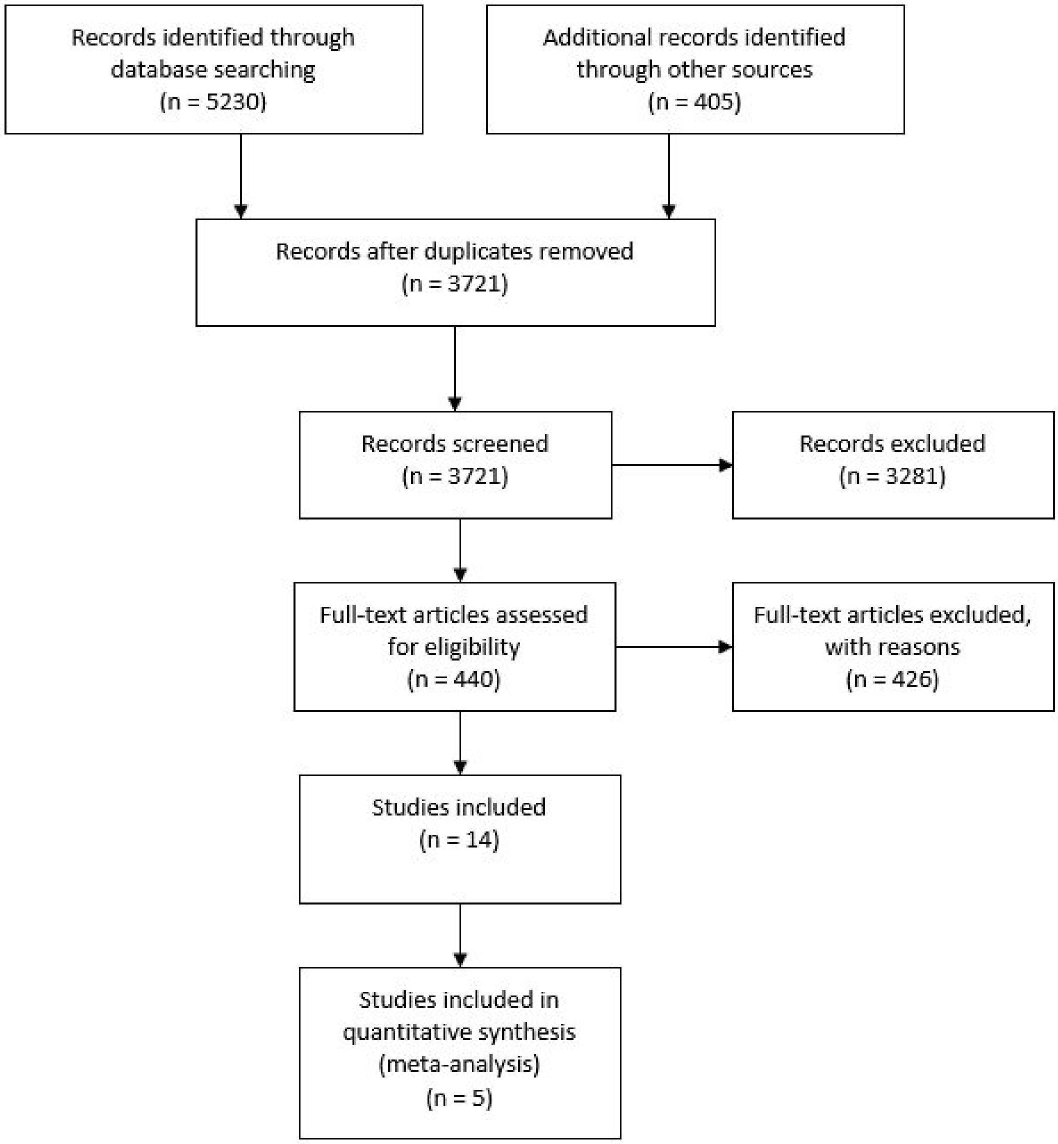


Figure 3.1. PRISMA flow diagram.

3.2.5 Data extraction. For each included study, data were extracted using a purpose constructed template, where available information collected included: the purpose and goals of the study, mentee participant characteristics, mentor participant characteristics, and features of the mentoring intervention. This approach was used to ensure information was reported equally across all included studies and to allow for the presentation of comparison tables describing features of the mentoring intervention used.

3.2.6 Quality assessment. The *Evaluative Method Tool* (Reichow, 2011) was used to review and describe the methodological rigour of all included experimental studies. This tool was selected since it can be applied to both single-case and group designs and was endorsed by a recent review of appraisal tools (Wendt & Miller, 2012). The Evaluative Method Tool is specifically designed for research involving individuals with autism spectrum disorder, and since the participants in this review included a wider range of communication disabilities, the criterion used in this tool for describing participants' autism spectrum disorder was not appropriate. This criterion was extended to include any relevant assessments or objective descriptions related to the broader range of communication impairments in line with the purposes of this review. The Evaluative Method Tool evaluates methods used on two levels: (a) primary quality indicators that are described as critical for demonstrating the validity of the study and (b) secondary quality indicators that are considered important but not necessary to establish validity (Reichow, 2011). A combination of primary and secondary quality indictors is used to determine the overall rating on a three-point scale, Strong, Adequate, or Weak (Reichow, 2011).

3.2.6.1 Statistical analysis. Five of the studies included in the review were SCEDs, and where information was available, effect size was reported using PND, mean, and range. (Scruggs, Mastropieri, & Casto, 1987). PND is the percentage of all data points in the mentoring phase that exceed the highest data point in baseline.

3.2.6.2 Inter-rater reliability. A second reviewer was included in each step of the review and where disagreements were evident, these were resolved with a third reviewer to increase the integrity and credibility of the review. A second reviewer screened and determined eligibility of 20% (n = 89) of the potentially relevant (full-text) articles. Inter-observer agreement was calculated and demonstrated 98% agreement, indicating a very high level of agreement. A consensus was made for disagreements following discussion with a third reviewer. The second reviewer also reviewed all the included experimental and non-experimental articles. Inter-observer agreement was calculated and demonstrated 79% agreement, indicating an acceptable level of agreement. Differences were resolved to 100% agreement following discussion with a third reviewer. Finally, quality ratings were completed using the Evaluative Method Tool and a second rater reviewed all five of the included experimental studies. Inter-observer agreement was calculated and demonstrated 80% agreement, indicating an acceptable level of agreement. Differences were resolved to 100% agreement following discussion between the two reviewers.

3.3 Systematic Review: Results

In all, 14 studies met the two levels of inclusion for this review. Both experimental studies (n = 5) and non-experimental studies or papers (n = 9) were retained to describe the features of the mentoring support provided (Table 3.3). The five experimental studies all employed SCED and included 12 participants between 12–25 years of age. Three of the non-experimental papers used descriptive designs (e.g., 2 x descriptive, 1 x case study, and 6 x discussion/narrative approaches). One study did not specifically describe the number of included participants with communication disability or the ages of the mentee participants, and the researcher requested further information from the author but did not receive a response. The other two papers included five participants aged 14–25 years. The further five non-experimental papers discussed or described mentoring interventions relevant to 10–25-year-old individuals with communication disability but did not specifically describe participants.

3.3.1 Effectiveness of interventions. The five experimental studies were evaluated to report the effectiveness of the interventions (Table 3.4). Data were available for calculation of PND in four of the five studies. Across all seven outcome measures reported in the four studies, PND indicated that treatments were effective (78.88%), although results across the measures were highly variable, ranging from unreliable (29.14%) to highly effective (100%). Support for the effectiveness of mentoring interventions was stronger when considering only the primary outcomes of the included studies. When including only the four primary outcome measures reported in the four studies, PND demonstrated that treatments were highly effective (95.67%) across all studies, ranging from 91% to 100%.

Methodological rigour of the five experimental studies was evaluated on primary and secondary measures. Although some studies did meet at least four of the high-quality indicators, they included other unacceptable features, and therefore, no studies met a strong or moderate quality of evidence according to the evaluative framework. Appraisal using the Evaluative Method Tool found all five studies as having weak overall quality (Reichow, 2011).

The full text of all 14 included papers was reviewed to determine the features of the mentoring interventions implemented or described in each study. Qualitative analysis of the full-text articles identified the five best practice features present across the studies to varying degrees (Table 3.5). Systematic monitoring of mentoring and the provision of mentor training were the most commonly implemented best practice features (n = 11).

Outcomes of the mentoring interventions investigated by the five experimental studies are listed in Table 3.4. Studies included outcomes across two of the five domains identified by DuBois (2002). This indicated a focus on social and educational outcomes, although several studies fell outside of these five domains and included other outcomes (e.g., total number of words and correct/incorrect response).

Table 3.3

General Characteristics of All Included Studies

First Author	Year	Design	Purpose	Mentees	Mentors
Ballin	2013	Experimental	"To investigate the outcomes of SGD mentoring by adult SGD communicators on mentees' device usage" (p. 440).	3	3
Carter	2011	Experimental	To investigate the effectiveness of peer-support interventions to "promote improvements in social interaction with classmates without disabilities relative to an exclusive reliance on individually assigned adults" (p. 109).	2	2
Shukla	1998	Experimental	"To better understand the source of academic improvements noted in previous research by assessing the influence of adult attention on peers without disabilities as they participate in peer support programs" (p. 399) (study reports outcomes for mentees and hence the present study included these data).	1	1
Lancioni	1992	Experimental	To determine "if dyad sessions would have effects on the individual performance of trainee and peer caregivers" (p. 130).	2	1
Lancioni	1990	Experimental	To determine whether "the dyad condition would have effects on the individual performance of the two persons" (p. 150).	1	1
Ballin	2013	Descriptive	"To investigate participants' views on (i) the mentoring programme, (ii) the training mentors received, and (iii) if mentees learnt about SGD use by participating in the mentoring programme" (p. 197).	3	3
Blatchford	2008	Discussion	Connects students who are deaf and attend mainstream schools with role models and other students who are deaf	not stated	30

Table 3.3 Continued

First Author	Year	Design	Purpose	Mentees	Mentors
Burgstahler	2001	Descriptive	“1. Can computer-mediated communication be used to initiate and sustain peer–peer and mentor–protégée relationships and alleviate barriers to traditional CSB related to time and schedule limitations, physical distances and disabilities of participants? 2. How do the functions of peer–peer and mentor–protégée electronic communications on the Internet compare in psychosocial, academic and career areas?” (p.62).	35	49
Fraas	2010	Discussion	“The goal of this project was to provide social support to youth survivors of ABI while simultaneously increasing the social connections of adult survivors. In addition, one was concerned with determining the effectiveness of the intervention in providing emotional and cognitive support as well as enhanced quality of life for the participants” (p.52).	1	1
May	2006	Discussion	“I communicate with children using my SGD, so that they can get a clear picture of what it is like to interact using an SGD. I never had an AAC role model, but it is something I always wanted”(p.1)	1	not stated
Murray	2012	Discussion	Develop mentor–protégée relationships for individuals with aphasia. To help “ward off the isolation and depression that sometimes results from aphasia and supports what they’re already learning with speech-language pathologists” (p.14).	not stated	not stated
Poeppelmeyer	2007	Discussion	“Guiding these students through a positive weekend of self-discovery” (p.24).	not stated	not stated
Rajtar	2001	Discussion	Cyber mentor project: using adults ”to enhance the experience of a deaf education student” (p.30).	not stated	not stated
Cohen	2000	Descriptive	“To explore aspects of the on-line mentoring process that may be unique to augmented communicators or require further investigation” (p. 229).	4	4

Table 3.4

Evaluation of Mentoring Intervention Effectiveness

1st Author	Year	Outcome Categories						Outcome Measures	IRA		PND	
		1	2	3	4	5	6		IRA %	% of sample	%	
Ballin	2013						X	Number total words	100.00	29.00	83.33	Highly Effective
							X	Number different words	100.00	29.00	63.33	Questionable effectiveness
							X	Number bound morphemes	83.33	29.00	40.00	Unreliable
Carter	2011			X				Participants & mentors' interactions	93.90	25.20	91.00	Highly Effective
					X			Academic engagement	85.40	25.20	15.05	Unreliable
Shukla	1998			X				Social interaction duration	not reported	not reported	not reported	not reported
					X			Active engagement	not reported	not reported	not reported	not reported
Lancioni	1992						X	Correct response for trainee	not reported	not reported	not reported	not reported
Lancioni	1990						X	Correct response for trainee	97	35	not reported	not reported

Note. 1 = Emotional/Psychological, 2 = Problem/High-Risk Behaviour, 3 = Social Competence, 4 = Academic/Educational, 5 = Career/Employment, 6 = Other; Sample

IRA = Inter-rater agreement

Table 3.5

Best Practice Features Present in the Included Studies

Features Present	All	By Study Design		
		Experimental	Descriptive	Discussion
Systematic monitoring of mentoring	11/14	5/5	2/3	4/6
Structure provided for formation of the relationship (e.g., training)	11/14	5/5	2/3	4/6
Structured activities to support mentoring	8/14	5/5	1/3	2/6
Expectations communicated to mentors prior to intervention	6/14	2/5	3/3	1/6
Parental support included	1/14	0/5	0/3	1/6

3.4 Systematic Review: Discussion

Fourteen studies were identified to provide information about peer-mentoring interventions, including five experimental studies. Analysis of these studies indicated that in some situations, for some outcomes, mentoring interventions can be highly effective for this population. However, the evidence is weak and no conclusions can be drawn regarding the application of peer-mentoring interventions for individuals with communication disability. This is because of the small number of studies, low participant numbers, and limitations in methodological quality. More research is needed to establish the possible benefits of the cross-age peer e-mentoring approach for individuals with communication disability. The range, scope, and features of the mentoring interventions present further points for discussion that may be valuable in directing future research in this area.

3.4.1 Defining mentoring. The term *mentoring* used in the literature broadly refers to a wide variety of interventions resulting in some unexpected challenges and inclusions in this systematic review. A large number and wide range of interventions were returned using the search terms to capture mentoring interventions with a broad lens. Although a specific definition was constructed to describe the scope of this review, the review of articles against this definition occurred at the screening stage and not the searching stage. This resulted in numerous irrelevant records included in the screening but was unavoidable, given that historically keywords are not used specifically to differentiate between peer tutoring, counselling, or education interventions that use the keyword, mentoring. The diversity of use of the term *mentoring* has been raised previously by other authors searching the mentoring literature for specific interventions (Karcher, 2014). For example, in this study over half (57%, 250/440) of the articles screened included a type of mentoring intervention or a peer-mediated intervention. Approximately a quarter (24%, 60/250) of these articles included peer-mentoring interventions according to the definition used; however only 5% (13/250) also discussed the population of interest, individuals with communication disability between the ages of 10–25 years. Despite the development of a clear protocol for this review, papers included and excluded by this review did not meet the intended outcomes of the review. For example, despite an attempt to place an emphasis on the importance of the mentoring relationship in the definition of mentoring interventions, some studies that met the definition employed a task-specific intervention that may be viewed more as peer tutoring rather than a relationship focused peer-mentoring intervention intended to be the focus of the review (e.g., Lancioni, Oliva, & Bartolini, 1990; Lancioni, Oliva, & Raimondi, 1992). Other studies appeared to be structured more as peer-mediated interventions than mentoring interventions (e.g., Ballin et al., 2012). Similar challenges regarding the scope and definition of cross-age peer mentoring have been reported by Karcher (2014), an international leader in this field. However, the focus on role modelling as an important component of mentoring was confirmed by definitions provided in the included studies. This may be particularly important for individuals who use AAC, given that young people who use AAC and their parents have highlighted that they have limited opportunities to interact with adults who are competent AAC users and who can be cross-age peer mentors (Batorowicz, Campbell, Von Tetzchner, King, & Missiuna, 2014).

Further, two key articles investigating peer mentoring with young people with communication disability did not provide information for considering the effectiveness of interventions. Cohen and Light’s (2000) pilot research was included as a non-experimental study. A second major project in the area, the AAC mentor project by Light et al. (2007) focused on the mentor training protocol and not the intervention. However, these studies make key contributions to the literature in this area and are included in the non-experimental studies.

3.4.2 Use of mentoring best practice features. To a varying degree, the studies that were included used the best practice features. The degree to which parent support was included in the interventions is unclear, given there was little emphasis on this in the descriptions of the interventions. Interventions commonly included support for initial matching, structured activities, and support for scheduling of mentoring contacts and other intervention coordination tasks completed by the researchers. Some studies included ongoing support during the intervention and others commented that further ongoing training would have been beneficial to the design; this included support for mentors and mentees. Four studies (Blatchford, 2008; Burgstahler & Cronheim, 2001; Fraas & Bellerose, 2010; Poeppelmeyer & Coco, 2007) mentioned the benefit of incorporating online conversation as part of the mentoring.

3.4.3 Limitations. Several limitations of this review are noted below.

- Despite inclusion of grey literature searches, no included articles were sourced from these searches.
- Included studies were limited to English language since resources were not available to extend the search beyond this limit.
- PND was the only non-overlap statistic used to evaluate the effectiveness of interventions. While it is acknowledged that there has been some discussion in the literature regarding the validity of this approach, PND continues to be the most widely used approach.
- Although endorsed by a recent review of quality indicators (Wendt & Miller, 2012), the framework used to evaluate methodological rigour was designed specifically for autism spectrum disorder and not for individuals with communication disability more generally.
- The review was conducted in August 2014 and does not include literature published after this date.

3.5 Systematic Review: Conclusion

This review highlights the highly variable nature of mentoring interventions discussed in the literature. Studies reviewed included social, educational, or communication-related outcomes of mentoring, and interventions applied most of the five best practice features. Two studies provided weak evidence that peer-mentoring interventions may be highly effective for some individuals with communication disability. However, no conclusions can be drawn regarding the best outcomes to target in mentoring interventions, the value of best practice features or the effectiveness of peer-mentoring interventions. Despite the limitations, this review establishes a gap in the literature regarding cross-age peer e-mentoring interventions for individuals with communication disability that is addressed in this thesis.

The next chapter describes the mixed methods approach used in this intervention research, which incorporated a multiple-baseline single case design.

Chapter 4: Method: Study Design

This chapter and the following chapter present the method used in this intervention research. This Chapter, 4, provides a comprehensive description of the approaches and tools used to investigate the effectiveness of a peer e-mentoring intervention to strengthen participation in online conversation by young people who use AAC. The research incorporated a SCED, and the delivery and fidelity of the intervention is described and analysed in the second method chapter, Chapter 5.

4.1 Methodology

This mixed methods intervention research explored changes in participation in online conversation before, during, and after an e-mentoring intervention. The objective was to investigate the effectiveness of a peer e-mentoring intervention to support social media use and participation in online conversation by young people who use AAC. Given the complexity of the constructs (i.e., participation, mentoring, and social media use), a mixed methods approach was thought most appropriate for the research questions (Tariq & Woodman, 2013). A visual model of the research process is presented in Figure 4.1. The study was positioned within the research paradigm of pragmatism. Pragmatism is based on the view that knowledge is acquired through action and reflection and is established through practical application (Dewey, 1916). This pragmatic approach was consistent with the ICF theoretical framework (WHO, 2001) and focus on participation in everyday life activities. Further, this approach guided the researcher to apply methods based on their suitability to the research question and constructs of interest (Glogowska, 2011; Teddlie & Tashakkori, 2009).

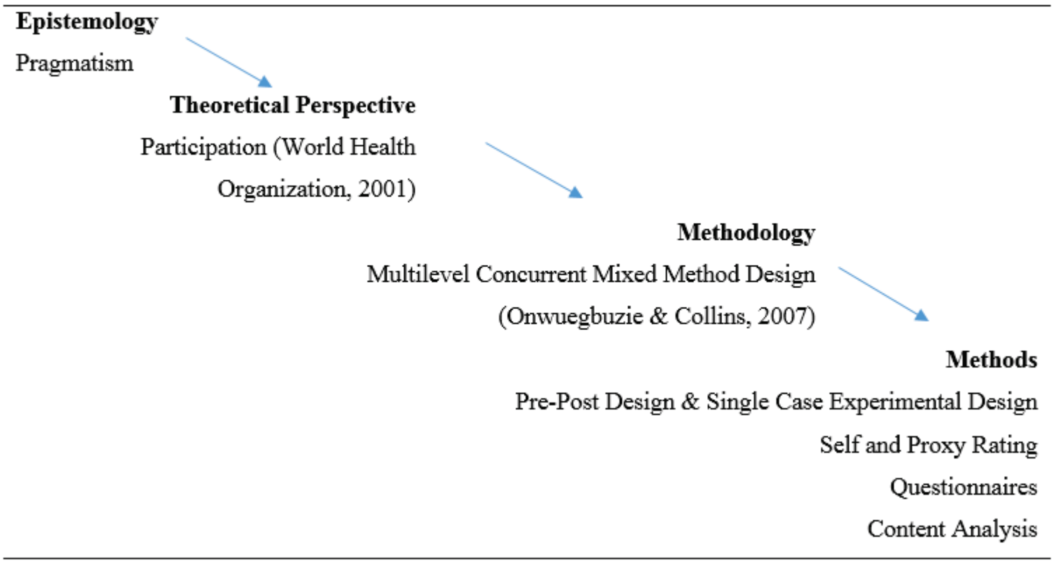


Figure 4.1. Visual representation of the research process. Adapted from "The foundations of social research: meaning and perspective in the research process", by Crotty (1998, p. 4), London: Sage.

4.1.1 Multilevel concurrent mixed method design. A multilevel concurrent mixed method design was used in which qualitative data were collected alongside quantitative data (Figure 4.2; Onwuegbuzie & Collins, 2007). This approach allowed for exploration of data from three groups, mentees, mentee's care givers, and the mentors (a multilevel approach) and also allowed for simultaneous (a concurrent approach) collection of data across several constructs that are theoretically linked to participation in online conversation (Onwuegbuzie & Collins, 2007). Guided by the research question, an emphasis was placed on quantitative approaches in the data analysis with qualitative elements included for additional interpretation (Table 4.1).

Table 4.1

Research Questions and Approaches to Measurement

Research Question	Research Hypotheses	Approach to Measurement	Measures
1. What is the effect of a cross-age peer e-mentoring intervention on participant goals for online conversation?	That participants will show positive changes in: • perception of performance; and • perception of satisfaction with performance in identified problem areas in online conversation; and • progress in attainment of goals for online conversation following the intervention.	Quantitative and Qualitative	COPM GAS
2. What is the effect of a cross-age peer e-mentoring intervention on the reported intensity of online conversation?	Participants would increase their online conversation in terms of: • the frequency (days per week); • duration (in hr); and • total words transmitted in online conversation following the intervention.	Quantitative	Frequency
3. What is the effect of a cross-age peer e-mentoring intervention on social and self-engagement in online conversation?	Participants and their mothers would report positive experiences of participation in online conversation, which would also be positively affected by the intervention, as demonstrated by: • increased ratings on the SEAS-PCS; and/or • increased self & proxy ratings on the engagement probe, following the intervention.	Quantitative and Qualitative	SEAS-PCS[16, 17] (self-report) Engagement Probe

Research Question	Research Hypotheses	Approach to Measurement	Measures
4. What is the effect of a cross-age peer e-mentoring intervention on written online conversation of mentees when they communicate with partners other than their mentor on one targeted social networking platform?	Written online conversation between the participants and other communication partners outside of the mentoring intervention would be enhanced by the e-mentoring intervention. Participants would increase in their use of online modes (e.g., like, tag, attach photo/video and use of chat abbreviations) in online conversation following the intervention. Use of linguistic moves in online conversation would demonstrate increase in: • total moves; • assertiveness (e.g., initiations of topic, initiations of conversation); and/or • optional/non-obliging move types following the intervention. Use of pragmatic functions in online conversation would demonstrate: • increased range of functions; • reduced use of confirmation-denial functions; and/or • increased provision of information functions following the intervention.	Quantitative and Qualitative	Language-focused CA (moves, modes & functions)

Note. COPM = Canadian Occupational Performance Measure is from Law et al. (2005); GAS = Goal Attainment Scaling is from Kiresuk and Sherman (1968); SEAS-PCS = Self-Reported Experiences of Activity Settings-Picture Communication Symbol version is from Batorowicz, King, Vane, Pinto and Raghavendra (2017); CA = Content analysis.

The quantitative data were used to test the hypothesis that predicts that the e-mentoring intervention will enhance activity competence and participation in online conversation for young people who use AAC, as described in questions 1–3 using goal attainment, frequency, duration, and engagement measures. Quantitative data were also collected through self (mentee) and proxy (mentee’s mother) reports before, during, and after the e-mentoring intervention.

The qualitative data were collected concurrently before, during, and after the e-mentoring intervention for the following purposes:

1. to describe problem areas and goal statements for social media use (question 1);
2. to provide more depth to responses on the Self-Reported Experiences of Activity Settings-Picture Communication Symbol questionnaire (SEAS-PCS[16, 17]; Batorowicz, King, Vane, Pinto and Raghavendra, 2017) and engagement probe (question 3); and
3. to investigate changes in participation in online conversation with peers, as a result of the e-mentoring intervention (question 4).

Participation in online conversation is understood as both attendance and involvement in online conversation (WHO, 2001). A language-focused approach to CA as defined by (Herring, 2004a) was used to address question 4 investigating social media conversations to describe linguistic moves, pragmatic functions, and online modes present. The quantitative data included self- and proxy reports of activity and participation-related constructs utilising a range of tools:

1. Self-Reported Experiences of Activity Settings-Picture Communication Symbol version (SEAS-PCS; Batorowicz et al., 2017),
2. Goal Attainment Scaling (GAS; Kiresuk & Sherman, 1968),
3. Canadian Occupational Performance Measure (COPM; Law et al., 2005),
4. Engagement Probe (a study-specific rating tool).

The qualitative data include social media problem statements by participants and online conversation between the mentees and other communication partners on one chosen social network.

SCED was employed to report on observed changes in constructs related to participation in online conversation (Questions 1–4). The research questions, dependent variables, and measures used are summarised in the relevant section below (Table 4.3).

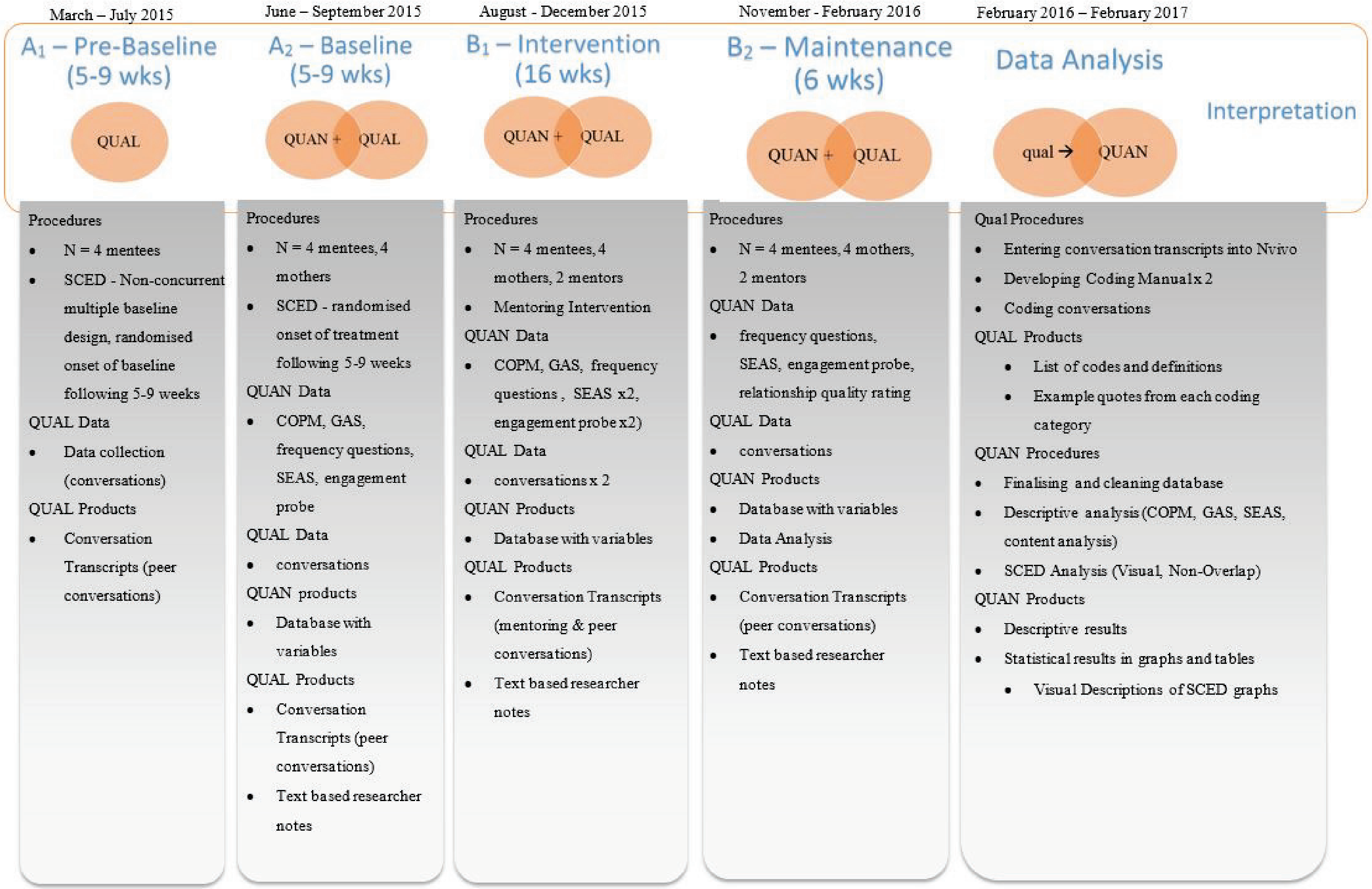


Figure 4.2. Multilevel concurrent mixed methods design. Adapted from “A Concise Introduction to Mixed Methods Research”, by

Creswell (2014); Notation conventions from p. 53: Uppercase letters indicate prioritised methods (i.e., QUAN, QUAL); lowercase letters indicate lesser priority (i.e., quan, qual); + indicates convergent methods (i.e., QUAN + QUAL); → indicates sequential methods (i.e., QUAN → QUAL)..

4.2 Single-Case Experimental Design (SCED)

SCED was used where participants act as their own control. In contrast to involving numerous participants and documenting whole group performance at a small number of time points, SCED involves a few participants but a large number of measurement points (Kratochwill & Levin, 2014). The SCED is valuable in this research since it allows for the investigation of the effectiveness of interventions in small heterogeneous populations where larger studies are not feasible and where significant variability might be present between one individual and the next (Schlosser, 2003). Given the potential significant variation between participants and small number of participants in the target population, the SCED was considered the most appropriate design for evaluation of the research questions.

The SCED employed is described using the approach recommended by Kratochwill and Levin (2014) that initially describes an understanding of the research questions and the independent and dependent variables followed by the consequent decisions regarding the nature of the SCED and finally, the approach to data analysis.

4.3 Independent Variable: E-Mentoring

The independent variable in this study was the delivery of the cross-age peer e-mentoring intervention to support participation in online conversation for young people who use AAC. Cross-age peer e-mentoring in this study met the four criteria listed below:

1. The mentee and mentor will share a similar characteristic/s (C. Dennis, 2003).
2. As defined by Rhodes (1994), there was "an older, more experienced mentor and an unrelated, younger" (p.188) mentee.

3. The mentor provided “ongoing guidance, instruction, and encouragement aimed at developing the competence” of the mentee (Rhodes, 1994, pp. 188-189). Specifically, instruction was focused around the mentee’s goals to develop their use of social media.
4. As defined by Jacobi (1991) mentoring will include:
    i. supports and help to the mentee more broadly;
    ii. a mentor who has more experience and skills in the area of mentoring focus; and
    iii. provision of role modelling, specifically, in this study, role modelling of online conversation and use of AAC, where the mentor’s example in these areas may have had an effect on the mentee’s attitudes, skills, or knowledge in this area.

The 16-week e-mentoring intervention in this study occurred within the following framework that was based on a meta-analysis of 55 youth mentoring interventions, which suggested these features may be particularly important for positive outcomes in mentoring interventions (DuBois et al., 2002):

- Caregivers consented to, and supported, mentee involvement in the intervention.
- Mentors were provided training prior to the intervention and a handbook that recorded all key information from the training and provided clear expectations for the frequency of contact with mentees.
- Ongoing support was provided to the mentors, mentees, and their families and continual monitoring of all conversations by the researcher.
    - Structured activities were arranged during the mentoring intervention.

4.3.1 Mentoring procedure. The procedure used for the e-mentoring intervention in this study is summarised in Table 4.2. The intervention was designed to meet recognised benchmarks for effective mentoring practice (Garringer et al., 2015) across six standard areas: recruitment, screening, training, matching and initiating, monitoring and support, and closure. A detailed description of the e-mentoring intervention design as it aligns with these standards is provided in Chapter 5.

Each participant in this study was invited to respond to, and connect with, their mentor online over a four-month (16-week) period. Four months has been recommended as a minimum timeframe for the provision of youth mentoring interventions (Nakkula & Harris, 2014). The programme length was also similar to that used in previous studies of e-mentoring interventions for young people with disabilities or chronic health conditions (Barnfather, Stewart, Magill-Evans, Ray, & Letourneau, 2011; Raghavendra, Newman, Wood et al., 2015). Shorter timeframes have been used in some studies (e.g., Ahola Kohut et al., 2016; Stinson et al., 2016). However, it has also been concluded by some research that much longer timeframes are ideal and are associated with larger intervention effects (Nakkula & Harris, 2014; Shpigelman & Gill, 2013). In particular, increased length of relationship is recognised to buffer against potential negative outcomes of mentoring interventions (DuBois et al., 2002). Mentors were expected to contact participants online, at least weekly, for the duration of the intervention. Scheduling of online contacts was arranged by participants and mentors, with support from the researcher as requested.

Table 4.2

E-Mentoring Intervention Procedural Steps

1. Recruitment of participants.
2. Mentor, participant, and participant family member consent.
3. Participant goal development, discussion of participant expectations for e-mentoring intervention and possible topics of conversations, and recommendations for best dates and times for e-mentoring and for structured activities.
4. Mentor pre-match training.
5. Distribution of participant individualised goals for online conversation and e-mentoring event calendars for each participant.
6. First contact between participants and mentors (1:1); researcher present for introduction.
7. Support to mentor from researcher as requested or initiated by researcher following two weeks of no contact where this occurred.
8. 16 weeks of contact between mentor and mentee; mentor supporting mentee in the areas of focus, online conversation, and using social media.
9. Monthly group e-mentoring calls.
10. Final contact with participants—celebration of e-mentoring relationship.
11. Feedback—relationship quality rating, interviews, and discussion regarding ongoing contact.

Further detailed aspects of the e-mentoring intervention procedure and training alongside the internationally recognised benchmarks and standards are provided in the following chapter along with the intervention fidelity measures and results (Chapter 5).

4.4 Dependent Variables

This research investigated changes in activity competence and participation in online conversation. In particular, the dependent variables in the study were participant goals for online conversation; reported intensity of participation in online conversation; and self-reported, and observed, social, and self- engagement in online conversation. More than one measure was used, reflecting the complexity of understanding changes in participation. Changes in participation in online conversation were investigated using measures of frequency and engagement, including measures of the linguistic moves and pragmatic functions present in the participant's conversations. Assessment of these variables was completed through a combination of direct observation and self- and proxy reporting. Observations and self-ratings are appropriate for SCED and commonly used in this field where researchers aim to avoid interference in the process of the intervention while repeatedly measuring dependent variables (Kazdin, 2011).

4.4.1 Additional periodic measures. Multiple measures are used in this project to enable a more complete understanding of changes in participation in online conversation. Multiple measures are commonly collected in SCED (Kazdin, 2011). It is common practice in SCED that not all measures are collected with the same frequency. However, at least one measure must be collected in an ongoing manner throughout each phase (i.e., in this study, the frequency, duration, and CA measures fulfil this criterion; Kazdin, 2011). It is not always desirable, feasible, or efficient to collect all measures in an ongoing manner. When not collected on an ongoing basis, additional measures may be administered as pre/post or periodic probes (Kazdin, 2011). Periodic probe techniques are commonly used in SCED to provide additional information alongside the primary dependent variable. Additional probes may target the same dependant variables but at different time points or may target different variables at the same/different time points. For example, studies have used periodic probes to assess the generalisability of outcomes (e.g., E. Carr & Kologinsky, 1983) and the persistence of effects after the intervention has ended (e.g., Sira & Fryling, 2012) or to collect additional information (e.g., Rudolph & Wendt, 2014). Other researchers have used an additional pre-post probe to collect additional information (e.g., for social validity; Koh, 2013).

In this research, two sets of additional probes were collected: (a) Pre-post probes were used to collect reports regarding social media problem areas and goal attainment; and (b) periodic engagement probes were collected at four occasions (prior to baseline [T1], during intervention [T2], following intervention [T3], and following maintenance [T4]) to report on changes in engagement in online conversation (Figure 4.3). It was not considered feasible for engagement measures to be collected in a weekly or continuous manner (see Section 4.7.3). The key features of assessment for each dependent variable are discussed against the relevant research questions and are summarised in Table 4.3. Detailed definitions and descriptions for each dependent variable are outlined below the table (see Section 4.7).

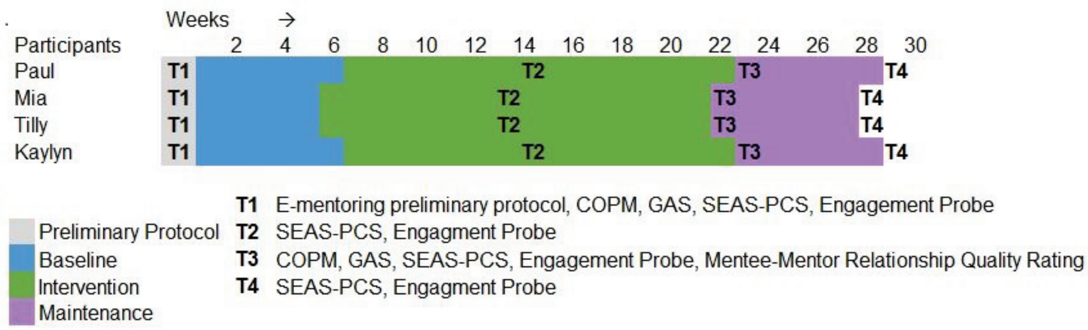


Figure 4.3. Graphical representation of research timeline.

Table 4.3

Summary of Key Features

Research Question	Dependent Variable Measures	Schedule for Repeated Assessment	Consistency of Measure	Capacity to Reflect Change	Dimensional Scale	Relevance [a.]
1. What is the effect of a four-month e-mentoring intervention on participant goals for online conversation?	COPM GAS	Pre-Post Probes	IRA – n/a	Recommended by authors (Law et al., 2005) and used in other research to demonstrate change	Mean performance score (scale) Mean satisfaction score (scale) GAS T-score (scale)	Activity competence has been theoretically linked to participation (Imms, Adair, Keen, Ullenhag, Rosenbaum, & Granlund, 2016).
2. What is the effect of a four-month e-mentoring intervention on the reported intensity of online conversation?	Frequency	Weekly probes reported by participants and their caregivers	IRA – n/a	Designed specifically for this research	days (scale) hours (scale)	Measures of frequency in days and duration in hours. Frequency measures are appropriate measures of change in participation attendance (World Health Organization, 2001). Real-time retrospective reports have been argued to increase the reliability of measures of attendance (Granlund, 2013; G. King, 2013).

Table 4.3 Continued

Research Question	Dependent Variable Measures	Schedule for Repeated Assessment	Consistency of Measure	Capacity to Reflect Change	Dimensional Scale	Relevance [a.]
3. What is the effect of a four-month e-mentoring intervention on social and self-engagement in online conversation?	SEAS-PCS (self-report)	4 probes collected by researcher via participant self-report	IRA–n/a	Recommended by authors to be used to reflect changes following intervention (King et al., 2014)	Personal Growth (scale) Psychological Engagement, Social Belonging, Meaningful Interactions and Choice and Control	This additional measure has been included to allow for a complete discussion of participation, including involvement and not only attendance in online conversation (Granlund, 2013; G. King, 2013; G. King, Batorowicz, Rigby, McMain-Klein, et al., 2014; World Health Organization, 2007).
	Engagement informal ratings	4 probes collected by researcher via participant (self) and parent (proxy) report	IRA – n/a	Designed specifically for this research	Mean engagement self-rating (scale) Mean engagement proxy rating (scale)	This additional measure has been included as researchers have advocated the use of both proxy and self-reported measures in understanding the construct of involvement (Adolfsson, Granlund, & Pless, 2012; McDougall, Bedell, & Wright., 2013).

Table 4.3 Continued

Research Question	Dependent Variable Measures	Schedule for Repeated Assessment	Consistency of Measure	Capacity to Reflect Change	Dimensional Scale	Relevance [a.]
4. What is the effect of a four-month e-mentoring intervention on written online conversation of participants when they communicate with partners other than their mentor on one targeted social networking platform?	Conversation measures (moves, modes & functions)	Continuous data collected, reported as weekly observations	IRA -20% of probes	Previous AAC and CMDA studies have used similar measures to demonstrate change (see references in right-hand column)	total linguistic moves (scale) individual move types (expressed as a % of the total moves) range of pragmatic functions (scale) individual function types (expressed as a % of the total functions) range of modes (scale) individual mode types (expressed as a % of the total modes)	Several researchers have used similar measures to demonstrate changes in conversation (Bunning, Smith, Kennedy, & Greenham, 2013; Herring, 2013a; Herring & Androutsopoulos, 2015; Herring et al., 2005; Light et al., 1985a, 1985b, 1985c; Pennington & McConachie, 1999).

Note. IRA = Inter-rater agreement

[a.] Relevance & Importance of the Measure in Understanding Changes in Participation in Online Conversation

4.5 Ethical Approval

Ethical approval for this project was provided (01/09/2014) by the Social and Behavioural Research Ethics Committee (SBREC) at Flinders University (Project No. 6535; Appendix C). Since recruitment was extended across a range of service providers, further approvals were provided (Appendix D). All modifications to the protocol were reviewed and approved by the SBREC.

4.6 Participants, Caregivers and Mentors

The research aimed to recruit two groups, five to eight mentee participants (here after referred to as participants) and their matched caregivers, and one to two mentors. Both groups were recruited using convenience sampling according to general inclusion criteria (Table 4.4). Further inclusion criteria applied more specifically to each group (Table 4.4). Caregivers of participants who were willing to be involved in the research were recruited to match the participants, no further inclusion criteria applied to the caregivers.

Table 4.4

Inclusion Criteria

General Criteria (applied to participants and mentors)
Had limited or no use of natural speech and used augmentative or alternative communication
Had access to a computer/ other device and Internet at home

Criteria for Participants	Criteria for Mentors
Between 10–21 years of age	Between 21–35 years of age
Interested in increasing their use of the Internet for social networking	Interested in being mentors to young people with disabilities
Symbolic communicators (i.e., they understand that spoken or written words, pictures or signs represented meaning and concepts and used them for their communication)	Skilled users of AAC, computers and the Internet, including a variety of social media websites, programs and/or applications
Independently accessed the computer/ other device and Internet	Had undertaken, or were willing to undertake, a police clearance check

Initially, only one participant was recruited from South Australia. Therefore, the recruitment process was extended to include participants across Australia, to include indirect invitations that were publicised online (see Section 4.6.2) and to increase the age range for mentors (see Section 4.6.4). Following this extended process, five participants and three mentors were recruited.

4.6.1 Service provider recruitment. Twenty-five Australian service providers were contacted between September 2014 and June 2015 (Appendix D). Approximately one-quarter of service providers (*n* = 7, 28%) declined to participate following initial contact, and a further quarter (*n* = 7, 28%) required extra approvals for research to be conducted within their organisation. Approximately two-thirds (*n = 11*, 61%) of the service providers expressing interest considered the ethical approval provided by the SBREC at Flinders University adequate and accepted the invitation to participate. Inability to recruit participants locally and the delays involved in developing and waiting for extra approvals from service providers across Australia considerably delayed recruitment of participants to the project.

Two of the organisations that requested further approval went on to directly invite participants to the project (Appendix D). Overall, 13 (52%) of the service providers approached went on to invite participant/s (n = 54) and/or mentor/s (n = 5) to the project.

4.6.2 Online recruitment. Social media provides the opportunity to reach a wide audience and is a potentially powerful avenue for recruitment in health research (O'Connor, Jackson, Goldsmith, & Skirton, 2014). Online invitations for mentors and participant's caregivers were designed to be sent via email list-serves, Twitter, and Facebook. Online invitations were not directly sent from the researcher's social networking accounts to avoid any perception of coercion. Service providers who consented were invited to use their social networking presence to advertise the project more generally (e.g., posting the invitation via their Facebook or Twitter account/s).

Online invitations included a hyperlink to an online survey hosted by the Flinders University website to ensure confidentiality of any personal information provided. The survey provided a copy of the inclusion criteria and project information sheets. The project information sheets available online were viewed by 46 individuals. Expressions of interest and contact information were shared by four individuals (n = 2 caregivers of potential participants and n = 2 potential mentor participants). Half did not meet the inclusion criteria (n = 1 potential mentor participant, n = 1 potential participant), and the other two consented to involvement in the project. One further parent of a participant contacted the researcher directly via email but did not view the online information sheets; the participant did not meet the project inclusion criteria. In total, six participants expressed interest following reading information about the project online.

4.6.3 Participant recruitment. In total, 57 participants were invited to the study; 54 were directly invited by a service provider and three expressed interest after responding to an online advertisement. Invitations included a copy of the project information sheet (Appendix E), letter of invitation from Flinders University (Appendix F), and letter of support from the service provider (Appendix G). An expression of interest slip (Appendix H) and a reply-paid envelope were included for posted invitations.

Following an expression of interest, the researcher discussed the project via email or phone with a parent of the participant. Several caregivers initially expressing interest (*n* = 21) declined to participate following this discussion of the project (*n* = 15, see Table 4.5). The researcher arranged to travel to meet face-to-face with the participants and their caregivers who confirmed their interest (*n* = 6). At the initial meeting, the project information sheet and consent forms were discussed again, and completed.

Table 4.5

Reported Barriers to Research Participation

Barrier to Participation	N	% out of 57
Unable to commit for the period required	4	7
Assistive technology not available in home environment	4	7
Participant does not meet the inclusion criteria	2	4
Change of mind; no reason provided	5	9

Two participants initially consented and began to participate in the project, but withdrew later. The first participant withdrew from the project during Week 4 of baseline owing to the burden perceived by his caregivers in supporting him to continue to learn to use social media. These concerns included time to set up and program the complex communication device to access social media and scaffold the success of the participant, who was only beginning to learn to use eye-gaze to access his complex device. Another participant withdrew from the project eight weeks into the intervention phase. The participant's family explained that they were not able to prioritise time for social media and the e-mentoring project owing to the importance of prioritising time for school attendance, health and therapy appointments.

As outlined in Figure 4.2, four participants completed the project. Demographic information relevant to the participants (Paul, Mia, Tilly, & Kaylyn; pseudonyms have been used to maintain participant anonymity) is provided in Table 4.6. Ability characteristics were collected using modified self-report descriptors (Appendix I) for the Gross Motor Function Classification System (GMFCS; Bartlett & Gorter, 2011; Palisano, Rosenbaum, Bartlett, & Livingston, 2008), Manual Ability Classification System (MACS; Eliasson et al., 2006) and Communication Function Classification System (CFCS; Hidecker et al., 2011). All participants used direct touch to access their AAC systems, and they were identified as able to communicate effectively with familiar, but not always with unfamiliar, partners (Level III on the CFCS).

Table 4.6

Participant Demographic and Ability Characteristics

Participant	Age[a]	Sex	AAC Systems	CFCS	GMFCS	MACS
Paul	17;1	M	DynaVox Maestro[18] and PODD[19]	III	II	III
Mia	16;7	F	iPad[20] and Proloquo2go[21] Key Word Sign	III	II	III
Tilly	13;4	F	Accent[22] and Unity[23] Alphabet Board with key words iPad and Key2go keyboard[24]	III	IV	IV
Kaylyn	18;3	F	iPad and Proloquo2go Mobile phone and text message app Key Word Sign	III	I	II

Note. The researcher and the participant's caregivers completed modified self-report descriptors (see Appendix I). Self-report descriptors for the Communication Function Classification System (CFCS) were adapted from Hidecker et al. (2011); for the Gross Motor Function Classification System (GMFCS) were adapted from Palisano, Rosenbaum, Bartlett and Livingston (2008); and for the Manual Ability Classification System (MACS) were adapted from Eliasson et al. (2006). PODD = Pragmatically organised dynamic display.

[a] Age = years; months

4.6.4 Mentor recruitment. Six mentor participants were directly invited via service providers, and two other mentor participants expressed interest in participating through information posted online. Invitations included a copy of the project information sheet (Appendix E), letter of invitation from Flinders University (Appendix F), letter of support from the service provider (Appendix G), an expression of interest slip (Appendix H), and a reply-paid envelope. Following expression of interest, the researcher offered to meet with the mentor participants via face-to-face, phone (e.g., voice and/or text communication), or online contact (e.g., video conference, instant message, and/or email). During this meeting, the project information sheet and consent forms were discussed and completed. Following consent, the researcher supported mentors to initiate an application for Child Related Employment Screening according to the relevant process within their state of Australia. The cost of these applications was funded by the research project. Such screening confirms that individuals do not have a recorded history of violent or abusive behaviour, and it is a requirement of the Australian government for all individuals working with children. Mentors were provided an honorarium for their participation.

Recruitment initially targeted mentors aged 21–35 years (inclusive). However, no mentors were successfully recruited, and the inclusion criteria were subsequently broadened to include individuals over 21 years who met all other inclusion criteria. Following this change, three mentors (all aged over 40 years) were recruited to the project. Despite this success, given the number of participants recruited to the project only two mentors went on to complete the training and be matched with participants (Figure 4.2). The researcher matched mentors and participants by the communication modes that they used. Mentor–mentee matches were discussed with the primary supervisor and consequently with the mentors prior to being confirmed. Descriptive information for both mentors is provided below (Table 4.7). Both mentors described experience in using a range of social networking platforms. One mentor had significant prior experience in mentoring roles, but the other mentor had only informal experiences with mentoring previously. Both mentors had not previously received any mentor training.

Table 4.7

Mentor Descriptive Information

Descriptive Information	Mentor 1	Mentor 2
Prior experience with social media	Facebook (5 years) Twitter (5 years) Email (many years) Skype (4 years)	Forums & Billboards (approx. 30 years) Facebook (approx. 10 years) Twitter (approx. 7 years) Email (approx. 25 years) Skype (approx. 10 years) and Vibe (approx. 5years)
Previous mentoring experience	Informal (e.g., mentoring support staff/paid carer)	Cross-Age Peer Mentor (15 years) Informal mentoring (35 years)
Mentor training	No	No formal training. "On the job training"; Informal support from "other camp staff"
Gender	Female	Female
Age range	40–49	50–59
Diagnosis	Cerebral Palsy	Cerebral Palsy
AAC system	iPad with VOCA app Mobile Phone (i.e., text messages)	iPad with VOCA app Dedicated Complex VOCA
CFCS	III	II
MACS	II	II
GMFCS	III	III

Note. The Communication Function Classification System (CFCS) was adapted from Hidecker et al. (2011); the Gross Motor Function Classification System (GMFCS) was adapted from Palisano, Rosenbaum, Bartlett and Livingston (2008); and the Manual Ability Classification System (MACS) was adapted from Eliasson et al. (2006).

4.7 Procedures for Measurement of the Dependent Variables

4.7.1 Research question 1: Attainment of goals relevant to social media use. Goal setting is a common approach to provide direction to e-mentoring interventions (Balcazar & Keys, 2014; Karcher & Hansen, 2014). The COPM (Law et al., 2005) is a semi-structured interview tool used to identify problems in occupational performance. A modified version of the tool was used, focusing on the leisure and recreation section and specifically on the Internet and participation in online conversation. Participants rated their performance and their satisfaction with performance for three problem areas on two 10-point rating scales ranging from 1 (*not able to do it/ not satisfied at all*) to 10 (*able to do it extremely well/ extremely satisfied;* Figure 4.4). For example, one problem area identified by Mia was using Facebook independently and actively (e.g., not just viewing posts but also responding). It was predicted that participants would improve in performance and satisfaction in identified problem areas and progress in goal attainment following the e-mentoring intervention.

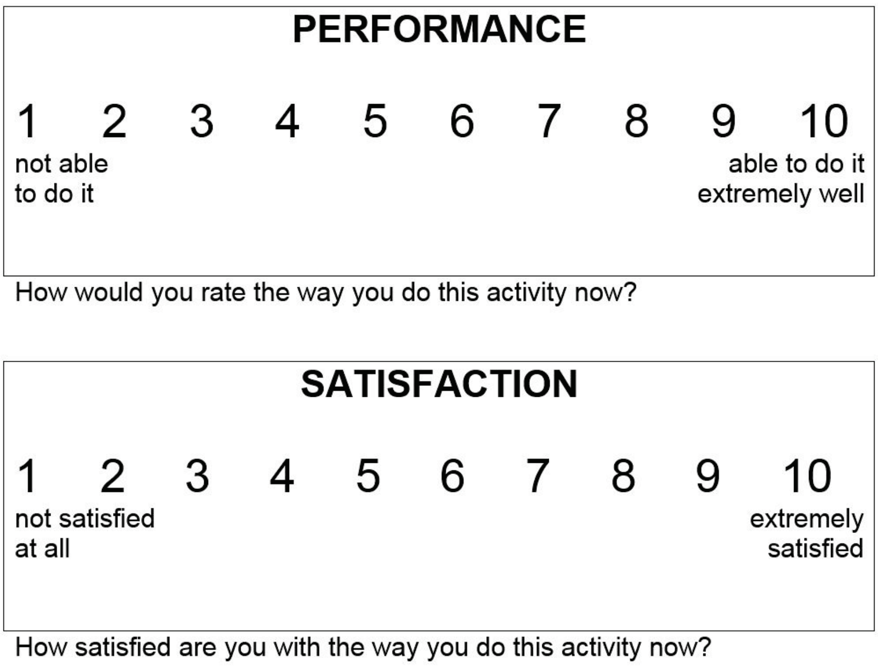


Figure 4.4. COPM performance and satisfaction rating scale.

GAS (Kiresuk & Sherman, 1968) was then used to develop the three problem statements into three behavioural goals. The GAS uses a 5-point rating scale to rate goal attainment ranging from −2 (*least favourable outcome*), through to 0 (*most likely outcome*), and +2 (*most favourable outcome*; Figure 4.5).

-2	Baseline	An outcome if the current situation didn't change at all
-1	Better than baseline	An outcome where some progress has been made towards the goal
0	**Expected outcome**	**The outcome expected to be achieved**
+1	Greater than expected outcome	An outcome slightly above what's expected
+2	Much greater than expected outcome	An outcome even further above what's expected

Figure 4.5. The GAS rating system.

Caregivers were provided a copy of the goal attainment scales developed and invited to provide feedback or changes; however, no changes were made to the goal attainment scales. Goals corresponded to the problem areas identified on the COPM. For example, the problem area identified above was converted into the following behavioural goal: By the end of the project, Mia reads and responds to personal Facebook messages and browses and actively participates in the newsfeed. This goal and levels of goal attainment developed for this goal are detailed in Figure 4.6.

Goal: **By the end of the project Mia reads and responds to personal FB messages and browses and actively participates in the newsfeed.**	
	Predicted Level of attainment
-2	Mia does not respond to messages without direct prompts for 75 - 100% of the steps.
-1	Mia is directly prompted for 50 - 74% of the steps. Maybe indirectly prompted (do you want to reply to that message?).
0	**Mia is directly prompted for 25-49% of the steps. She maybe indirectly prompted (i.e., do you want to reply to that message?)**
+1	Mia is directly prompted for 0 – 24% of the steps. Maybe indirectly prompted (do you want to reply to that message?).
+2	By the end of the project Mia reads and responds to personal FB messages and browses and actively participates in the newsfeed (e.g., likes/comments, posts her own update or like, photo or link) by herself and without any prompting to do so.
-2 = baseline, -1 = better than baseline, **0 = expected outcome**, +1 or +2 = better than expected outcome	

Note. A direct prompt is when you show Mia where to press / what to do next directly (e.g., press this button here). An indirect prompt is more general and can sometimes be considered more as a comment than a command. e.g., 'it's time for your skype call', 'who will you send a message to?', 'what's next?'

Figure 4.6. Example of problem area identified by Mia developed as a behavioural goal using GAS.

The COPM and GAS tools have been demonstrated to be valid and reliable measures of change in children with disabilities (Carswell et al., 2004; Cusick, McIntyre, Novak, Lannin, & Lowe, 2006; Steenbeek, Ketelaar, Galama, & Gorter, 2007). Both tools have been used commonly in intervention research for young people with disabilities (Ostensjo, Oien, & Fallang, 2008; Raghavendra, Newman, et al., 2013). Recent reviews have identified that the COPM and GAS provide the potential to measure changes in activity or participation; however, careful attention to individualised goal development is required (Adair et al., 2015).

The COPM and GAS tools were introduced between pre-baseline and baseline and ratings were collected at this time and at the commencement of the maintenance phase (Figures 4.2 and 4.3).

4.7.2 Research question 2: Frequency and duration of all online conversation. It was predicted that the frequency and duration of online conversation would increase following the e-mentoring intervention. Attendance in an activity, or physical engagement, is one indicator of participation and can be measured by frequency and duration of time spent in the activity (WHO, 2001). A simple approach to recording frequency and duration is through self- or proxy report. Another potential approach to measuring attendance in online conversation may have been to use computer software to track real-time access to social networking media. For two reasons, a combined self- and proxy report was used to collect attendance data in this research in preference to a more technological or observational approach. First, automated monitoring of time spent online would have been problematic, given that the research was specifically interested in participation in online conversation and not time spent accessing the Internet more generally. Second, given the research already inherently involved the use of, and communication between, a range of technologies (e.g., SGD, screen recording software, and other assistive technologies, such as screen readers and social networking software), the complexity of addressing compatibility of further software to enable automatic tracking of computer use was considered unfeasible.

Prior to the commencement of baseline, the researcher arranged with each participant and their family member an agreed method for the collection of weekly reports of days and hours spent in online conversation (see Table 4.8 for examples). To increase the accuracy of reporting, the weekly probes were designed in three steps:

1. Have you had any online conversation?
2. In the past week, on how many days did you have online conversation?
3. For how many hours did you participate in online conversation?

Where further information was provided by participants and their family members, this was recorded in the research notes (e.g., “Paul was at camp this week and not able to access the Internet”). Weekly probes were collected during baseline, intervention, and maintenance phases (Figure 4.2). All weekly probes were responded to, although at times the researcher sent repeated prompts to request a response.

In addition to the weekly probes, all words transmitted in online conversation for one social network platform were collected for analysis (see Section 4.7.4 for further information regarding collection of conversation transcripts). Individuals who use AAC are known to experience difficulties in timing of conversation that may vary widely based on individual differences. For this reason, an alternative measure of duration of conversation, total number of words transmitted in online conversation, was proposed in this research as a primary measure of the duration of online conversation. It is argued that the words transmitted may provide a more authentic measure of the duration of online conversation as perceived by communication partners, particularly given that reported time spent in online conversation may have included time composing messages that were not completed or transmitted until later, or messages that were not transmitted at all.

Table 4.8

Method for Collecting Weekly Frequency and Duration Probes

Participant	Agreed Method for Weekly Contact	Example Message
Paul	Email to participant copied to parent	Hope you have had a good week. It's Emma here with 3 questions for the research project.
Tilly	Email to parent	1. In the last week (since Mon 7–Sun 13), have you had any conversations online (e.g., over email or Skype or Facebook)? Yes/No 2. If the answer is Yes: How many days of the week did you have conversations online? 1 / 2 / 3 / 4 / 5 / 6 / 7 3. If you add up all the time you spent having a conversation online this week how many minutes/hours did you spend? ___ minutes/hours
Mia	Text message to parent	Hi *Parent*, Just sending the 3 weekly questions for the research project.
Kaylyn	Text message to parent	1. Have you (*participant*) had any conversations online this week (since Mon 7–Sun 13)? Yes/No 2. How many days? 1/2/3/4/5/6/7 3. How many hours total? _ Hours Thanks

4.7.3 Research question 3: Periodic measurement of engagement. The SEAS-PCS tool (Batorowicz et al., 2017) was used as the primary measure for investigating changes in the experience of participating in online conversation or involvement. Self- and proxy reports of involvement in activities can be variable (Adolfsson et al., 2012; McDougall et al., 2013), and it was therefore considered important to include not only the SEAS-PCS tool, that allows for self-report, but also a further measure of proxy-reported engagement to enable a more complete understanding of involvement. Self- and proxy reports of social and self-engagement were measured using the specifically designed engagement probe (Figure 4.8).

Collecting repeated measures of involvement at weekly intervals was not considered feasible given the SEAS-PCS involves responding to 22 items. Since the SEAS-PCS is a validated tool, it was not considered appropriate to modify the tool and administer a smaller set of items each week. Given these reasons, periodic probes for involvement were conducted on four occasions (at the start of baseline [T1], during intervention [T2], at the end of the intervention [T3] and at the end of the maintenance period [T4]; Figures 4.2 and 4.3).

The following paragraphs are adapted from an excerpt of the method section in the pre-print version of, "Exploring Participation Experiences of Young People who use AAC in Social Media Settings: Impact of an e-Mentoring Intervention", by E. Grace, P. Raghavendra, J. McMillan and J. Shipman Gunson, 2019, *Augmentative and Alternative Communication, 35*, 132–141. doi:10.1080/07434618.2018.1557250

4.7.3.1 Self-Reported Experiences of Activity Settings-Picture Communication Symbol version (SEAS-PCS). The SEAS questionnaire provides opportunities for participants to rate their participation experiences within specific activity settings (G. King, Batorowicz, Rigby, McMain-Klein, et al., 2014). The SEAS-PCS was selected because it measures self-reported experiences of participation, has strong psychometric properties and is designed to be used by individuals who use AAC (Batorowicz et al., 2017; G. King, Batorowicz, Rigby, McMain-Klein, et al., 2014). The SEAS-PCS version of the Self -Reported Experiences of Activity Settings (SEAS) questionnaire includes Picture Communication Symbols (PCS[17]) that provide graphical information to support comprehension of the questionnaire items (Figure 4.7). The SEAS-PCS version of the 22-item questionnaire was used with permission and was made available for this research by the authors. These test items probe participation experiences across five domains: Personal Growth, Psychological Engagement, Social Belonging, Meaningful Interactions, and Choice and Control (Appendix J). The questionnaire was designed to be completed either independently (by a child with Grade 3 level silent reading abilities) or with support (G. King, Batorowicz, Rigby, McMain-Klein, et al., 2014). Respondents rate their in-the-moment experiences on a 7-point bipolar scale (+3 to −3; Figure 4.7). The scale for each of the 22 items includes oppositely labelled endpoints, for example, “I felt excited” and “I felt bored”, and four scale anchors *strongly agree* (+3 or −3), *agree* (+2 or −2) and *agree a little* (+1 or −1), with an option for *neither* (0) at the midpoint of the scale (Figure 4.7). Following the 22 items targeting self-reported experiences of participation, 11 additional questions were used to gather background information about the activity setting and any support provided in completing the questionnaire. Previous research involving the SEAS and SEAS-PCS questionnaire has focused on validation and development of the tool (G. King, Batorowicz, Rigby, McMain-Klein, et al., 2014; G. King, Batorowicz, Rigby, Pinto, et al., 2014; G. King et al., 2013). The SEAS and SEAS-PCS questionnaires have not yet been reported in intervention research. As such, their responsiveness to intervention is not yet known.

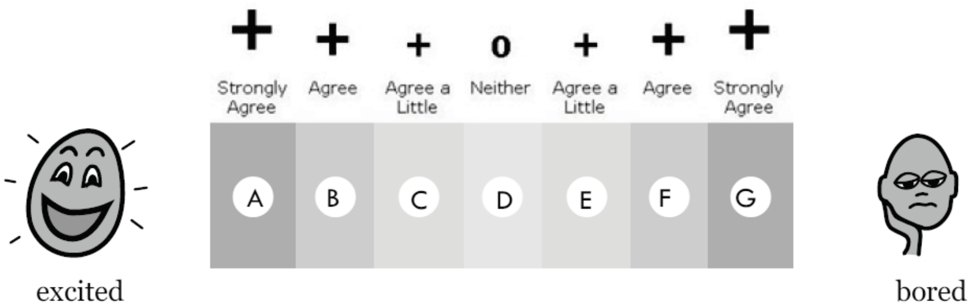


Figure 4.7. Example SEAS-PCS rating scale. Adapted from "Exploring Validation of a Graphic Symbol Questionnaire to Measure Participation Experiences of Youth in Activity Settings", by B. Batorowicz, G. King, F. Vane, M. Pinto and Raghavendra, 2017, *Augmentative and Alternative Communication, 33,* p. 100.

The SEAS-PCS questionnaire was administered to mentee participants at four time points extending across a period of approximately 6 months: before intervention (Time 1 [T1]), mid-intervention (after 8 weeks of the 16-week intervention, Time 2 [T2]), post-intervention (at the end of the 16-week intervention, Time 3 [T3]), and delayed post-intervention (at 6 weeks post intervention, Time 4 [T4]) time points. Each time, the researcher prompted participants to have an online conversation for at least 15 min with a communication partner other than the mentor. For example, Paul read an email using Text Help software and wrote and sent a reply to his friend using his communication device, which was linked via Bluetooth to his computer. The conversations took place in their home environments. The SEAS-PCS tool was designed to be completed by participants independently, although in this study, participants were known to read and listen with comprehension below Grade 3 level and were supported by the researcher to complete the questionnaire. The researcher used the examples provided in the SEAS-PCS tool as opportunities for the participants to practice responding to the items. The researcher read each test item out aloud to the participant, pointing to the picture communication symbols to support participant understanding.

This is the end of the excerpt of the method section in the pre-print version of, "Exploring Participation Experiences of Youth who use AAC in Social Media Settings: Impact of an e-Mentoring Intervention", by E. Grace et al., 2019, *Augmentative and Alternative Communication, 35,* 132–141. doi:10.1080/07434618.2018.1557250

4.7.3.2 Proxy and self-reported engagement probe. To allow for proxy reporting of social and self-engagement, a study-specific probe was developed (Figure 4.8). The participants and their caregivers both provided ratings regarding perceived engagement of the participant in online conversation. They were asked to respond to three questions on a 1–10 rating scale where 1 indicated *not at all so* and 10 indicated *very much so*. Participants were asked to respond to the same questions to allow for a comparison between self- and proxy reports. These questions were developed based on the tool used by Seekins et al. (2007) and modified in consideration of the definition of engagement given by Maxwell (2012) and Kang (2010). The engagement probe was presented to other researchers and the wording of the items was modified following feedback. The engagement probe was also completed by participants and their caregivers at four time points across the phases of the experiment (Figures 4.2 and 4.3). The engagement probe was completed following administration of the SEAS-PCS tool. Participants and their caregivers were asked to base their responses on the same online conversation reported on in the SEAS-PCS questionnaire.

1	2	3	4	5	6	7	8	9	10
Not at all									Very Much So

Proxy Report

1. Involvement can be described as being attentive, enthusiastic, inquisitive, confident and persistent with activities. How involved is *name* when having this conversation online?
2. Feeling connected means you feel you are doing the activity together with a friend, or with your family or with another group of people. How connected do you think *name* is when having this conversation online?
3. Being fulfilled means you feel pleased, happy and satisfied. How fulfilled do you think *name* is when having this conversation online?

Self-Report

1. Being involved in an activity means that you pay attention and are interested, motivated and enthusiastic, confident, and want to keep trying. How involved do you think you are in having this conversation online?
2. Feeling connected means you feel you are doing the activity together with a friend, or with your family or with another group of people. How connected do you feel when having this conversation online?
3. Being fulfilled means you feel pleased, happy, and satisfied. How fulfilled do you feel when having this conversation online?

General questions

1. Is it a typical day (for *name*)?
2. Do you think this is how you/*name* usually use/s the computer to have conversations online?
3. Is there anything that's happened to you/*name* that has made it harder/ easier today (e.g., pain, fatigue, seizures, or medication effects)?
4. Are there any supports or barriers making it easier/ more difficult (for *name*) to use the computer for online conversation today (e.g., communication, environment, support from someone, physical access, social, or other things)?

Figure 4.8. Engagement probe.

4.7.4 Research question 4: Changes in written online conversation with peers. It was considered feasible and desirable that the e-mentoring intervention would influence participation in conversations outside the context of the intervention (e.g., with other communication partners at other times). It was predicted that written online conversation between the participant and other communication partners outside of the e-mentoring intervention would be enhanced by the e-mentoring intervention. All online conversations of participants were collected on one targeted social network before, during, and after the e-mentoring intervention. Only one social networking platform was included in data collection rather than collecting data for all online conversations. This was to minimise the burden to participants, given that conversations were collected over a 27–33-week period. Prior to the commencement of baseline, the participant was asked to nominate a preferred social networking platform and method for data collection, as described below (Table 4.9). Transcripts of online conversation were collected during pre-baseline, baseline, intervention, and maintenance and provided the qualitative data for this research (Figure 4.2).

Table 4.9

Chosen Social Networking Platform and Method for Collection of Online Transcripts

Participant	Chosen Social Networking Platform	Method of Data Collection
Paul	Email	Messages forwarded or copied by participant at time of sending. This was monitored periodically by his mother.
Mia	Facebook	The family requested that the researcher log into the participants Facebook account directly to collect conversations.
Tilly	i-message	Screenshots of i-message conversations provided by family member.
Kaylyn	Email	The family requested that the researcher log into the participant’s email account directly to collect conversations.

4.7.4.1 Observation of changes in written online conversation. The researcher was not aware of any previous research investigating transcripts of online conversations of young people who use AAC. For this reason, a new analysis method was developed based on approaches previously used to investigate face-to-face conversation of young people who use AAC and on CMDA. Notably, this approach is unrelated to, and distinct from, critical discourse analysis, a form of discourse analysis that investigates links between language and social or political power (Seel, 2012).

Language-focused CA has been used commonly to describe or to analyse and investigate improvements in face-to-face conversation of individuals who use AAC (i.e., Bunning, Smith, Kennedy, & Greenham, 2013; Clarke & Kirton, 2003; Light et al., 1985a, 1985b, 1985c; Pennington & McConachie, 1999). Although some variability exists between the studies, they focus on coding communication modes, linguistic moves or turns, and pragmatic functions present in interactions of individuals who use AAC. The approach has contributed to the current understanding of patterns of communication in interactions by these individuals. For example, research has highlighted that these individuals typically take a passive role in interactions and their communication partners dominate the conversation (e.g., individuals who use AAC have higher rates of responding moves and lower rates of initiating moves, and have higher rates of confirmation/denial such as Yes/No responses, functions, or other short contributions of information, and lower rates of request functions; Light, 1988; Pennington & McConachie, 1999). This CA approach has been used previously in research and therefore was considered appropriate to be used as the basis for the coding system in this study. Codes and definitions published in similar previous AAC research (Bunning et al., 2013; Clarke & Kirton, 2003; Light et al., 1985a, 1985b, 1985c; Pennington & McConachie, 1999) were listed to develop a foundation for the coding manual. A list of codes and definitions was developed, including example quotes from the transcripts for each coding category (Figure 4.2).

CMDA uses a similar CA approach to the studies described above that is designed to be applied to computer-mediated communication and not to face-to-face communication. However, both the AAC and CMDA analyses draw from the field of linguistic discourse analysis that has traditionally been used to analyse written text and/or spoken language. Four levels of analysis are commonly applied in CMDA: structure, meaning, interaction management, and social phenomena (Herring, 2013a; Herring & Androutsopoulos, 2015; Herring et al., 2005). The level of meaning includes features such as speech acts and pragmatics. The level of interaction management includes conversation turns and sequences. These two levels, meaning and interaction management, were considered of most relevance and interest in this thesis. Codes used for CMDA analysis in the current study were developed by considering a foundational list of codes from studies of face-to-face interaction within the field of AAC (see Appendix K). This approach has been used by other authors implementing CMDA analysis, who have based coding on previous work on face-to-face communication in their fields. For example, van der Meij and Boersma (2002) investigated children's collaborative learning via email and developed their CMDA coding based on coding used in research investigating student collaboration in face-to-face talk in classroom activities.

In online conversation, some transmissions include more than one functional unit; for other transmissions, functional units occur over more than one transmission (Table 4.10). In this thesis, functional turns and not transmission units were used to allow for more consistent segmentation of the transcripts. The term *functional turn* "is understood as the smallest interactionally relevant complete linguistic unit in a given context" (Herring & Androutsopoulos, 2015, p. 136). Two examples are included in Table 4.10. In the first example, one transmission is divided into two functional turns; in the second example, two transmissions combine to make one functional turn.

Table 4.10

Example of Differences between Transmission Units and Functional Turns

Transmission Unit	Functional Turns (as transcribed)
Hi girl What did you do today?	Mia: Hi girl Mia: What did you do today?
I got a bleeding nose at lunch time today	Mia: I got a bleeding nose at lunch time today

4.7.4.2 Faceted classification of conversations. In this study, transcripts of online conversation were collected across several platforms: Facebook Messenger, Facebook newsfeed, i-message, and email. The individual choice of media was integral to the e-mentoring intervention designed to support participant's individualised preferences and goals, and important to the social validity of the study. It is acknowledged that conversational behaviour and language is expected to be variable across media. CMDA classifies discourse according to a set of medium- and situation-related factors that affect the way language is used (Herring, 2007). These factors are reported in Appendix A for each of the media used in this study. It is acknowledged that traditional distinctions emphasised by this approach are more complex in practice. For example, some media that may be classified as asynchronous (i.e., users do not have to be online at the same time to send and receive messages) can also support synchronous chat.

4.7.4.2.1 *Medium factors.* Medium factors reflect the technical functioning of the media (Herring, 2007). As described in Appendix A, the majority of medium-related factors were similar across the media used (e.g., synchronicity, message transmission, persistence of transcript, size of message buffer, anonymity of message, and filtering). Differences in the following factors were noted: channels of communication, privacy of messages, quoting, and message format. Channels of communication, such as, text, graphics (static/animated), and video, are used to broadly categorise multimedia available to users on a given medium (Herring, 2007). With one exception, sharing of video on email, media used by participants supported text, graphics, and video. However, detailed analysis of the structures or modes available identified that the media used by participants varied substantially (see Table 4.11). The availability of variable features may affect the behaviour and language of users. For example, perhaps participants will take increased turns on media where single-click linking is available (e.g., Friend and Like).

Table 4.11

Modes Used across Online Media

Mode	Facebook page	Facebook Messenger	i-message	Email
Text	✓	✓	✓	✓
Image	✓	✓	✓	✓
Video	✓	✓	✓	×
Like	✓	✓	✓	×
Friend	✓	✓	×	×
Tag user	✓	×	×	×
Tag place	✓	×	×	×
Hyperlink	✓	✓	✓	✓
Emoji	✓	✓	✓	×
Stickers	✓	✓	✓	×

4.7.4.2.2 *Situational factors.* Situational factors describe social and cultural factors that are proposed to influence the discourse patterns used (Herring, 2007). Several situational factors, such as purpose, topic or theme, tone, activity, and code, were similar across the media selected by participants in this study (Appendix A). This classification is consistent with the social participation focus of this study. However, classification of the participation structure and norms of interaction differed across the media used (Appendix A). Participation structure refers to the structure of the online conversation, for example, the rate of interaction and number of communication partners. The structure of participation influences the way messages are written and interaction patterns between communication partners (e.g., passivity/dominance of communication partners in the interaction). For example, a user sends one message on their Facebook newsfeed and receives many short responses from a large range of communication partners. A similar message sent via email is likely to include fewer communication partners and fewer, but perhaps longer, responses.

The linguistic coding system has been applied consistently in this thesis across all the media used by participants. However, results can only be understood in the context of the medium- and situation-specific factors of each medium used.

4.7.4.3 Development of coding procedure. As described in Figure 4.2, a predominantly sequential qual → QUAN approach was used in the analysis of conversation transcripts (Creswell, 2014). A qualitative approach was used to develop and refine the codes. Once qualitative coding was completed, a quantitative approach was applied using simple CA to count the occurrence of the different codes within the transcripts. Utilising the above approaches, a coding manual was developed. It was intended that an a priori approach be used with coding applied using the definitions in the specifically developed coding manual (Green & Thorogood, 2014). However, as described below, for some more complex elements of the transcripts, a deductive approach to coding was more appropriate resulting in the emergence of new codes to describe the non-text or non-standard, but orthographical, elements of the transcripts. The conversational context was used to develop new codes to describe the linguistic functions of these elements. Complexity in understanding the functioning of non-standard orthographical elements or graphical elements in online conversation has been identified in previous research (Amaghlobeli, 2012; Derks, Bos, & von Grumbkow, 2008; Dresner & Herring, 2010; Dunlap et al., 2016; Herring & Dainas, 2017; Vandergriff, 2014).

Following development of the coding manual, samples from the online conversation were coded by the student researcher and supervisors. Discussions were held to describe agreement, disagreement, and areas for improvement in the coding definitions. This resulted in further refinement of the coding categories and descriptions. For example, as part of refining the coding manual it was agreed by the student and supervisors that modes other than text would be excluded from the pragmatic function analysis, given ambiguity in inferencing the pragmatic functions of emojis and emoticons such as "☺". Further, when using a case-by-case approach it was not possible to reach consensus on dividing the transcripts into minimum interactionally relevant units, such as deciding whether "Hello ☺" is divided into one minimum unit or two, requiring inferencing about the function of ☺ beyond what was available in the transcript. Considering these modes as separate functional turns was preferred to ensure rigour and consistency in analysis. Nevertheless, it is acknowledged that this approach is also problematic, given that emojis, emoticons, and other graphical elements often modify the function of the accompanying text (Dresner & Herring, 2010; Herring & Dainas, 2017).

The Follow-up linguistic move category has been used in previous AAC research; however, this literature has only focused on the classroom context (Bunning et al., 2013; Clarke & Kirton, 2003; Sinclair & Coulthard, 2002). Given the social context of conversations in this study, the linguistic move categories were modified to allow for descriptions of how moves linked forward in the conversation (e.g., turns that obliged a communication partner to respond in the future were coded as Oblige) and how moves linked backward in the conversation (e.g., responses were coded as optional or obligatory and initiations were clearly marked as optional turns). Further, distinction was made between turns that initiated a new conversation and turns that initiated new topics within a conversation. The Follow-up category was retained, yet it was considered unlikely that this category would be relevant to the social media context.

Transcripts in this study were segmented into functional units and CA was applied according to the coding manual. The anticipated effects of the intervention are listed in the table below (Table 4.12) and the full definitions for each code and variable are described in the coding manual (Appendix K).

Table 4.12

Question 5: Dependent Variables and Research Hypotheses

Dependent Variable	Research Hypothesis
Modes	Increased use of online modes (e.g., like, tag, attach photo/video and use of chat abbreviations)
Linguistic moves	Increased moves following e-mentoring
	Increased assertiveness (e.g., initiations of topic and of conversation) following e-mentoring
	Increased optional/non-obliging move types following e-mentoring.
Pragmatic functions	Increased range following e-mentoring
	Reduced confirmation-denial following e-mentoring and increased provision of information

4.7.5 Reliability of coding. Inter-rater reliability was completed for 20% of the conversations by a second rater, who was independent from the study (Horner et al., 2005; Kratochwill et al., 2010; Tate et al., 2013). The samples of conversations were systematically selected to ensure that they included at least 20% of the words transmitted in online conversation across each phase of the study and for each participant. Conversations were coded as whole conversations, and therefore, the percentages varied across participants and phases (Table 4.13). Reports of days and hours spent in online conversation each week were directly provided by participants, and therefore, it was not necessary that these variables be coded by a second rater. Agreement of minimum units was calculated using total agreements divided by agreements plus disagreements. Inter-rater agreement for dividing the transcripts into minimum units was 91%. Inter-rater agreement of linguistic analysis was calculated using Cohen's Kappa that demonstrated substantial to almost perfect agreement between raters (Table 4.14), comparable with other studies applying CMDA analysis with Cohen's Kappa ranging between 0.66 (Van der Meij & Boersma, 2002) and 0.90 (Nastri, Peña, & Hancock, 2006). Reliability of the e-mentoring intervention fidelity analysis is reported in the e-mentoring intervention chapter (see Chapter 5).

Table 4.13

Percentage of Conversations Coded by a Second Rater

Participant	Pre-Baseline (%)	Baseline (%)	Intervention (%)	Maintenance (%)	Overall (%)
Paul	67	75	29	50	55
Mia	75	38	27	48	47
Tilly	n/a	43	21	26	30
Kaylyn	100	100	100	100	100
Overall	81	64	44	56	58

Table 4.14

Inter-Rater Agreement for Linguistic Analysis of Online Conversation Transcripts

Dependent Variable	Cohen's Kappa	Strength of Agreement
Obliges	0.899	Almost perfect agreement
Moves	0.745	Substantial agreement
Functions	0.767	Substantial agreement

Note. Strength of agreement as defined by Landis and Koch (1977); 0.61–0.81 = Substantial agreement; 0.81–1.00 = Almost perfect agreement

4.8 Experimental Procedure: Multiple-Baseline Design

The experimental model of this SCED multiple-baseline design is described in the following section based on an understanding of the dependent variables described previously and details of the e-mentoring intervention described in Chapter 5. Relevant features of the e-mentoring intervention and mechanisms of the intervention effect (i.e., lagged treatment effect, small effect size, availability and payment of mentors, and weekly contact) are reviewed briefly followed by an explanation of the design for each phase of the experiment. A visual overview of the multiple-baseline design is provided in Figure 4.2 and Figure 4.3.

Mentoring intervention is provided over a long period and is not expected to have a strong on/off intervention effect (DuBois et al., 2002). It was anticipated that effects on the dependent variables would be lasting, and therefore that no changes would be apparent on withdrawal of the e-mentoring intervention. To maximise the opportunity to demonstrate experimental control and potentially demonstrate a repeated effect of the e-mentoring intervention, a multiple-baseline design was employed (Kratochwill & Levin, 2014). This design allows for the intervention to be introduced at different times across the participants (Lane & Gast, 2014). Mentors were paid to provide weekly support to the participants during the intervention period. Owing to funding constraints, the total length of the e-mentoring intervention from the first participant beginning intervention to the final participant completing intervention was a maximum of six months. This was an important consideration in decisions regarding the timing of treatment onset across participants discussed further below.

The e-mentoring intervention continued for four months and change was expected to occur over the longer period, as is the nature of e-mentoring interventions. Given that the intervention effect was anticipated to be lagged, it was considered inappropriate to use a criterion-based method to determine the timing of the onset of intervention across the participants (Kazdin, 2011). It was not feasible for participants to be left in baseline for exceptionally long or significantly disproportionate periods, given that it would be an unreasonable burden on participants, their families and the mentors, and would increase the cost of the e-mentoring intervention.

Another important factor in the design of the overall experiment was the frequency with which data points would be collected since this controlled the total length of the experiment. Current standards in SCED demand a minimum of 5 data points per phase (Horner et al., 2005; Kratochwill et al., 2010; Tate et al., 2013). To provide consistency of measurement across time points, weekly intervals were used. This was important owing to two factors: the expected variability in social media access patterns across weekdays and weekends and the plan for e-mentoring support to be provided at weekly intervals. Therefore, baseline would need to continue for a minimum of 5 weeks, the e-mentoring intervention was prescribed to occur for 16 weeks, and the maintenance phase would also need to continue for a minimum of 5 weeks. At a minimum, the experiment would continue over 26 weeks. Since a multiple-baseline design was planned, the duration of baseline would be increased for some participants to allow for the introduction of the intervention at different time points. Further, because of delays in recruitment to the project, a decision was made to modify the design to a non-concurrent design across a maximum two-month window. This decision enabled the recruitment of further participants who expressed interest following the commencement of the experiment.

In summary, the multiple-baseline design was selected in consideration of the specific research questions and variables. The mentoring intervention occurred over 4 months and was intended to effect a long-lasting change in the dependent variables. Therefore, it was considered that a multiple-baseline design would be most appropriate. The design of each phase of the experiment is detailed below.

4.8.1 Baseline: 5–9 weeks. In a multiple-baseline single-case design, the intervention is introduced at different time points across participants (Figure 4.3). Although the most common and traditional approach in SCED is a criterion-based or response-guided approach as described above, this methodology was not feasible given the nature of the intervention. Further, recent discussions in the SCED field have highlighted that response-guided onset decisions may reduce the internal validity and credibility of the experimental design (Dugard, File, & Todman, 2012; Kazdin, 2011; Kratochwill & Levin, 2014). There were two potential options for determining the onset of intervention in this project: staggered onset and randomised onset (Kazdin, 2011). It was determined that the onset of intervention would be randomised to occur between Weeks 6–10 (Figure 4.2). Therefore, the maximum time spent in baseline for any one participant would be 9 weeks. It is acknowledged that this window for onset of intervention is small in comparison with the length of treatment. However, this was determined to avoid participants being required to wait in baseline unable to access the e-mentoring support, and to minimise the cost and burden to participants, mentors, and the project. A limitation of this 5-week timeframe is that across the potential eight participants, it was likely that more than one participant will be allocated to begin intervention at the same time. While not ideal, the introduction of treatment at the same time across two or more baselines is an accepted and necessary adaption in multiple-baseline designs, given the need to avoid prolonged baselines (Kazdin, 2011).

It was argued that the advantage of randomising the onset within a specified window would provide stronger internal validity than staggering the onset within this same window, and therefore, a decision was made to apply randomised onset of the intervention in this study. Further, the inclusion of randomised onset would allow for the use of randomisation statistics in the analysis (Kazdin, 2011). Given the non-concurrent model, random allocation of treatment onset was determined for up to a maximum of eight potential participants using the random number generator provided by the Excel Package of Randomization Tests (ExPRT, Version 1.2; Gafurov & Levin, 2014).

One criticism of randomised or staggered onset intervention decisions is that this process removes control from the experimenter to ensure stability is demonstrated during the baseline phase (Dugard et al., 2012). Given that the onset is pre-determined, the researcher has no ability to control for this by extending the time of baseline and establishing stability. Stability in baseline is a critical principle of SCED because baseline phase data patterns are used to predict future performance and outcomes of the intervention (Dugard et al., 2012). Therefore, as recommended by Dugard et al. (2012), it was planned that if stability was not demonstrated in the first 4 weeks of baseline for the first participant, extra weekly probes could be added to the design to extend the baseline period.

However, during the study it was not possible to implement this planned feature of the design. For example, when the first participant did not demonstrate baseline stability by Week 4, a meeting was held with the researcher and supervision team to discuss extension to baseline. However, given the planning involved in arranging employment of the mentors and appointment planning for linking up the mentors and participants in the first week of intervention, it was decided that it would not be feasible or ethical to extend baseline as planned

4.8.2 Pre-baseline: 5–9 weeks. Given the concerns discussed above regarding patterns in the baseline data, a pre-baseline phase was proposed to increase the strength of the experimental control within the design (Figure 4.2). The length of the pre-baseline period was randomised across participants (Table 4.15). Despite the pre-baseline timeframe having passed, for some of the outcomes it was possible to retrospectively collect transcripts of online conversation. In addition to concerns regarding poor baseline stability, anecdotal reports from participants and their families regarding the benefits of having met the researcher and the related effects on their social media use further supported the decision to request pre-baseline data. A modification to the ethics approval was obtained and participants were approached to provide transcripts of online conversation for the pre-baseline period. It was not feasible to collect pre-baseline data for research questions 1, 3, and most of question 2, but data were collected to include a pre-baseline phase for research question 4 and a part of question 2. One participant declined to provide pre-baseline transcripts, given the already extensive time that had been involved in supporting the research. Three participants provided conversation transcripts that were used to report pre-baseline measures for some of the dependent variables.

Table 4.15

Pre-Baseline Randomised Start Points

Participant	Weeks
1	6
2	6
3	7
4	8
5	6
6	9

Note. Randomised pre-baseline period in number of weeks.

4.8.3 Intervention: 16 weeks. An intervention period of 16 weekly e-mentoring contacts was determined for this research (Figure 4.2). In consideration of the burden on participants and the feasibility of recording and collecting weekly probes from volunteers over a longer period, a 4-month intervention was determined to be appropriate for this study. It was not feasible in this case to randomise the end of e-mentoring since it was important that all participants received the same dose of intervention (16 weeks).

4.8.4 Maintenance: 6 weeks. Maintenance measures were collected for 6 weeks following the e-mentoring intervention (Figure 4.2). This allowed for a minimum of 5 data points per phase as required by standards for rigorous SCED design (Tate et al., 2013). In consideration of the overall length of the experiment (27–31 weeks), it was not considered feasible to continue the follow-up duration beyond 6 weeks.

4.9 E-Mentoring Preliminary Protocol

Following consent, several measures were completed by the researcher with the participants and their caregivers to collect demographic data (Figure 4.2 and Figure 4.3). The researcher administered the whole-to-part silent reading assessment (Erickson & Kopenhaver, 2014) with participants according to the instructions (see below). The participant's caregivers (with support from the researcher as requested), and/or mentors, completed modified self-report descriptors for the GMFCS (Palisano et al., 2008), MACS (Eliasson et al., 2006), and CFCS (Hidecker et al., 2011). The modified self-report descriptors for all three tools are included in Appendix I, this approach has been used in other similar research (Bartlett & Gorter, 2011; Raghavendra, Newman, Wood, et al., 2015).

Further measures relevant to the research questions were also administered at this time (Figure 4.2 and Figure 4.3). The COPM and GAS tools were administered at this time. Following this, the SEAS-PCS tool (T1) and engagement probe was completed. Administration of the SEAS-PCS tool also offered the researcher the opportunity to observe the young person using social media. In some situations, the researcher resolved issues for participants unable to access social media (e.g., they did not have social media accounts that they could access, had forgotten their password, or needed supporting in setting up Wi-Fi access on their AAC device).

At this time, Paul declined support to create a Facebook account or activate privacy settings despite having stated this as his goal for the e-mentoring intervention. The researcher provided information to support him and his family in setting up the account and privacy settings once he felt ready to do this. All other participants were successfully connected to social media accounts relevant to their goals.

Owing to ethical considerations, the researcher discussed and addressed possible concerns regarding cyber safety with the participants and their caregivers. The researcher provided them information about cyber safety developed by the Australian Communications and Media Authority. Following this, the researcher developed a set of individualised agreed cyber-safety house rules with the participant and parent (Figure 4.9). The researcher discussed restrictions for devices (e.g., computer Internet filters and iPad/ iPhone restrictions) and checked, and where relevant updated, privacy settings for social media accounts (e.g., Skype privacy settings, Facebook privacy settings).

Figure 4.9. Example cyber-safety house rules.

Contact with the mentor and plans for data collection during the project were discussed with participants and their caregivers. Each participant agreed to a list of social media accounts that could be provided to the mentor for the purposes of the e-mentoring intervention. One social networking platform was selected for the collection of online conversation with all online contacts. Participants were asked to post a message to communication partners on this social networking platform to inform them of their participation in the research project and an example message was provided. The researcher discussed the participant's availability for e-mentoring appointments to enable scheduling of appointments and the preparation of a calendar of events for each participant.

Questions asked in this discussion included:

- When are good days or times to connect with the mentor?
- How can the researcher collect conversations from your targeted social networking platform?
- How can the researcher collect your responses to weekly questions about how often you have been online?
- What topics would you like to discuss with your mentor?

At the completion of this protocol, the baseline period commenced (Figure 4.10). During baseline, weekly reports of social media use and conversation transcripts of online conversation on one social networking platform were collected according to the method agreed with the researcher and participant.

Details of the intervention are provided in Chapter 5. The four time points were extended across the phases of the SCED: before intervention, mid-intervention (after 8 weeks of the 16-week e-mentoring intervention), post-intervention (at the end of the 16-week e-mentoring intervention), and delayed post-intervention (at the end of the maintenance phase) time points. During intervention, at Week 8, the SEAS-PCS and engagement probe were collected (T2). Following the 16-week intervention, the SEAS questionnaire and engagement probe were repeated (T3, Figure 4.10).

4.9.1 Post-intervention measures. At this time the COPM and GAS were also completed. The participant, mentor, and participant's mother completed a rating of the mentor/mentee relationship quality. Weekly reports of social media use and transcripts of online conversation continued to be collected for a further 6 weeks (Figure 4.10). At the completion of the maintenance period, a final SEAS-PCS and engagement probe were completed (Figure 4.10).

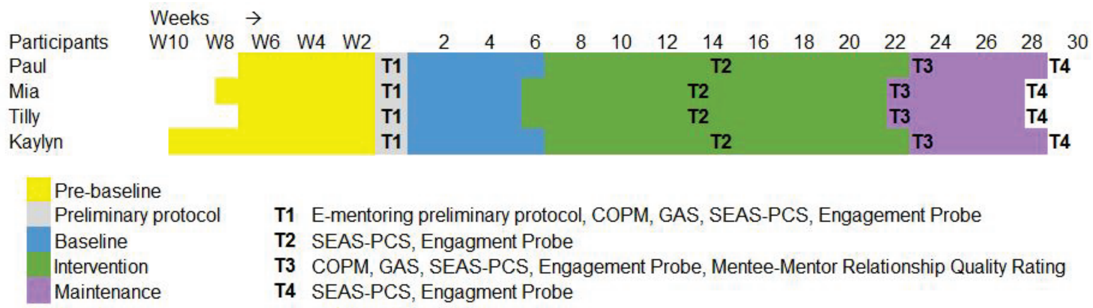


Figure 4.10. Graphical representation of the research timeline, including pre-baseline allocation.

4.9.2 Literacy assessment. The approach used in this assessment is based on the whole-to-part model of silent reading comprehension that identifies three key skills constituting silent reading ability (Cunningham, 1993; Erickson & Koppenhaver, 2014; Figure 4.11). Note that the assessment was based on an American reading inventory (Johns, 2012), which was selected given the availability of adaptions for individuals who use AAC (Erickson & Kopenhaver, 2014).

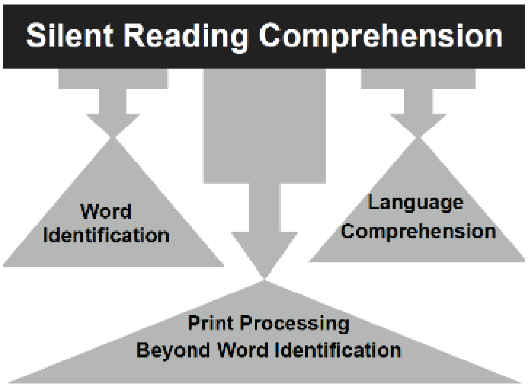


Figure 4.11. The whole-to-part model of silent reading comprehension. From *AGOSCI Level 2 Literacy Intensive. Literacy in AAC: Assessments to Guide Instruction. Whole to Part Reading Assessment*, by K. Erickson and D. Koppenhaver, 2014, Melbourne, Victoria: AGOSCI. Reproduced with permission.

The tasks assessed are word identification, language comprehension, and silent reading. For example:

- *Word Identification:* Four visually similar words were presented. The participant was asked to point to the word from the graded list. Proficiency on this task is demonstrated by correctly responding to 17/20 words (Figure 4.12).

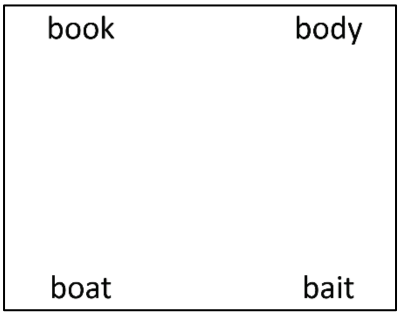


Figure 4.12. Example of the word identification task.

- *Listening Comprehension:* A graded passage was read aloud to the participant. They were then asked questions about the passage and given the opportunity to select from up to four multiple-choice or Y/N responses. Proficiency in this activity was demonstrated by correctly responding to 80% of the questions (Figure 4.13).
- *Reading Comprehension:* A graded passage was provided for the participant to read silently to themselves. They were then asked questions about the passage and given the opportunity to select from up to four multiple-choice or Y/N responses. Proficiency in this activity was demonstrated by correctly responding to 80% of the questions (Figure 4.13).

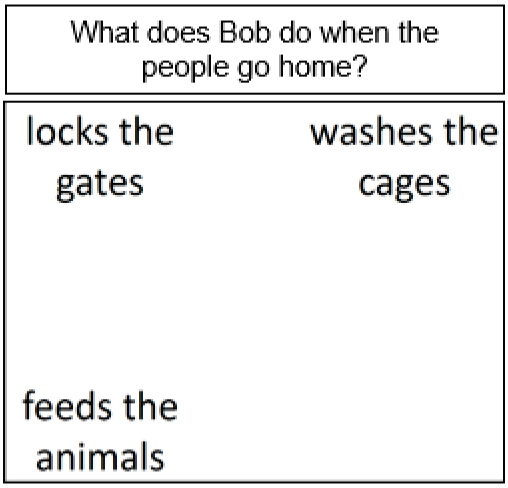


Figure 4.13. Example of the listening comprehension and reading comprehension tasks.

Results provide an indication as to which area of silent reading comprehension requires further support (print processing, word identification, or language comprehension).

4.10 Data Analysis

A summary of the approach to analysis of the data in this research is provided in Figure 4.2. Analysis of single-case experimental data enable interpretations and judgements to be made about how likely the changes noted in the dependent variables were related to the independent variable (Kratochwill & Levin, 2014). Within the field of SCED, visual inspection is considered the primary method of evaluating single-case designs and has traditionally been used to make judgements about the effectiveness of interventions (Barlow, Nock, & Hersen, 2009; Kazdin, 2011).

With the need to demonstrate the rigour of the design, SCED methodology and data analysis strategies have grown in complexity and sophistication over the past 10 years. Where previously conclusions were drawn from visual analysis of the results, further statistical analysis of the results is now expected (Tate et al., 2013). Visual inspection may allow for clear conclusions where data show a marked and clear change in level between phases. However, in situations where the influence of the independent variable on the data may be less clear, visual inspection has been demonstrated to have poor reliability and to be subject to bias (Kazdin, 2011; Kratochwill & Levin, 2014). In this case conducting additional analysis is recommended to supplement visual analysis (Kratochwill & Levin, 2014). Currently, there is no clear agreement in the field regarding analysis techniques that are the most appropriate in SCED and further research is still required to determine the relative benefits of the different approaches (Kazdin, 2011; Kratochwill & Levin, 2014). Given the discrepancies between different analysis approaches, an expert in the field recommended using more than one analysis approach (Wendt, personal communication 07/10/2014) in this study, an approach that other experts in the field also recommended (Kratochwill et al., 2013). Several other SCED authors have also reported more than one analysis approach (Ahmed-Husain & Dunsmuir, 2013; M. Dennis, Sorrells, & Falcomata, 2015; Hall, 2013; Satsangi & Bouck, 2014; Shin & Bryant, 2015). Experts have argued that in situations with a small effect or significant data variability, randomisation should be used (Kratochwill & Levin, 2014). Although limited previous research has investigated e-mentoring treatments for individuals who use AAC, or e-mentoring interventions that employ the use of a SCED, the wider e-mentoring literature employing larger group designs has demonstrated that e-mentoring interventions traditionally have a small effect size ($d = 0.2$; Dubois et al., 2002). Given the current emerging standards, and the complexities of investigating e-mentoring interventions and participation in social media, the use of additional analysis to support visual analysis was critical. The process for approaching visual inspection of the data and further analysis is described below, focusing on analysis of the weekly probes initially and then analysis of the additional probes.

4.10.1 Visual inspection. Standards in SCED highlight the importance of a structured approach to visual analysis (Kratochwill et al., 2010). Several authors have proposed guidelines to support researchers in conducting visual analysis of SCED data (e.g., the four steps and six variables method outlined by Kratochwill & Levin, 2014; guidelines by Lane & Gast, 2014). The approach described by Lane and Gast (2014) was used in this study (see Table 4.16). Each outcome is analysed in two sections, within and across phases using a 12-step process that provides a clear structure for the visual analysis conducted in this study.

Table 4.16

A Systematic Approach to Visual Analysis (Lane & Gast, 2014)

Two Stages	**Within-phase visual analysis** Pre-baseline Baseline Intervention Maintenance
	Between-phase visual analysis pre-baseline to baseline pre-baseline to intervention pre-baseline to maintenance baseline to intervention baseline to maintenance Intervention to maintenance
Twelve Steps	**Within-phase visual analysis** A-B-C notation Number of data points in each phase Stability of level and range of data by phase Level change and absolute level change within each phase Estimate of trend Investigate trend stability (variability) **Between-phase visual analysis** Describe trend and data paths Determine the number of variables that changed between phases Change in trend direction between phases Change in trend stability between phases Level change between phases Overlap of data between phases

Note. Analysis steps from Lane & Gast (2014), with adaptions to suit the terminology used in this thesis.

The steps of analysis listed in Table 4.16 are summarised below according to the instructions provided by Lane and Gast (2014). The figures below provide excerpts from a sample worksheet (Appendix L) used to conduct the systematic analysis in this study (Figure 4.14, Figure 4.15, and Figure 4.18) and the graphical displays produced by this analysis (Figure 4.16 and Figure 4.17). This worksheet was used to complete systematic analysis for all dependent variables and all participants included in the SCED.

4.10.1.1 Within-phase analysis. The analysis for Steps 1 and 2 provides identifying letters and numbers to the phases and data points used across the experiment (Figure 4.14). Step 3 allows for a description of the stability, level, and range of data points within a phase. This includes calculation of the mean, median, full range, and stability envelope (Figure 4.15). The stability envelope is the range between 25% above and 25% below the median; where ≥ 80% of the data points in a phase are within the stability envelope, the phase is considered stable. Plotting the stability envelope on the visual display has been demonstrated to increase reliability of visual analysis (Figure 4.16). Step 4 calculates the change in level across the phase using two measures: relative level, by comparing the median value of the first half of the phase to the median value of the second half of the phase, and absolute level, by reporting the value of the first and last data points in the phase (Figure 4.15). Step 5 provides an estimate of the trend calculated using the split-middle method. The split-middle method of trend estimation uses the median value for each half of the phase (previously calculated in step 4) and plots these against the mid-dates in each half of the phase (Figure 4.17). Plotting the trend on the visual display of the data has been demonstrated to increase reliability of visual analysis. Step 6 uses a similar approach to the calculation in step 3, a stability envelope is calculated and plotted alongside the split-middle trend lines (Figure 4.15 and Figure 4.17). In step 7, the researcher describes the trend, stability and pathways observed in the data (Figure 4.15). This completes stage one of the systematic visual analysis, the within-phase steps. Stage one of the analysis forms the basis of the stage two comparisons to be made in the between-phase steps (Steps 8–12). Before continuing to the stage two steps (8–12), stage one steps (1–7) are repeated for each phase of the experiment:

Step 1: Notations	A2 – Baseline B1 – Intervention B2 – Maintenance
Step 2: Number of Observations	Total observations in A2 = 5–6 Total observations in B1 = 16 Total observations in B2 = 6

Figure 4.14. Within-phase analysis Steps 1 & 2 (Lane & Gast, 2014).

Mia	A2
Step 3: Mean (M) Median (Med) Range (R) Stability Envelope (Sta) Percent On or Within the Stability Envelope	 M = 1 Med = 1 R = 0-3 Sta = 0.75-1.25 2/5 = .4 40%
Step 4a: Level Change Within Median Of 1st Half Median Of 2nd Half Relative Change	 Med = 2 Med = 1.5 Δ = -0.5 Deteriorating
Step 4b: First and Last Value First Last Absolute Change	 A = 1 Ω = 1 Δ = 0 Stable
Step 5: Split-Middle Trend Estimate. Mid-Date 1st Half Mid-Rate Median Value 1st Half Mid-Date 2nd Half Mid-Rate Median Value 2nd Half	Week 2 Med = 2 Week 4 Med = 1.5
Step 6: % of Data Points Within Stability Envelope	 1/5 = 20%
Step 7: Direction Stable or Variable? Multiple Paths Within Trend?	 Decelerating Variable Alternating pattern

Figure 4.15. Within-phase analysis Steps 3–7 (Lane & Gast, 2014).

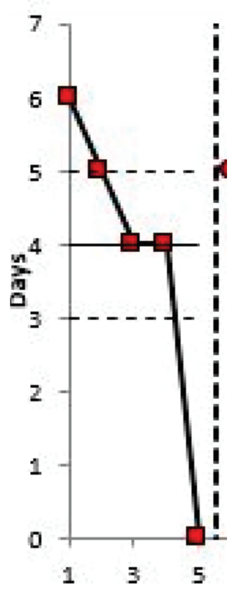


Figure 4.16. Example of Step 3 in systematic visual analysis (Lane & Gast, 2014).

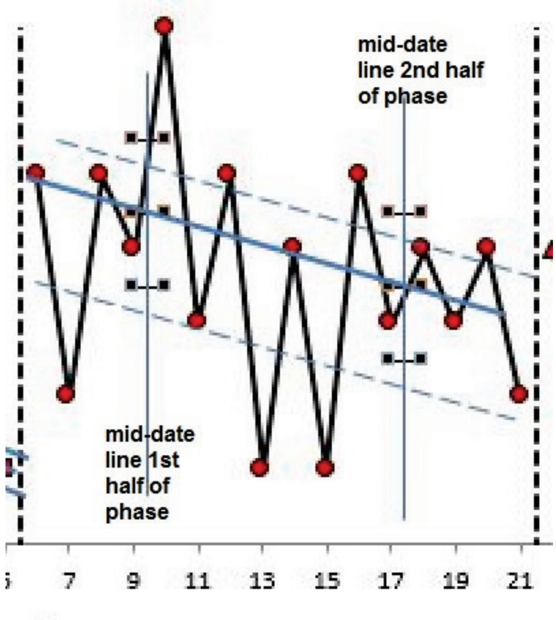


Figure 4.17. Example of step 5–7 in the systematic visual analysis (Lane & Gast, 2014).

4.10.1.2 Between-phase analysis. Step 8 identifies the independent variable that changes between the phases of the experiment. Step 9 compares the trends present in the adjacent conditions to describe any changes in trend; note that these trends were identified in step 7 but are compared in step 9. Similarly, step 10 compares the stability judgements made in step 6 of the systematic analysis. Step 11 compares the level changes calculated in step 3. Step 11 includes comparison of change in all measures of level: (a) relative level, comparing the median of the adjacent half-phases; (b) absolute level change, comparing last and first values of the adjacent phases providing an indicator of the immediacy of any level change that may be present; (c) median; and (4) mean level changes. Step 12 involves calculation of PND. Examples of the calculations completed in Steps 8–12 are included in Figure 4.18 using an excerpt from the example worksheet (Appendix L). The approaches to non-overlap calculations used in this study are described in the following section. The between-phase analysis steps are repeated for each phase comparison in the experiment. The four between-phase comparisons included in this study are listed in Table 4.16 above. The systematic visual analysis steps are completed for each participant in the study.

Mia	B-I	
Step 9: Trend Direction	Decelerating Deteriorating	Decelerating Deteriorating
Step 10: Trend Stability	Unstable	Unstable
Step 11a: Relative Level	Relative level change 4.5-1.5 = +3 Improving	
Step 11b: Absolute Level	Absolute level change 5-1 = +4 Improving	
Step 11c: Median Level	Median level change 4-1 = +3 Improving	
Step 11d: Change in Mean Level	Mean level change 4-1 = +3 Improving	
Step 12: Non-Overlap	PND = 56% Tau-U = 0.7375 (CI = 0.239<>1; *p* = 0.0149)	

Figure 4.18. Example of calculations completed in the between-phase analysis Steps 9–12 (Lane & Gast, 2014).

4.10.2 Non-overlap methods. Non-overlap methods are considered a valuable further analysis technique in the field of SCED, given that they blend well with the visual analysis approach and are also able to be represented visually (Parker, Vannest, & Davis, 2011). Most of these approaches allow for the reporting of effect size of the intervention and have an advantage over other, more widely used statistical approaches in that they do not rely on parametric assumptions about data distribution or scale type. Most non-overlap approaches are insensitive to trend in baseline data and others lack precision power (Kratochwill & Levin, 2014). As discussed above, there is currently no agreement within the field of SCED as to which non-overlap approaches are the standard for evaluation of SCED data. As described above, it was recommended that more than one approach to statistical analysis be used in the evaluation of the data (see page 134).

The non-overlap approaches used in this study were percentage of non-overlapping data (PND; Scruggs et al., 1987) and Tau-U (Parker, Vannest, Davis, & Sauber, 2011). These methods were chosen for separate reasons. PND was selected since this approach is used most commonly in the field and is therefore familiar to most readers and widely accepted (Kratochwill & Levin, 2014). Further, PND is included in the systematic approach to visual analysis outlined by (Lane & Gast, 2014) and applied in this thesis. PND was calculated using a custom-designed excel spreadsheet according to the approach described by Scruggs et al. (1987), where the number of phase B data points that exceeded the highest Phase A data point was divided by the total number of data points in Phase B.

Tau-U has been used by other researchers in the evaluation of SCED multiple-baseline data (e.g., Ganz, Goodwn, et al., 2013; Huskens, Reijers, & Didden, 2012; Tan, Trembath, Bloomberg, Iacono, & Caithness, 2014) and was selected since some of the limitations of PND can be overcome by using this approach (Kratochwill & Levin, 2014). Tau-U has been recommended for statistical analysis in SCED owing to a range of factors, including increased statistical power and the possibility to control for baseline trend (Chen, Peng, & Chen, 2015; Parker, Vannest, & Davis, 2011; Shadish, 2014). Tau-U scores range between 0 and 1 and are equivalent to non-overlap of all pairs (an alternate non-overlap indice), although Tau-U also allows for combining non-overlap with trend (Parker, Vannest, & Davis, 2014). Similar to non-overlap of all pairs, Tau-U provides a distribution-free non-parametric effect size (Parker & Vannest, 2012). To date, a consensus is lacking for the interpretation of the Tau-U effect size index, and the guideline by Ferguson (2009) was used in this thesis, as has been applied in similar studies (DeJager & Filter, 2015; Galletta & Vogel-Eyny, 2015; Ganz, Boles, Goodwyn, & Flores, 2013; Ganz, Hong, & Goodwyn, 2013).

This effect size index was proposed for use in SCED statistical analysis by Parker, Vannest, Davis, and Sauber (2011) and titled Tau-U because it is based on the combination of two statistics, Kendall's Rank Correlation (Tau) and the Mann–Whitney U test. As described by Parker, Vannest, and Davis (2011), all data points are paired and compared for determining whether the change between phases is positive, negative or tied (Figure 4.19, Table 4.17). Where Tau_{novlap} = S/Pairs, S = Positive-Negative (Table 4.17). The number of pairs is calculated by multiplying the number of Phase A data points by the number of phase B data points (Parker, Vannest, & Davis, 2011). Where within baseline Tau was higher than 0.2, a decision was made to control for baseline trend (Vannest & Ninci, 2015). In these cases, Tau-U was used in place of Tau_{novlap}. Tau-U includes the A vs. B comparisons in Tau_{novlap} and also subtracts Trend in baseline (phase A): Tau-U = (S_{novlap}-S_{trendA})/Pairs (Parker, Vannest, Davis, & Sauber, 2011).

All data were entered into an online calculator (Version 2.0; Vannest, Parker, Gonen, & Adiguzel, 2016) that provided effect size (Tau-U or Tau_{novlap}), *p* values, confidence intervals, and a weighted average for each of the phase contrasts across participants. Since establishment in 2011, the online calculator has been increasingly used in SCED research (Caldarella, Williams, Hansen, & Wills, 2014; Ganz, Hong, & Goodwyn, 2013; Huskens et al., 2012; Tunnard & Wilson, 2014).

			B1																A2				
			21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
			0.5	0.5	0.7	0.8	0.4	0.5	0.6	0.9	0.6	1	0.8	1	0.6	0.3	0.3	1.5	0	0.3	0.3	0.7	0.3
	1	0.3	+	+	+	+	+	+	+	+	+	+	+	+	+	T	T	+	-	T	T	+	0
	2	0.7	-	-	T	+	-	-	-	+	-	+	+	+	-	-	-	+	-	-	-	0	
A2	3	0.3	+	+	+	+	+	+	+	+	+	+	+	+	+	T	T	+	-	T	0		
	4	0.3	+	+	+	+	+	+	+	+	+	+	+	+	+	T	T	+	-	0			
	5	0.0	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0				
	6	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0					
	7	0.3	+	+	+	+	+	+	+	+	+	+	+	+	+	T	0						
	8	0.3	+	+	+	+	+	+	+	+	+	+	+	+	+	0							
	9	0.6	-	-	+	+	-	-	T	+	T	+	+	+	0								
	10	1.0	-	-	-	-	-	-	-	-	-	T	-	0									
	11	0.8	-	-	-	T	-	-	-	+	-	+	0										
	12	1.0	-	-	-	-	-	-	-	-	-	0											
B1	13	0.6	-	-	+	+	-	-	T	+	0												
	14	0.9	-	-	-	-	-	-	-	0													
	15	0.6	-	-	+	+	-	-	0														
	16	0.5	T	T	+	+	-	0															
	17	0.4	+	+	+	+	0																
	18	0.8	-	-	-	0																	
	19	0.7	-	-	0																		
	20	0.5	T	0																			
	21	0.5	0																				

Figure 4.19. Logic matrix for all pairwise data comparisons. The rectangular box represents between-phase data, the top right triangle represents comparisons within phase A2 (baseline) and the bottom left triangle represents comparisons within phase B1 (intervention).

Table 4.17

Example Tau-U Calculations

	Pairs	Positives	Negatives	S
A2 vs. B1	80	64	9	55
A2 vs. A2	10	1	6	−5

4.10.3 Additional periodic probes.

4.10.3.1.1 *Pre-post activity competence probes.* Descriptive statistics have been reported for the pre-post COPM and GAS data. For the COPM data, the change score (Δ) or difference between the Mean pre and Mean post ratings is reported for each participant and across all participants. COPM change scores are reported for performance ratings and for satisfaction with performance ratings. GAS results are reported as T-scores as recommended by the developers and used in previous research, where a score of 50 indicates that goals were achieved at the expected level (Kiresuk & Sherman, 1968; Turner-Stokes, 2009). Scores above 50 and below 50 indicate greater than expected and less than expected goal attainment, respectively.

4.10.3.2 Four self-and proxy-engagement probes. Mean SEAS results are reported for each sub-scale and time point (e.g., before, during, after, and well after the e-mentoring intervention). Mean scores for the engagement probe are also reported for each time point with self- and proxy reports presented alongside each other to allow for visual comparison and discussion.

4.10.4 Social validity. Social validity is an important aspect of an intervention's effectiveness that considers the perspectives of individuals other than the researcher (Kazdin, 2011). This includes the perspectives of the participants and the perspectives of their families (e.g., the acceptability of the treatment and the meaningfulness of the changes observed; Kazdin, 2011). The COPM and GAS tools were used in the planning of the e-mentoring intervention so that intervention goals were individualised and relevant to the everyday lives of the participants. The results on the COPM present the perspectives of the participants regarding changes in their performance and satisfaction with performance on the identified problem areas in social media, and hence, have allowed for the researcher to make comments regarding the social validity of the intervention. Further, the inclusion of qualitative data in the research process may have increased the meaningfulness of the observed changes, given that they were observed within transcripts of online conversation with peers.

4.11 Summary of Method

This chapter described the methods used in this intervention research. The mixed methods approach incorporated a multiple-baseline single case design. The project aimed to investigate the effectiveness of a peer e-mentoring intervention to strengthen participation in online conversation by young people who use AAC. In intervention studies, the delivery of the intervention to the participants is an important component of the research method. In SCED, evaluation of the delivery of the intervention is considered an integral component of the study design (Kratochwill & Levin, 2014). Intervention fidelity measures are used to determine the degree to which the intervention was delivered as described by the researcher. The following chapter provides further details of the cross-age peer e-mentoring intervention delivered in this research and an analysis of the intervention fidelity.

Chapter 5: Method: Cross-Age Peer E-Mentoring Intervention: Description and Fidelity

In this chapter, the e-mentoring intervention is described and compared with international evidence-based practice benchmarks and standards (Garringer et al., 2015). These international benchmarks are considered best practice for e-mentoring interventions; these have been developed based on currently available research evidence and were reviewed by expert practitioners in the area of mentoring (Garringer et al., 2015). This is followed by a detailed description of the procedure guided by the steps previously listed in Table 4.2. Subsequently, further information is provided regarding monitoring and support from the researcher that occurred across all the procedural steps.

Finally, the approach to, and results of, the evaluation of the e-mentoring support are reported using the following measures:

- The frequency and duration of online conversation by the mentor and participant is analysed.
- The e-mentoring provided (transcripts of online conversation between mentors and participants) is compared with the definition of e-mentoring used in this programme.
- The quality of each e-mentoring relationship is reported as rated by mentors, participants, and participant family members.

The inclusion of both instrumental and relationship quality measures reflects the intention of the mentoring intervention to provide both developmental and instrumental activities.

5.1 Overview of the E-Mentoring Intervention and Approach to Measurement

Peer-mentoring intervention research does not typically involve use of a standardised protocol for mentor and mentee interactions; a training protocol for mentors is considered more appropriate (Stinson et al., 2016). This allows for a person-centred approach where interventions are tailored to the individual relationship between each mentor and participant pair. A handbook and training protocol were developed and implemented to support the mentors in delivering the intervention in this study in preference to a prescriptive intervention protocol. This approach has been used in other experimental (Ahola Kohut et al., 2016; Stinson et al., 2016) and pre-experimental (Raghavendra, Newman, Wood, et al., 2015) designs investigating the effects of similar e-mentoring interventions.

5.1.1 Assessment of the programme against international benchmarks. The *Elements of Effective Practice for Mentoring* resource provides an international guideline for mentoring interventions (Garringer et al., 2015). Standards are recommended across six major elements of mentoring interventions: (a) Recruitment, (b) Screening, (c) Training, (d) Matching and Initiating, (e) Monitoring and Support and, (f) Closure (Garringer et al., 2015). The e-mentoring intervention met most items across all of the elements of effective mentoring practice benchmarks and several of the optional enhancements (Table 5.1, Appendix M provides a full list of the benchmarks; Garringer et al., 2015). The e-mentoring intervention design was compliant with 43 of the 48 benchmarks (Table 5.1). The addition of written reference checks for mentors and a written mentor application form would have strengthened compliance with these benchmarks. However, this requirement would have increased the burden of time involved for mentors and potentially negatively affected mentor recruitment. This negative impact was anticipated owing to the small population targeted in this study and the time and effort that would have been involved for mentors, who used methods other than speech, to provide these extra communications. The mentors recruited to this project were recommended and invited by speech pathologists familiar with the programme objectives. In addition, the researcher interviewed potential mentors via Skype and face-to-face discussions; mentors were also required to complete consent forms.

Table 5.1

Did the Programme Meet the Elements of Effective Mentoring Practice Benchmarks?

Garringer, Kupersmidt, Rhodes, Stelter & Tai's (2015) Standards	Benchmarks Met	Benchmarks Not Met
Recruitment "Recruit appropriate mentors and mentees by realistically describing the program's aims and expected outcomes". (p. 10)	1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7	
Screening "Screen prospective mentors to determine whether they have the time, commitment, and personal qualities to be a safe and effective mentor and screen prospective mentees, and their parents or guardians, about whether they have the time, commitment, and desire to be effectively mentored". (p. 24)	2.1, 2.3, 2.4, 2.6, 2.7, 2.8, 2.9, 2.10, 2.11, 2.12.	2.2, 2.5, 2.9
Training "Train prospective mentors, mentees, and mentees' parents (or legal guardians or responsible adult) in the basic knowledge, attitudes, and skills needed to build an effective and safe mentoring relationship using culturally appropriate language and tools". (p. 34)	3.1, 3.2, 3.3, 3.4	
Matching & Initiating "Match mentors and mentees, and initiate the mentoring relationship using strategies likely to increase the odds that mentoring relationships will endure and be effective". (p. 54)	4.1, 4.2, 4.3, 4.4.	
Monitoring and Support "Monitor mentoring relationship milestones and child safety; and support matches through providing ongoing	5.1, 5.2, 5.3, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10.	5.4, 5.11

advice, problem-solving, training, and access to resources for the duration of each relationship". (p. 60)	
Closure "Facilitate bringing the match to closure in a way that affirms the contributions of the mentor and mentee, and offers them the opportunity to prepare". (p. 70)	6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9

5.1.2 Mentoring intervention: Procedural Steps 1–5. Procedural Steps 1–5 are listed in Table 4.2: Recruitment, consent, goal development, discussion of expectations, scheduling of online contacts, pre-match training, and distribution of goals and e-mentoring event calendars. As detailed in the previous chapter, recruitment of participants and mentors occurred via the distribution of project information sheets. The information sheets described the benefits and challenges of being involved in the e-mentoring intervention and were made available via disability service providers and social media (Benchmarks 1.1, 1.2, 1.6, 2.1, and 2.8 [hereafter referred to as B1.1, B1.2, etc.] and Enhancements 1.2, 1.3, and 1.4 [hereafter referred to as E1.2, E1.3, etc.]). Mentors were not required to complete a written application or reference checks (B2.2 and B2.5). Specific inclusion criteria for mentors and participants were developed and included on the information sheets (see Chapter 4, Section 4.6; B1.3, B1.7, 4.1, and E4.1). Mentors and participants recruited to the project were encouraged to recruit other peers whose needs and/skills matched the programme (B1.4, B1.5, and B1.7). To plan for relationship closure, the information sheets provided clear information about the length of the programme and closure (B6.1). Contingencies for unplanned closure were discussed with mentors, participants and caregivers prior to consent (B6.2, B6.3, and B6.5). In addition, information regarding relationships closure and the option for possible ongoing contact between mentors and participants was outlined in the information sheet and/or consent forms (B6.5, B6.6, and B6.9).

Consent forms were completed by caregivers of participants, participants, and mentors (B2.6, B2.7, B2.10, B2.11, B2.12, E2.8, and B4.4). Caregivers were not asked to complete an application form (B2.9). However, a home visit was conducted with participants and their parent at the time of consent. Prior to consent, mentors were asked to apply for Child Related Employment Screening, or a Working with Children Check, as appropriate for the state where they resided (B2.4). Where required, the researcher supported the mentors in completing these applications (i.e., lodging documentation at the post office and support to find and or complete form). All checks were provided by mentors prior to the commencement of the programme. Mentors were reimbursed any expenses associated with this process (i.e., lodgement fee and photo cost).

The researcher met each participant and the family member prior to meeting the mentors (B2.7). During this meeting, the participants were supported to develop their own individualised goals for learning to use social media (see Section 6.2; E3.4, E3.5, E3.6, and E3.7). At this meeting, the researcher provided the randomly allocated e-mentoring start and end dates and asked the family and participant regarding any planned absences (e.g., holidays) during this period and the best days and times for the participant to be online, and suggested conversation topics for e-mentoring contacts (E4.6). Following this meeting, participants began their baseline phase.

The researcher met the mentors face-to-face prior to confirming their involvement in the project (B2.3). During participant baseline, the researcher provided a 4-hour training protocol in person in their home (discussed in detail below; B3.1 and E2.2). The researcher arranged and confirmed the initial and final contacts between the participant and mentor (B4.2). Once e-mentoring dates were confirmed with mentors, an individualised calendar was developed and sent to each participant and mentor confirming their commitments (Figure 5.1). GAS schedules (described below in Figure 5.2; Kiresuk & Sherman, 1968) were developed by the researcher, checked by caregivers of participants and then shared with mentors (E3.4; Appendix N).

August 2015

In August:
☐ Answer weekly questions
☐ Send Emma copies of FB messages ☐ Group Skype Call 23rd August
☐ Meet Mentor online on Monday the 3rd August

Mon	Tue	Wed	Thu	Fri	Sat	Sun
					1	2
3 3:45 Emma 4pm — 1st Skype with Mentor	4	5	6	7	8	9
10 Text from Emma	11	12	13	14	15	16
17 Text from Emma	18	19	20	21	22	23 Group Skype Call
24 Text from Emma	25	26	27	28	29	30
31 Text from Emma						

Figure 5.1. Example individualised calendar of e-mentoring commitments.

Mentoring Goals:

The mentoring program has specific goals for learning social media that we developed together at the start of the project. A special tool called *Goal Attainment Scaling* has been used to make a table for each goal that describes a range of five possible outcomes. At the end of the mentoring I will use these descriptions to measure progress made towards goals in learning to use social media.

The goal outcomes descriptions are listed against five categories.

-2 Baseline	An outcome if the current situation didn't change at all
-1 Better than Baseline	An outcome where some progress has been made towards the goal
0 Expected Outcome	The outcome expected to be achieved
+1 Greater than expected outcome	An outcome slightly above what's expected
+2 Much Greater than expected outcome	An outcome even further above what's expected

Figure 5.2. GAS description.(Excerpt from parent letter; see Appendix N)

The training provided is detailed in the section below.

5.1.2.1 Training of mentors. Training of mentors is important for positive outcomes from e-mentoring relationships (DuBois, 2002). The importance of training was emphasised in a meta-analysis of 55 mentoring interventions, which found that programmes that provided training (71%) and ongoing support (23%) to mentors had greater retention of mentors and greater participant outcomes (DuBois, 2002; Herrera et al., 2007). Similarly, Herrera et al. (2007) found that 71% of mentors in their research received training through the mentoring intervention. Experts have proposed that this relationship between mentor training and participant outcomes could be a result of the improved closeness, satisfaction and effectiveness of the mentoring relationship that subsequently influences the outcomes for participants and duration of the mentoring relationship (retention of mentors; Herrera, Sipe, & McClanahan, 2000; Kupersmidt & Rhodes, 2014; Parra, DuBois, Neville, Pugh-Lilly, & Povinelli, 2002). For example, it is thought that training is likely to improve active listening, empathy, and problem-solving skills in mentors and address other important factors, such as mentor expectations and motivations (Kupersmidt & Rhodes, 2014). Some mentors may need less support and training compared with other mentors with less experience or aptitude (Spencer, 2012). Kupersmidt and Rhodes (2014) provide evidence-based principles for mentor training and recommend that programmes provide consistent, purposeful, innovative training that also addresses programme-specific needs (i.e., population-specific or method-specific content). However, few pre-designed programmes are available and those available do not address the unique combination of specific needs of this programme (Kupersmidt & Rhodes, 2014).

The training provided in this research was designed to incorporate the evidence-based practice principles recommended by Kupersmidt and Rhodes (2014). A programme-specific handbook was developed and used both as a protocol for training and as a printed guide and handout for mentor pre-match training. The handbook content was developed from a combination of sources including: the CA of 15 mentoring training manuals completed by Kupersmidt and Rhodes (2014), a review of locally based mentoring intervention training materials (Julia Farr), attendance at a training course for a local programme (Inspire Mentoring), and review of online training resources (Light et al., 2000) designed for mentors who use AAC (B3.4). Training provided was designed to include at least 6 hours of 1:1 contact with the project coordinator. Initial training was designed to continue for 4 hours (240 minutes) and was provided to mentors in their homes using the technology and social media accounts that were planned to be used for the project (E3.3). Ongoing training and support were designed to be provided as requested, with not less than fortnightly contact between each mentor and the researcher (B5.1, B5.2, B5.3, B5.7, B5.9, and B5.12). Guidelines recommend that training provided pre-match should not be less than 2 hours (Garringer et al., 2015). Best practice guidelines highlight that training of at least 6 hours is associated with higher levels of mentor/mentee closeness, and therefore potentially improved mentee outcomes (Kupersmidt & Rhodes, 2014). A summary of the training content is included in Table 5.2, and the full training handbook is provided in Appendix O (B3.2, B3.3, and E4.5).

Table 5.2

Pre-Match Training Content and Evidence-Based Practice Principles

Sections of Training Manual	Content of Training Provided to Mentors	Evidence-Based Practice Topics for Mentor Training (Kupersmidt & Rhodes, 2014)
Your Role as a Mentor	Expectations of peer mentors. How much time should I spend being a mentor? Help and support. Honorarium payment. What is peer mentoring? Four things to avoid when you are a mentor. What makes the project move forward?	Introduction to mentoring Mentor motivation Expectations Behaviours of successful mentors: 3Bs of mentoring (Authentic, Trustworthy, Empathic) Have fun (Liang, Spencer, Brogan, & Corral, 2008) Roles (e.g., relationship boundaries).
Safety	Safety What are your responsibilities in regard to safety? Project rules. Researcher will monitor all conversations…Why? cyber safety	Ethics
Mentoring Goals	Goals Information about mentees	Population-specific content
Communication Skills	Problem solving Communication skills Keeping the conversation going Positive feedback Suggested topics of conversation	(Light et al., 2007) Communication skills Conflict resolution Problem solving
Relationship Closure	Saying goodbye at the end of the project	Closing the relationship

Table 5.2 Continued

Sections of Training Manual	Content of Training Provided to Mentors	Evidence-Based Practice Topics for Mentor Training (Kupersmidt & Rhodes, 2014)
Computer Skills & Knowledge	Computer skills & knowledge	Programme-specific content
	Screen recording	
	Internet accounts	
	Gmail	
	Facebook (shared)	
	Skype	
Role Play Scenarios	Mentoring intervention	First meeting
	Let's work through some potential scenarios…	
	Scenario 1: Introductions & Your first meeting	
	Scenario 2: An email from your mentee	
	Scenario 3: What if you can't get in touch online?	
	Scenario 4: So, you want to help your mentee share their photo on Facebook?	
Evaluation	Training evaluation	

Mentors were provided regular phone or online contact from the researcher in the middle of the intervention period and other periodic support as requested or indicated from monitoring of the e-mentoring conversations. Ongoing support is recognised to be important in mentoring interventions (Kupersmidt & Rhodes, 2014). For example, to support mentors in balancing rapport building activities with a focus on participant programme goals (Kupersmidt & Rhodes, 2014).

5.1.3 Mentoring intervention: Procedural Steps 6–7. At the commencement of intervention, the researcher linked up online with the participant and mentor to introduce them (B4.3). The researcher then left the mentor and participant to continue their conversation without interruption. The participant and mentor were expected to arrange subsequent contacts. However, the researcher was available to provide support for this process to the degree that was preferred by the mentor, participant or their family. For example, this included support for scheduling appointments in some cases, communicating between both parties when last-minute changes were necessary and/or following up if a mentor or participant was not online as expected. The researcher used mobile phone and social networking accounts (i.e., Skype) specific to the project and continuously monitored these for communication from mentors or participants. The researcher also maintained contact with participants and their caregivers on a weekly basis (B5.6). A written record of all communication between the researcher and mentor, and researcher and participants or their family members was kept by the researcher (B6.6).

5.1.4 Mentoring intervention: Procedural step 8. Monthly group appointments were arranged by the researcher where the mentors and participants had the opportunity to connect over Skype. Initially, it was intended that the mentors would both be included in the group appointments. However, both mentors only participated in one of the group appointments. For other appointments, only one mentor was involved, which was the preference of the mentors in this study. The researcher was involved where requested by the mentors, which occurred during two of the four group appointments.

5.1.5 Mentoring intervention: Procedural Steps 9–11. The researcher scheduled, but did not participate in, the final e-mentoring appointment. Following the final e-mentoring appointment, participants were presented with a certificate of completion that included an individualised statement of affirmation to participant from the mentor about the achievements they had made during the programme (E6.2). Mentors were asked to indicate whether they wished to continue contact with the participant at completion of the programme (E6.1). Mentors, participants, and participant family members were asked to rate the quality of the e-mentoring relationship (Figure 5.3).

Mentor Relationship Quality Rating (1 = not at all, 10 = very much so).
For mentor.

1. My mentee and I have a close relationship.
2. My mentee and I have a trusting relationship.
3. My mentee and I enjoyed talking to each other.
4. Overall the relationship between me and my mentee was helpful for the mentee.

Mentor Relationship Quality Rating (1 = not at all, 10 = very much so).
For mentee and family member.

1. My/The mentor and I/*name* have a close relationship.
2. My/The mentor and I/*name* have a trusting relationship.
3. My/The mentor and I/*name* enjoyed talking to each other.
4. Overall the relationship between me/*name* and my/the mentor was helpful for me

Figure 5.3. Mentor relationship quality rating questions.

5.1.5.1 Support for relationship closure. A positive experience of the mentoring relationship is often assumed; however, approximately 50% of mentoring relationships end prematurely (Rhodes, 2002). Further, premature ending of mentoring relationships is linked to negative outcomes for participants (Spencer & Basualdo-Delmonico, 2014). Relationship closure has been categorised into three groups: Planned—For example, this programme is planned to continue for 4 months only; Unplanned owing to changes in life circumstances—For example, somebody moves out of the area or becomes unwell; Unplanned owing to a difficulty in the relationship—For example, not responding to messages and perceived lack of participant motivation. Extra supports and mentor training are recommended to minimise potential negative effects of mentoring interventions (Garringer et al., 2015; Kupersmidt & Rhodes, 2014).

Relationship closure may be avoided if expectations are made clear to mentors and participants (Spencer & Basualdo-Delmonico, 2014). Possible negative outcomes may be minimised or avoided if the closure occurs with warning and when the positive aspects of the relationship are highlighted and celebrated (Kupersmidt & Rhodes, 2014; Spencer & Basualdo-Delmonico, 2014).

In this programme, unplanned relationship closure occurred on three occasions. One unplanned closure was instigated by the participant's family member early in baseline because of the complexities and burden of accessing e-mentoring online via complex AAC technology that had become more obvious to the family in the weeks following the commencement of baseline. The second was prompted by the mentor just prior to the planned initial meeting with the participant and was owing to changes in life circumstances (the mentor became unwell). In this instance, the participant was matched with a different mentor. The third occurred two months into the e-mentoring intervention and was prompted by the participant's family member who reported that it was no longer possible to prioritise e-mentoring contacts, given the participant's medical appointments.

In this programme, mentors, participants, and their family members were sent a written reminder from the researcher one month before the programme. The provision of a reminder was included to ensure that e-mentoring relationships were ended with ample warning for all parties and in an effort to increase positive aspects and minimise negative aspects of the planned closure. Participants were presented with individualised certificates to celebrate their completion of the e-mentoring intervention. Each completion certificate included an individual affirmation for the participant written by the mentor, designed to support the mentor and participant in celebrating and remembering the positive aspects of the programme (Table 5.3). Mentors and participants were asked whether they would like to continue the relationship beyond the planned programme. One mentor and participant pair continued contact following the programme. One participant began contact with a new mentor following the programme. The other two participants did not disclose any continuing involvement in e-mentoring following the programme. Interviews were conducted with participants, mentors, and caregivers following the programme, which provided opportunities for all participants to debrief regarding their experience of participating in the programme. Providing opportunities for both participants and mentors to debrief and give feedback at the end of an e-mentoring relationship is recognised as an important standard for mentoring interventions (B6.4, B6.7, and B6.8; Garringer et al., 2015). Nevertheless, these qualitative interviews were not included in the thesis, given the overall scope of the research.

Table 5.3

Mentor Affirmations to Celebrate Positive Aspects of E-Mentoring Relationship Closure

Participant	Mentor Affirmation
Paul	Hi Paul, It was great to get to know you during the project. Congratulations on your willingness to try new things, even when they are scary and unknown. Caution is a good thing to have, but don't let it stop you from giving things a go. I wish you all the best. Your mentor
Mia	Hi Mia, I have thoroughly enjoyed meeting you and learning more about your life. It has been an absolute pleasure to be your mentor, and seeing you develop so much in such a short time in being a great AAC user. You have certainly shown me a lot in your communication and participation—thank you and best wishes, Mentor
Tilly	Hi Tilly, It has been an absolute pleasure to meet you, Tilly. I have been inspired to connect with another [user of AAC software], and to see how quickly you learn technology. Learning about your artistic self and your love for animals, particularly dogs, has been very enjoyable too. Best wishes for your studies and keep on with your amazing artwork. Cheers, Mentor.
Kaylyn	Kaylyn, it was wonderful to meet you and get to know you on Skype. Thank you for your commitment and interest in the mentor project, particularly for your regular Monday morning Skype. Keep up the great work and your gym fitness is a fantastic commitment Your Mentor

5.2 Monitoring and Support

Monitoring and support for the mentoring intervention was provided throughout the procedural steps. The support provided by the researcher is described below. Monitoring of e-mentoring contacts was considered important owing to cyber safety and ethical considerations, given that the programme occurred via online contacts. Further, this allowed for the researcher to be positioned as a trained mandated notifier for the purpose of ensuring a child-safe environment, and avoided the need for mentors to complete this training (B5.3). During all Skype calls, the mentors used screen recording software; the researcher had access to all user names and passwords for social media accounts used by mentors. It was intended that recordings be uploaded to an online secure shared drive. However, owing to the size of the video files this protocol was revised during the project. As an alternative measure, the mentors sent recordings to the researcher via post. The researcher reviewed all recordings. Online conversation between the mentors and participants were transcribed verbatim.

5.2.1 Record of support provided. A record of training and support provided by the researcher to the mentors is included in Table 5.4. Pre-match face-to-face training was provided according to a specific protocol and was therefore comparable across both mentors (Mentor 1 = 300 minutes; and Mentor 2 = 250 minutes). Since ongoing training was provided according to individual needs, the amount of support varied considerably between the mentors (i.e., 4 hours vs. ½ an hour of Skype video support). However, both mentors were provided with the minimum protocol of fortnightly contact and the nature of ongoing training and support was similar across the mentors (i.e., providing structure for group Skype calls; technology support; administrative support in arranging appointments; questions regarding ethical guidelines, namely, appropriate online behaviour or sharing given the constraints of the research programme; and balancing goal achievement with rapport building activities). In addition to time spent in face-to-face meetings, the researcher provided support with practical preparation or research required to respond to participant questions or issues. For example, one participant was interested in advice on connecting a mobile phone to the AAC device, and another participant wanted support in connecting the AAC device to an iPad. In addition, the researcher responded to emails and text messages. Post-programme debriefing was provided according to a pre-designed protocol. However, given the extent of feedback provided and time required for communication using AAC methods, this also varied considerably between the mentors (i.e., 3.5 hours vs. 5 hours). The training and support needs of one mentor was significantly greater than those of the other mentor (i.e., Mentor 1 supported 1 participant and was provided a total of approximately 15 hours of 1:1 meeting support, 133 emails, and 136 phone contacts; Mentor 2 supported 3 participants and was provided a total of approximately 11 hours of 1:1 meeting support, 132 emails, and 62 phone contacts). Significant variation in training and support needs has been observed in other mentoring interventions (Kupersmidt & Rhodes, 2014).

Table 5.4

Training and Support Provided to Mentors

Time	Mentor	Total Meetings/Contacts Made by Researcher			
		Face-to-Face (minutes)	Skype Video (minutes)	Email	SMS/Phone
Before intervention	Mentor 1	2 (300)	2 (135)	57	8
	Mentor 2	2 (250)	1 (75)	54	0
During intervention	Mentor 1	0	6(244)	75	132
	Mentor 2	0	2 (30)	67	62
Post intervention	Mentor 1	1 (210)	0	2	6
	Mentor 2	1 (240)	1 (60)	11	0
Total	Mentor 1	3 (510)	8 (379)	133	146
	Mentor 2	3 (490)	4 (165)	132	62

5.2.2 Honorarium payment. Mentors were paid an honorarium for the time and skills they provided in this study. This honorarium was considered appropriate and necessary since the intervention required adults who use AAC and who were skilled in using computers and social media to be available and online regularly across a period of 16 weeks.

5.3 Frequency of Online Conversation by the Mentor

The mentors and participants were instructed to connect with each other online weekly for 1–2 hours each week of the 16-week programme. The mentors were also asked to respond reliably within a week to any online contact from the participants. The mentoring intervention included both instrumental and developmental activities. The social media use goals developed by each participant were intended to provide a focus for the e-mentoring intervention; however, mentors were given the freedom to discuss any topics of interest to the participant that may support them in developing rapport and to role model social media and AAC use.

5.3.1 Record of contacts that occurred. The programme design and clear expectation to mentors was for mentors and participants to make at least weekly online contact. For three of the four participants, the mentors connected in at least 14 of the 16 weeks using email, Skype, or Facebook (Table 5.6). However, no participant–mentor match adhered to this expectation for the minimum of weekly contact (Table 5.5). Challenges in consistency of online appointments have been experienced in other e-mentoring interventions (Raghavendra, Newman, Wood, et al., 2015; Stewart et al., 2011; Stinson et al., 2016). One mentor–mentee pair experienced significant challenges in connecting, particularly during the first half of the programme (with no contact for 5 of the first 8 weeks). This mentor–mentee match was changed in the week leading up to the match because of the initial mentor being unwell and unable to go ahead with the match. It is possible that this disruption contributed to the difficulties in this mentor–mentee pair successfully connecting online in the first weeks of the programme (e.g., in planned matches, the initial online meet-up was scheduled prior to baseline commencing; this date was negotiated well in advance and designed to be suitable for the mentor and participant. Further, in planned matches, the researcher negotiated the best days and times for contacts online between the participants and mentors). This support process and development of suitable times for online contacts between the new mentor and participant match took several weeks to establish.

Table 5.5

Did the Mentors Provide Weekly Contact with Participants as Directed?

Participant	Weeks (%)
Paul	14/16 (81)
Mia	15/16 (94)
Tilly	14/16 (81)
Kaylyn	9/16 (56)

Table 5.6

Type of Social Media Used by Mentors to Contact Mentees for e-Mentoring

Participant	Total Contacts		
	Skype	Email	Facebook
Paul	12	8	2
Mia	8	1	32
Tilly	5[a]	2	32
Kaylyn	7[a]	3	0

Note.

[a.] On one occasion for Tilly and two for Kaylyn, the mentor attempted to make contact on Skype by sending instant messages but no video call was successful. These attempts by the mentor are not included in the total contacts reported.

5.3.2 Group contacts. Four group Skype calls were scheduled during the e-mentoring intervention as structured activities for the mentors and participants (e5.2; Table 5.7). For the group calls, the mentors selected topics (e.g., advantages/disadvantages of Facebook vs email, school holiday events) and activities (e.g., post your favourite sticker/emoji). Both mentors and all participants were invited to participate in these calls. The researcher was also available to support mentors and participants in connecting and managing the group contacts on Skype to minimise any possible breakdowns with the technology. However, in the initial call one mentor was unwell and unable to attend, and following the second call, two participant caregivers provided feedback that they would prefer to have only one mentor present during group calls. Therefore, both mentors were present for only one of the four group calls. Participation in the group calls is recorded in Table 5.7.

On two occasions, the researcher joined the group Skype call following a request by the mentor for support in making the call or troubleshooting problems that arose.

Table 5.7

Group Skype Calls

Group Skype	Participants	Duration[a]	Who Participated?
Month 1	4	62	Mentor 2, Paul, Mia, Tilly[b]
Month 2	5	60	Mentor 1, Mentor 2, Tilly, Mia, Paul
Month 3	4	93	Mentor 1, Kaylyn, Paul, Tilly
Month 4	3	62	Mentor 2, Mia, Paul

[a]Duration in minutes. [b]At the time of month 1 call, Kaylyn was unable to join the group since she was yet to complete baseline.

The e-mentoring contacts provided were not compliant with the aim to provide a minimum of weekly online contact over 16 weeks. However, for three of the four participants the intervention was at least 80% compliant with this protocol, and on average, the intervention was 80% compliant overall.

5.4 Thematic Analysis of E-Mentoring Conversations

Twenty per cent of conversations between mentors and participants were randomly selected to be cross-checked against the peer mentoring definition provided in the mentoring handbook using deductive thematic CA (Green & Thorogood, 2014). The conversations were analysed to determine whether mentoring as defined in the manual was evident through the conversation transcripts. The researcher, who was familiar with the handbook and the mentoring conversations, used the mentoring handbook to develop codes and themes for analysis of the mentoring provided to participants during the programme. These themes were applied to a transcript of one online conversation between one mentor and participant by the researcher, and one supervisor. Following this, the researcher and supervisor met. At this meeting, codes were cross-checked, revised and consolidated to arrive at the final codes and themes to be used (Table 5.8; see also Appendix P for full list of codes and sub-codes). The researcher then applied these themes and codes to the randomly selected 20% of e-mentoring conversations. Following coding of all conversations, a separate researcher (not involved in code development) was trained in the coding (using a segment of the e-mentoring conversation not included in this analysis) and then completed coding on 20% of the coded conversations (20% of 20%). Inter-rater agreement was calculated using Cohen's Kappa, which indicated substantial agreement (0.64) between coders (Landis & Koch, 1977).

Table 5.8

Themes Used to Identify Whether Mentors Provided Mentoring

#	Theme
1	Provides support & encouragement (Be supportive)
2	Shares from their own experience
3	Is a role model
4	Guidance
5	Be Reliable/Trustworthy
6	Be Genuine, Be yourself
7	Have Fun
8	Be understanding—think what it was like when you first started using the Internet
9	Be a good listener/communication partner

The mentoring intervention was provided as defined in the handbook. Peer mentors provided support and encouragement, sharing from their own experience, acted as a role model, provided guidance, were genuine (be yourself), had fun, were understanding, and were skilled communication partners. Eight of the nine themes were present in the conversations reviewed (see Figure 5.4). For theme 5 (be reliable and trustworthy), it was anticipated that it may not be feasible to identify these features based on a selection of random conversations. However, theme 5 was included to provide the researcher opportunity to note any positive or negative examples; no examples were coded. Examples are provided in Table 5.9 and more detailed excerpts from conversations are provided in the figures below (Figure 5.5 to Figure 5.13) for each of the eight themes.

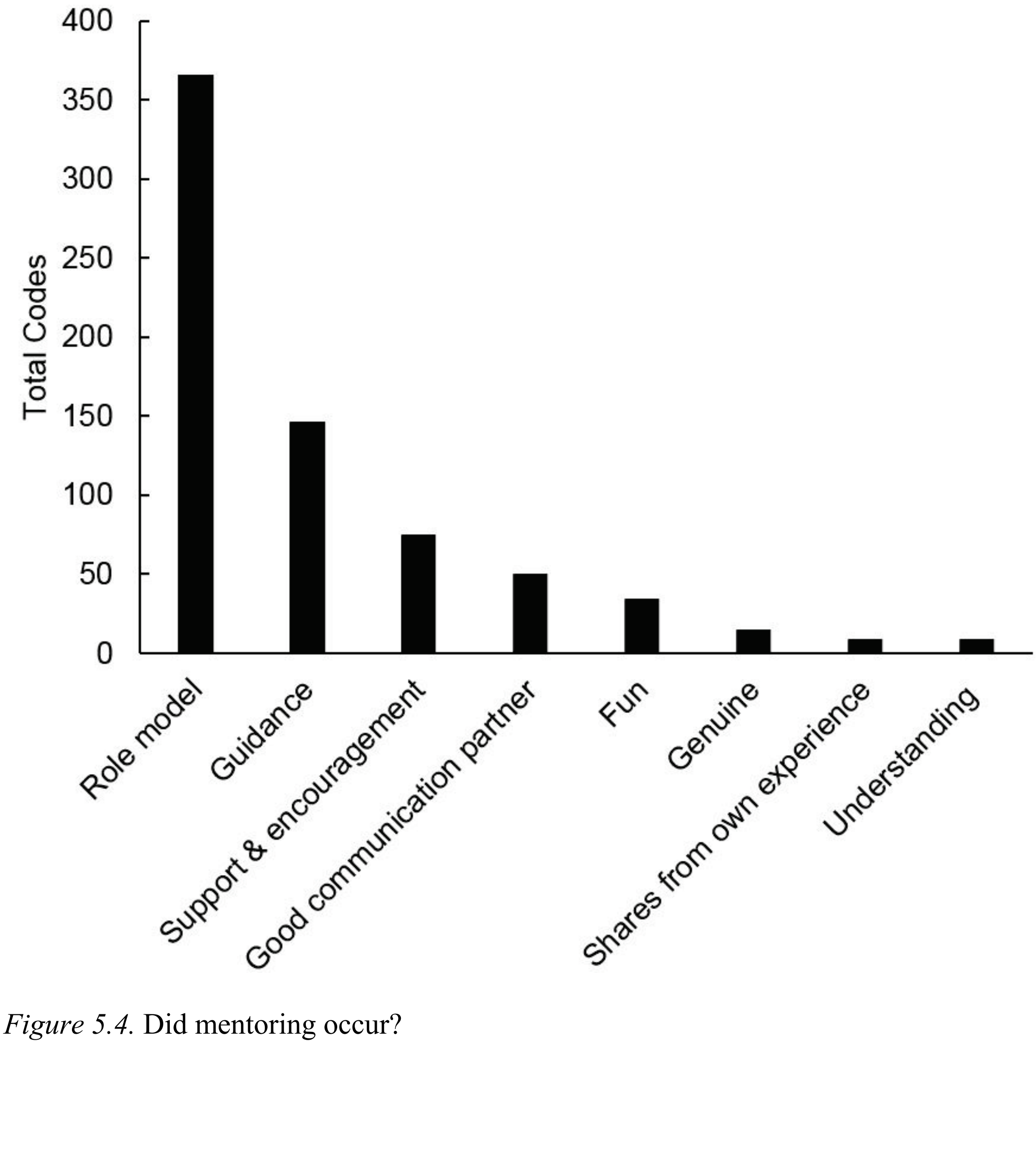


Figure 5.4. Did mentoring occur?

Table 5.9

Examples of Mentor Quotes Provided for Each Theme

#	Theme	Quote
1	Provides support & encouragement	This is awesome Good Question Knew you would, Knew you would, Yeah I'll be online and you can call me when you're ready
2	Shares from their own experience	I don't even put personal info up Yes, on mine there is the USB option where the Bluetooth is…
3	Is a role model	Hey, hello, how are you? What has been happening? We may have a funny line We probably need to finish soon as we have been talking nearly an hour
4	Guidance	Have you friended anyone yet? Just delete the request, one to confirm and one to delete, just click on delete Ensure all volumes are up What about the output mode, is that on the immediate setting not delayed Great. I can help you if you want, I will put it in the email what you need to do. Help you if you want, I will put it in the email what you need to do
6	Be Genuine, Be yourself	Sorry everyone, I'm having such a hard time with this I am only just getting my head in Instagram and snapchat (IM) snapchat Oh yum, I love coffee too
7	Have Fun	yay (waves hands in the air, squeals with excitement) The last time I bowled I dropped the ball on my toe What swimming style do you like best? (SGD; acts out swimming styles)
8	Be Understanding	Were you worried about Facebook? How did you feel about email when you first used it?
9	Be a good communication partner	How did you go? So, what else have you been doing? Yes, maybe that's an idea thank you Wow, that's great you must be pretty fit

hi Kaylyn

i'm really looking forward to meeting you soon on Skype! I think you are going on holidays next week - wow! i hope you can take some photos, maybe snapchat some?

can you let me know if you get this email?

cheers

Mentor

Figure 5.5. Mentors provided support and encouragement to mentees.

Hi Kaylyn,

great to chat with you today on Skype. Another App you might like to try is the NRS App and it is free... It is an App for making phone calls through the National Relay Service. I use it for making phone calls because it means i can type, and my message is relayed by a speaking person (relay officer) let me know if this interest you. I would love to get an email from you if you have time.

cheers until next time,

Mentor

Figure 5.6. Mentors shared with participants from their own experiences.

Mentor	*"Have you thought anymore of Facebook?"*
Paul	*ah No*
Mentor	*No? All right*
Paul	<inaudible>
Mentor	*that's right*
Mentor	*"I thought I could show you my page"*
Paul	*Yes please*
Mentor	*You would like that?*
Paul	*Yes please*

Figure 5.7. Mentors acted as role models for participants.

Mia	*"year"*
Mia's Mother	*that was the answer, to how long have you been using Proloquo2go, 1 year*
Mentor	*"Excellent and it doesn't matter how long you need to learn it that's the part of aac we all share".* ((looks at Camera and nods head))
	Excellent and it doesn't matter how long you need to learn it that's the part of aac we all share.
Mia's Mother	[*Yeah* YES] ((looks to Mia)) *did you?*
Mia	NO ((shakes head))
Mia's Mother	*she's going to repeat it* ((to Mia then looks to web camera)) *can you repeat it?*
Mentor	YES
Mentor	*"Excellent and it doesn't matter how long you need to learn it that's the part of aac we all share."*
Mia	GOOD ((looks to webcamera))

Figure 5.8. Another example of the mentors acting as role models for participants.

Mentor	*"You know that you don't need to email for permission because if they don't want to friend you they can just delete a request"*
Paul's Mother	((Paul's mother moves back over closer to his computer))
Paul	*"I want to"*
Paul	*"I want to email"*
Mentor	*"You want to ask them first?"* *That's fine, good* *"okay that's fine" "but as long as you know you don't have to"* *You get that?*
Paul	*"I email first"*
Mentor	*"not everyone will ask in an email they will just send a request"*
Paul	*yeah*

Figure 5.9. Mentors gave guidance to participants as they learnt new social media.

Mentor	*"I would love that yes maybe even snapchat?"*
Tilly's Mother	*Snapchat?*
Mentor	*Yeah*
Tilly's Mother	*Oh yeah Snapchat, yep. Tilly hasn't done a lot of snapchat but she's on Instagram. Have you got Mentor on Instagram?* We might get Tilly following you Mentor or you following her?
Mentor	*"I would love that yes maybe even Snapchat? I am only just getting my head in Instagram and Snapchat"* I would love that yes maybe even Snapchat? I am only just getting my head in Instagram and Snapchat
Tilly	Me too

Figure 5.10. Mentors were genuine in the ways that they interacted with participants.

Mentor	What is new?
Paul	((squeals with excitement)) *"I got Facebook"* ((smiles at Mentor))
Mentor	*Yeah* ((mentor squeals with excitement))
Paul	((responds and squeals with excitement))

Figure 5.11 Mentors kept an atmosphere of fun and enjoyment.

Mentor	what has been happening in your world
Tilly	exams
Mentor	are you still doing them or have you finish
Tilly	one tomorrow
Mentor	I can imagine tomorrow night you will be feeling pretty happy it is over
Tilly	yes

Figure 5.12. Mentors were understanding of participants by interacting with empathy.

Tilly	*"I went to dog agility"* ((Conversation occurs between mentor and Tilly's mother regarding how to get Tilly's SGD messages))
Mentor	*"Tell me more"* Tell me more
Tilly	Dog jump overrun thru tunnel
Mentor	Wow is that like a dog festival or show?
Tilly	Practice

Figure 5.13. Mentors were skilled communication partners.

Mentor presence as a role model was the most frequently coded theme. The sub-codes under the two predominant themes, Role model and Guidance, are presented in Figure 5.14 and Figure 5.15. The figures provide a more detailed understanding of this important feature of the mentoring provided (i.e., mentors role modelled online conversation, use of AAC, and how to respond when things do not go as planned).

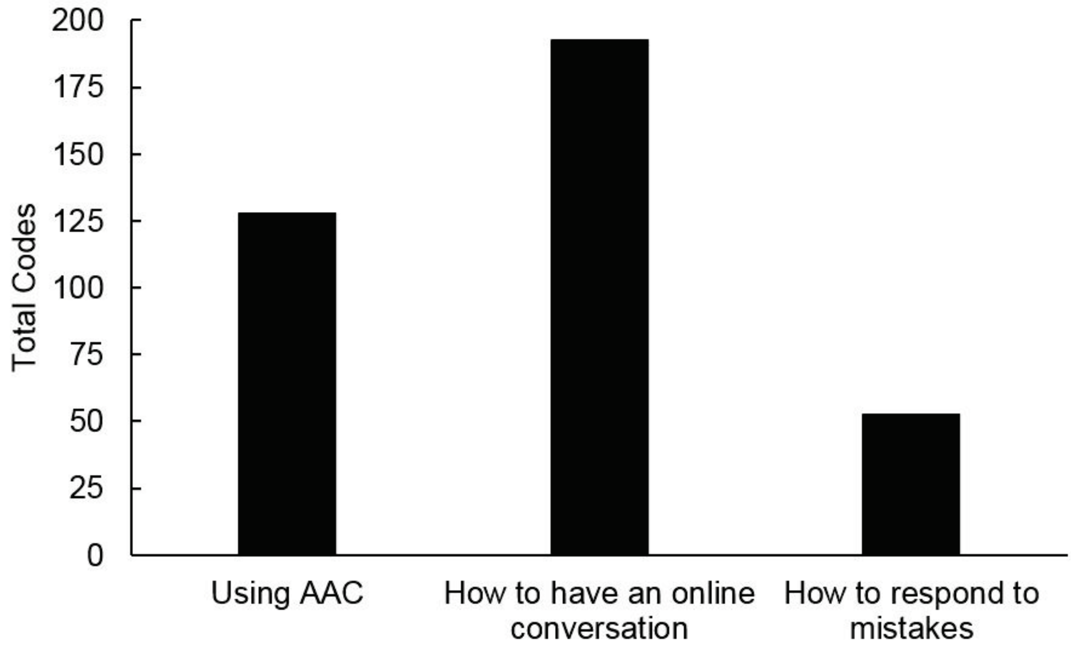


Figure 5.14. Sub-codes for mentors acting as role models.

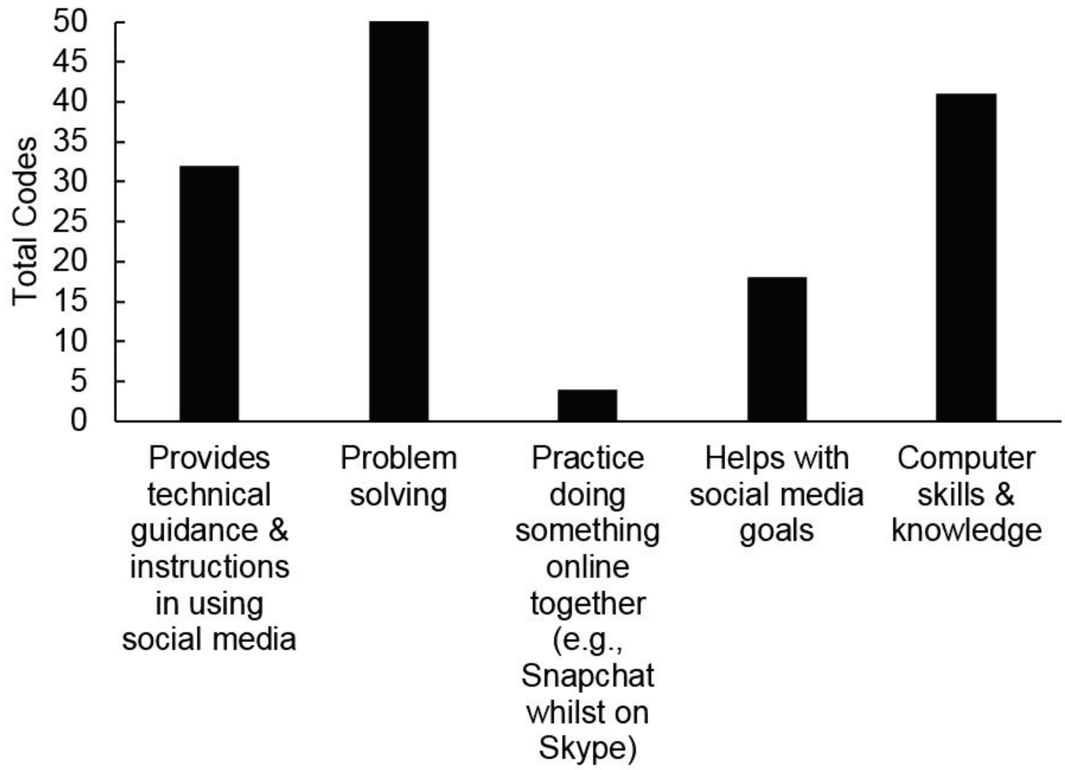


Figure 5.15. Sub-codes for mentors providing guidance.

5.5 Assessment of Mentoring Relationship Quality

Mentoring relationship quality influences participant outcomes (Nakkula & Harris, 2014; Rhodes, 2008) and has been recognised as an important part of programme evaluation (DuBois et al., 2002). Mentors, participants, and participant family members all reported positive e-mentoring relationships (Figure 5.16 to Figure 5.19). Nevertheless, variations in this pattern were observed. On average, caregivers rated e-mentoring relationships slightly lower (8/10) than mentors or participants (9/10). This pattern was particularly distinct for Mia where her mother reported a lower overall relationship quality than Mia and her mentor (Figure 5.16). Variation in this overall pattern was also observed; for example, Tilly's mentor rated the relationship as less close and trusting than Tilly and her mother (Figure 5.17 and Figure 5.18), but overall ratings by Tilly, her mother, and her mentor were similar (Figure 5.16). Nevertheless, caregivers, mentors, and participants all agreed that mentors and participants experienced strong e-mentoring relationships during this programme.

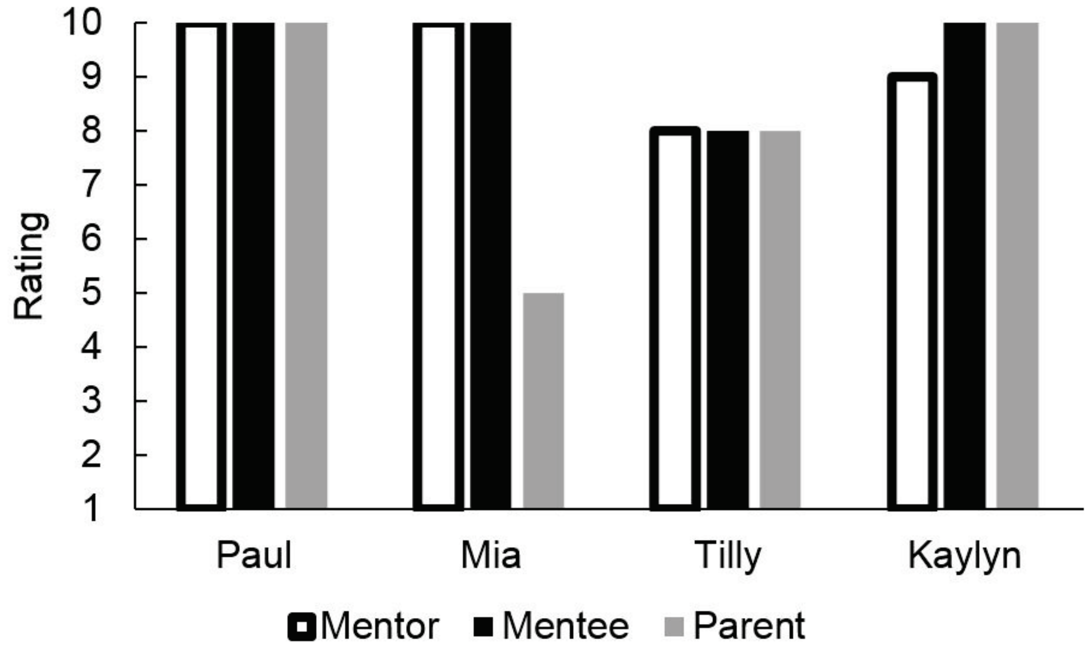


Figure 5.16. Overall, the relationship between me and my participant was helpful for the participant.

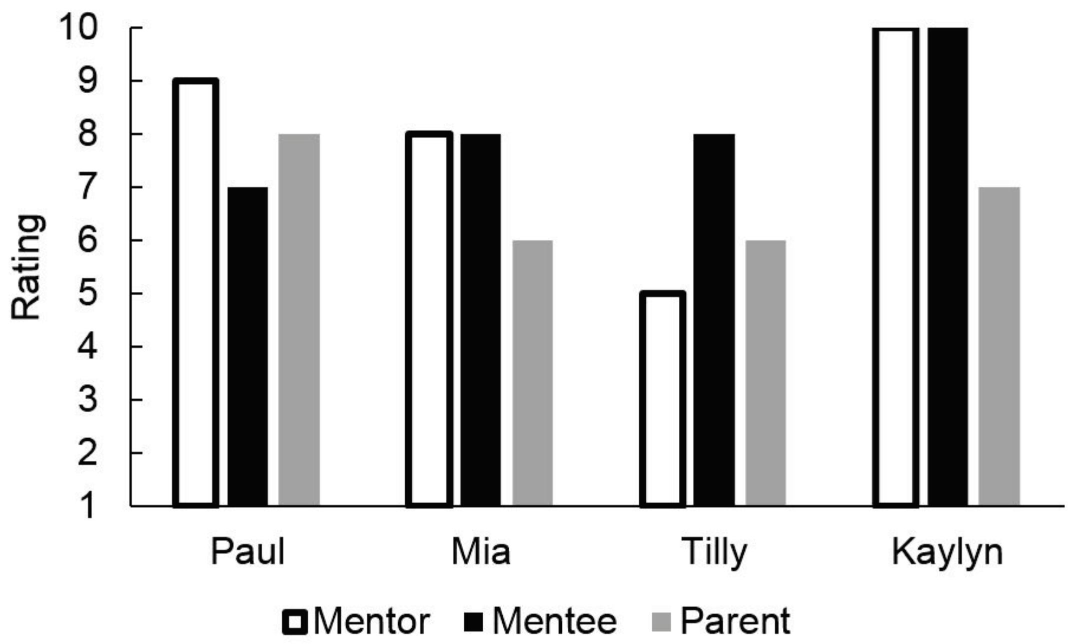


Figure 5.17. My participant and I have a close relationship.

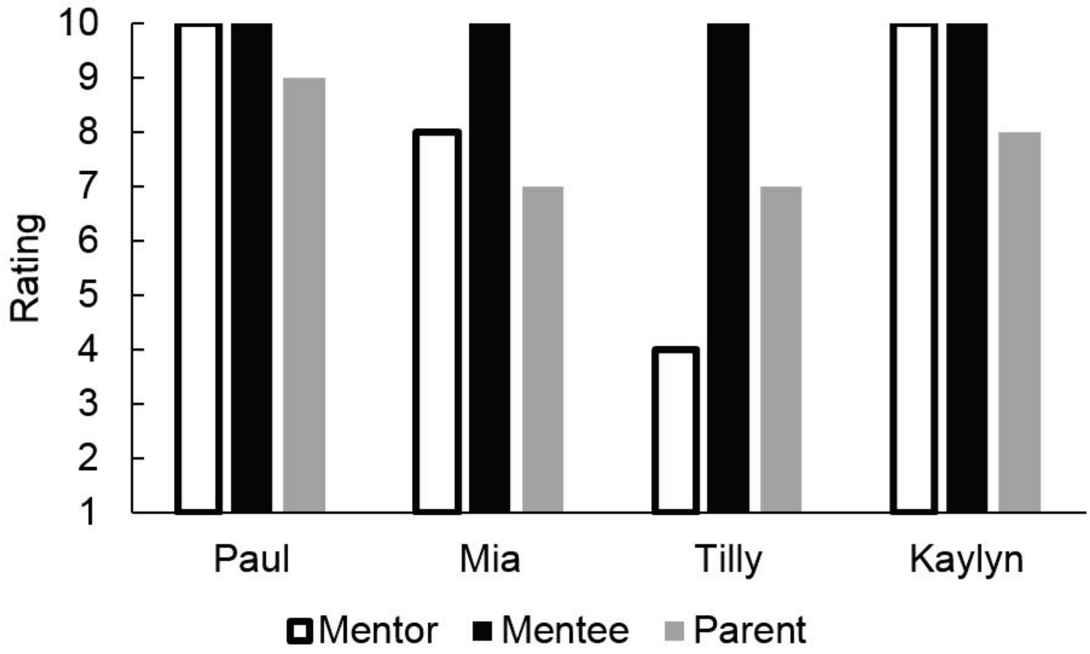


Figure 5.18. My participant and I have a trusting relationship.

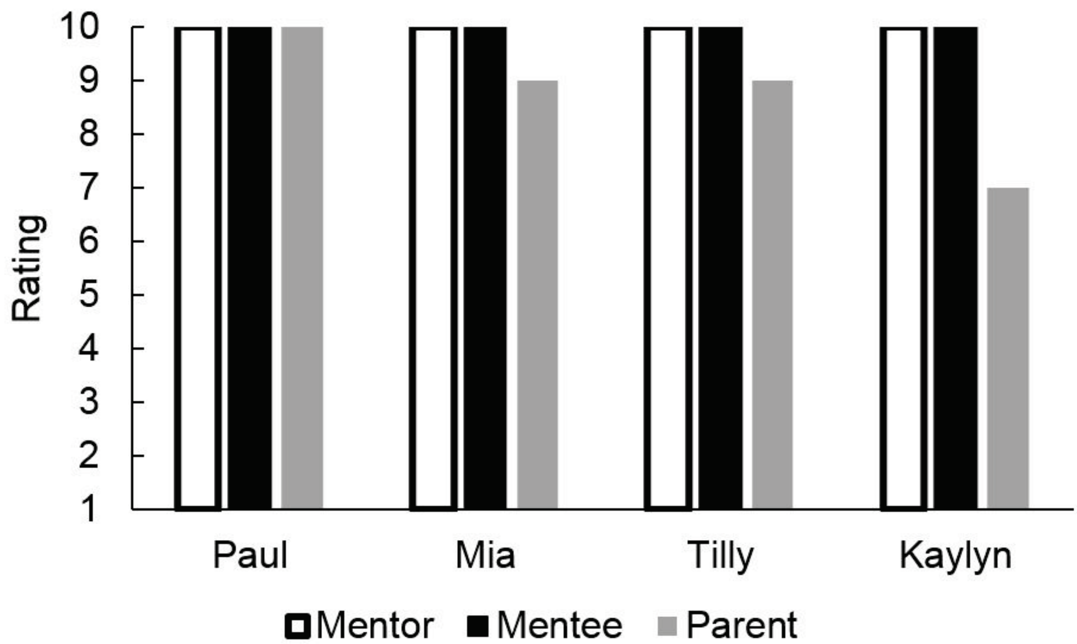


Figure 5.19. My participant and I enjoyed talking to each other.

5.6 Summary of E-Mentoring Intervention

The e-mentoring intervention provided in this research met the internationally recognised evidence-based practice standards. The frequency of e-mentoring contacts was not compliant with the aim to provide a minimum of weekly online contact to participants. However, on average, the intervention was 80% compliant with this protocol. For the fourth participant, the intervention was unable to be delivered as intended with e-mentoring support provided for only 9 of the 16 weeks.

The e-mentoring intervention was provided as it was defined in the handbook. Peer mentors provided support and encouragement, shared from their own experience, acted as a role model, provided guidance, were genuine (be yourself), had fun, were understanding, and were skilled communication partners. As illustrated in Figure 5.16–5.19, caregivers, mentors, and participants all agreed that mentors and participants both experienced strong e-mentoring relationships during this programme. Further detailed results reporting the outcomes of the intervention will be discussed in the following chapters on results (Chapters 6–9).

Chapter 6: Results: Participants' Description and Effect of Peer E-Mentoring on Online Conversation Goals

This chapter and the following three chapters present the data collected and the analysis conducted on those data. The information in the four chapters aligns with the research questions:

- Chapter 6, Question 1. Activity competence: What is the effect of a cross-age peer e-mentoring intervention on participant goals for online conversation? This chapter reports the goals developed for each participant and the pre-post ratings are reported first within and then across the participants.
- Chapter 7: Question 2. Physical engagement: What is the effect of a cross-age peer e-mentoring intervention on the reported intensity of online conversation?
- Chapter 8: Question 3. Social and self-engagement: What is the effect of a cross-age peer e-mentoring intervention on social and self-engagement in online conversation?
- Chapter 9: Question 4. Social and self-engagement: What is the effect of a cross-age peer e-mentoring intervention on written online conversation of mentees when they communicate with partners other than their mentor on one targeted social networking platform?

6.1 Participant Background Information

In this chapter, first, background information collected for each participant is summarised. Participant background information is critical in understanding and interpreting outcomes of SCED research. Several areas are included in the participant background, such as personal information, AAC systems, literacy skills, and IT set-up.

Literacy skills were reported using outcomes of the whole-to-part assessment of silent reading comprehension (Erickson & Koppenhaver, 2014).

6.1.1 Participant background: Tilly. Tilly was a young teenager, aged 13 years, with cerebral palsy and lived in a regional town with her parents and younger sister. Tilly was in Year 8 at the local high school and was supported by a paraprofessional/teacher's aide. She enjoyed spending time with, and training, her dog, watching reality TV, shopping, and going to the movies. Her mother rated her gross motor, fine motor, and communication abilities using the modified self-report descriptors as GMFCS, Level IV; MACS, Level IV; and CFCS, Level III (Appendix I).

6.1.1.1 Tilly's AAC system. Tilly was unable to use speech to communicate but used vocalisations to contribute to conversations (e.g., to indicate a choice). She used a range of low-tech and high-tech AAC modes: a 60-location Unity core word system and an A4 alphabet board with additional keywords; she was able to use the Key2go keyboard with her iPad.

6.1.1.2 Tilly's baseline literacy skills. Tilly demonstrated her strongest skills on the word identification task (Grade 8), followed by the reading comprehension (Grade 2), and then listening comprehension activities (Grade 1; Figure 6.1).

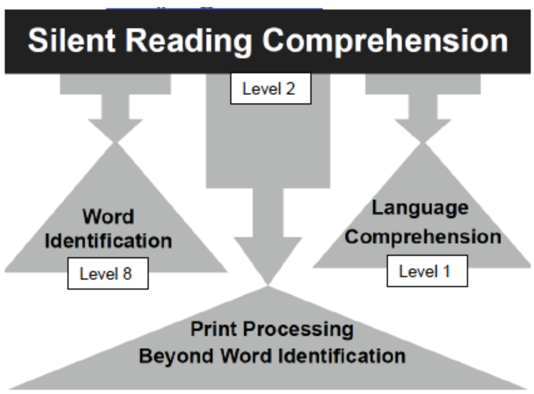


Figure 6.1. Tilly's silent reading comprehension. *Adapted from* AGOSCI Level 2 Literacy Intensive. Literacy in AAC: Assessments to Guide Instruction. Whole to Part

Reading Assessment*, by K. Erickson and D. Koppenhaver, 2014, Melbourne, Victoria: AGOSCI. Reproduced and adapted with permission.*

6.1.1.3 Tilly's baseline social media access. At the start of the project, Tilly used her iPad to send i-messages to friends from primary school and to her Nanna. Tilly typed her messages on the Key2go keyboard on the iPad screen with her iPad fixed to her wheelchair tray with Velcro. Tilly wanted her own Facebook account but her mother felt that this was not appropriate since Tilly was not aware of how to manage her own safety online. Tilly was allowed to use her mother's Facebook account to chat with her cousins on Facebook Messenger on the family computer. Tilly used text to speech to read aloud on a Kindle at times. However, on her iPad she was not able to access the voice feature. She was not physically able to triple click fast enough and also not able to select copy and paste function buttons, which remain small even when using large text settings on the iPad. The equipment Tilly used to access social media is listed in Table 6.1, including an estimate of the total cost of this equipment.

Tilly's social media goals developed using COPM and GAS are listed later in the chapter (Table 6.6) and included use of Facebook specifically and also more generally extending her use and knowledge of other social media sites (e.g., Instagram and Snapchat). During the baseline period, a Facebook account and Skype account were created for Tilly. Privacy settings were discussed with Tilly and her mother and set on the family computer. A cable was purchased to enable Tilly to connect her SGD and iPad. It was anticipated that the project mentor may support Tilly to learn to set up and use this.

Tilly and her mother agreed that i-Message was her preferred social network platform for the collection of conversations with peers during the research project. Cyber-safety rules were agreed upon, together with Tilly and her mother. It was agreed that the mentor would contact Tilly via her email address, i-Message, Facebook, and/or Skype.

Table 6.1

Assistive Technology or Equipment Tilly Needed to Access Social Media

Specialised Equipment	Cost (AU$)
Wheelchair; requires specialised postural support for access	15,000.00
Mounting arm for SGD	900.00
SGD with Unity 60 location	10,550.00
Mounting arm for iPad	600.00
Key2go keyboard	100.00
[a]Cable to connect SGD to iPad	50.00
Bluetooth connection between computer and SGD	350.00
Total	27,550.00

Note. Tilly's computer, iPad and Internet connection are considered standard equipment.

[a]Cable to connect SGD to iPad was purchased by the research project.

6.1.2 Participant background: Mia. Mia was a young woman with cerebral palsy, aged 16 years, who enjoyed music, arts, hockey, and swimming. She attended a special school. She lived part time with her mother and part time with her father. Her older brother also spent time with her, and she enjoyed attending his hockey games. Mia participated in the project predominately while at her mother's house, which was every other week. Her mother rated her gross motor, fine motor, and communication abilities using the modified self-report descriptors at GMFCS, Level II; MACS, Level III; and CFCS, Level III (Appendix I). Mia had a short attention span, which affected her ability to undertake activities in her daily life without prompting and redirection from others. She wore glasses.

6.1.2.1 Mia's AAC system. Mia communicated using keyword signs and vocalisation but these interactions were often unclear for unfamiliar communication partners to interpret. Mia had Proloquo2go installed on her iPad but the family viewed this application as predominately useful in the school environment.

6.1.2.2 Mia's baseline literacy skills. In all three skill areas investigated in this assessment, Mia was unable to demonstrate competence at the lowest criterion (i.e., Pre-Primer 1 level; Figure 6.2) on the US graded inventory. During the listening comprehension task, key words in the story were signed because Mia was familiar with key word sign. Mia also used sign when she responded to questions. Investigation of the sub-components within each test area indicated that language comprehension was Mia's strength and that word identification was the area of greatest difficulty. A developmental spelling test was also completed to allow for further description of Mia's abilities at a lower level than the whole-to-part assessment allowed for. Her responses were at the pre-literate or letter name stage (Young, 2007).

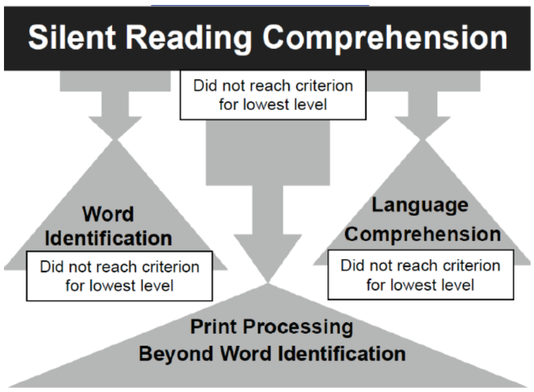


Figure 6.2. Mia's silent reading comprehension. *Adapted from* AGOSCI Level 2 Literacy Intensive. Literacy in AAC: Assessments to Guide Instruction. Whole to Part Reading Assessment*, by K. Erickson and D. Koppenhaver, 2014, Melbourne, Victoria: AGOSCI. Reproduced and adapted with permission.*

6.1.2.3 Mia's baseline social media access. At the start of the project, Mia used some social media. Mia had Facebook and Messenger applications installed on her iPad and had a Facebook account. Prior to meeting the researcher, Mia's mother supported her by reading messages aloud to her and typing her responses. They largely used the Messenger application to interact with family, friends, and relatives but also passively used the Facebook application, to view others' posts.

Before the baseline period, the researcher set-up the ability to use voice on the iPad via the speak selection option and demonstrated how Mia could read a Facebook message aloud to herself. The size of the text on Mia's iPad was changed to large. The equipment Mia used to access social media is listed in Table 6.2, including an estimate of the total cost of this equipment.

Mia's social media goals developed using COPM and GAS are listed later in the chapter (Table 6.7) and included use of Snapchat, Skype, and Facebook. These Internet accounts were created on the iPad. A Gmail account was also created for Mia to provide an email address needed in creating Snapchat and Skype accounts. Mia's mother was anxious that they would not be able to link up with the mentor successfully and requested support. A practice Skype call between the researcher's mobile phone and Mia's iPad was completed to demonstrate this when the researcher was at Mia's house.

The researcher installed and set-up Skype on the family PC and purchased and provided the web camera. This was necessary to enable Mia to use her iPad for communication when using the PC for a Skype call during the mentoring intervention. Prior to the intervention, Mia's mother asked whether they could use headphones to increase Mia's focus during Skype calls; hence, two sets of headphones and a Y-cable were purchased and provided by the researcher. Prior to baseline, Mia's mother completed some programming on the Proloquo2go application for Mia; for example, so that names of family and friends were included and could be used in online conversation. This was not requested, or prompted, by the researcher.

Mia and her mother agreed that Facebook was her preferred social network platform for the collection of conversations with peers during the research project. Information about cyber safety was provided and individualised rules were developed. Mia's Facebook privacy settings were reviewed and updated according to settings that were agreed between the researcher, Mia, and her mother. The researcher supported Mia and her mother in updating these settings. It was agreed that Mia's mentor could contact her over Gmail, Skype, Snapchat, and/or Facebook.

Table 6.2

Assistive Technology or Equipment Mia Needs to Access Social Media

Specialised Equipment	Cost (AU$)
Proloquo2go	400.00
[a]Headphones x 2	20.00
[a]Y-cable	5.00
Total	425.00

Note. Mia's iPad, the family computer, web camera and Internet connection are considered standard equipment.

[a]Headphones and Y-cable were purchased and provided by the researcher.

6.1.3 Participant background: Paul. Paul was a young man with cerebral palsy, aged 17 years, who lived with his parents and siblings. Paul attended a special school. He enjoyed using his computer and iPad, bowling, and shopping. His mother rated his gross motor, fine motor, and communication abilities using the modified self-report descriptors at GMFCS, Level II; MACS, Level III; and CFCS, Level III. He was able to communicate effectively with familiar, but not always with unfamiliar, partners (Appendix I).

6.1.3.1 Paul's AAC system. Paul used a Pragmatically Organised Dynamic Display (PODD) page set on his SGD. He had a key guard to help him directly access the symbols (6 columns and 5 rows). In some contexts, Paul used natural speech to communicate, particularly with familiar communication partners. When using natural speech, he resolved communication breakdown or added more detail using the SGD. In other situations, for example with unfamiliar partners, he relied solely on the SGD.

6.1.3.2 Paul's baseline literacy skills. Paul demonstrated his strongest skills in silent reading comprehension (Grade 3), followed by listening comprehension (Grade 1), and then word identification (Primer; Figure 6.3). However, given further ongoing observations it was concluded that Paul's overall silent reading result was not representative of his everyday abilities. A repeat assessment demonstrated this level to be lower at the Pre-Primer 2 level. Silent reading comprehension involves the amalgamation of an individual's word identification, language comprehension, and print processing skills. Therefore, this second result aligns better with his skills demonstrated in the other areas (e.g., word identification and language comprehension).

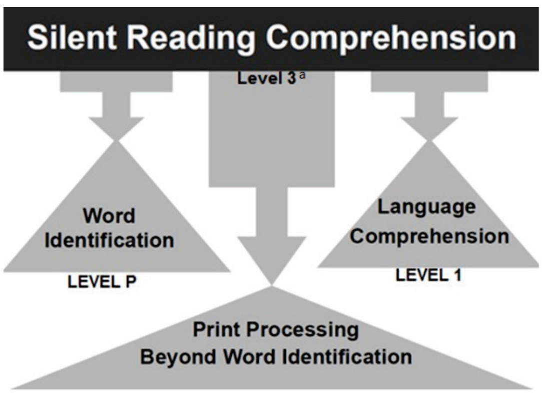


Figure 6.3. Paul's silent reading comprehension. *Adapted from* AGOSCI Level 2 Literacy Intensive. Literacy in AAC: Assessments to Guide Instruction. Whole to Part Reading

Assessment*, by K. Erickson and D. Koppenhaver, 2014, Melbourne, Victoria: AGOSCI. Reproduced and adapted with permission.*[a]Silent reading comprehension level was corrected to Pre-Primer 2 level following subsequent observations

6.1.3.3 Paul's baseline social media access. At the start of the project, Paul used the Internet to send emails and for searches on Google or YouTube. He accessed his own desktop computer via his SGD. The SGD did not have direct Internet access (as funding policies prohibited this at the time). However, text from the SGD could be sent to a computer. Paul used screen reading and text prediction software that was installed on his desktop computer to read the screen and support his typing.

Paul's bedroom was also his study and exercise room. He had two work tables, his bed, a treadmill, and other equipment around the treadmill. One work table was for handwriting with the following features: Both the table and chair were adjustable in height, the table had a cut-out, a moveable grab rail, and a wheelie stool for an extra support person. The second table was for using the computer and had the following features: The table and chair heights were adjustable, the table had a cut-out, a smaller angled table was used to position the keyboard and a Perspex keyguard was on the computer keyboard. When using the SGD with the computer, a support person placed the SGD on top of the keyboard keyguard on a non-slip mat. Paul sent text from the SGD to the computer via Bluetooth. He had a specialised joystick to navigate the screen, rather than a computer mouse. The equipment Paul used to access social media is listed in Table 6.3, including an estimate of its total cost.

Paul typed his message in full on the SGD and then used Bluetooth to send the text to the computer. He also had a Computer Controls page on his SGD to support this process.

Paul's social media goals developed using COPM and GAS are listed later in the chapter (Table 6.8) and included use of Skype and Facebook. Therefore, creation of these social media accounts was discussed. Paul and his family requested that they would create these accounts themselves rather than follow the protocol of the researcher creating these. Written information was provided to support creation of the accounts and selection of privacy settings for these accounts. Note that a Facebook account was not created for Paul at this time. Despite Paul's goal to use Facebook, he was anxious about setting this up and decided to discuss this with his mentor first.

A web camera was provided at the start of baseline to support Paul in using Skype. The researcher supported Paul's brother in installing this on Paul's computer, because of some problems with incompatibility with Paul's other USB devices (i.e., Access IT and joystick). This required uninstalling and reinstalling all USB devices on Paul's computer and phone support with the researcher for trouble shooting.

Paul and his mother indicated that email was his preferred social network platform for the collection of conversations with peers during the research project. Information about cyber safety was provided and individualised rules were developed and programmed into a new page on Paul's SGD. It was agreed that the mentor would be in contact with Paul via email, Skype, and/or Facebook (once set-up).

Table 6.3

Assistive Technology or Equipment Paul Needs to Access Social Media

Equipment	Cost (AU$)
Adjustable desk	1,250.00
Adjustable chair	600.00
Slope board	200.00
Grab bar	100.00
Specialised joystick	1,500.00
Text Help Read and Write Gold[a]	650.00
SGD with PODD page set, keyguard and Bluetooth connection	6,800.00
Key guard for computer keyboard	150.00
Total	11,250.00

Note. Total cost does not include specialist services provided for programming, configuring and/or training in use of this equipment and software. Paul's computer and Internet connection is considered standard equipment and not part of this total; PODD = Pragmatic organised dynamic display.

[a] Text Help Read and Write Gold is computer software

6.1.4 Participant background: Kaylyn. Kaylyn was a young woman with Down syndrome, aged 18 years. She lived with her two sisters and parents. Kaylyn wore a right hearing aid and glasses. She was completing her final year at a local high school and was supported by a paraprofessional. She completed her schooling during her involvement in the research. She worked as a part-time volunteer allied health assistant. She reported that she enjoyed cooking and regularly attended the local gym. At the time of the project, she was trying out crochet as a new hobby. Her mother rated her gross motor, fine motor, and communication abilities using the modified self-report descriptors at GMFCS, Level I; MACS, Level II; and CFCS, Level III (Appendix I).

6.1.4.1 Kaylyn's AAC system. Kaylyn used natural speech to communicate with familiar partners. When using natural speech, she resolved communication breakdown using the text messaging application on her phone. In other situations, for example, when communicating with unfamiliar partners, she largely relied on her mother to provide communication assistance. Although Kaylyn preferred speech and text messaging, she reported that she also used key word signs with some partners and had Proloquo2go available her iPad.

6.1.4.2 Kaylyn's baseline literacy skills. Kaylyn demonstrated her strongest skills on the word identification (Grade 5; Figure 6.4), followed by language comprehension, and then silent reading comprehension activities. Kaylyn attempted all activities. However, her responses on the listening and silent reading passages did not meet the criterion on the lowest level provided by this assessment.

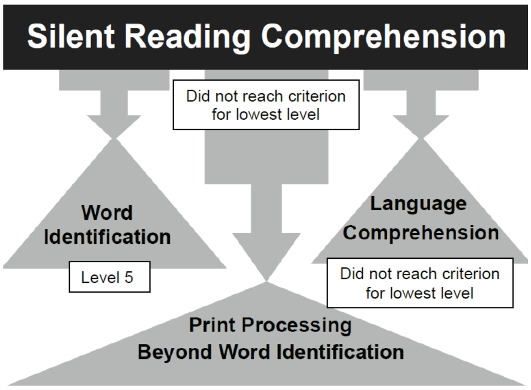


Figure 6.4. Kaylyn's silent reading comprehension. *Adapted from* AGOSCI Level 2 Literacy Intensive. Literacy in AAC: Assessments to Guide Instruction. Whole to Part Reading Assessment*, by K. Erickson and D. Koppenhaver, 2014, Melbourne, Victoria: AGOSCI. Reproduced and adapted with permission.*

6.1.4.3 Kaylyn's baseline social media access. At the start of the project, Kaylyn was not yet using social media. However, Kaylyn had a laptop computer, iPad, and iPhone available to her and an email address allocated at her school. The equipment Kaylyn used to access social media is listed in Table 6.4, including an estimate of the total cost of this equipment.

Kaylyn's family reported that she had no prior experience with social media. Kaylyn's social media goals developed using COPM and GAS are listed later in the chapter (Table 6.9) and included use of email, Skype, and Snapchat. Prior to baseline, a Gmail account and Snapchat account were created for Kaylyn. Kaylyn's family did not feel comfortable with her connecting to Facebook at this stage. It was discussed that perhaps as Kaylyn increased her knowledge and use of social media, the family and Kaylyn could consider this option at a later stage.

At the time of commencement of the research, Kaylyn's laptop and her iPad keyboard were not working. Her iPad, iPhone, and laptop were not set-up to access the home Wi-Fi network and Kaylyn and her mother were unsure of the network details. Kaylyn's Proloquo2go application was also not set-up; therefore, Kaylyn did not have access to any page sets. Kaylyn's mother explained that they had reset this accidently. Kaylyn and her mother indicated they no longer had access to the speech pathology service previously used when this was installed, and they did not know how to access the previous page sets they had used. The researcher supported Kaylyn and her family in resolving these issues prior to commencement of baseline because the issues experienced would have prevented Kaylyn from accessing the e-mentoring support. In addition, new social media accounts were created for Kaylyn according to her goals. Applications were added to her iPad and iPhone for Gmail, Skype, Snapchat, and SnapSaver. The Snapchat app allows users to take photos and video and share with friends. Sent photos and videos are available for a limited time, up to 10 seconds, and are not saved or available later. At the time the project began, SnapSaver was an unendorsed surrogate app for Snapchat that enabled users to save photos and videos. SnapSaver removes the demand for speed and accuracy required to operate Snapchat. It was anticipated that Kaylan may need more time to be successful in her goal to use Snapchat and that SnapSaver would support her in operational skills and provide her increased time to comprehend messages. A link to Kaylyn's Gmail was installed on her laptop and IncrediMail was also installed as a possible alternative to accessing Gmail via the Internet browser if necessary. Kaylyn sent a practice email on her iPad with support from the researcher and her mother.

It was agreed that during the project, Kaylyn's Gmail account would be used to collect online conversation with peers. Kaylyn, her mother and the researcher discussed, and agreed upon, cyber-safety rules to guide Kaylyn and her family as she began to use social media. It was also agreed that the mentor would be in touch with Kaylyn via email, Skype, and Snapchat.

Table 6.4

Assistive Technology or Equipment Kaylyn Needed to Access Social Media

Specialised Equipment	Cost (AU$)
Key2go keyboard	100.00
Total	100.00

Note. Kaylyn's laptop, iPad and Internet connection are considered standard equipment.

6.1.5 Summary of participants. The participants included in this study resided in three states across Australia (South Australia, New South Wales, and Victoria). As described above, they had a wide range of abilities although all participants reported that they were able to communicate effectively with familiar, but not always with unfamiliar, partners (CFCS Level III). All participants reported barriers in accessing social media, although Kaylyn was the only participant who had no experience using social media at the start of the project. Barriers included limited literacy skills and difficulties operating and accessing social media sites. The participants in this study were selected since they had supports already available to access social media. In some cases, these supports were both complex and expensive (e.g., over AU$27,000 for Tilly). The participants expressed their own goals in learning to use social media. Data related to these goals and the progress made towards these goals as a result of the intervention are presented and analysed in the following section.

6.2 Question 1: Online Conversation Goal Attainment

This research question was addressed by comparing pre-post measures on COPM, final levels attained on GAS and aggregated goal achievement (GAS T-score). Participant ratings on the COPM are presented as change scores, that is, the pre-intervention score is subtracted from the post-intervention score to report the change (Δ) in the rating following intervention.

Overall, participants identified 12 problem areas and related goals. The majority (10/12) were focused within the activity domain (e.g., all goals for Mia and Kaylyn). Two goals focused on participation (e.g., one of Paul's goals focused on the dimension of social engagement; one of Tilly's goals focused on the dimension of physical engagement and, specifically, diversity of social media use). The goals are listed in the sections below for Tilly (Table 6.6), Mia (Table 6.7), Paul (Table 6.8), and Kaylyn (Table 6.9).

Mean change in performance and satisfaction with performance was clinically significant, that is, change was ≥ 2 points, which is indicated as a clinically significant result by the authors of the tool (Table 6.5 and Figure 6.5; Law et al., 2005).

Given the observed clinically significant change following intervention a pragmatic approach to analysis was employed. A parametric statistic was applied despite the small sample size, bias corrected accelerated (BCA) bootstrapping was used to obtain confidence intervals (Wood, 2016). Although there are limitations to this approach, similar approaches have been utilized by other researchers (Cusick et al., 2006; Flanagan, Krzak, Peer, Johnson & Urgan, 2009). The paired *t*-test showed that changes in both performance and satisfaction with performance (reported respectively) were statistically significant; t ($df = 11$) = −5.93, $p = .0001$, BCA 95% CI [-7.00, -3.58] and t ($df = 11$) = -2.46, $p = .032$, BCA 95% CI [-5.91, -1.17] (Figure 6.5). Following the cross-age peer e-mentoring intervention, participants reported significant improvements in their self-rated performance and satisfaction with performance for the identified problem areas related to online conversation. Table 6.5 reports the Mean (M) change (Δ) in performance and satisfaction with performance for each participant; distinct from this, Figure 6.5 presents the mean ratings across participants and presents pre-intervention and post-intervention ratings rather than the change in ratings.

Table 6.5

Mean Change in COPM Ratings by Participant

Participant	COPM	
	ΔPR M(SD)	ΔSR M(SD)
Paul	8.00 (1.73)	2.00 (3.46)
Mia	4.00 (4.00)	0.33 (9.02)
Tilly	2.67 (1.15)	5.00 (1.00)
Kaylyn	6.67 (2.52)	7.33 (2.89)
Mean Score	5.33 (2.43)	3.67 (3.12)

Note. The Canadian Occupational Performance Measure (COPM) is from Law et al. (2005); ΔPR = Change in Performance Rating; ΔSR = Change in Satisfaction Rating.

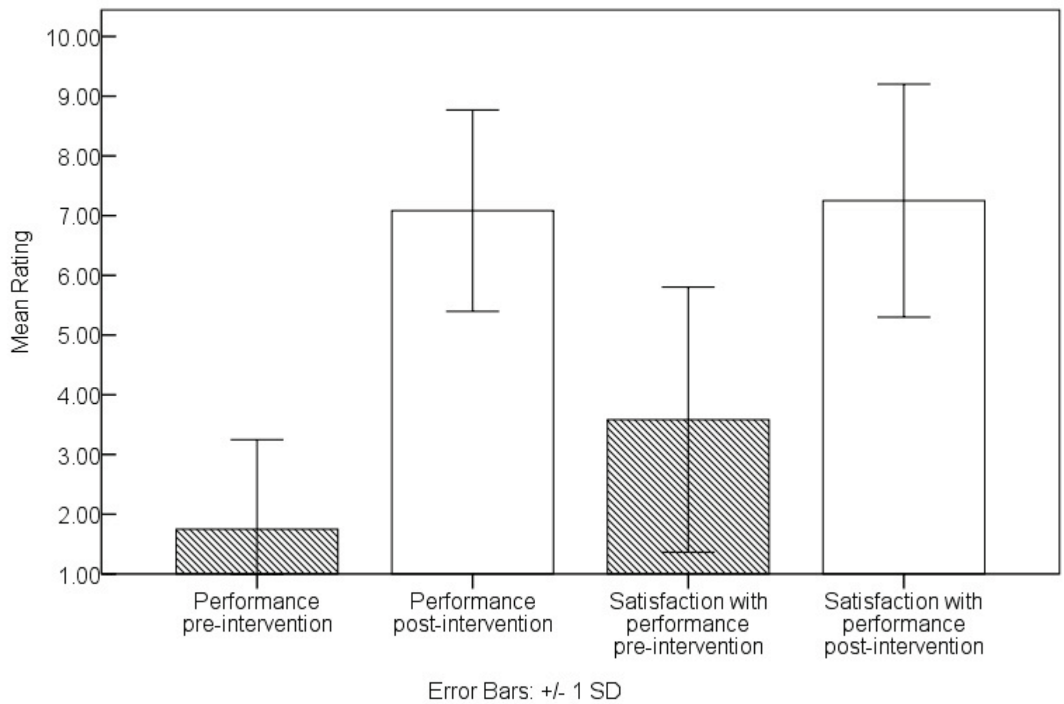


Figure 6.5. Mean COPM pre-intervention and post-intervention ratings.

GAS was used to quantify participant progress towards their goals in social media use. On average, participants met or exceeded expected goals (8/12 goals, T = 51.54, Figure 6.6). All participants, on average, met the expected level of goal achievement, although results varied when considering specific goals. For example, Paul met all three of his goals above the expected level, whereas Tilly's goal attainment was below expected for two of her goals, and well beyond expected for the third goal. Mia met two goals at the expected level, although she made no progress on her goal to use Snapchat (see Section 6.2.2).

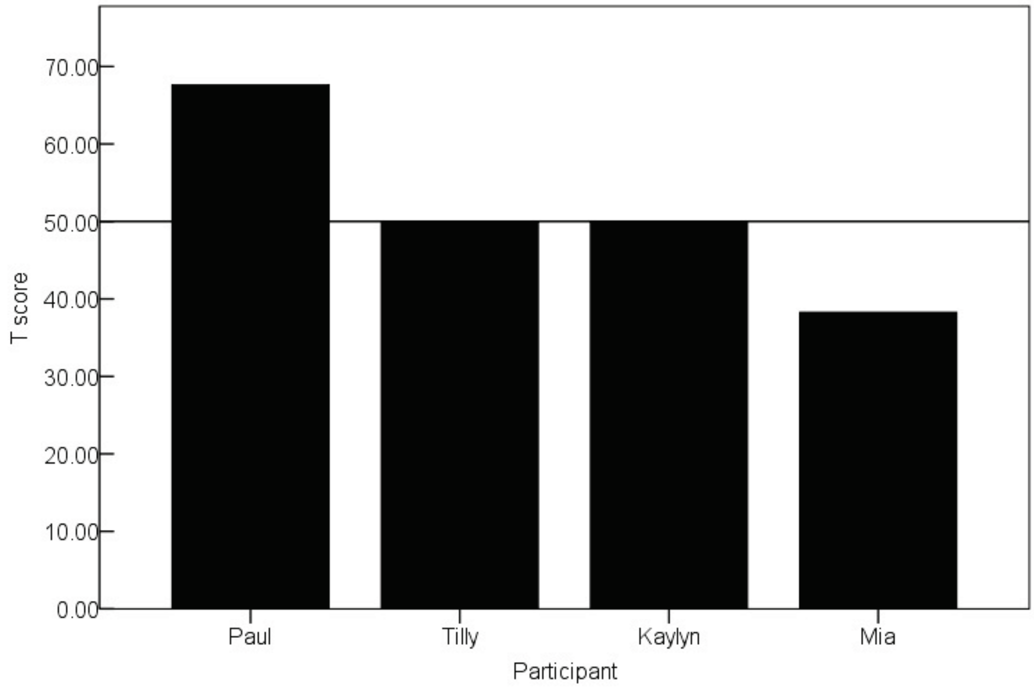


Figure 6.6. GAS T-scores across participants in decreasing order. T-score calculated as recommended by Turner-Stokes (2009).

6.2.1 Online conversation problem areas and goals identified by Tilly. The researcher discussed Tilly's current Internet and social media use with Tilly and her mother using the COPM tool. Tilly identified three problem areas that were later developed into GAS goals. The overall goals and scores for each goal are provided in Table 6.6. Two goals were situated within the domain of activity. The other goal was situated within the domain of participation and dimension of physical engagement and targeted diversity of social media use (e.g., extending use across more platforms).

Using the COPM tool, Tilly reported an increase (M = 2.67) in performance that was similar across all three goals (Table 6.8 and Table 6.6). For example, she rated her performance for goal two, following the agreed cyber-safety rules as 3 before the intervention and 5 following the intervention. Her reported satisfaction with performance increased to a greater extent (M = 5.00). For example, on the same goal she rated her satisfaction with performance as 3 before the intervention and 8 following the intervention. These improvements were also measured objectively using the GAS. The aggregated measure across all three GAS goals indicated that Tilly met the expected level of goal attainment (T = 50).

Table 6.6

Tilly's Goals for the E-mentoring Intervention and Ratings on the COPM and GAS

Goals by the End of the Mentoring	COPM		GAS
	ΔPR	ΔSR	Final Score
Tilly uses new strategies to send messages more efficiently.	+4	+6	−1
Tilly's Facebook feed demonstrates that she has followed her cyber-safety goals when on Facebook.	+2	+5	+2
Tilly has trialled at least 1 other social media option (in addition to Facebook and i-message; e.g., Instagram or Snapchat).	+2	+4	−1
Combined score	[a]+2.67	[a]+5.00	[b]50

Note. The Canadian Occupational Performance Measure (COPM) is from Law et al. (2005); Goal Attainment Scaling (GAS) is from Kiresuk and Sherman (1968); ΔPR = Change in Performance Rating; ΔSR = Change in Satisfaction Rating

[a]Expressed as the Mean score. [b]Expressed as the T-score, as recommended by Turner-Stokes (2009).

6.2.2 Online conversation problem areas and goals identified by Mia. The researcher discussed Mia's current Internet and social media use with Mia and her mother using the COPM tool. Mia identified three problem areas that were later developed into GAS goals. The overall goals and scores for each goal are provided below (see Table 6.7). All three goals were situated within the domain of activity.

Using the COPM tool, Mia reported an increase (M = 4.00) in performance that was only reported in two of the three goals (Table 6.7). For example, she rated her performance for goal one, sending a photo on Snapchat, as 1 before the intervention and 5 after the intervention. Her reported satisfaction with performance remained at almost the same level (M = 0.33). She reported a large negative change in satisfaction on the first goal, despite the concurrent perception of improved performance. However, objective measurement using the GAS indicated no improvement in performance on this goal. The aggregated measure across all three GAS goals indicated that Mia did not meet the expected level of goal attainment (T = 38.28). This is inconsistent with Mia's self-reported change in performance, but consistent with the lack of change in satisfaction.

Table 6.7

Mia's Goals for the E-mentoring Intervention and Ratings on the COPM and GAS

Goals by the End of the Mentoring	COPM		GAS
	ΔPR	ΔSR	Final Score
Mia sends photos on Snapchat by herself.	+4	−9	−2
Mia makes and answers video calls on Skype by herself.	+0	+1	0
Mia reads and responds to personal Facebook messages and browses and actively participates in the newsfeed.	+8	+9	0
Combined score	[a]+4.00	[a]+0.33	[b]38.28

Note. The Canadian Occupational Performance Measure (COPM) is from Law et al. (2005); Goal Attainment Scaling (GAS) is from Kiresuk and Sherman (1968); ΔPR = Change in Performance Rating; ΔSR = Change in Satisfaction Rating

[a]Expressed as the Mean score. [b]Expressed as the T-score, as recommended by Turner-Stokes (2009).

6.2.3 Online conversation problem areas and goals identified by Paul. The researcher discussed Paul's current Internet and social media use with Paul and his mother using the COPM tool. Paul identified three problem areas that were later developed into GAS goals. The overall goals and scores for each goal are provided below (Table 6.8). Two goals were situated within the activity domain (Goal one and three). The other goal was situated within the domain of participation and the dimension of social engagement, focusing on extending social networks (Goal two).

Using the COPM tool, Paul reported an increase in performance of a mean of 8 points on the rating scale that was similar across the three goals (Table 6.8). For example, he rated his performance for goal one, his connection with others on Facebook, as 1 before intervention and 7 following the intervention. His reported satisfaction with performance increased to a lesser extent (M = 2.00). He reported a negative change in satisfaction regarding his use of Facebook, despite the agreed concurrent improvement in skill, rating his satisfaction with performance at 8 before the intervention and 6 following the intervention. Consistent with Paul's self-reported change in performance, GAS demonstrated that goal attainment exceeded the expected level for all goals since it was above 50 (T = 67.59).

Table 6.8

Paul's Goals for the E-mentoring Intervention and Ratings on the COPM and GAS

Goals by the End of the Mentoring	COPM		GAS
	ΔPR	ΔSR	Final Score
Paul makes and answers video calls on Skype by himself	+9	+4	+1
Paul uses Facebook to keep in touch with others (e.g., mentor, extended family, friends and/or acquaintances)	+6	−2	+1
Paul shares photos with others over the Internet (e.g., maybe via Facebook, email, or Skype)	+9	+4	+1

Combined score	[a]8.00	[a]2.00	[b]67.59

Note. The Canadian Occupational Performance Measure (COPM) is from Law et al. (2005); Goal Attainment Scaling (GAS) is from Kiresuk and Sherman (1968); ΔPR = Change in Performance Rating; ΔSR = Change in Satisfaction Rating

[a]Expressed as the Mean score. [b]Expressed as the T-score, as recommended by Turner-Stokes (2009).

6.2.4 Online conversation problem areas and goals identified by Kaylyn. Kaylyn identified three problem areas on the COPM that were later developed into GAS goals. Kaylyn was the only participant who developed her goals independently without collaboration with her mother. The overall goals and scores for each goal are provided below (Table 6.9). All goals were situated within the activity domain.

Using the COPM tool, Kaylyn reported an increase (M = 6.67) in performance that was similar across all three goals (Table 6.9). For example, she rated her performance for goal one, to use email, at 1 before the intervention and as 8 following the intervention. Her reported satisfaction with performance increased to a similar extent (M = 7.33). Kaylyn's aggregated goal achievement measured using the GAS was at the expected level (T = 50).

Table 6.9

Kaylyn's Goals for the E-mentoring Intervention and Ratings on the COPM and GAS

Goals by the End of the Mentoring	COPM		GAS
	ΔPR	ΔSR	Final Score
Kaylyn uses email on her laptop, iPhone, and/or iPad.	7	9	+2
Kaylyn makes and receives video calls on Skype.	9	9	0
Kaylyn makes, sends, and receives photos over Snapchat.	4	4	−2
Combined score	[a]6.67	[a]7.33	[b]50

Note. The Canadian Occupational Performance Measure (COPM) is from Law et al. (2005); Goal Attainment Scaling (GAS) is from Kiresuk and Sherman (1968); ΔPR = Change in Performance Rating; ΔSR = Change in Satisfaction Rating.

[a]Expressed as the Mean score. [b]Expressed as the T-score, as recommended by Turner-Stokes (2009).

As described in this chapter, the participants in this study used a range of equipment to support them to access social media. Kaylyn was the only participant with no prior experience using social media. The COPM and GAS tools demonstrated that overall, participants made progress in self-identified problem areas and goals for online conversation. In the following chapter, changes in the frequency and duration of reported participation in online conversation before, during, and after the e-mentoring intervention are reported.

Chapter 7: Results, Question 2: Frequency and Duration of Online Conversation

This chapter reports the results for the second research question: What is the effect of a cross-age peer e-mentoring intervention on the reported intensity of online conversation? All measures of frequency of online conversation and duration in online conversation (days, hours, and words transmitted) are graphically displayed in the three major sections of this chapter. As outlined in the method section (Section 4.7.2), it was predicted that the total words written would provide a measure of the duration of engagement in online conversation not affected by the time taken to compose the message. Data for number of days and total hours were reported weekly by participants over three phases, baseline, intervention, and maintenance. Data for words transmitted were also collected for the pre-baseline phase. Data are described using systematic visual analysis of trend, level, and stability (Lane & Gast, 2014, see Section 4.10). Trend was calculated using the split-middle method of trend estimation. Level was analysed within and between phases by comparing the mean, median, and absolute values of the data points for each phase. Stability envelopes were applied to the median level and split-middle trend lines, and both graphs are displayed. Data were considered stable when ≥ 80% of observations were within the stability envelope. Statistical analysis consisted of calculation of PND (Scruggs et al., 1987), and $\text{Tau}_{\text{novlap}}$ or Tau-U (Parker, Vannest, Davis, & Sauber, 2011; see Section 4.10.2). PND was interpreted as being *ineffective* or unreliable if < 50%, of *questionable effectiveness* if between 50–70%, *fairly effective* if between 70–90% and *highly effective* if > 90%. Combined weighted effect size was also calculated. The letters assigned to phases and number of observations in each phase are listed in Table 7.1.

Table 7.1

Phases of the Experiment

	ID	Figure Legend[a]	N
Pre-Baseline	A^1		5–9
Baseline	A^2		5–9
Intervention	B^1		16
Maintenance	B^2		6

Note. ID = letter assigned to phase; N = number of observations.

[a]Figure legends relevant for all SCED graphs in results chapters.

7.1 Frequency and Duration of Online Conversation

7.1.1 Visual inspection of results: Number of days. It was hypothesised that the number of days per week that participants participated in online conversation would increase after the e-mentoring intervention. The results are displayed for all four participants in Figure 7.1, and the scale of the y-axis is constant across the participants. Further figures are displayed to support the presentation of the systematic visual analysis for individual participants. The scale varies across the graphs, to allow for marking of within-phase trend estimations in a legible manner (Figures 7.2, 7.3, 7.5, and 7.6).

Systematic visual analysis indicated increases in the number of days spent in online conversation for three participants, Tilly, Mia, and Paul, although statistical analysis only indicated an effect for Mia. Variability in the results complicates the ability to confirm this relationship between frequency of online conversation and the e-mentoring intervention using statistical analysis. The graphs across participants are displayed first. Following this, the systematic visual analysis and statistical analysis are presented, including tables and graphs to display the data for each participant. At the end of this section, the visual and statistical analysis of the number of days per week that participants participated in online conversation is summarised.

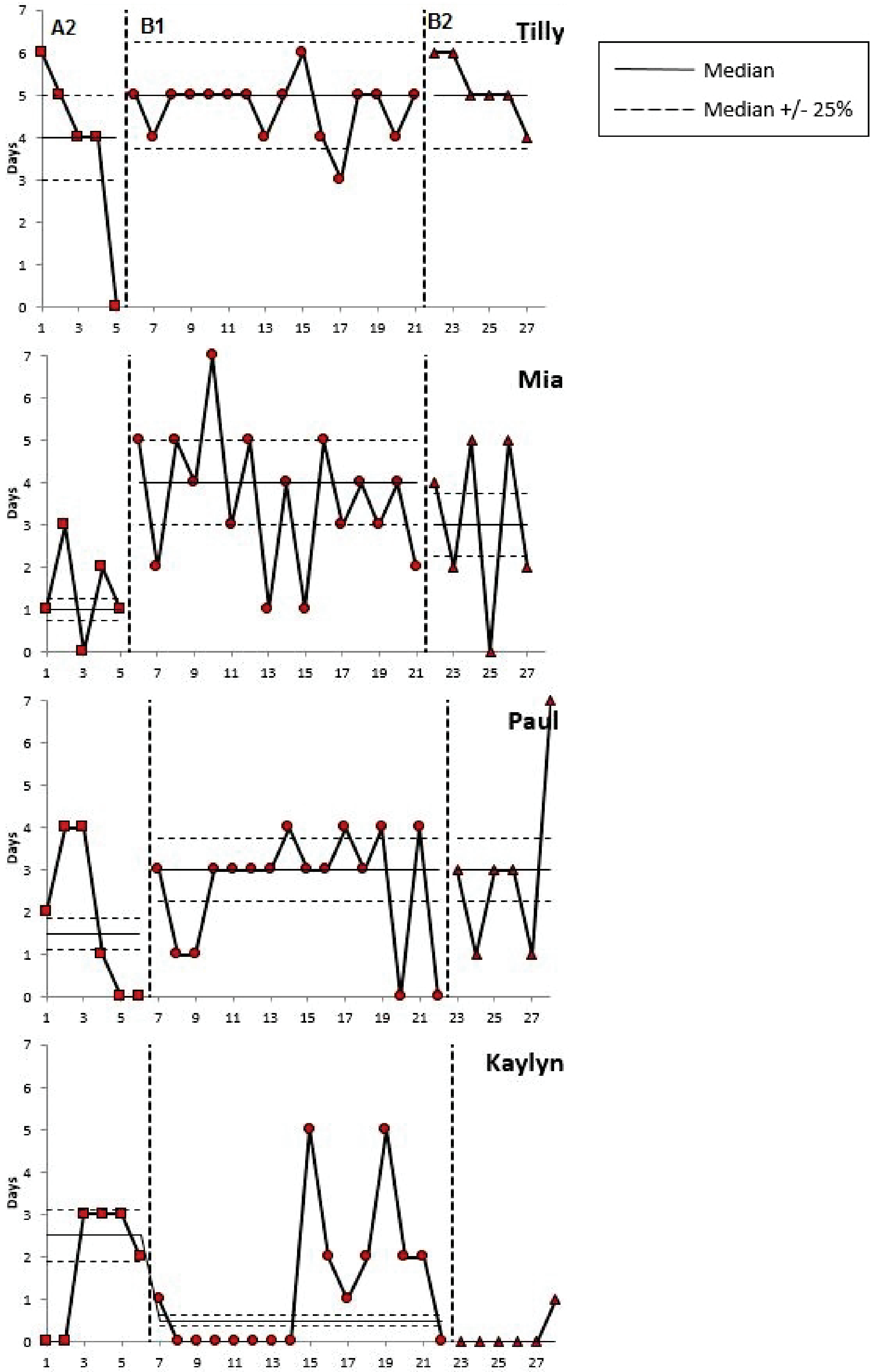


Figure 7.1. Number of days participated in online conversation per week.

7.1.1.1 Tilly: Number of days.

7.1.1.1.1 *Within-phase analysis.* For Tilly, evaluation of each phase indicated data were variable during baseline, but relatively stable during intervention and maintenance (Figure 7.1 and Table 7.2). Evaluation of level change indicated frequency of online conversation was deteriorating during baseline and maintenance and constant during intervention (Table 7.2). Trend estimation indicated a decreasing contra-therapeutic trend during baseline and maintenance, and a zero-celerating trend during intervention (Figure 7.2). Application of a stability envelope to the trend lines revealed that data were stable in all three phases (Table 7.2 and Figure 7.2).

Table 7.2

Within-Phase Analysis of Tilly's Number of Days Participating in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Baseline	4	5	0–6	60	−3.5	−6.0	100.0
Intervention	5	5	3–6	94	0.0	0.0	87.5
Maintenance	5	5	4–6	100	−1.0	−2.0	100.0

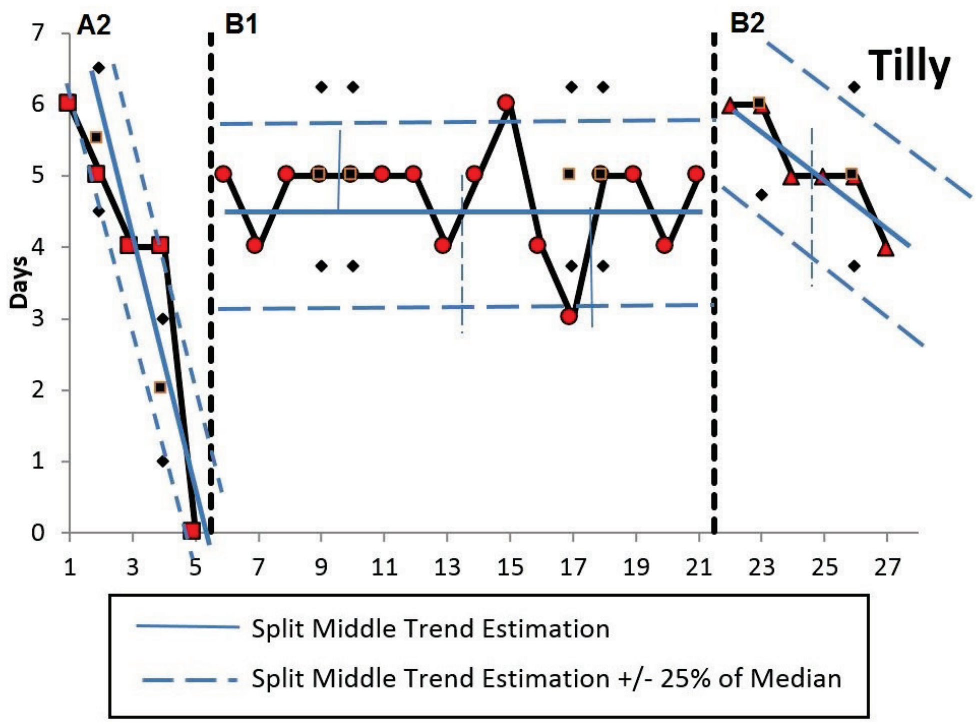


Figure 7.2. Tilly's number of days participated in online conversation per week, within-phase trend marked.

7.1.1.1.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, a change in frequency of online conversation across phases went from a decelerating, deteriorating trend in baseline to a zero-celerating trend during intervention, returning to a decelerating, deteriorating trend during maintenance (Figure 7.2). All level change measures indicated a constant or positive, improving change across the three phases (Table 7.3). Calculations of PND indicated the intervention was *ineffective* (Table 7.4). PND is unable to take into account the deteriorating trend present in the baseline data. Calculation of Tau-U, which includes a correction for trend, indicated a minimal effect from baseline to intervention, which was not significant. However, when comparing baseline to maintenance a moderate effect, which was significant, was observed (Table 7.4).

Table 7.3

Between-phase Level Change Analysis of Tilly's Number of Days Participating in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	3	5	0	1
Baseline–Maintenance	4	6	0	1

Table 7.4

Between-phase Statistical Analysis of Tilly's Number of Days Participating in Online Conversation

Phase Changes	PND	Tau-U		
		Tau-U	CI 90%	*p*
Baseline–Intervention	0	0.32	[0.18, 0.82]	0.29
Baseline–Maintenance	0	0.73	[0.13, 1.00]	0.04*

Note. Correction for baseline trend applied.

*$p < .05$.

7.1.1.2 Mia: Number of days.

7.1.1.2.1 *Within-phase analysis.* For Mia, evaluation of each phase indicated data were variable during baseline, and intervention, and highly variable in maintenance (Table 7.5 and Figure 7.1). Evaluation of level change indicated frequency of online conversation was deteriorating during baseline, intervention, and maintenance, but absolute level was stable for baseline (Table 7.5). Trend estimation indicated a decreasing contra-therapeutic trend during baseline, intervention, and maintenance, and were considered variable, within all phases (Figure 7.3 and Table 7.5).

Table 7.5

Within-Phase Analysis of Mia's Number of Days Participating in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Baseline	1	1	0–3	40	−0.5	0	20
Intervention	4	4	1–7	69	−1	−3	56
Maintenance	3	3	0–4	0	−2	−2	33

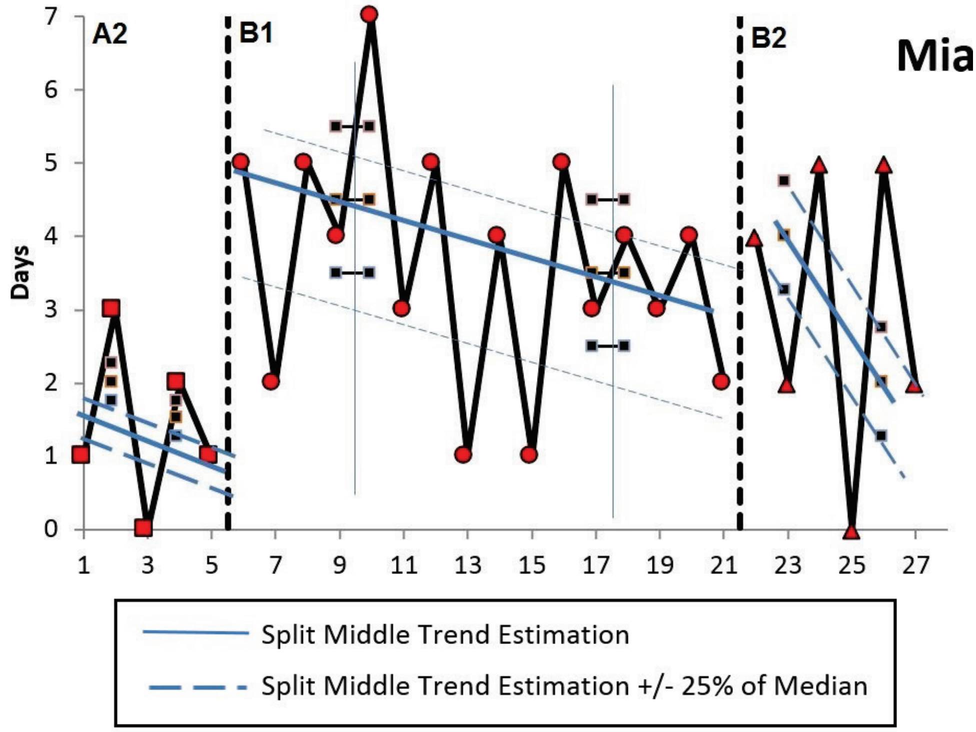


Figure 7.3. Mia's number of days participated in online conversation; within-phase trend marked.

7.1.1.2.2 *Between-phase analysis.* The decelerating, deteriorating trend and lack of stability observed in the within-phase analysis was constant across all phases (Figure 7.3). All level change measures indicated a positive (improving) change across the three phases (Table 7.6). PND indicated questionable intervention effects (Table 7.7). Tau_{novlap} indicated a moderate effect from baseline to intervention, which was significant (Table 7.7). A moderate effect was also calculated between baseline and maintenance, but was not significant.

Table 7.6

Between-phase Level Change Analysis of Mia's Number of Days Participating in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	3	4	3	3
Baseline–Maintenance	2.5	3	3.5	3

Table 7.7

Between-phase Statistical Analysis of Mia's Number of Days Participating in Online Conversation

Phase Changes	PND (%)	Tau_{novlap}		
		Tau	CI 90%	*p*
Baseline–Intervention	56	0.74	[0.24, 1.00]	0.01*
Baseline–Maintenance	67	0.50	[−0.10, 1.00]	0.17

Note. *$p < .05$.

Observation of the variability within Mia's data revealed an alternating up/down pattern that may have been explained by Mia's living situation. Mia lived across two houses alternating each week. The observations have been separated across the two environments to provide a clearer understanding of the changes in frequency of online conversation within and across phases (Figure 7.4). For example, in one environment overall levels were higher and data were stable across the phases. In the other environment, overall levels were lower and the data were more variable. PND indicated the intervention was effective in both environments (75% in environment 1 and 100% in environment 2, non-overlap). Calculation of Tau-U for environments 1 and 2 revealed strong (0.8 and 1, respectively) and significant ($p = 0.04$ and $p = 0.03$, respectively) effects. This statistical analysis clearly contrasts with the data presented in Table 7.7 where all data points were combined as relating to one environment. This further investigation of the data also suggests observation of a possible functional and positive relationship between the number of days spent in online conversation and the e-mentoring intervention.

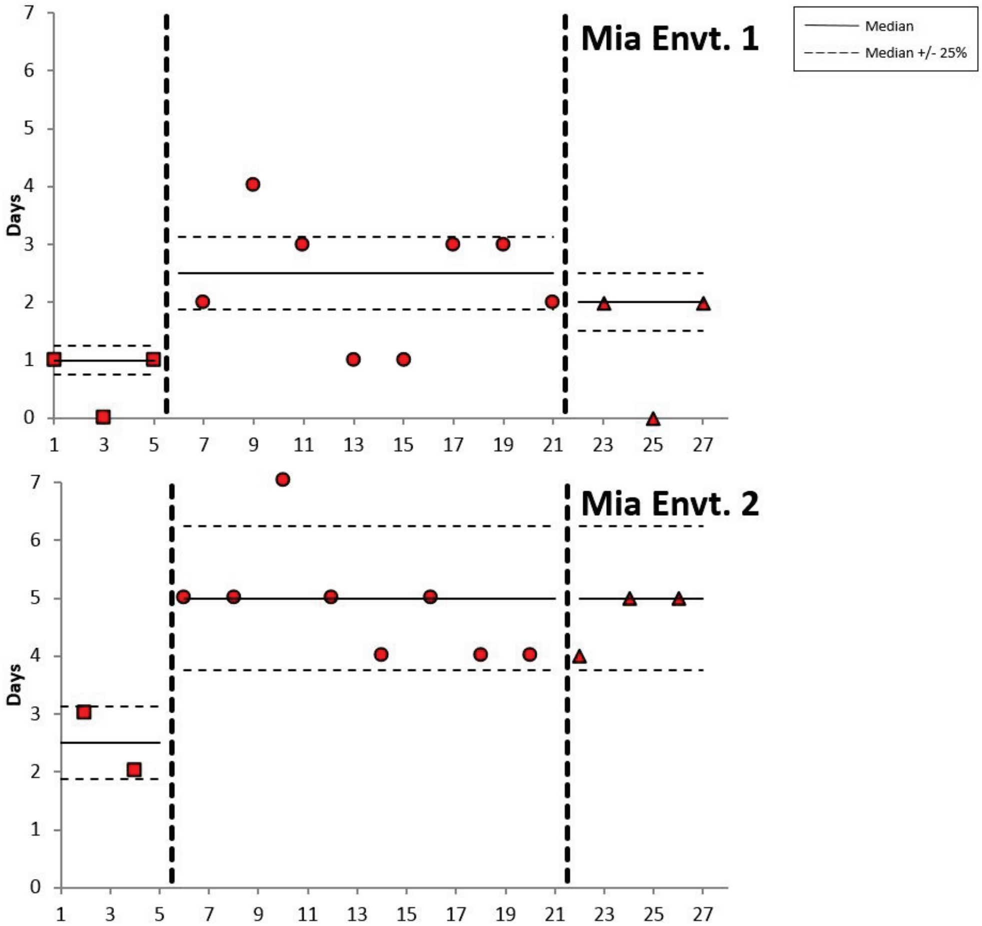


Figure 7.4. Data for number of days separated across two environments for Mia.

7.1.1.3 Paul: Number of days.

7.1.1.3.1 *Within-phase analysis.* For Paul, evaluation of each phase indicated data were variable in all phases (Table 7.8 and Figure 7.1). Evaluation of level change indicated frequency of online conversation was deteriorating during baseline and stable during intervention and maintenance (Table 7.8). However, given large fluctuations evident within all phases, relative level change contrasted with absolute level change and deteriorated during intervention but improved during maintenance (Figure 7.5 and Table 7.8). Trend estimation indicated a decreasing contra-therapeutic trend during baseline and stable zero-celerating trend during intervention and maintenance, and the data were considered variable (Table 7.8 and Figure 7.5).

Table 7.8

Within-Phase Analysis of Paul's Number of Days Participating in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Baseline	2	1.5	0–4	0	−4	−2	50
Intervention	3	3	0–4	50	0	−3	50
Maintenance	3	3	1–7	50	0	4	50

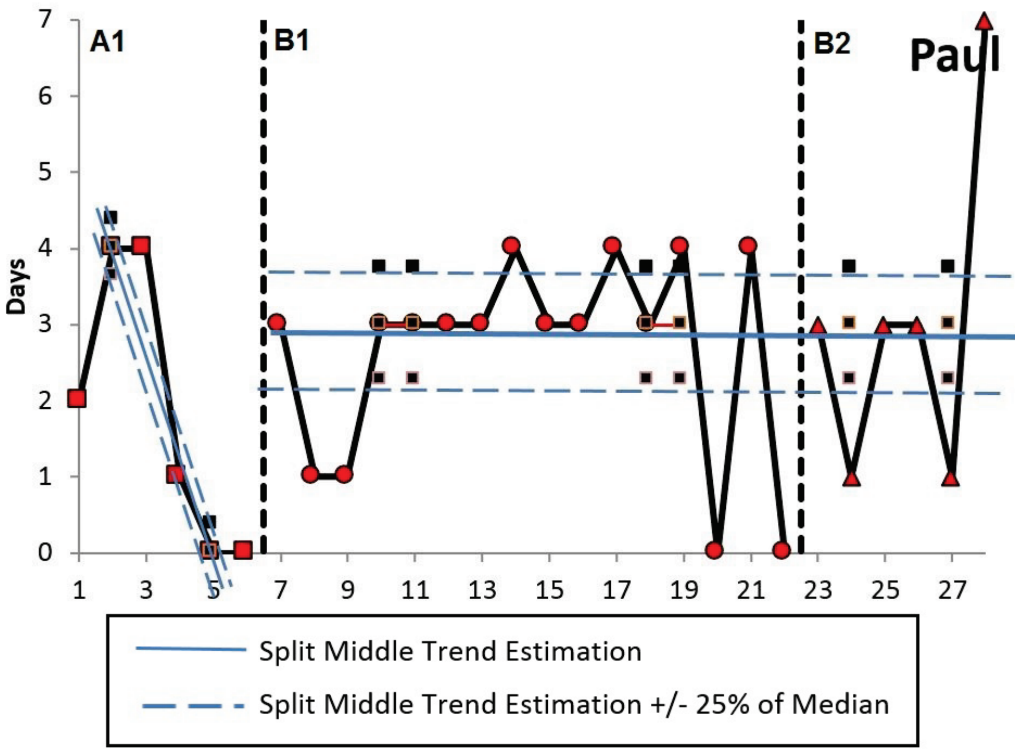


Figure 7.5. Paul's number of days participated in online conversation; within-phase trend marked.

7.1.1.3.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, a change in frequency of online conversation across phases went from a decelerating, deteriorating trend in baseline to a zero-celerating, constant trend during intervention and maintenance, but remained unstable within all phases (Figure 7.5). All level change measures indicated a positive (improving) change across the three phases (Table 7.9). Calculations of PND indicated treatment was *ineffective* (Table 7.10). Calculation of Tau-U, which included a correction for trend, indicated a minimal effect from baseline to intervention, which was not significant (Table 7.10). However, when comparing baseline to maintenance this increased to a moderate effect, which was also not significant.

Table 7.9

Between-phase Level Change Analysis of Paul's Number of Days Participating in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	3	3	1.5	1
Baseline–Maintenance	3	3	1.5	1

Table 7.10

Between-phase Statistical Analysis of Paul's Number of Days Participating in Online Conversation

Phase Changes	PND (%)	Tau-U		
		Tau-U	CI 90%	*p*
Baseline–Intervention	0	0.32	[−0.14, 0.79]	0.25
Baseline–Maintenance	17	0.53	[0.04, 1.10]	0.13

Note. Correction for baseline trend applied.

7.1.1.4 Kaylyn: Number of days.

7.1.1.4.1 *Within-phase analysis.* For Kaylyn, evaluation of each phase indicated level was low but variable during baseline and intervention, and low and stable during maintenance (Figure 7.1 and Table 7.11). Evaluation of relative level change indicated that number of days per week was improving during baseline and intervention but stable in maintenance (Table 7.11). However, absolute change indicated slightly deteriorating frequency of online conversation in intervention and slightly improving frequency of online conversation in maintenance. There was an accelerating, improving trend during baseline and intervention and a zero-celerating trend during maintenance (Figure 7.6). Application of a stability envelope to the trend lines revealed that data were variable within baseline and intervention and stable in maintenance (Table 7.11 and Figure 7.6).

Table 7.11

Within-Phase Analysis of Kaylyn's Number of Days Participating in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Baseline	2	2.5	0–3	67	3	2	67
Intervention	1	0.5	0–5	0	2	−1	19
Maintenance	0	0	0–1	83	0	1	83

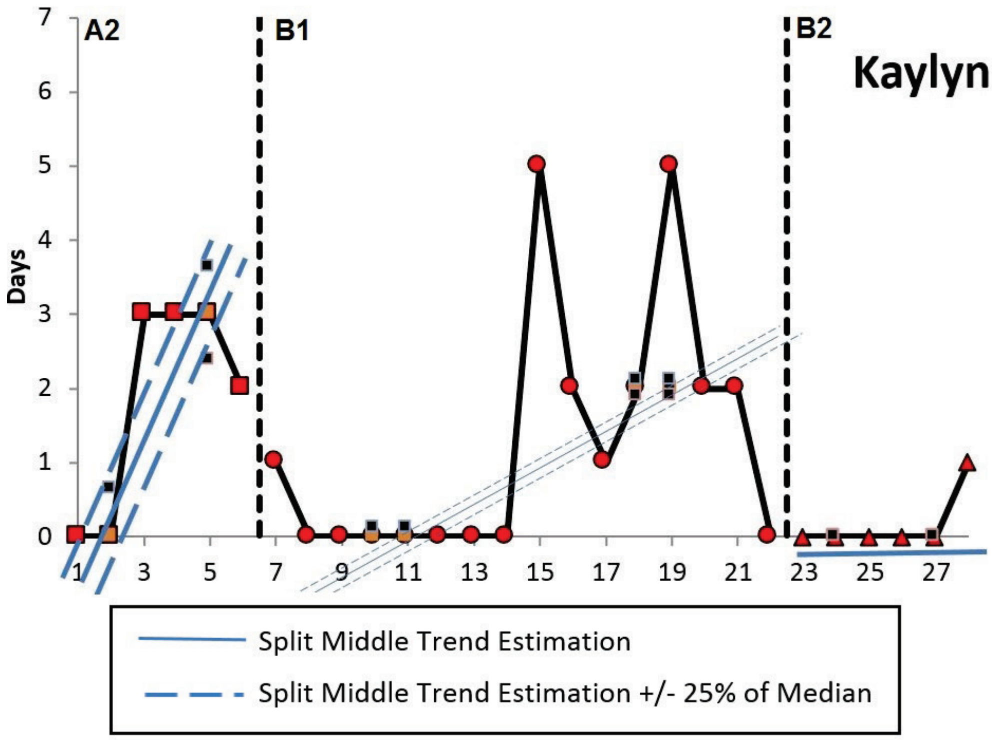


Figure 7.6. Kaylyn's number of days participated in online conversation; within-phase trend marked.

7.1.1.4.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, an accelerating, improving trend was evident in baseline and intervention; this changed to a zero-celerating, constant trend during maintenance (Figure 7.6). All level change measures indicated a deteriorating change between phases (Table 7.12). Calculations of PND indicated the intervention was ineffective (Table 7.13). Calculation of Tau-U, which included a correction for the accelerating trend in baseline, indicated a minimal negative effect from baseline to intervention, which was not significant. When comparing baseline to maintenance, this negative effect became strong and significant (Table 7.13). There appears to be a positive effect during baseline that affects the ability to observe any treatment effects.

Table 7.12

Between-phase Level Change Analysis of Kaylyn's Number of Days Participating in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	−3	−1	−2	−1
Baseline–Maintenance	−3	−2	−2.5	−2

Table 7.13

Between-phase Statistical Analysis of Kaylyn's Number of Days Participating in Online Conversation

Phase Changes	PND (%)	Tau-U		
		Tau-U	CI 90%	p
Baseline–Intervention	13	[a] −0.34	[−0.81, 0.12]	0.22
Baseline–Maintenance	17	[a] −0.75	[−1.00, −0.18]	0.03*

Note. Correction for baseline trend applied.

*$p < .05$.

Observation of a lagged response to the introduction of the mentoring in Kaylyn's data is explained by a delay in Kaylyn and the mentor meeting online. Kaylyn did not engage with the mentoring intervention until Week 13. Therefore, weeks prior to this may reflect her baseline behaviour rather than the true intervention that was successfully provided. Viewing the data in this way reveals an increase in level during the intervention, but the data remain variable (Figure 7.7). Calculation of PND indicates the treatment was ineffective (20%). Calculation of Tau-U indicated a minimal effect (0.45) that was not significant (p = 0.08). This calculation of Tau-U for the adjusted baseline and intervention phase differs from the data presented in Table 7.13.

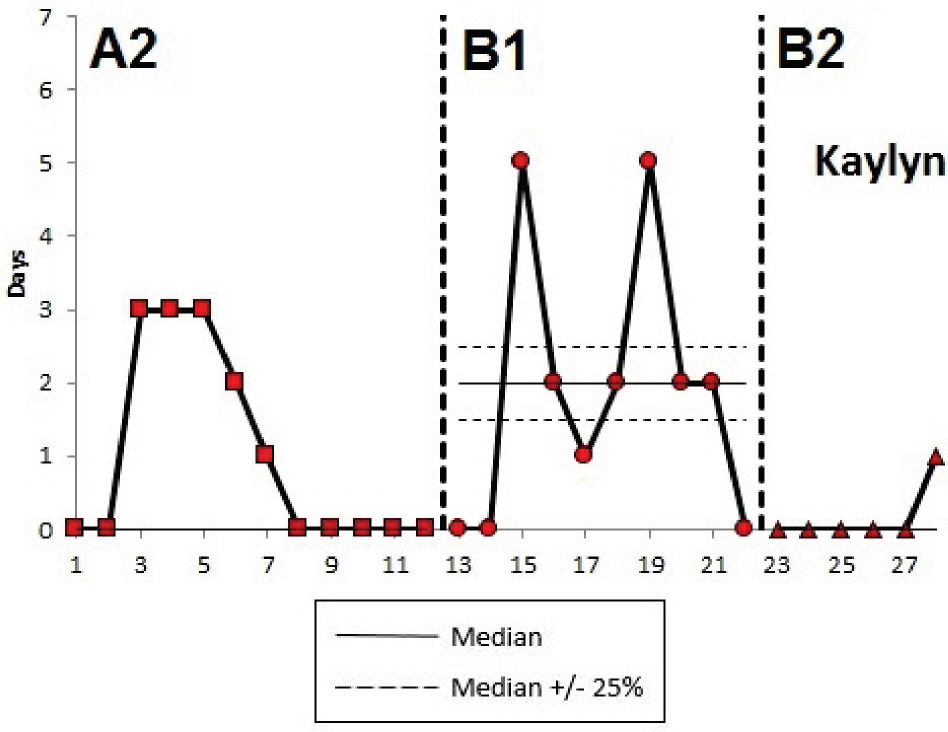


Figure 7.7. Revised graph reflecting true intervention that Kaylyn accessed successfully.

7.1.1.5 Summary: Number of days. Systematic visual analysis indicated effects of the intervention that were replicated across three participants, Tilly, Paul, and Mia (Table 7.14). This effect was also observed when comparing from baseline to maintenance for Tilly and Mia. Calculation of PND indicated questionable effectiveness of the intervention for Mia, which was also observed when comparing from baseline to maintenance. Calculation of Tau-U indicated significant effects of the intervention for three of the participants (baseline–intervention for Mia, baseline–maintenance for Tilly). However, for Kaylyn this was a negative effect. Combined weighted Tau scores across participants indicated a minimal effect that was not significant, 0.25, 90% CI [−0.04, 0.54], p = 0.08. Increases in the number of days spent in online conversation were observed using systematic visual analysis for three out of four participants, indicating an effect of the intervention. Variability in the results complicates the ability to confirm this relationship between number of days spent in online conversation and the e-mentoring intervention using statistical analysis. The hypothesis that the e-mentoring intervention would increase the number of days that participants participated in online conversation was not met.

Table 7.14

Summary of the Visual and Statistical Analysis for Number of Days Spent in Online Conversation for All Four Participants

Participant	Baseline–Intervention		
	SVA	PND	Tau
Tilly	✓	×	×[a]
Mia	✓	?	✓
Paul	✓	×	×
Kaylyn	×	×	×[b]

Note. SVA = systematic visual analysis, PND = Percentage non-overlapping data.

For the majority of comparisons, the effects observed or not observed were similar when comparing from baseline–maintenance, with the following exceptions: [a]An effect of the intervention was observed when comparing from baseline– maintenance. [b]A negative effect of the intervention was observed when comparing from baseline–maintenance.

7.1.2 Visual inspection of results: Total hours. It was hypothesised that the duration (total hours) of online conversation per week would increase after the intervention. The results are displayed for all four participants in Figure 7.8. In Figure 7.8, the scale of the y-axis is constant across the participants from 0–6 hours since 6 was the longest duration observed. Further figures are displayed to support the presentation of the systematic visual analysis for individual participants. The scale varies across these graphs, to allow for marking of within-phase trend estimation in a legible manner (Figures 7.9, 7.10, 7.11, and Figure 7.12).

Similar to the frequency of days reported previously, the total hours spent in online conversation were considerably variable from week to week. This variability complicates the ability to draw conclusions about a relationship between duration of online conversation and the e-mentoring intervention. However, application of systematic visual analysis to the data suggested possible effects for three of the four participants, indicating an experimental effect of the intervention to increase hours spent in online conversation. The graphs across participants are displayed first. Following this, the systematic visual analysis and statistical analysis are presented for each participant, and then, the results are summarised across participants.

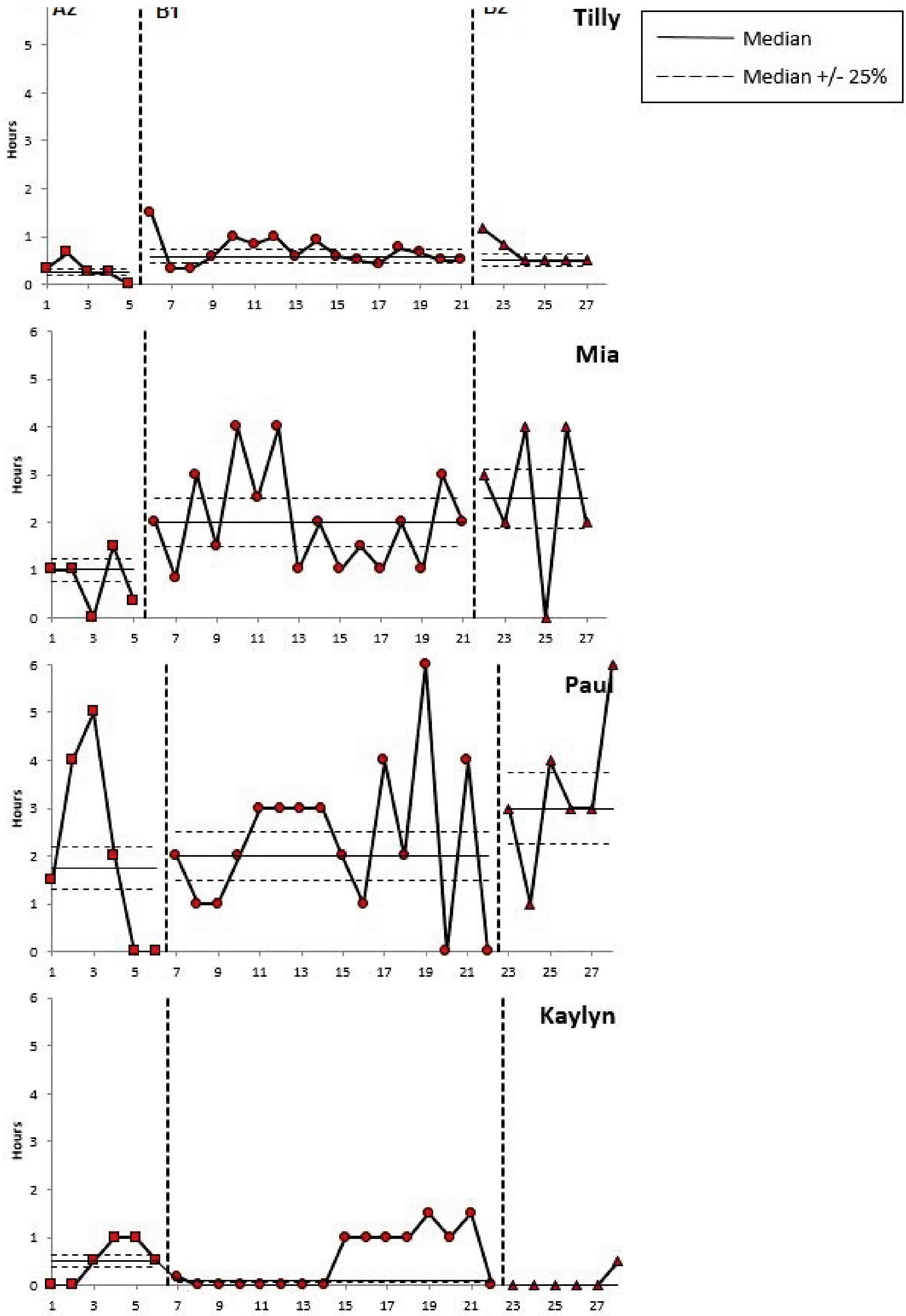


Figure 7.8. Hours spent participating in online conversation per week.

7.1.2.1 Tilly: Hours.

7.1.2.1.1 *Within-phase analysis.* For Tilly, evaluation of each phase indicated data were variable in all phases (Figure 7.8). There appear to be outliers in each phase (Weeks 2, 6, and 22) where Tilly spends more hours than usual in online conversation and the reasons for this are not clear. Although all outliers occur towards the beginning of a phase, Week 6 is the first week of the intervention phase and Week 22 is the first week of maintenance. Evaluation of level change indicated duration of online conversation was deteriorating during all three phases (Table 7.15). Trend estimation indicated a decreasing contra-therapeutic trend during all phases, which was considered variable (Table 7.15 and Figure 7.9).

Table 7.15

Within-Phase Analysis of Tilly's Hours Spent in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Baseline	0.3	0.5	0–0.67	60	−0.37	−0.33	60
Intervention	0.69	0.71	0.33–1.5	56	−0.17	−1	44
Maintenance	0.67	0.83	0.5–1.17	67	−0.33	−0.67	67

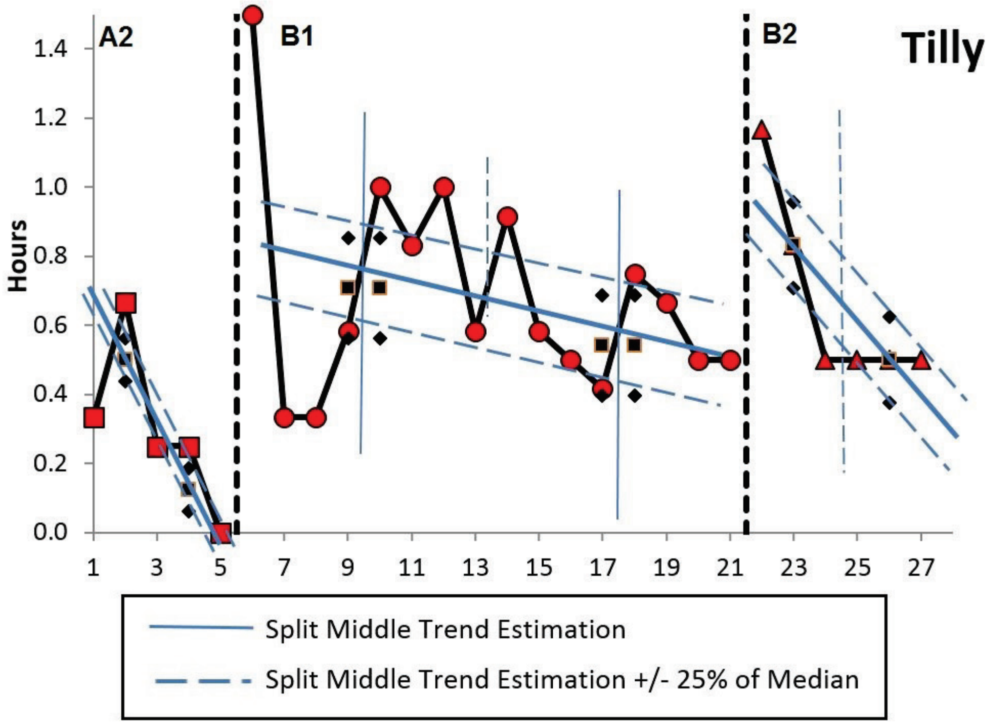


Figure 7.9. Tilly's hours spent in online conversation; within-phase trend marked.

7.1.2.1.2 *Between-phase analysis.* With consideration of the within-phase analysis of trend, a decelerating, deteriorating trend was noted in all three phases (Figure 7.9). Almost all level change measures indicated an improving change across the three phases (Table 7.16). Calculations of PND indicated the intervention was *ineffective* (Table 7.17). Calculation of Tau_{novlap} indicated a strong effect, which was significant from baseline to intervention and baseline to maintenance (Table 7.17).

Table 7.16

Between-phase Level Change Analysis of Tilly's Hours Spent in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	0.58	1.5	0.21	0.39
Baseline–Maintenance	0.7	1.17	0.33	0.37

Table 7.17

Between-phase Statistical Analysis of Tilly's Hours Spent in Online Conversation

Phase Changes	PND (%)	Tau_{novlap}		
		Tau	CI 90%	*p*
Baseline–Intervention	38	0.70	[0.20, 1.00]	0.02*
Baseline–Maintenance	33	0.90	[0.30, 1.00]	0.01*

Note. *$p < .05$.

7.1.2.2 Mia: Hours.

7.1.2.2.1 *Within-phase analysis.* For Mia, evaluation of each phase indicated data were variable within all phases (Figure 7.8 and Table 7.18). Evaluation of level change indicated duration of online conversation was deteriorating during all phases, but absolute change was constant during intervention (Table 7.18). Trend estimation indicated a decreasing contra-therapeutic trend during baseline, intervention, and maintenance, which was considered variable in all phases (Figure 7.10 and Table 7.18).

Table 7.18

Within-Phase Analysis of Mia's Hours Spent in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Baseline	0.77	1	0–1.5	40	−0.08	−0.67	80
Intervention	2.02	2	0.83–4	44	−0.5	0	37.5
Maintenance	2.5	2.5	0–3	50	−1	−1	33

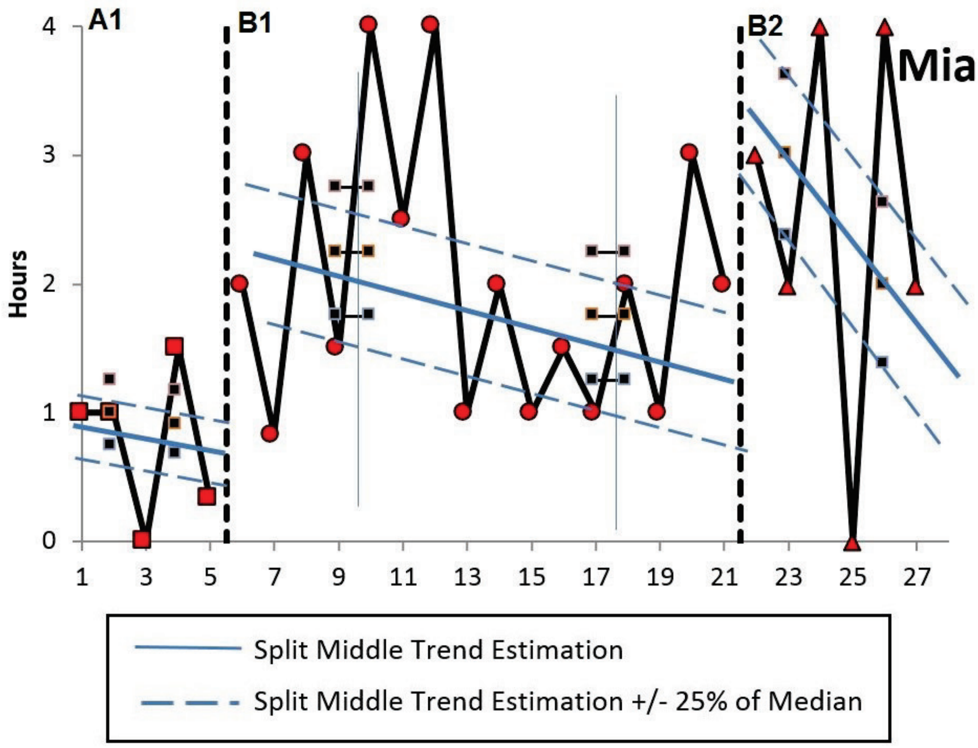


Figure 7.10 Mia's hours spent in online conversation; within-phase trend marked.

7.1.2.2.2 *Between-phase analysis.*

The decelerating, deteriorating trend and lack of stability observed in the within-phase analysis was constant across all phases (Figure 7.10). All level change measures indicated a positive (improving) change across the three phases (Table 7.19). Despite decelerating, deteriorating trend present in baseline, calculations of PND indicated questionable intervention effects (Table 7.20). When comparing baseline to maintenance, this increased, indicating the intervention was *fairly effective*. Calculation of $\text{Tau}_{\text{novlap}}$ indicated a strong effect, which was significant from baseline to intervention but not significant from baseline to maintenance (Table 7.20).

Table 7.19

Between-Phase Analysis of Mia's Hours Spent in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	1.33	1.67	1.33	1.25
Baseline–Maintenance	2.08	2.67	2.08	1.73

Table 7.20

Between-Phase Statistical Analysis of Mia's Hours Spent in Online Conversation

Phase Changes	PND (%)	Tau_{novlap}		
		Tau	CI 90%	*p*
Baseline–Intervention	56	[b] 0.70	[−0.20, 1.00]	0.02*
Baseline–Maintenance	83	[b] 0.70	[0.10, 1.00]	0.06

Note. *$p < .05$.

7.1.2.3 Paul: Hours.

7.1.2.3.1 *Within-phase analysis.* For Paul, evaluation of each phase indicated data were highly variable during all phases (Figure 7.8). Evaluation of level change indicated duration of online conversation was deteriorating during baseline and intervention and was constant or improving (by absolute change) during maintenance (Table 7.21). Trend estimation indicated a decreasing contra-therapeutic trend during baseline and intervention and zero-celerating trend during maintenance, but data were variable (Table 7.21 and Figure 7.11). In Weeks 19 and 27, Paul reported spending 6 hours in online conversation. Week 19 occurs during the middle of school term, and a review of the transcripts indicates that at this time Paul was using email to ask friends to participate in a fundraiser, which may have increased the time he spent online that week. Week 27 occurred during the Christmas/New Year holiday week, which may have increased his availability and motivation to participate in online conversation.

Table 7.21

Within-Phase Analysis of Paul's Hours Spent in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Baseline	2.08	1.75	0–5	53	−4	−1.5	50
Intervention	2.31	2.00	0–6	25	−0.5	−2	25
Maintenance	3.33	3.00	1–6	50	0	3	67

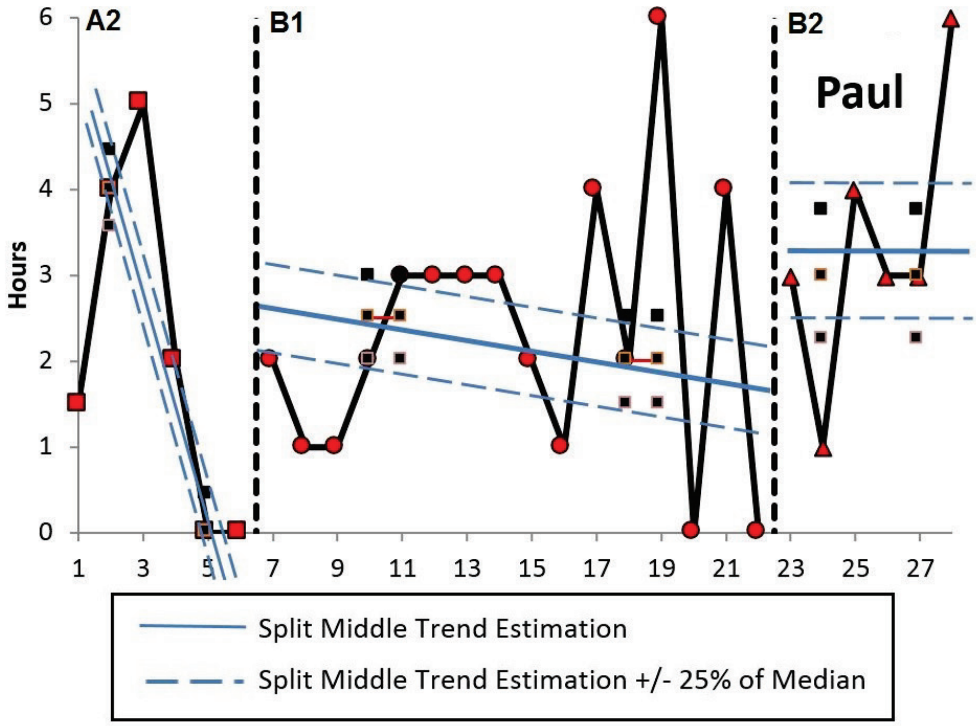


Figure 7.11. Paul's hours spent in online conversation; within-phase trend marked.

7.1.2.3.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, a change in duration of online conversation across phases went from decelerating, deteriorating in baseline and intervention to zero-celerating, constant trend during maintenance, but remained variable (Figure 7.11). All level change measures indicated a positive (improving) change (Table 7.22). Calculations of PND indicated treatment was *ineffective* (Table 7.23). However, PND is unable to account for deteriorating trend present in the baseline data. Calculation of Tau-U, including a correction for baseline trend, indicated a negligible effect from baseline to intervention and moderate effect from baseline to maintenance, and both were not significant (Table 7.23).

Table 7.22

Between-Phase Level Change Analysis of Paul's Hours Spent in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	2.5	2	0.25	0.23
Baseline–Maintenance	3	3	1.25	1.25

Table 7.23

Between-Phase Statistical Analysis of Paul's Hours Spent in Online Conversation

Phase Changes	PND (%)	Tau-U		
		Tau-U	CI 90%	*p*
Baseline – Intervention	6	0.17	[−0.30, 0.63]	0.56
Baseline – Maintenance	17	0.53	[−0.04, 1.00]	0.13

Note. Correction for baseline trend applied.

7.1.2.4 Kaylyn: Hours.

7.1.2.4.1 *Within-phase analysis.* For Kaylyn, evaluation of each phase indicated data were variable during baseline and intervention but stable during maintenance. Evaluation of level change indicated duration of online conversation was improving during baseline and intervention and constant during maintenance (Table 7.24). Trend estimation indicated an accelerating, improving trend during baseline and intervention and a zero-celerating trend during maintenance. Data were variable within baseline and intervention and stable in maintenance (Table 7.24 and Figure 7.12).

Table 7.24

Within-Phase Analysis of Kaylyn's Hours Spent in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Baseline	1	0.5	0–1	33	1	0.5	50
Intervention	1	0.08	0–1.5	50	1	0.17	6.25
Maintenance	0	0	0–0.5	83	0	0.5	83

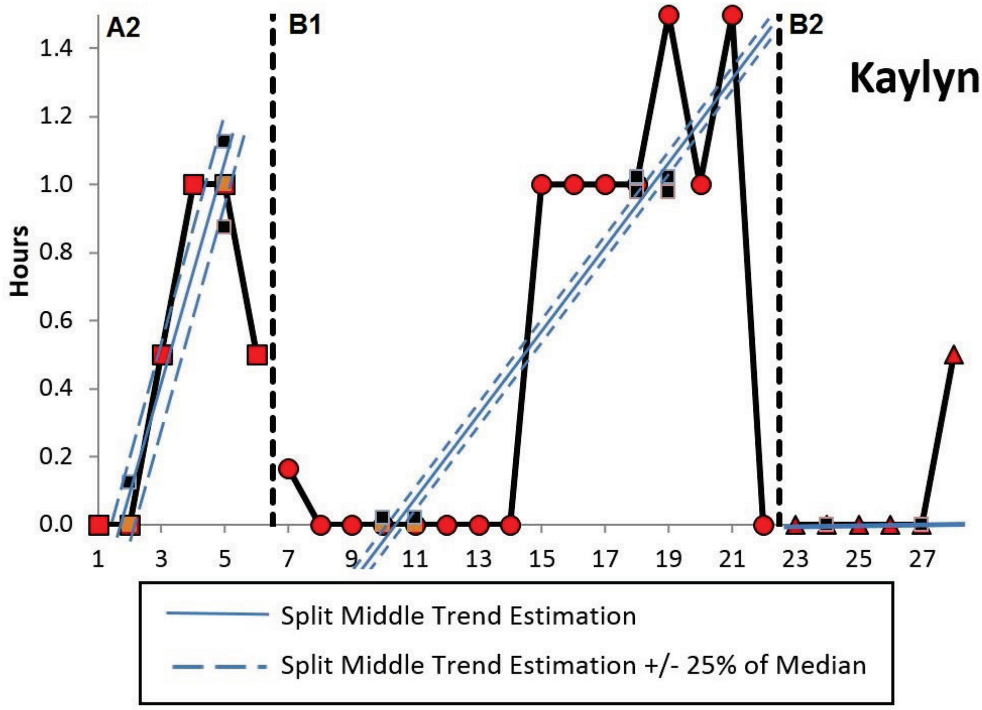


Figure 7.12. Kaylyn's hours spent in online conversation; within-phase trend marked.

7.1.2.4.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, an accelerating, improving trend was evident in baseline and intervention, and this changed to a zero-celerating, constant trend during maintenance (Figure 7.12). All level change measures indicated no change or a deteriorating change between phases (Table 7.25). Calculations of PND indicated the intervention was *ineffective* (Table 7.26). Calculation of Tau-U, which included a correction for the accelerating trend in baseline, indicated a negligible negative effect from baseline to intervention, which was not significant (Table 7.26). When comparing baseline to maintenance, the negative effect was strong and significant. This indicates that Kaylyn's hours spent in online conversation were increased during baseline compared with maintenance. This may reflect Kaylyn's initial interest and motivation to participate in online conversation.

Table 7.25

Between-Phase Level Change Analysis of Kaylyn's Hours Spent in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	0	−0.33	−0.42	0
Baseline–Maintenance	0	−0.5	−0.5	−1

Table 7.26

Between-Phase Statistical Analysis of Kaylyn's Hours Spent in Online Conversation

Phase Changes	PND (%)	Tau-U		
		Tau-U	CI 90%	*p*
Baseline–Intervention	13	−0.10	[−0.57, 0.36]	0.71
Baseline–Maintenance	0	−0.78	[−1.00, −0.21]	0.03*

Note. Correction for baseline trend was applied.

**p* < .05.

7.1.2.5 Summary: Hours. Systematic visual inspection indicated an effect of the intervention that was replicated across three participants (Tilly, Paul, and Mia), which was also observed when comparing with the maintenance phase (Table 7.27).

Table 7.27

Summary of the Visual and Statistical Analysis for Hours Spent in Online Conversation for all Four Participants

Participant	Baseline–Intervention		
	SVA	PND	Tau
Tilly	✓	×	✓
Mia	✓	?[a]	✓[b]
Paul	✓	×	×
Kaylyn	×	×	×[c]

Note. SVA = systematic visual analysis, PND = Percentage non-overlapping data.

For the majority of comparisons, the effects observed or not observed were similar when comparing from baseline–maintenance, with the following exceptions: [a]An effect of the intervention was observed when comparing from baseline–maintenance. [b]This effect of the intervention was not observed when comparing from baseline–maintenance. [c]A negative effect of the intervention was observed when comparing from baseline–maintenance.

Calculation of PND indicated *questionable effectiveness* of the intervention for one participant, and a *fairly effective* intervention when comparing from baseline to maintenance. Calculation of Tau-U indicated significant positive effects for two of the four participants (baseline–intervention for Mia, and baseline–maintenance for Tilly). One participant demonstrated a significant negative effect (baseline–maintenance for Kaylyn). Combined weighted Tau scores across participants indicated a minimal effect from baseline to intervention which was significant, 0.37, 90% CI [0.13, 0.61], $p = 0.01$. The data suggested possible effects for three of the four participants. However, for the fourth participant, a possible negative effect was observed. These results confirm the hypothesis that the e-mentoring intervention increased hours spent in online conversation for three of the four participants.

7.1.3 Visual inspection of results: Words. It was hypothesised that total words transmitted in online conversation each week would increase after the intervention. The results are displayed for all four participants in Figure 7.13. In Figure 7.13, the scale of the *y*-axis is constant across the participants from 0–550 words. In Week 22, Paul transmitted 541 words, which included two emails. One email about the things he had done during the school holidays was almost 500 words long. Further figures are displayed to support the presentation of the systematic visual analysis for individual participants. The scale varies across these graphs, to allow for marking of trend lines in a legible manner (Figures 7.14, 7.15, 7.16, and 7.17). The data for this sub-question are collected using online conversation transcripts, and for this reason, it was possible to include a pre-baseline phase (A1) for three of the four participants. One participant, Tilly, declined to share these transcripts. Note that the order of participants is varied because of the inclusion of pre-baseline data, and participants are ordered by the week they were allocated to start the intervention.

Changes in words written in online conversation were variable within and across participants. Effects were only visually discernible for one participant. The graphs across participants are displayed first. Following this, the systematic visual analysis and statistical analysis are presented, including tables and graphs for each participant. At the end of this section, the visual and statistical analysis of the words that participants transmitted in online conversation is summarised.

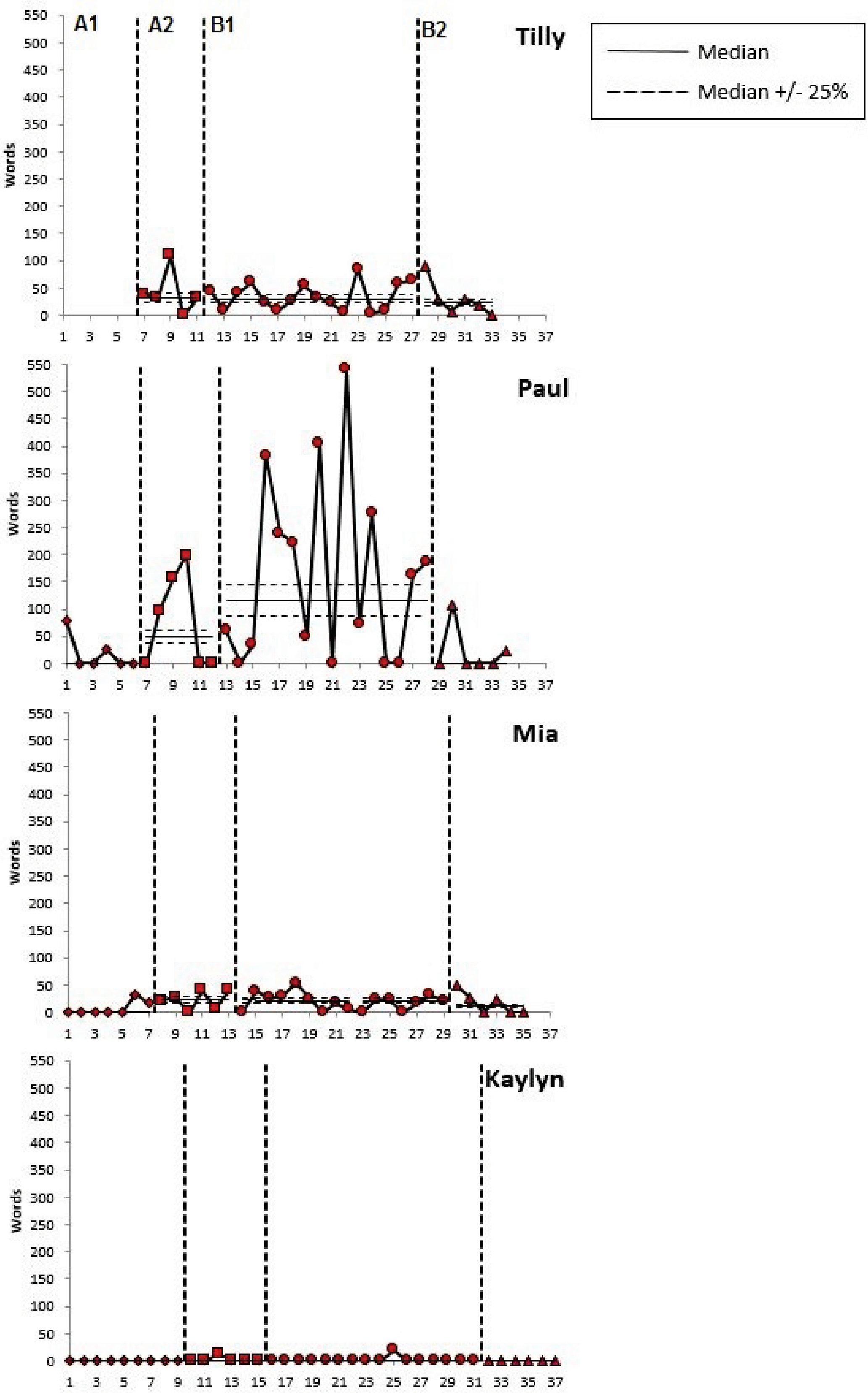


Figure 7.13. Words transmitted in online conversation per week.

7.1.3.1 Tilly: Words.

7.1.3.1.1 *Within-phase analysis.*

For Tilly, evaluation of each phase indicated that data were variable during all phases (Figure 7.13 and Table 7.28). Evaluation of level change indicated performance was deteriorating during baseline, intervention, and maintenance (Table 7.28), although absolute level change improved during baseline. Trend estimation indicated a decreasing contra-therapeutic trend during baseline, intervention, and maintenance. During baseline, in Week 9 Tilly wrote over 100 words. This week was during the middle of the school term, and on review of the transcripts it seems that events during that week may have been related to this increase. For example, in her messages that week Tilly shared that she was involved in an accident at school, a minor fire occurred in her house, and it snowed (which is rare).

Table 7.28

Within-Phase Analysis of Tilly's Words Transmitted in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Baseline	43	32	0–110	67	−19.5	7	40
Intervention	34	30	4–85	25	−6	−18	31
Maintenance	29	23	0–90	50	−18	−90	22

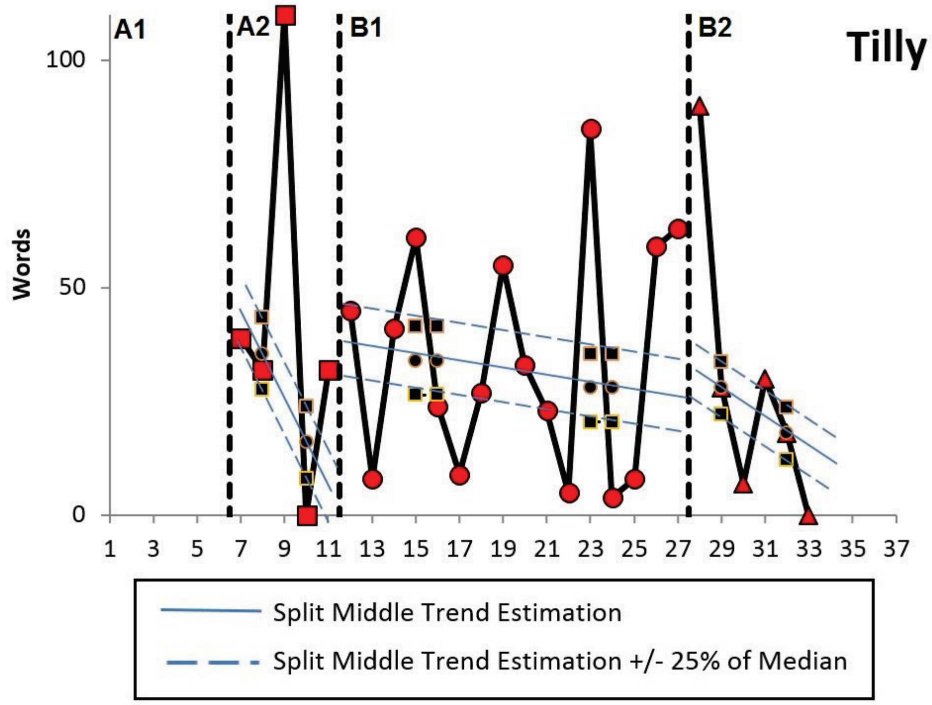


Figure 7.14. Tilly's words transmitted in online conversation per week.

7.1.3.1.2 *Between-phase analysis*

A decelerating, deteriorating trend was found in all phases. Median and Mean level changes indicated deteriorating change across the three phases (Figure 7.14). However, owing to fluctuations in the data absolute level improved in all three phases and relative level also indicated improvements (Table 7.29). Calculations of PND indicated the intervention was *ineffective* (Table 7.30). Calculation of Tau-U also indicated a negligible effect that was not significant (Table 7.30).

Table 7.29

Between-Phase Level Change Analysis of Tilly's Words Transmitted in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	18	13	−2	−9
Baseline–Maintenance	12	58	−9	−14

Table 7.30

Between-Phase Statistical Analysis of Tilly's Words Transmitted in Online Conversation

Phase Changes	PND	Tau-U		
		Tau-U	CI 90%	*p*
Baseline–Intervention	0	−0.06	[−0.56, 0.44]	0.84
Baseline–Maintenance	0	[a] −0.1	[−0.70, 0.50]	0.78

Note. Correction for baseline trend applied.

7.1.3.2 Paul: Words

7.1.3.2.1 *Within-phase analysis*

For Paul, evaluation of each phase indicated data were highly variable across all phases (Figure 7.13). Evaluation of relative level change indicated that performance was constant during pre-baseline and maintenance and deteriorating during baseline and intervention (Table 7.31), although absolute level improved for intervention and maintenance phases. Trend estimation was conducted and indicated a zero-celerating trend during pre-baseline and maintenance and a deteriorating trend during baseline and intervention (Figure 7.15). Data were considered variable in all phases (Table 7.31).

Table 7.31

Within-Phase Analysis of Paul's Words Transmitted in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Pre-baseline	18	0	0–79	66	0	−79	67
Baseline	91	48.5	0–198	0	−97	0	33
Intervention	165	117.5	0–541	0	−24	125	31
Maintenance	22	117.5	0–108	66	0	22	33

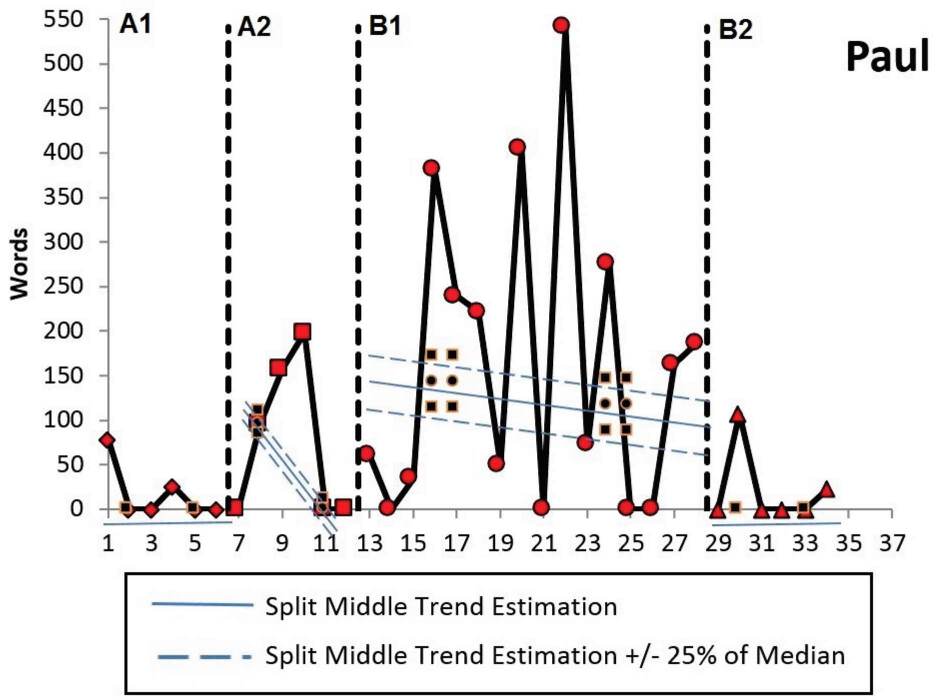


Figure 7.15. Paul's words transmitted in online conversation per week.

7.1.3.2.2 *Between-phase analysis*

With consideration of within-phase analysis of trend, a change in performance was evident from zero-celerating in pre-baseline to decelerating in baseline and intervention and back to zero-celerating in maintenance (Figure 7.15). When comparing from baseline or pre-baseline to intervention, all level change measures indicated improvements (Table 7.32). In other phase comparisons, some level changes indicated no improvements. Calculations of PND indicated the intervention was *ineffective* compared with baseline, although questionably effective when comparing pre-baseline with intervention (Table 7.33). Tau-U was calculated, which demonstrated a minimal and non-significant effect from baseline–intervention and a moderate significant effect from pre-baseline to intervention (Table 7.33).

Table 7.32

Between-Phase Level Change Analysis of Paul's Words Transmitted in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	141.5	61	69	74
Baseline–Maintenance	0	0	69	69
Pre-baseline–Baseline	97	0	48.5	73
Pre-baseline–Intervention	141.5	61	117.5	147
Pre-baseline–Maintenance	0	0	117.5	4

Table 7.33

Between-Phase Statistical Analysis of Paul's Words Transmitted in Online Conversation

Phase Changes	PND (%)	Tau		
		Tau	CI 90%	*p*
Baseline–Intervention	38	[b] 0.36	[−0.10, 0.83]	0.20
Baseline–Maintenance	0	[b] −0.28	[−0.84, 0.30]	0.42
Pre-baseline–Baseline	50	[a] 0.47	[−0.01, 1]	0.18
Pre-baseline–Intervention	50	[a] 0.68	[0.21, 1]	0.02*
Pre-baseline–Maintenance	17	[a] 0.14	[−0.43, 0.71]	0.69

Note. [a]Tau-U = correction for baseline trend applied. [b]$\text{Tau}_{\text{novlap}}$

**p* < .05.

7.1.3.3 Mia: Words.

7.1.3.3.1 *Within-phase analysis.*For Mia, evaluation of each phase indicated data were variable across all phases (although considerably less so in baseline; Figure 7.13 and Table 7.34). Evaluation of level change indicated total words improved during pre-baseline and baseline and deteriorated during intervention and maintenance (Table 7.34), although absolute level improved during intervention. Trend estimation indicated a zero-celerating trend during pre-baseline, an increasing therapeutic trend during baseline and a decreasing contra-therapeutic trend during intervention and maintenance

(Figure 7.16). Despite accounting for trends, data were variable across phases (Table 7.34 and Figure 7.16).

Table 7.34

Within-Phase Analysis of Mia's Words Transmitted in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Pre-baseline	7	0	0–33	71	17	17	71
Baseline	19	22	0–41	33	18	18	40
Intervention	21	23.5	0–53	50	−5	22	31
Maintenance	21	23.5	0–49	0	−28	−49	33

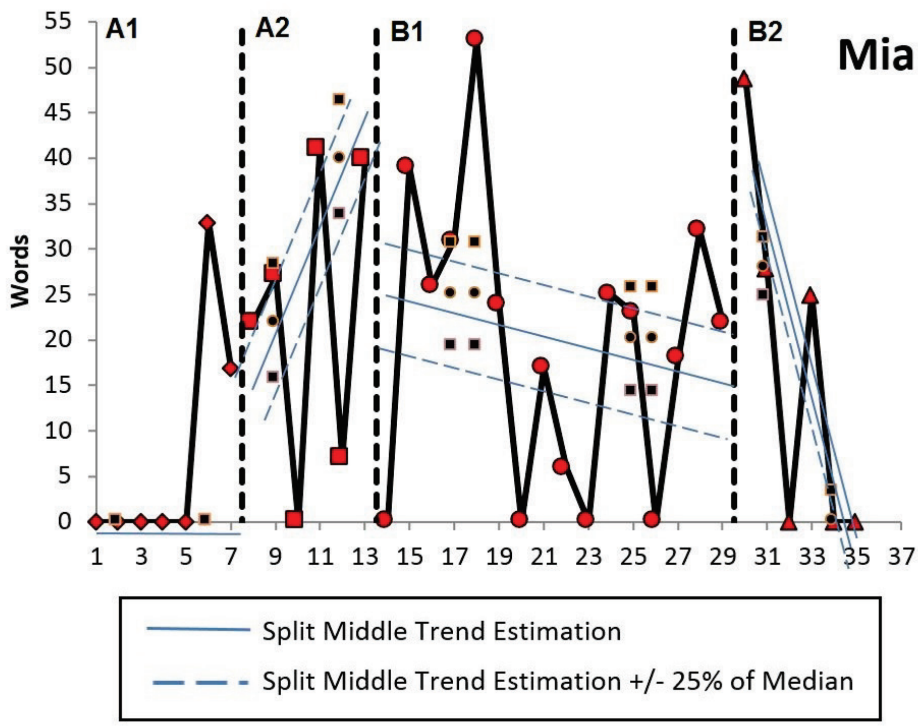


Figure 7.16. Mia's words transmitted in online conversation per week.

7.1.3.3.2 *Between-phase analysis.* Within-phase analysis of trend indicated that a zero-celerating trend in pre-baseline changed to an improving trend in baseline and then to deteriorating trend in intervention and maintenance (Figure 7.16). All level change measures indicated improvements, except for the comparison from baseline to maintenance where the median and mean measures of level change indicated no change or a slightly deteriorating change, respectively (Table 7.35). When investigating changes from pre-baseline to other phases, it was noted that almost all measures of level change indicated improvement (except for pre-baseline to intervention absolute change). PND was *ineffective* across all phases (Table 7.36). Tau indicated minimal to negligible effects that were not significant for any of the phase changes (Table 7.36). Note that Tau trend calculations contradicted the systematic visual analysis trend estimation with correction for an increasing trend applied in pre-baseline (baseline trend $Tau_{trendA1} > 0.2$) but no correction for trend was applied in baseline (baseline trend $Tau_{trendA2} < 0.2$, see Figure 7.16).

Table 7.35

Between-Phase Level Change Analysis of Mia's Words Transmitted in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	7.5	5	1.5	2
Baseline–Maintenance	11.0	32	0.0	−1
Pre-baseline–Baseline	7.5	5	22.0	12
Pre-baseline–Intervention	11.5	17	23.5	14
Pre-baseline–Maintenance	11.0	32	22.0	11

Table 7.36

Between-Phase Statistical Analysis of Mia's Words Transmitted in Online Conversation

Phase Changes	PND (%)	Tau		
		Tau	CI 90%	*p*
Baseline–Intervention	6	[b]0.00	[−0.50, 0.50]	1.00
Baseline–Maintenance	17	[b]0.03	[−0.57, 0.63]	0.93
Pre-baseline–Baseline	20	[a]0.26	[−0.32, 0.84]	0.46
Pre-baseline–Intervention	19	[a]0.41	[−0.03, 0.85]	0.13
Pre-baseline–Maintenance	17	[a]0.21	[−0.33, 0.76]	0.52

Note. [a]Tau-U = correction for baseline trend applied. [b]Tau$_{novlap}$

7.1.3.4 Kaylyn: Words.

7.1.3.4.1 *Within-phase analysis.* For Kaylyn, evaluation of each phase indicated data were stable across phases (Figure 7.13). Evaluation of level change indicated that the words transmitted were constant in all phases (Table 7.37). Trend estimation indicated a zero-celerating trend across all phases (Figure 7.17 and Table 7.37). During two weeks, Kaylyn sent emails. She shared photos with her sister on email, shared photos with her dad on email and sent a brief message to a work colleague in Week 3, and later in Week 25, sent a short email to her dad. Note that data collection included only one social networking platform, email.

Table 7.37

Within-Phase Analysis of Kaylyn's Words Transmitted in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Pre-Baseline	0	0	0	100	0	0	100
Baseline	2	0	0–13	83	0	0	83
Intervention	2	0	0–20	93	0	0	94
Maintenance	1	0	0	100	0	0	100

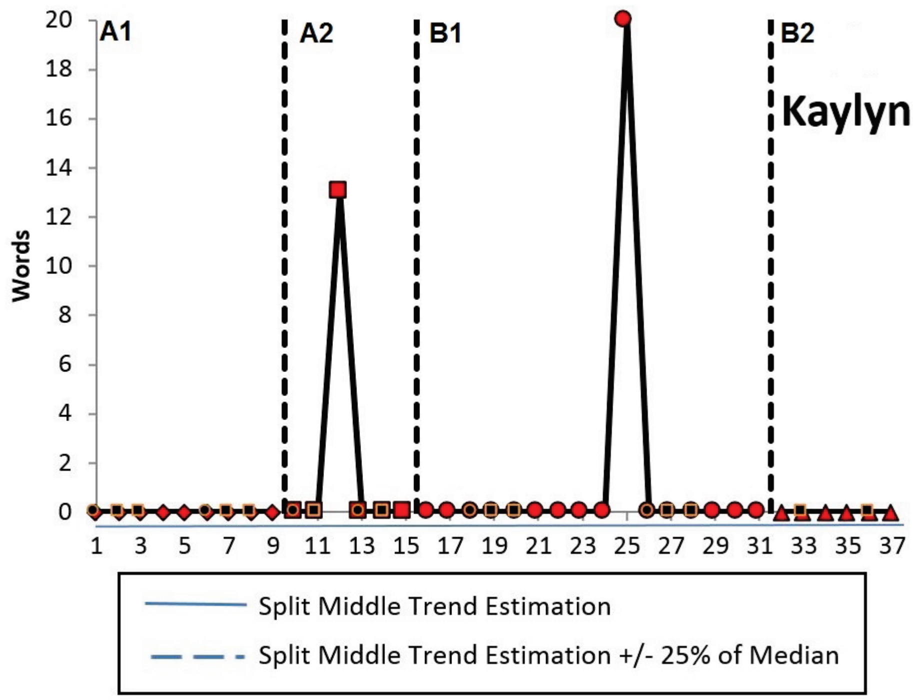


Figure 7.17. Kaylyn's words transmitted in online conversation per week.

7.1.3.4.2 *Between-phase analysis.* Trend remained stable across all phases. Almost all level change measures demonstrated no change, except for mean level change, which is more likely to be influenced by outliers (Figure 7.17). Mean level showed some improvements when comparing other phases with pre-baseline levels and some deterioration when comparing maintenance with baseline and intervention with maintenance (Table 7.38). Calculations of PND indicated treatment was *ineffective* (Table 7.39). Calculation of Tau_{novlap} indicated negligible effects that were not significant (Table 7.39).

Table 7.38

Between-Phase Level Change Analysis of Kaylyn's Words Transmitted in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	0	0	0	0
Baseline–Maintenance	0	0	0	−1
Pre-baseline–Baseline	0	0	0	2
Pre-baseline–Intervention	0	0	0	2
Pre-baseline–Maintenance	0	0	0	1

Table 7.39

Between-Phase Statistical Analysis of Kaylyn's Words Transmitted in Online Conversation

Phase Changes	PND (%)	Tau_{novlap}		
		Tau	CI 90%	*p*
Baseline–Intervention	6	−0.09	[−0.56, 0.37]	0.74
Baseline–Maintenance	0	−0.17	[−0.73, 0.40]	0.63
Pre-baseline–Baseline	17	0.17	[−0.35, 0.68]	0.60
Pre-baseline–Intervention	6	0.06	[−0.34, 0.47]	0.80
Pre-baseline–Maintenance	0	0	[−0.52, 0.52]	1

7.1.3.5 Summary: Words. When comparing from baseline to intervention, systematic visual analysis indicated an effect of the intervention for one participant (Paul) and a questionable effect for a second participant (Mia). When comparing from pre-baseline to intervention, the effect for Mia was more clearly observed (Table 7.40). When comparing from pre-baseline to maintenance, an effect of the intervention was observed for Paul. When using systematic visual analysis, this effect was not observable for the other participants (Kaylyn and Tilly), neither when comparing from pre-baseline nor when comparing from baseline to intervention. Calculation of PND from baseline to intervention or maintenance indicated the intervention was not effective for any participant. However, when comparing from pre-baseline to intervention or maintenance, calculation of PND indicated a questionable effect of the intervention for Paul. Tau-U calculations were only significant for Paul when comparing from pre-baseline to intervention. Combined weighted Tau scores across participants indicated a negligible, non-significant effect from baseline–intervention (0.05; $p = 0.71$). Nevertheless, combined weighted Tau scores comparing from pre-baseline to intervention indicated a minimal and significant effect (0.37; $p = 0.02$).

Table 7.40

Summary of the Visual and Statistical Analysis for Words Transmitted in Online Conversation for all Four Participants

Participant	Pre-Baseline–Intervention			Baseline–Intervention		
	SVA	PND	Tau	SVA	PND	Tau
Tilly[a]				×	×	×
Paul	✓	✓	×[b]	✓[c]	×	×
Mia	✓[d]	×	×	?[b]	×	×
Kaylyn	×	×	×	×	×	×

Note. SVA = systematic visual analysis, PND = Percentage non-overlapping data.

[a]Pre-baseline data were not available for Tilly.

For the majority of comparisons, the effects observed or not observed were similar when comparing from baseline–maintenance, with the following exceptions: [b]An effect of the intervention was observed when comparing from baseline to maintenance. [c]This effect of the intervention was not observed when comparing from baseline to maintenance. [d]An effect of the intervention was not observed when comparing from pre-baseline to maintenance.

Chapter 8: Results, Question 3: Social and self-engagement in Online Conversation

This chapter reports the results for the third research question: What is the effect of a cross-age peer e-mentoring intervention on social and self-engagement in online conversation?

The following paragraphs are adapted from an excerpt of the results section in the pre-print version of, "Exploring Participation Experiences of Youth who use AAC in Social Media Settings: Impact of an e-Mentoring Intervention", by E. Grace et al., 2019, *Augmentative and Alternative Communication, 35,* 132–141. doi:10.1080/07434618.2018.1557250

The SEAS-PCS questionnaire and informal engagement probe were administered to participants using four periodic probes. The four periodic probes coincided with the phases of the experiment and occurred over a total period of approximately 6 months: before baseline (Time 1 [T1]), mid-intervention (after 8 weeks of the 16-week intervention, Time 2 [T2]), post-intervention (Time 3 [T3]), and post-maintenance (Time 4 [T4]) time points. Across these four time points, 16 questionnaires were completed describing reported experiences in a range of informal online conversations. Participants took part in conversations with communication partners other than the mentor on social networking sites of their own choice (Table 8.1). Immediately following, participants completed the SEAS-PCS questionnaire (Batorowicz et al., 2017) and the informal engagement probe designed specifically for this study based on a tool developed by Seekins et al. (2007; see Section 4.3.3). The addition of the informal engagement probe allowed for the inclusion of a proxy-reported measure of the participants' engagement. The results are presented in four sections, an introduction to the 16 activities and contexts, the SEAS-PCS ratings, the informal engagement probe ratings and barriers and facilitators to participation reported by participants. The chapter concludes by highlighting the key results collected regarding participants self- and proxy-reported engagement in online conversation.

8.1 Activity and Context

Both the SEAS-PCS questionnaire and informal engagement probe collected information regarding the participants' social and self-engagement in the activity setting of online conversation. This included information to describe the activity-setting context, such as the place, activity, and social contacts. The SEAS-PCS questionnaire also asked participants to rate their familiarity with the activity, setting, and people from 1 (*not at all familiar*) to 7 (*familiar to a very great extent*).

All participants were asked to engage in social media activities within their home environment. Participants used social media in a range of rooms within their house (bedroom $n = 4$, kitchen or dining room $n = 9$, lounge or family room $n = 2$, and home office $n = 1$). Participant reports on experiences of participation took place in the morning ($n = 4$), afternoon ($n = 9$), and evening ($n = 3$). Appointments were arranged with the researcher and may not reflect times that participants would have otherwise chosen to engage in online conversation outside of the project.

On average, participants reported that they were familiar to a very great extent with the setting (a room in their house) and people with whom they interacted online (Table 8.2). This was consistent across all time points. They reported increasing familiarity with the activity (email or Facebook) across the time points (Table 8.1), except for Paul, who reported being familiar to a very great extent with the activity at T1.

Table 8.1

Ratings of Familiarity with Online Conversation Activities Over Four Times

Participant	Time 1	FR	Time 2	FR	Time 3	FR	Time 4	FR
Paul	Email	7	Email	7	Email	7	Email	7
Mia	Facebook	4	Facebook	7	Facebook	7	Facebook	7
Tilly	i-message	6	i-message	7	i-message & Facebook	6	i-message & Instagram	7
Kaylyn	Email	1	Email	1	Email	7	Email	7

Note. FR = familiarity rating, participants rated familiarity with the activity from 1 (*not at all*) to 7 (*to a very great extent*).

Table 8.2

Ratings of Familiarity with the People with Whom Online conversation were Undertaken over Four Times

Participant	Time 1	FR	Time 2	FR	Time 3	FR	Time 4	FR
Paul	Friends	7	Friends	6	Other relatives	7	Friends	7
Mia	Parents	7	Parents, other relatives, friends	7	Parents, friends	5	Parents, friends	7
Tilly	Friends	7	Other relatives, friends	7	Friends	7	Other relatives, friends	7
Kaylyn	Parents	7	Parents	7	Parents, other	7	Parents, other	7

Note. FR = familiarity rating; participants rated familiarity with people from 1 (not at all) to 7 (to a very great extent).

All participants reported help from parents and/or the researcher in filling out the SEAS-PCS questionnaire in recording the answers on the questionnaire (*n* = 9), reading the questions (*n* = 16), and/or explaining the words (*n* = 15). Parents and participants were invited to provide open comments at the end of the SEAS-PCS questionnaire

(Table 8.3). All participants were supported to respond to the items by the researcher with or without further support from a parent.

Table 8.3

Did You Feel Any Different after Doing this Activity? Please Explain:

Participant	Time 1	Time 2	Time 3	Time 4
Paul	No	I felt happy	No	No
Mia	No	Thankyou	No	No
Tilly	No	No	No	No
Kaylyn	Good at the start, unsure, great	No	Yes, felt good	Yes, it felt good

8.2 Mean Ratings on SEAS-PCS

The SEAS-PCS questionnaire includes 22 items that probe participation experiences across five domains related to engagement: Personal Growth, Psychological Engagement, Social Belonging, Meaningful Interactions, and Choice and Control. Respondents rate their in-the-moment experiences on a 7-point bipolar scale (+3 to −3) with four scale anchors, strongly agree (+3 or −3), agree (+2 or −2), and agree a little (+1 or −1), with an option for neither (0) at the midpoint of the scale. Ratings on the SEAS are presented in the following order: (a) the total score across time, (b) variation in participants rating of the different domains, and (c) changes in domains across time (Table 8.4).

Table 8.4

Mean SEAS-PCS Ratings

Domain	Time 1	Time 2	Time 3	Time 4
	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)
Psychological Engagement	2.94 (0.13)	2.38 (0.52)	2.63 (0.75)	2.25 (1.02)
Social Belonging	2.44 (0.43)	2.54 (0.59)	2.63 (0.75)	2.38 (1.25)
Choice and Control	2.25 (1.02)	2.31 (0.72)	2.38 (1.25)	2.88 (0.25)
Meaningful Interactions	2.00 (0.98)	1.56 (1.28)	1.50 (2.12)	2.38 (1.09)
Personal Growth	0.95 (2.23)	−0.04 (1.74)	−0.25 (2.75)	0.46 (2.95)
All Domains	2.05 (0.80)	1.59 (0.64)	1.59 (1.32)	1.92 (1.34)

Using all 22 items of the SEAS-PCS questionnaire, which employs a +3 to −3 scale, participants reported predominantly positive experiences of participation (i.e., ratings were between +1 and +3). Mean ratings, across all domains, were slightly higher before and 6 weeks post the intervention and slightly lower during and directly following the intervention (Table 8.4). This pattern was similar across participants, except for Tilly

(Figure 8.1); although, this varied across domains (Table 8.4).

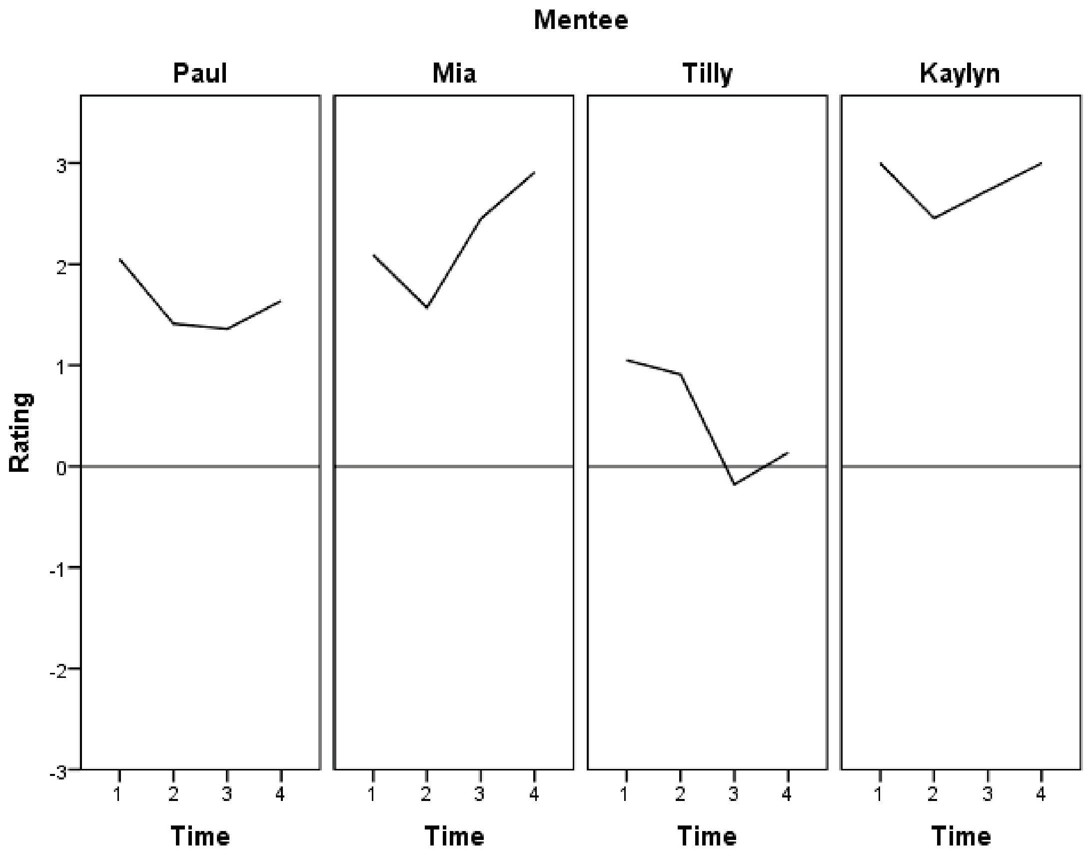


Figure 8.1. Mean SEAS-PCS rating at each time point across participants.

A key finding of the mean ratings for each domain across time was that participants reported positive experiences of psychological engagement, social belonging, and choice and control while having a conversation online. Mean ratings were at the top end of the scale, between +2 (*agree*) to +3 (*strongly agree*), at all time points for these three domains. Participant ratings on the Meaningful Interactions domain were slightly lower, ranging from +1 (*agree a little*) to +2 (*agree*). Ratings on the Personal Growth domain were lowest, ranging from +1 (*agree a little*) to −1 (*disagree a little*; Table 8.4).

Reported experiences of choice and control slightly increased across time and reported experiences of social belonging remained relatively stable across the time points. Reported experiences of psychological engagement and personal growth were rated highest at T1, whereas meaningful interactions were rated highest at T4 (Table 8.4).

This is the end of the excerpt of the results section from the pre-print version of, “Exploring Participation Experiences of Youth who use AAC in Social Media Settings: Impact of an e-Mentoring Intervention”, by E. Grace et al., 2019, *Augmentative and Alternative Communication, 35,* 132–141. doi:10.1080/07434618.2018.1557250

8.3 Self- and Proxy Ratings on Engagement Probe

A study-specific probe was developed to allow for proxy reporting of engagement in online conversation and was based on a previously published tool by Seekins et al. (2007). The participants and mothers both rated three statements relevant to their engagement in online conversation and more specifically describing their; involvement or attentiveness, connection with others and fulfilment during the online conversation. Each statement was rated on a scale from 1–10 where 1 indicated *not at all so* and 10 indicated *very much so* (e.g., How fulfilled do you think you are/your child is when having this conversation online). Ratings were made based on the same online activity as used for the SEAS-PCS tool. Ratings on the informal engagement probe are presented in the following order: change in mean self and proxy scores for all participants across time, and variation in self and proxy ratings of the different items.

Overall, mean ratings by participants and their mothers were high across all time points with the highest mean rating at T1 (M = 9.42) by participants and the lowest rating at T4 by mothers (M = 7.42; Table 8.5). Ratings by participants and mothers were slightly lower at T4 compared with mean ratings at T1, T2, and T3. This pattern was also evident for three of the four participants (Paul, Mia, and Tilly; Figure 8.2). Participants reported barriers to participation in online conversation at T4 that are discussed further below and may have contributed to the decrease in ratings, particularly of connectedness and fulfilment.

Ratings were provided for three questions intended to target different aspects of social and self-engagement in online conversation (involvement or attentiveness, connectedness, and fulfilment). For two participants (Paul and Kaylyn), no variation in ratings across these items was observed. For the remaining two participants (Mia and Tilly), ratings across the domains were distinct from each other. Tilly rated connectedness and fulfilment similarly but differently from involvement. Tilly's mother rated all three differently. Mia and her mother both rated the three questions differently from each other. Both participants and mothers rated involvement at higher levels than connectedness or fulfilment. Involvement did not seem to be affected as much by the barriers experienced (e.g., problems with technology, access or lack of communication partners available online). At T4, Mia required support from her mother to enter text owing to a technical problem with her AAC system; her mother rated her fulfilment very low following this experience, although at T1, this would have been a usual occurrence for Mia.

Table 8.5

Mean Ratings on Informal Engagement Probe at Four Time Points.

Question		Time 1	Time 2	Time 3	Time 4
		Mean (*SD*)	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)
Involved/Motivated	Self	10 (0)	9.5 (1.00)	8.75 (1.89)	9.25 (0.96)
	Proxy	8.5 (3.00)	10 (0)	9 (2.00)	9 (1.41)
Connected	Self	8.75 (2.50)	8.5 (3.00)	7.75 (2.63)	6.5 (3.70)
	Proxy	9 (2.00)	8(4.00)	9 (2.00)	7 (3.56)
Fulfilled	Self	9.5 (1)	9 (1.15)	8 (2.83)	7.5 (2.38)
	Proxy	9.5 (1.00)	9.75 (0.5)	9.75 (0.5)	6.25 (3.86)
Mean	Self	9.42 (0.79)	9.00 (1.59)	8.17 (2.38)	7.75 (2.03)
	Proxy	9.00 (2.00)	9.25 (1.29)	9.25 (1.50)	7.42 (2.70)

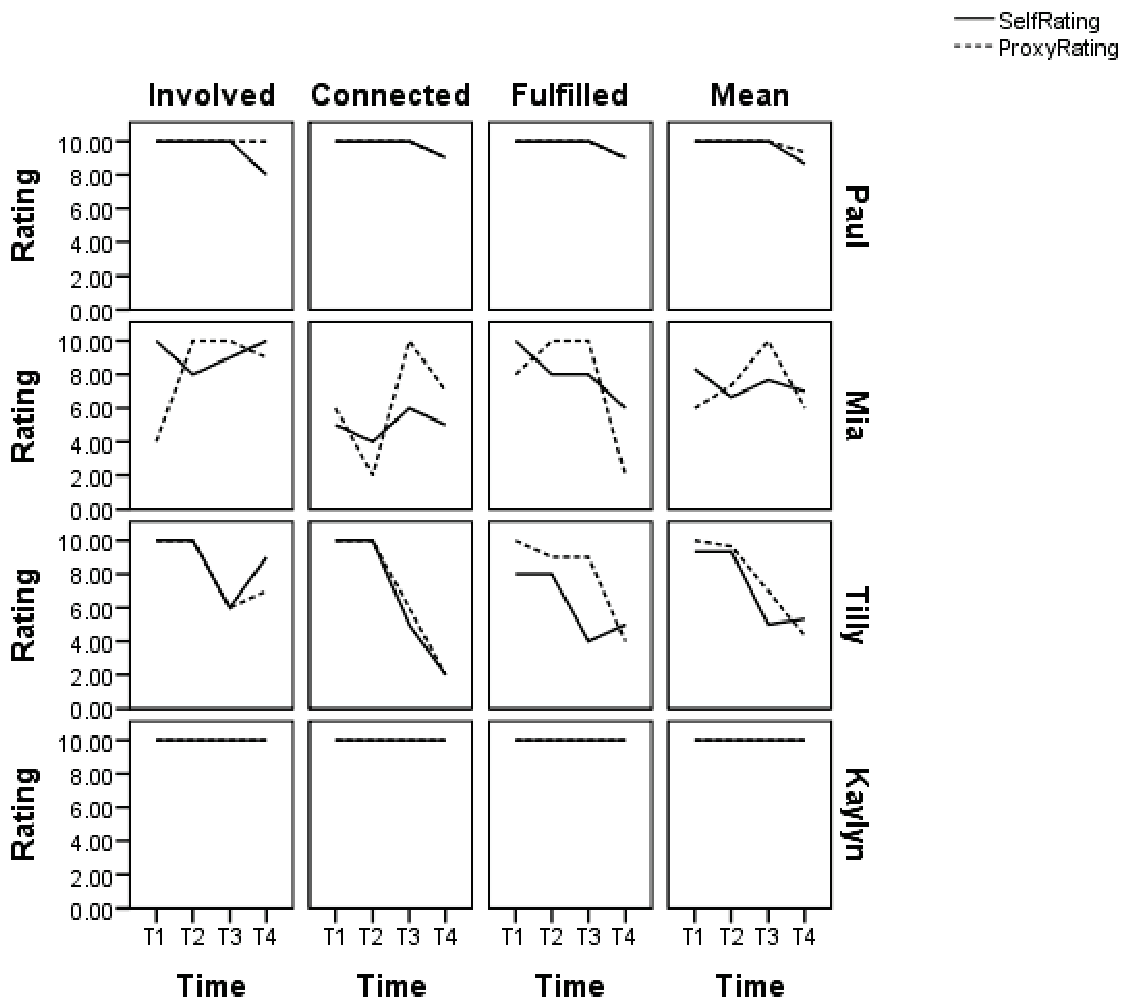


Figure 8.2. Engagement probe ratings.

8.4 Facilitators and Barriers

A small range of facilitators and barriers were reported across the time points by participants or their mothers in response to questions on the SEAS-PCS questionnaire and informal engagement probe. Perhaps participants and their mothers felt that some barriers and facilitators were part of a "typical day" and therefore did not list these factors when responding to the final question (Table 8.6). The prompts for reporting of facilitators and barriers included in the informal engagement probe were adapted from the Seekins et al. (2007) tool. These questions were designed to prompt participants and their mothers to report barriers and facilitators they were experiencing to participation in online conversation. The SEAS-PCS questionnaire also included a prompt for further information; the data collected in response to this question similarly informed the researcher regarding facilitators and barriers for participants. The information is reported and discussed below, first for the informal engagement probe and then for the SEAS-PCS item.

Table 8.6

Prompt for Reporting Facilitators and Barriers to Participation in Online Conversation (Seekins et al., 2007)

Is it a typical day? Do you think this is how you usually use the computer to have conversations online? Is there anything that's happened to you that has made it harder/easier today? (e.g., pain, fatigue, seizures, and/or medication effects)? Are there any supports or barriers making it easier/more difficult to use the computer for online conversation today? (e.g., communication, environment, support from someone, physical access, social, and/or other things).

Participants and their mothers reported facilitators and barriers relevant to the participant's in-the-moment experiences of online conversation, elicited using prompts provided by the researcher (Table 8.6). The researcher reviewed all reports and evaluated them as either facilitators or barriers to participation in online conversation (Table 8.7). The researcher also reviewed reports provided using the question "Please feel free to tell us anything else about your child's experiences in a different activity setting that you would like us to know" included in the SEAS-PCS questionnaire. Reports provided on the SEAS-PCS item were largely consistent with the responses collected using the engagement probe and are therefore reported together; three additional barriers were added (all reported by Paul and his mother) and one facilitator was edited to include more specific information (reported by Mia and her mother; Table 8.7). Overall, participants reported more barriers (n = 18) than facilitators (n = 10), and this was not consistent in individual-participant reports. An increase in barriers was reported at later time points T3 and T4 (*n* = 6) compared with earlier time points T1 (*n* = 3) and T2 (*n* = 3). In contrast, reports of facilitators consistently decreased over time. These patterns, increased barriers compared with facilitators and increased barriers across time, are discussed for each participant (Table 8.7).

Tilly and her mother reported the most facilitators and barriers (*n* = 12) and reported three times more barriers (*n* = 9) than facilitators (*n* = 3). They reported no barriers or facilitators at T4. Paul and his mother also reported more barriers (*n* = 6) than facilitators (*n* = 1). The barriers were all reported at T3 and T4, and the facilitator was reported at T3.

Divergent from the overall pattern observed, Mia reported slightly more facilitators (*n* = 4) than barriers (*n* = 3). Two of the three barriers were observed at T4. Also divergent from the overall pattern, Kaylyn reported only facilitators (T1 and T2).

Table 8.7

Is There Anything That's Happened to you That has Made This Harder or Easier Today? Facilitators/Barriers

Reports	T1	T2	T3	T4
Barriers	Pressure of expectations (Tilly) Increased involuntary movements (Tilly) Increased tone (Tilly)	Involuntary movements (Tilly) Increased tone (Tilly) Time taken to construct a message (Mia)	Pressure of expectations (Paul) Technical difficulties with computer and AAC device connection (Paul) Involuntary movements (Tilly) Timing of activity with medication (reduced control of arms; Tilly) Tired since close to end of school term (Tilly) Tense because being observed (Tilly)	No available communication partners online (Paul) Reached limit of concentration (Mia) Keyboard not responding correctly (Mia) Keyguard broken, and therefore, positioning of device was different (Paul) Sound was difficult (Paul) [a]Mother directed interaction with the intent of being "correct" for the research (Paul)
Facilitators	Happy (Mia) Excited (Mia) Focused (Mia) New activity (Kaylyn)	Feels like a level playing field (Tilly) Not something we do every day (Kaylyn)	Mother supporting access (Tilly) Freedom to participate on own and in own time (Tilly) Liked talking to them (Paul)	Participant's new persistence (with technology challenges) not present prior to the intervention (Mia)

Note. Reports include both self- and proxy reports.

[a]The researcher has interpreted it as a barrier to engagement, although Paul's mother likely viewed this direction as a facilitator

Self- and proxy reports of facilitators and barriers were reviewed by the researcher to investigate possible overarching influences affecting the participants' experiences of engagement in online conversation (Table 8.8). Four overarching themes were identified, namely, the influence of (a) motivation, (b) the research process, (c) social contacts, and (d) the computer-mediated environment for conversation. Consistent with the items on the SEAS-PCS and engagement probe, participants identified the influence of motivation on their engagement in the activity of online conversation. It seems likely that engagement was influenced both positively and negatively by the research process and intervention (influencing motivation, creating opportunity for participation, directing participation at a specified time, and developing persistence with activity). Social contacts were reported by Paul as a facilitator and barrier to his engagement (Table 8.8). The computer-mediated environment for online conversation was reported to influence engagement both positively and negatively. For example, barriers reported included challenges with physical accessibility and operating skills, and facilitators included increased time available for taking a turn in the conversation and being like others.

Table 8.8

Is There Anything That's Happened to you That has Made This Harder or Easier Today? Themes

Reports	T1	T2	T3	T4
Motivation	Happy Excited Focused	No data	No data	Participants persistence (with technology challenges)
Involvement in the research project Influenced motivation Created opportunity Developed persistence Provided direction to participate at a specified time	Excited Focused New activity Pressure of expectations	Not something we do everyday	Pressure of expectations Tired since close to end of school term Tense because being observe	Participants persistence (with technology challenges) Reached limit of concentration

Table 8.8 Continued

Reports	T1	T2	T3	T4
Social contacts	No data	No data	Liked talking to them	No available communication partners online
Online conversation Physical accessibility to type message Problems with operating technology Increased time Being like others	Increased involuntary movements Increased tone	Feels like a level playing field Time taken to construct a message Involuntary movements Increased tone	Freedom to participate on own and in own time Mum supporting access Technical difficulties with computer and AAC device connection Involuntary movements Timing of activity with medication (reduced control of arms)	Keyboard not responding correctly No available communication partners online

Note. Reports include both self- and proxy reports.

8.5 Summary

In this final section, some observations are made regarding the ratings on the engagement probe (Figure 8.2), SEAS-PCS (Figure 8.1) and ways in which these align with each other and with the reported facilitators and barriers (Table 8.7). This comparison is made within individual participants before highlighting key results across participants.

On the engagement probe, Kaylyn and her mother rated all items at 10 for all items and all time points (Figure 8.2), which is consistent with Kaylyn's ratings on the SEAS-PCS and consistent with the lack of barriers reported across all time points.

Paul and his mother rated items on the engagement probe at the maximum available rating at times 1, 2, and 3 (Figure 8.2). Their ratings at T4 were slightly lower, which may be related to the reported lack of participants to interact with online at T4 (Table 8.7). Patterns on the SEAS-PCS were different (i.e., lower at T2 and T3 than at T1 and T4, Figure 8.1). Perhaps the barriers experienced at T4 more strongly affected ratings on the engagement probe than those on the SEAS-PCS.

Ratings by Mia and her mother were more varied in their responses to items both on the SEAS-PCS (Figure 8.1) and on the engagement probe (Figure 8.2). Mean ratings on the engagement probe showed no clear trend across time and were distinct from the pattern of ratings on the SEAS-PCS. For example, ratings were higher at T4 on the SEAS-PCS but lower on the engagement probe. Possibly, ratings on the engagement probe were more strongly influenced by the barriers Mia experienced at T4 (Table 8.7).

Ratings by Tilly and her mother followed a decreasing trend across time, as evident on both the SEAS-PCS (Figure 8.1) and on the engagement probe (Figure 8.2), and this trend may be related to reports of increasing difficulties with voluntary movement, particularly at T3 (Table 8.7).

Participants reported positive experiences of engagement on both the SEAS-PCS and engagement probe. These ratings had some variation across time and across participants. There does not appear to be a clear effect of the intervention across time. Participants reported facilitators and barriers to engagement in online conversation that were related to participants' motivation and social contacts, the computer-mediated environment for conversation, and the influence of the research process on participant experiences. Reported barriers were increased at T3 and T4, which may have affected ratings at these times.

Chapter 9: Results, Question 4: Linguistic Analysis

The results presented in this chapter address the question: What is the effect of a cross-age peer e-mentoring intervention on written online conversation of mentees when they communicated with partners other than their mentor on one targeted social networking platform? Conversations between the participants and their online communication partners on one chosen social networking platform were collected across all phases of the experiment. A language-focused CA developed specifically for this study was used to investigate the moves, functions, and communication modes present in the online conversation. A sequential qual → QUAN approach (Creswell, 2014) was used qualitative approach was used to develop and refine codes. Once qualitative coding was completed, a quantitative approach was applied using simple CA (Green & Thorogood, 2014). Measures selected were graphically displayed to investigate the sub-questions: What is the effect of intervention on:

- total number of moves taken;
- type of linguistic moves taken (e.g., initiations of conversation, initiations of topic, obligatory responses, and optional responses that keep the conversation going);
- range and type of modes used; and
- range and type of pragmatic functions (e.g., informative, feedback, requests, and social) used?

Data are described using systematic visual analysis of trend, level, and stability (Lane & Gast, 2014, see Section 4.10). Statistical analysis consisted of calculation of PND (Scruggs et al., 1987) and Tau_{novlap} or Tau-U (Parker, Vannest, Davis, & Sauber, 2011). Combined effect size was also calculated as an indicator of the effectiveness of the intervention across participants (Ganz, Goodwn, et al., 2013; Parker, Vannest, Davis, & Sauber, 2011). The letters assigned to phases and number of observations in each phase are listed in Table 9.1.

Table 9.1

Phases of the Experiment

	ID	Legend	N
Pre-Baseline	A^1		5–9
Baseline	A^2		5–9
Intervention	B^1		16
Maintenance	B^2		6

Note. ID = letter assigned to phase; N = number of observations

9.1 Question 4.1. Total Moves

It was hypothesised that the total number of participants' moves taken in online conversation would increase after the intervention. The results are displayed for all four participants in Figure 9.1. Further figures are displayed to support the presentation of the systematic visual analysis for individual participants.

A small increase in total moves taken in online conversation, including obligatory and optional moves, was observed for Mia and Paul when comparing from pre-baseline to intervention. The graphs across participants are displayed first. Following this, the systematic visual analysis and statistical analysis are presented, including tables and graphs to display the data, for each participant. At the end of this section, the visual and statistical analysis of the total moves taken in online conversation is summarised.

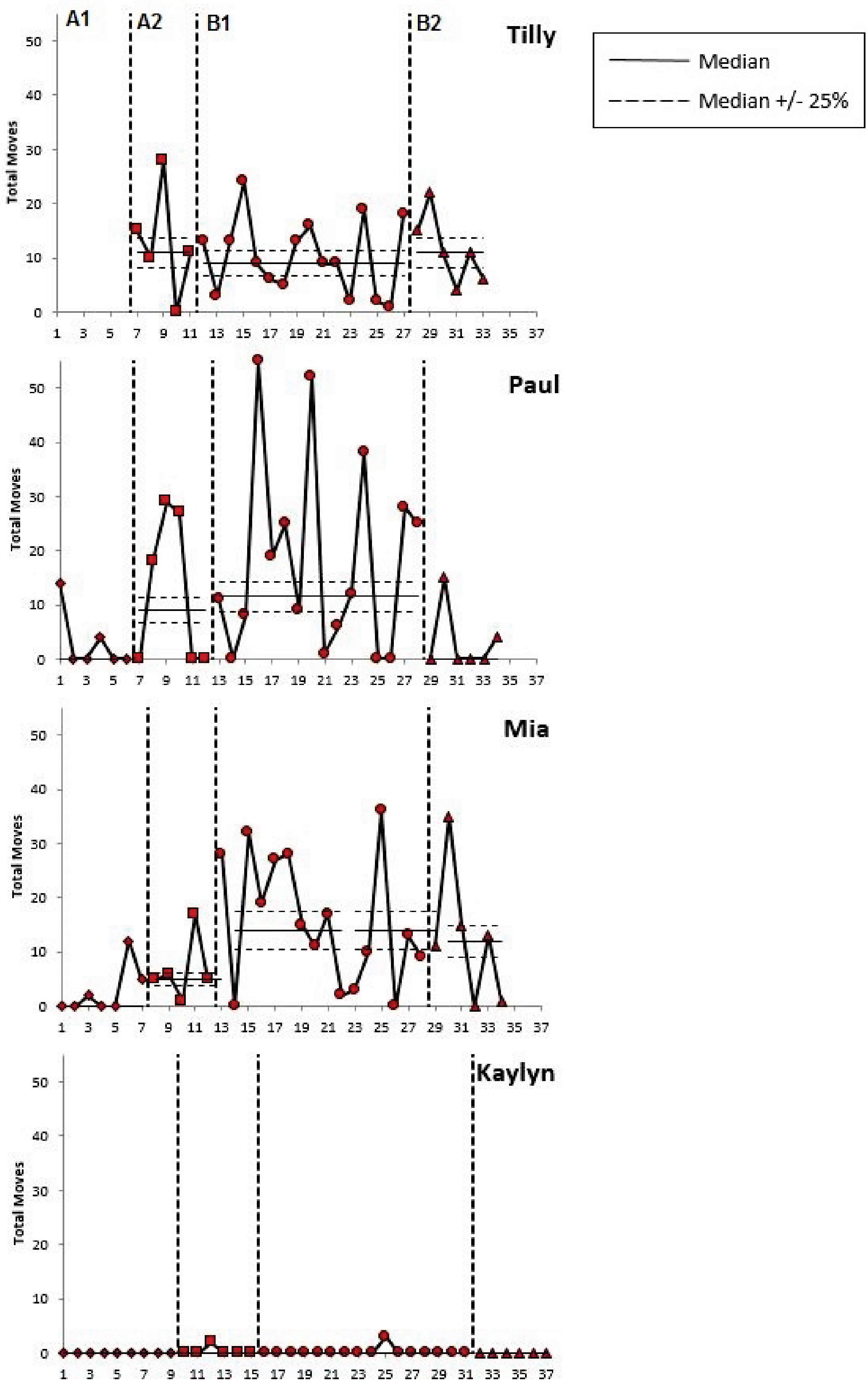


Figure 9.1. Total moves in online conversation per week.

9.1.1 Visual inspection of results: Total moves.

9.1.1.1 Question 4.1. Tilly: Total moves. The total moves taken in conversation included initiations of conversation, initiations of topic, obligatory responses, and optional responses. Examples of moves taken by Tilly are provided in Figure 9.2.

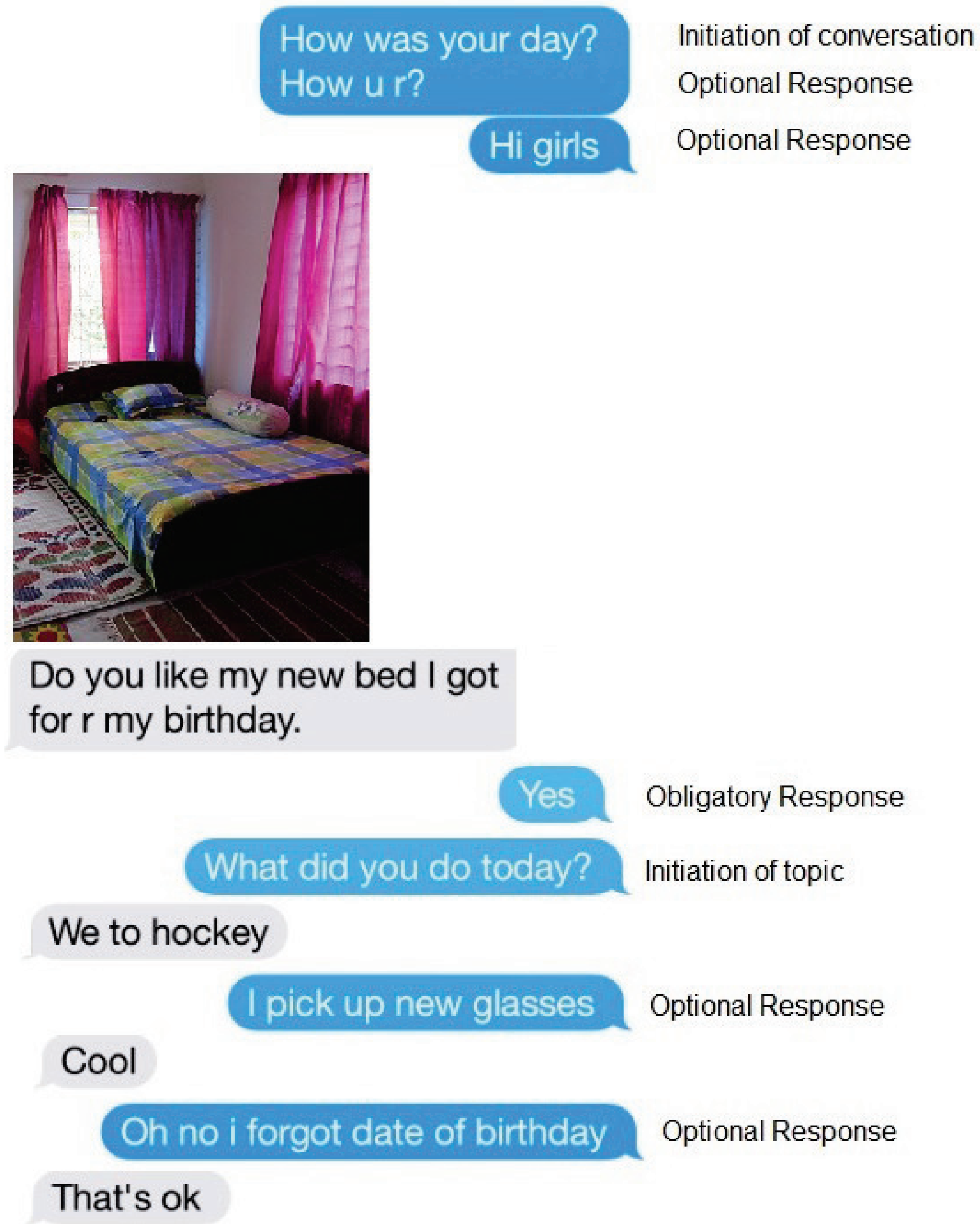


Figure 9.2. Example of move types taken by Tilly. Picture has been changed to maintain confidentiality.

9.1.1.1.1 *Within-phase analysis.* Evaluation of each phase indicated that data were variable during all phases (Table 9.2 and Figure 9.1). Evaluation of level change indicated total moves decreased during baseline, intervention, and maintenance, although absolute level change improved during intervention (Table 9.2). Trend estimation indicated a decreasing contra-therapeutic trend during all phases (Figure 9.3). Even with consideration of trend, data were variable (Figure 9.3 and Table 9.2).

Table 9.2

Within-Phase Analysis of Tilly's Total Moves in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Baseline	13	11	0–28	40	−7	−4	40
Intervention	10	9	1–24	19	−2	5	38
Maintenance	12	11	4–22	33	−9	−11	50

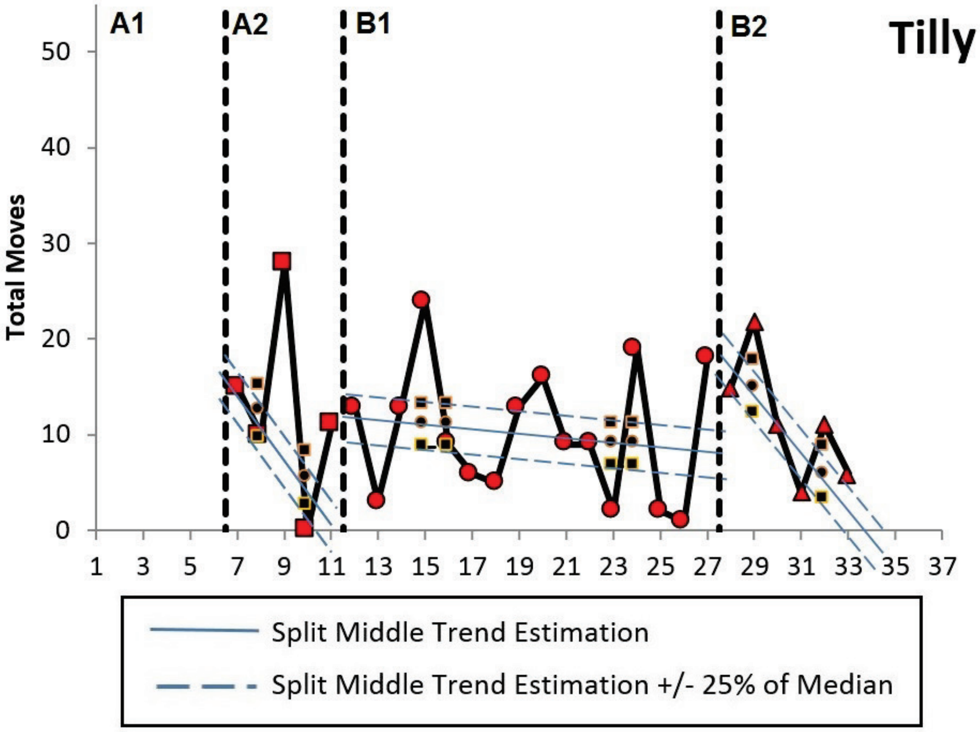


Figure 9.3. Tilly's total moves in online conversation per week, with trend marked.

9.1.1.1.2 *Between-phase analysis.* A decelerating trend was found in all phases (Figure 9.3). Median and mean level changes indicated deteriorating or no change, and absolute and relative level indicated improvements (Table 9.3). Calculations of PND indicated that the intervention was *ineffective* (Table 9.4). Calculation of Tau-U also indicated a negligible effect that was not significant (Table 9.4).

Table 9.3

Between-Phase Level Change Analysis of Tilly's Total Moves in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	5.5	2	−2	−3
Baseline–Maintenance	9.5	4	0	−1

Table 9.4

Between-Phase Statistical Analysis of Tilly's Total Moves in Online Conversation

Phase changes	PND	Tau-U		
		Tau-U	CI 90%	p
Baseline–Intervention	0	−0.13	[−0.62, 0.37]	0.68
Baseline–Maintenance	0	0.03	[−0.57, 0.63]	0.09

9.1.1.2 Question 4.1. Paul: Total moves. The total moves taken in conversation included initiations of conversation, initiations of topic, obligatory responses, and optional responses. Examples of moves taken by Paul are provided in Figure 9.4.

Figure 9.4. Example moves taken by Paul in an email conversation.

9.1.1.2.1 *Within-phase analysis.* Evaluation of each phase indicated data were unstable, fluctuating across the phases with larger fluctuations during intervention (Table 9.5 and Figure 9.1). Level change analysis provided variable results (Table 9.5). Level change measures either deteriorated or remained constant during pre-baseline and baseline, deteriorated or improved during intervention, and did not change or improved during maintenance. Trend estimation indicated a decreasing contra-therapeutic trend during baseline and intervention and a zero-celerating constant trend during pre-baseline and maintenance (Figure 9.5). In this regard, a review of data patterns in both pre-baseline and maintenance indicates variation from this constant trend in both phases, suggesting inconsistent increased participation in online conversation occurred in both these phases. Application of a stability envelope indicated that data were unstable in all phases (Figure 9.5 and Table 9.5).

Table 9.5

Within-Phase Analysis of Paul's Total Moves in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Pre-baseline	3	0	0–14	67	0	−14	67
Baseline	15	9	0–29	0	−18	0	50
Intervention	18	11.5	0–55	25	−6	14	13
Maintenance	3	0	0–15	67	0	4	67

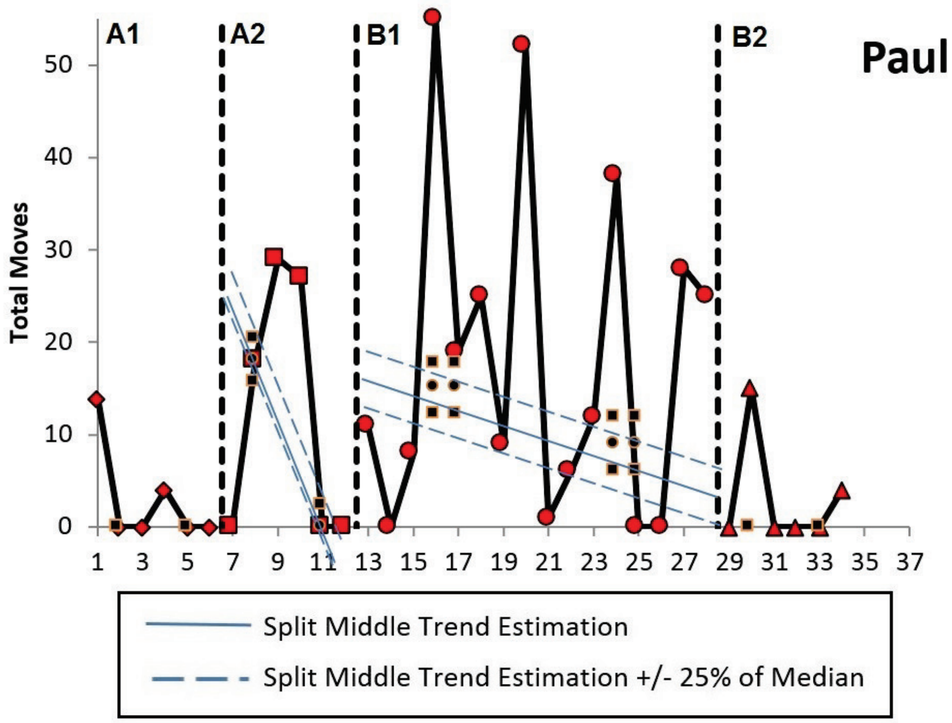


Figure 9.5. Paul's total moves in online conversation per week, with trend marked.

9.1.1.2.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, total moves across phases went from constant during pre-baseline to decreasing during baseline and intervention and back to a constant trend during maintenance (Figure 9.5). All level change measures when comparing from baseline to intervention and from pre-baseline to intervention were positive (Table 9.6). Visual analysis of trend and level suggests a possible effect of the intervention for Paul. Calculations of PND from baseline indicated the intervention was not effective, PND remained *ineffective*, when comparing to pre-baseline (Table 9.7), although PND indicated a questionable effect when comparing pre-baseline to baseline. Calculation of

Tau indicated a moderate significant effect from pre-baseline to intervention (Table 9.7).

Table 9.6

Between-Phase Level Change Analysis of Paul's Total Moves in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	15	11	2.5	3
Baseline–Maintenance	0	0	−9	−12
Pre-baseline–Baseline	18	0	9	12
Pre-baseline–Intervention	15	11	11.5	15
Pre-baseline–Maintenance	0	0	0	0

Table 9.7

Between-Phase Statistical Analysis of Paul's Total Moves in Online Conversation

Phase Changes	PND (%)	Tau		
		Tau	CI 90%	*p*
Baseline–Intervention	19	[b]0.20	[−0.27, 0.66]	0.48
Baseline–Maintenance	0	[b]−0.33	[−0.90, 0.24]	0.34
Pre-baseline–Baseline	50	[a]0.47	[−0.10, 1]	[a]0.47
Pre-baseline–Intervention	44	[a]0.67	[0.19, 1]	0.02*
Pre-baseline–Maintenance	17	[a]0.17	[−0.40, 0.74]	0.63

Note. [a]Tau-U = correction for baseline trend applied. [b]$\text{Tau}_{\text{novlap}}$

**p* < .05.

9.1.1.3 Question 4.1. Mia: Total Moves. The total moves taken in conversation included initiations of conversation, initiations of topic, obligatory responses, and optional responses. Examples of moves taken by Mia are provided in Figure 9.6.

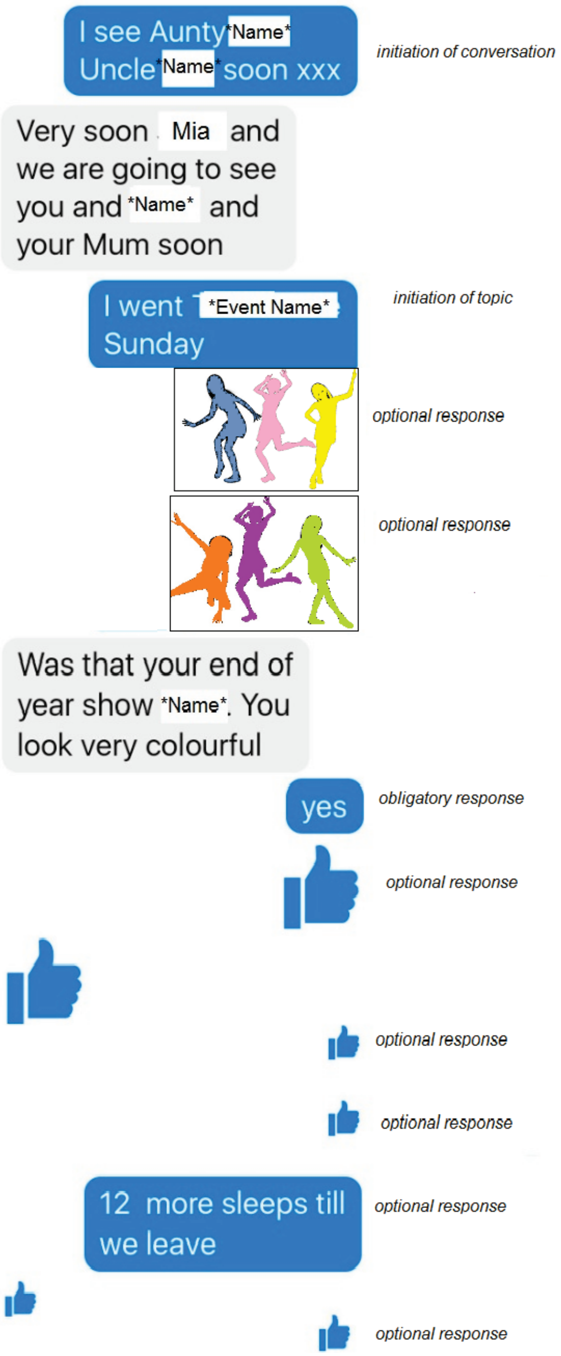


Figure 9.6. Example moves taken by Mia in online conversation. Photos have been changed to preserve confidentiality.

9.1.1.3.1 *Within-phase analysis.* Evaluation of each phase indicated data were variable, particularly during intervention (Table 9.8 and Figure 9.1). Evaluation of level change was inconsistent, with the fluctuations observed in the data across all phases (Table 9.8). Trend estimation indicated an increasing trend during pre-baseline and baseline and a decreasing trend during intervention and maintenance (Figure 9.7). Data were variable in all phases even when considering trend (Figure 9.7 and Table 9.8).

Table 9.8

Within-Phase Analysis of Mia's Total Moves in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Pre-baseline	3	0	0–12	57	5	−5	57
Baseline	7	5	1–17	60	5.5	0	40
Intervention	16	14	0–36	31	13.5	−19	25
Maintenance	13	12	0–35	50	−14	−10	33

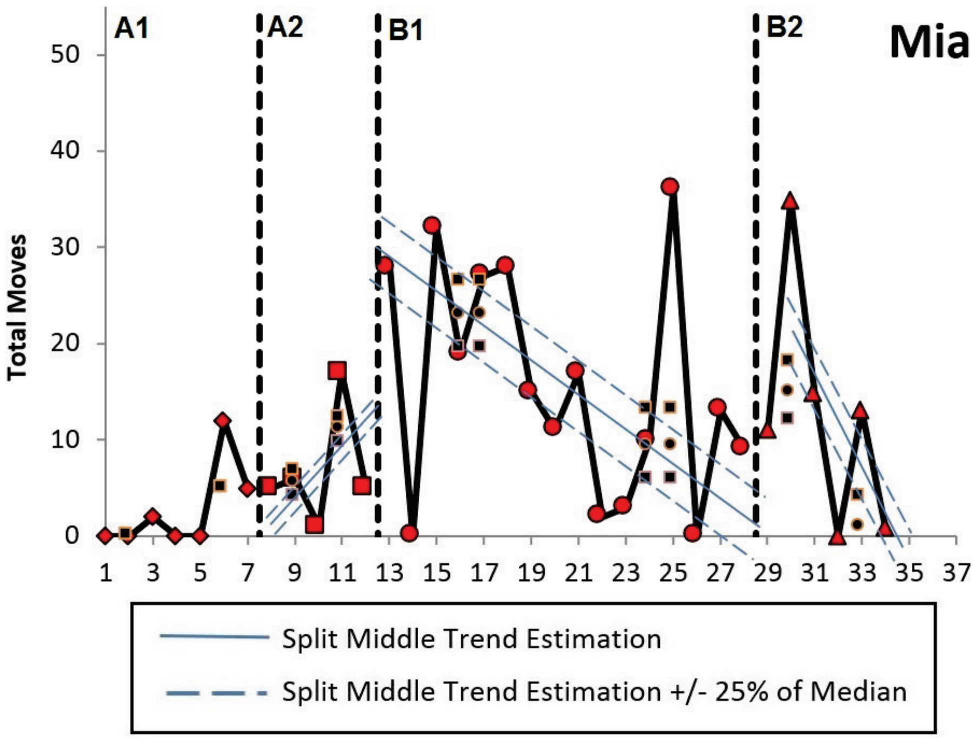


Figure 9.7. Mia's total moves in online conversation per week, with trend marked.

9.1.1.3.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, change in performance went from accelerating in pre-baseline and baseline to decelerating during intervention and maintenance (Figure 9.7). This may indicate that initial increases observed, possibly due to the intervention, were not maintained through the long intervention and maintenance period. All level change measures indicated either no change or improvement, suggesting an effect of the intervention for Mia (Table 9.9). Calculations of PND indicated the intervention had *questionable effectiveness* when considering pre-baseline to intervention or maintenance (Table 9.10). The Tau-U calculated demonstrated a moderate and significant effect from pre-baseline to intervention (Table 9.10).

Table 9.9

Between-Phase Level Change Analysis of Mia's Total Moves in Online Conversation

Phase changes	Relative	Absolute	Median	Mean
Baseline–Intervention	12	23	9	9
Baseline–Maintenance	4	6	7	6
Pre-baseline–Baseline	0.5	0	5	4
Pre-baseline–Intervention	18	23	14	13
Pre-baseline–Maintenance	10	6	12	10

Table 9.10

Between-Phase Statistical Analysis of Mia's Total Moves in Online Conversation

Phase Changes	PND (%)	Tau		
		Tau	CI 90%	*p*
Baseline–Intervention	44	[b]0.41	[−0.09, 0.91]	0.17
Baseline–Maintenance	17	[b]0.17	[−0.43, 0.77]	0.65
Pre-baseline–Baseline	20	[a]0.34	[−0.24, 0.92]	0.33
Pre-baseline–Intervention	56	[a]0.61	[0.17, 1]	0.02*
Pre-baseline–Maintenance	50	[a]0.36	[−0.19, 0.91]	0.28

Note. [a]Tau-U = correction for baseline trend applied. [b]Tau_{novlap}

*p < .05.

9.1.1.4 Question 4.1. Kaylyn: Total moves. The total moves taken in conversation included initiations of conversation, initiations of topic, and optional responses. Kaylyn had no opportunity to provide obligatory responses to communication partners other than her mentor. Kaylyn did have opportunity to take obligatory responses in conversation with her mentor, although she did not take these turns. Examples of moves taken in an email sent by Kaylyn are provided in Figure 9.8.

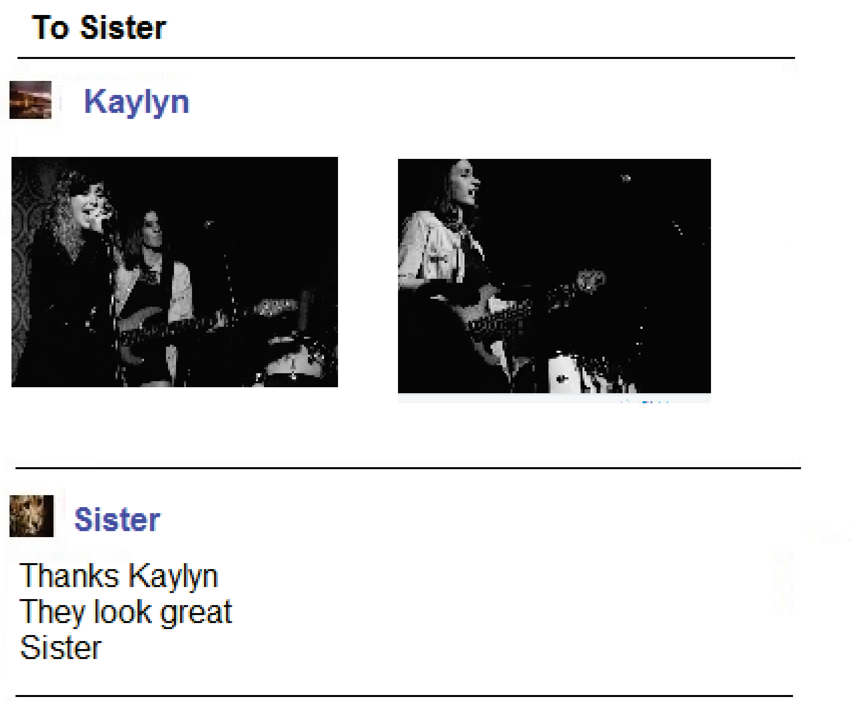


Figure 9.8. Examples of moves taken in an email by Kaylyn. Photos have been changed to preserve confidentiality.

9.1.1.4.1 *Within-phase analysis.* Evaluation of each phase indicated data were stable, at zero levels, across phases (Figure 9.1). Given that level and level change was constant at zero levels, except for two weeks, these results have not been presented in a table and the trend estimation, which remains constant and at 0 throughout the phases of the experiment, has not been marked on a separate figure.

9.1.1.4.2 *Between-phase analysis.* Calculations of PND indicated the intervention was not effective (Table 9.11). $\mathrm{Tau}_{\mathrm{novlap}}$ confirmed negligible effects across phase changes that were not significant (Table 9.11).

Table 9.11

Between-Phase Statistical Analysis of Kaylyn's Total Moves in Online Conversation

Phase Changes	PND (%)	$\mathrm{Tau}_{\mathrm{novlap}}$		
		Tau	CI 90%	*p*
Baseline–Intervention	6	−0.09	[−0.56, 0.37]	0.74
Baseline–Maintenance	0	−0.17	[−0.74, 0.40]	0.63
Pre-baseline–Baseline	17	0.17	[−0.35, 0.68]	0.60
Pre-baseline–Intervention	6	0.06	[−0.34, 0.47]	0.80
Pre-baseline–Maintenance	0	0	[−0.52, 0.52]	1

9.1.1.5 Question 4.1. Summary: Total moves. A possible effect of the intervention was observed, although variation within the data complicates the ability to draw conclusions about a relationship between total moves taken in online conversation and the e-mentoring intervention (Figure 9.1). When comparing from pre-baseline or baseline to intervention, systematic visual analysis indicated effects of the intervention that were replicated across two participants, Paul and Mia (Table 9.12). When comparing from pre-baseline or baseline to intervention, PND indicated the intervention was questionably effective for Mia and not effective for the other three participants. This questionable effect for Mia was maintained when comparing from pre-baseline to maintenance. Tau indicated moderate and significant effects of the intervention for Mia and Paul when comparing from pre-baseline to intervention. Combined weighted Tau scores across participants indicated a minimal and significant effect from pre-baseline to intervention, 0.43, 90% CI [0.13, 0.73], $p = 0.005$. This combined weighted calculation confirms the hypothesis that the e-mentoring intervention increased total moves in online conversation.

Table 9.12

Summary of the Visual and Statistical Analysis for Total Moves taken in Online Conversation for all Four Participants

Participant	Pre-Baseline–Intervention			Baseline–Intervention		
	SVA	PND	Tau	SVA	PND	Tau
Tilly[a]				×	×	×
Paul	✓[b]	×	✓[b]	✓[c]	×	×
Mia	✓	?[d]	✓[b]	✓	?[c]	×
Kaylyn	×	×	×	×	×	×

Note. SVA = systematic visual analysis, PND = Percentage non-overlapping data.

[a]Pre-baseline data were not available for Tilly.

For the majority of comparisons, the effects observed or not observed were similar when comparing from baseline–maintenance, with the following exceptions: [b]This effect of the intervention was not observed when comparing from pre-baseline–maintenance. [c]This effect of the intervention was not observed when comparing from baseline–maintenance. [d]An effect of the intervention was observed when comparing from baseline–maintenance.

9.2 Question 4.2. Type of Linguistic Moves Taken

To provide an overview of the moves taken in online conversation, the type of moves (e.g., initiations of conversation, initiations of topic, obligatory responses, and optional responses that keep the conversation going) were plotted across participants for each phase. The largest change across phases was the change in optional responses as displayed in Figure 9.9. The changes in optional responses were investigated in more detail. The percentage of optional responses each week was plotted graphically, and visually and statistically analysed (Figure 9.10).

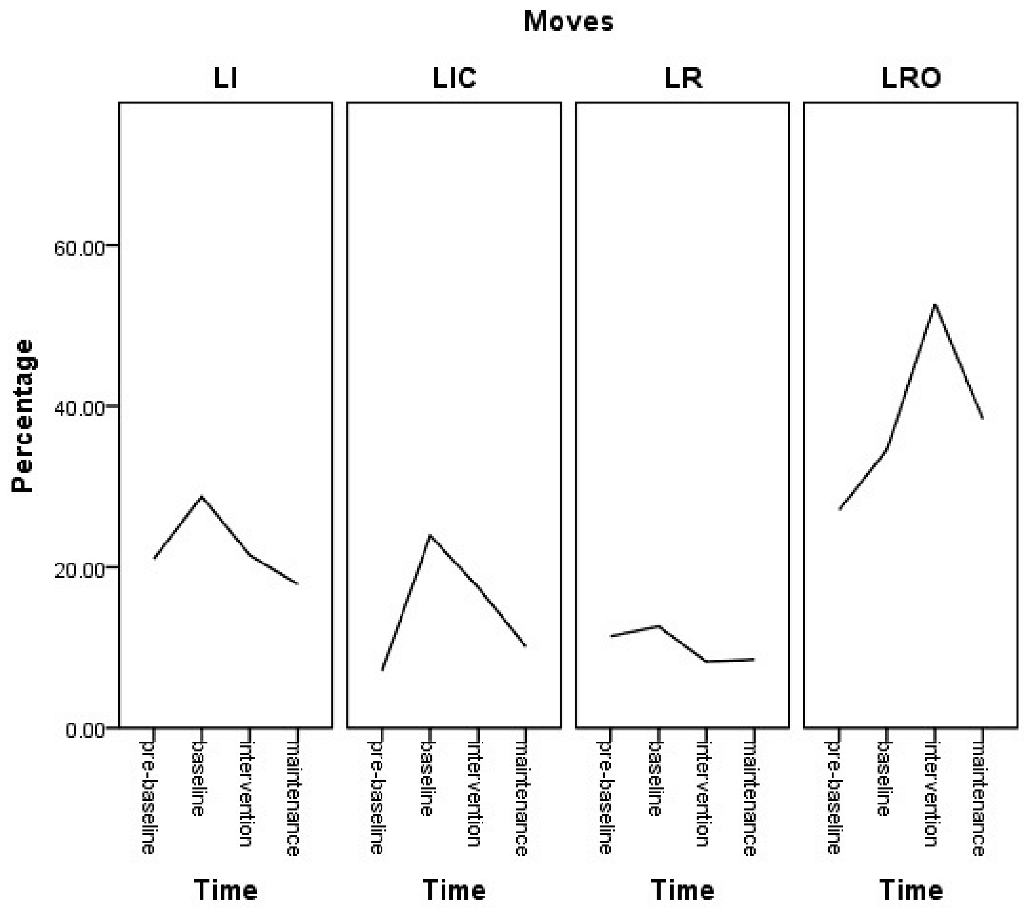


Figure 9.9. Mean percentage across four participants of the percentage for each move type across phases. LI = initiations of topic, LIC = initiations of conversation, LR = obligatory responses and LRO = optional responses. See coding manual (Appendix K) for full definitions of move types.

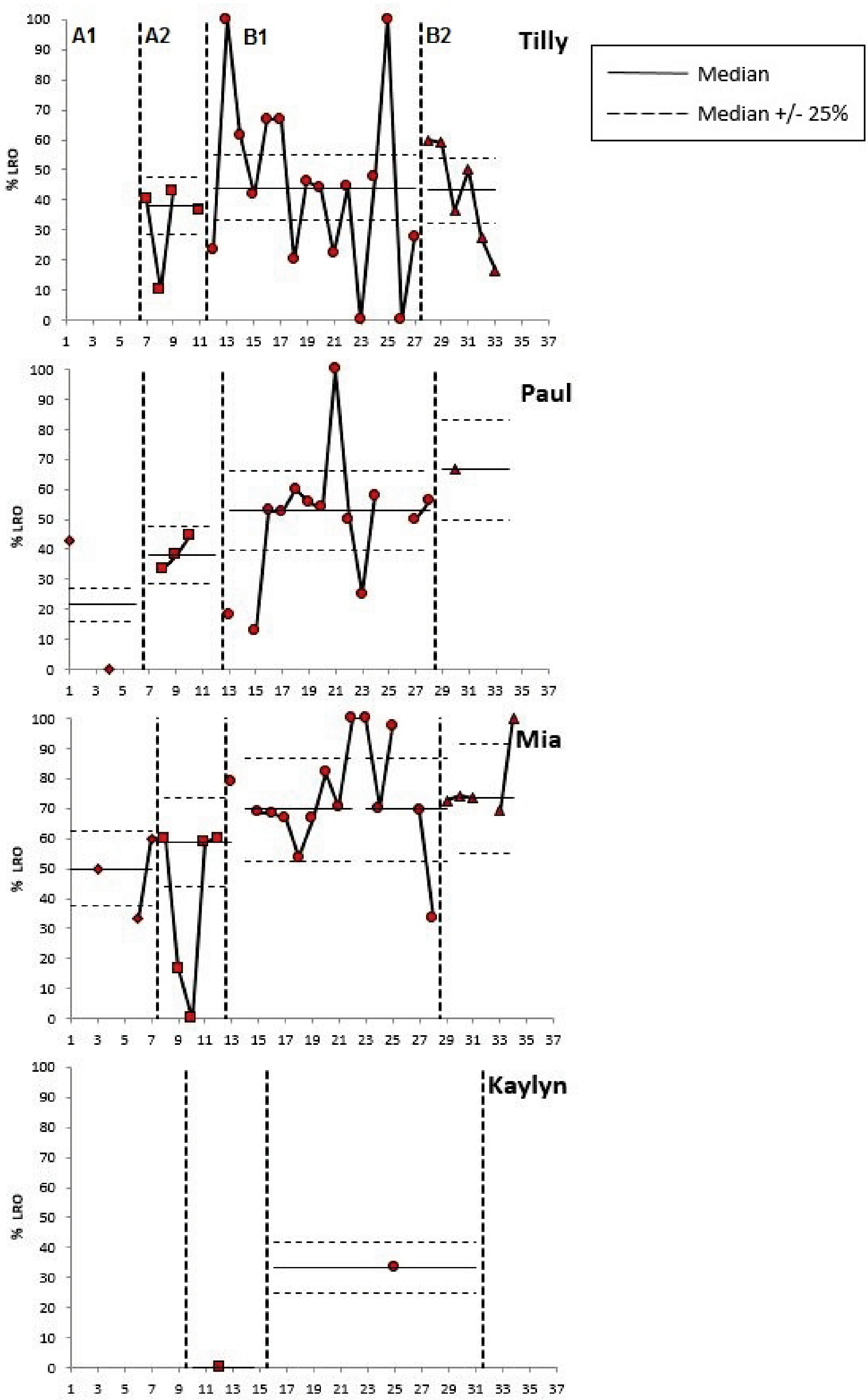


Figure 9.10. Percentage of optional responses taken by participants in online conversation per week.

9.2.1 Visual inspection of results: Percentage of optional responses. Note that when no online conversation occurred in a given week, the data point has not been included in analysis (i.e., Week 4 in baseline for Tilly). This contrasts with weeks when none of the turns (0%) in the online conversation were optional responses; when this occurred, it has been plotted at the 0 level on the graphs (i.e., Week 23 in intervention for Tilly). The following conversation transcripts provide examples of Mia not taking (Figure 9.12) or taking (Figure 9.11) optional turns in online conversation.

Figure 9.11. Example of conversation on Mia's Facebook newsfeed with no optional turns. Picture has been changed to maintain confidentiality.

Figure 9.12. Example of Mia taking optional turns in a Facebook personal message. All turns taken by Mia are aligned to the right-hand side, including the blue highlighted text and stickers. The first turn is optional but is an initiation. All other turns are optional responses.

9.2.1.1 Question 4.2. Tilly: Optional responses. Tilly participated in online conversation for 27/28 weeks of the experiment. No conversations occurred in Week 4 of baseline, and therefore, the percentage of optional responses within that week is not calculated.

9.2.1.1.1 *Within-phase analysis.* Evaluation of each phase indicated data were variable across phases, although less so during baseline (Figure 9.10 and Table 9.13).

Evaluation of level change indicated a mix of improving and deteriorating changes, consistent with the large fluctuations observed in the data (Table 9.13). Trend estimation was increasing in baseline and decreasing in intervention and maintenance phases. A stability envelope was applied with consideration for trend (Figure 9.13), and results indicated data were variable in baseline and intervention, and stable in maintenance (Table 9.13).

Table 9.13

Within-Phase Analysis of Tilly's Optional Responses in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Baseline	32	38	10–43	75	11	−4	25
Intervention	44	44	0–100	31	−18	5	31
Maintenance	42	43	32–54	33	−32	43	83

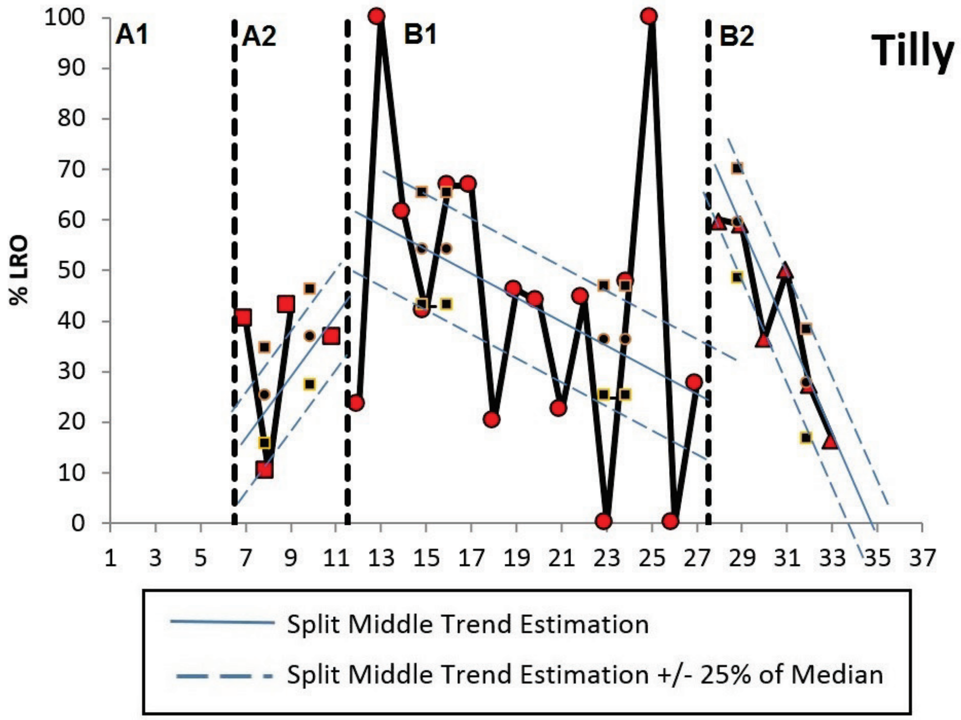


Figure 9.13. Percentage of optional responses taken by Tilly in online conversation per week, with trend marked.

9.2.1.1.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, a change from accelerating to decelerating trend occurred between baseline and intervention (Figure 9.13). This decelerating trend continued, and increased in slope, during maintenance. All level changes indicated an increase in level between phases, except for absolute change between baseline–intervention, which indicated an abrupt negative fluctuation (Table 9.14). Calculations of PND suggest that intervention was questionably effective (Table 9.15). Calculation of Tau_{novlap} indicates that effects were not significant (Table 9.15).

Table 9.14

Between-Phase Level Change Analysis of Tilly's Optional Responses in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	18	−13	6	12
Baseline–Maintenance	23	24	5	10

Table 9.15

Between-Phase Statistical Analysis of Tilly's Optional Responses in Online Conversation

Phase Changes	PND (%)	Tau_{novlap}		
		Tau	CI 90%	p
Baseline–Intervention	56	0.33	[−0.17, 0.82]	0.28
Baseline–Maintenance	50	0.30	[−0.30, 0.90]	0.41

9.2.1.2 Question 4.2. Paul: Optional responses. Paul participated in online conversation for 15/34 (44%) weeks of the experiment. No conversations occurred during the following 15 weeks: Weeks 2, 3, 5, 6, 7, 11, 12, 14, 25, 26, 29, 31, 32, 33, and 34. Therefore, no calculations of the percentage of optional responses were available for those weeks. Paul participated in conversations with communication partners other than the mentor in 81% of the weeks of intervention (13/16), more so than in any other phase of the experiment (1/6 weeks of pre-baseline: 17%; 3/6 weeks of baseline: 50%; 1/6 weeks of maintenance: 17%).

9.2.1.2.1 *Within-phase analysis.* Evaluation of each phase indicated data were stable in baseline and maintenance but unstable in pre-baseline and intervention (Figure 9.10 and Table 9.16). Evaluation of level change shows inconsistent results, which is likely because of fluctuations in the data, and several weeks where no online conversation occurred (Table 9.16). Trend estimation indicated a decelerating trend during pre-baseline, an accelerating trend during baseline and a zero-celerating trend during intervention and maintenance (Figure 9.14). With consideration of trend, data were stable in pre-baseline, baseline, and maintenance but remained unstable in intervention (Figure 9.14 and Table 9.16).

Table 9.16

Within-Phase Analysis of Paul's Optional Responses in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Pre-baseline	21	22	0–43	0	−43	N/A	100
Baseline	39	38	33–44	100	8	N/A	100
Intervention	50	53	40–66	64	0	38	70
Maintenance	67	67	50–83	100	N/A	N/A	100

Note. N/A = unable to calculate owing to missing data, or no online conversation occurring in initial or final week of phase.

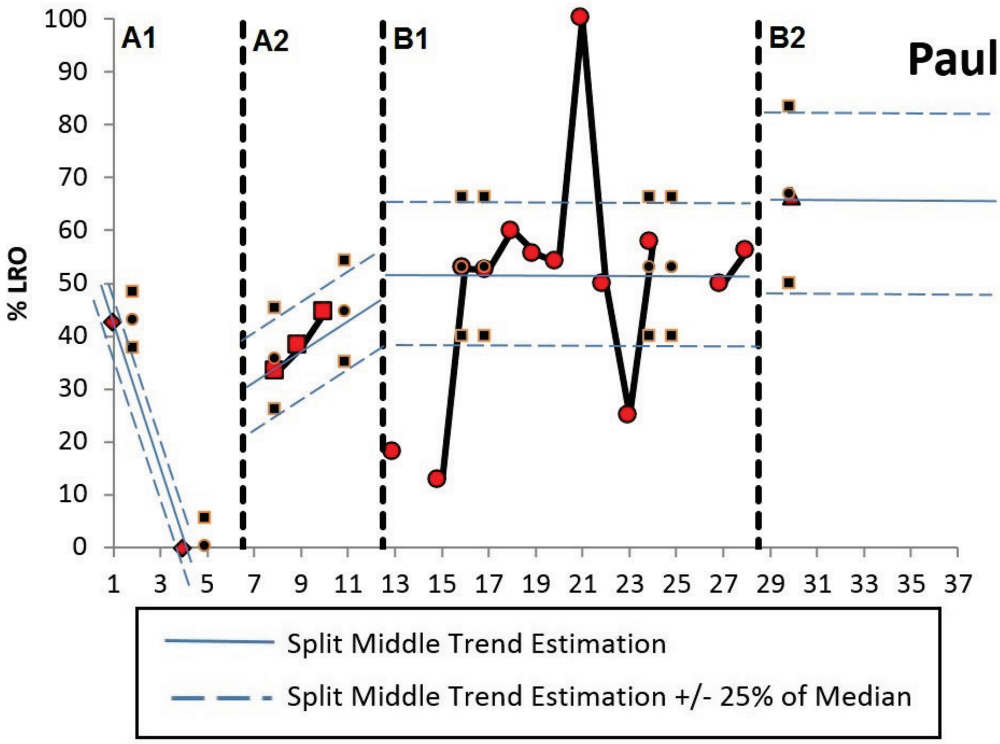


Figure 9.14. Percentage of optional responses taken by Paul in online conversation per week, with trend marked.

9.2.1.2.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, a decelerating, deteriorating trend in pre-baseline changed to an accelerating trend in baseline and zero-celerating trend in intervention and maintenance (Figure 9.14). All obtainable level change measures indicated improvements across time (Table 9.17). Calculations of PND indicated the intervention was *fairly effective* when comparing from baseline or pre-baseline to intervention and *highly effective* when comparing to maintenance (Table 9.18). Tau-U calculations indicated a moderate effect between baseline and intervention and strong effect between baseline and maintenance, and both were significant. When comparing pre-baseline to all other phases, the effect was strong and significant (Table 9.18).

Table 9.17

Between-Phase Level Change Analysis of Paul's Optional Responses in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	9	N/A	5	11
Baseline–Maintenance	23	N/A	29	28
Pre-baseline–Baseline	N/A	N/A	5	4
Pre-baseline–Intervention	N/A	N/A	10	7
Pre-baseline–Maintenance	N/A	N/A	24	24

Note. N/A = unable to calculate owing to missing data, or no online conversation occurring in initial or final week of phase.

Table 9.18

Between-Phase Statistical Analysis of Paul's Optional Responses in Online Conversation

Phase Changes	PND (%)	Tau-U		
		Tau-U	CI 90%	p
Baseline–Intervention	71	0.58	[0.12, 1]	0.04*
Baseline–Maintenance	100	0.89	[0.32, 1]	0.01*
Pre-baseline–Baseline	33	0.86	[0.29, 1]	0.01*
Pre-baseline–Intervention	77	0.82	[0.36, 1]	0.004*
Pre-baseline–Maintenance	100	1.14[a]	[0.57, 1]	0.001*

Note. Correction for baseline trend applied.

[a]Tau-U estimate is > 1. See Discussion Data analysis section 10.9.1.

**p* < .05.

9.2.1.3 Question 4.2. Mia: Optional responses. Mia participated in online conversation for 27/34 (79%) weeks of the experiment. No conversations occurred for 7 weeks: Weeks 1, 2, 4, 5, 14, 26, and 32. No calculations for the percentage of optional responses were available for those weeks. Mia participated in conversations with communication partners other than the mentor in less than half of the weeks of pre-baseline (3/7 or 43%). This participation rate increased such that Mia participated in online conversation in the majority of the weeks in the later phases of the experiment (i.e., 5/5 or 100% of the weeks of baseline, 14/16 or 88% of the weeks of intervention and 5/6 or 83% of the weeks of maintenance).

9.2.1.3.1 *Within-phase analysis.* Evaluation of each phase indicated data were variable during pre-baseline, baseline, and intervention but stable during maintenance (Figure 9.10 and Table 9.19). Evaluation of relative level change and trend estimation indicated level within-phase was increasing (baseline and maintenance) or relatively constant (pre-baseline and intervention; Figure 9.15 and Table 9.19).

Table 9.19

Within-Phase Analysis of Mia's Optional Responses in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Pre-baseline	48	50	33–60	67	-3	N/A	67
Baseline	39	59	0–60	60	21	0	40
Intervention	73	70	33–100	71	3	46	71
Maintenance	78	73	69–100	80	12	27	100

Note. N/A = unable to calculate owing to missing data, or no online conversation occurring in initial or final week of phase.

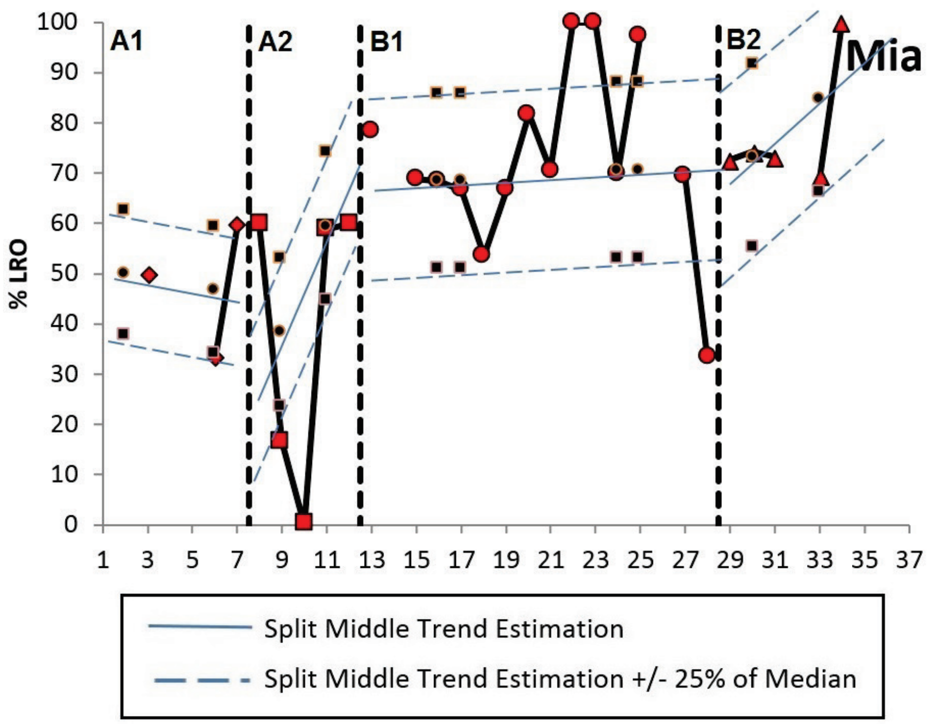


Figure 9.15. Percentage of optional responses taken by Mia in online conversation per week, with trend marked.

9.2.1.3.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, a relatively stable but slightly decelerating trend in pre-baseline changed to an improving trend in baseline, intervention, and maintenance (Figure 9.15). Level change measures largely indicated improvements across phases, except for comparisons between pre-baseline to baseline (Table 9.20). Calculations of PND indicated the intervention was *fairly effective*, and when comparing from baseline and pre-baseline to maintenance this became *highly effective* (Table 9.21). Calculation of Tau_{novlap} indicated strong and significant changes for all phase comparisons (baseline to intervention, baseline to maintenance, pre-baseline to intervention, and pre-baseline to maintenance) apart from changes between pre-baseline to baseline (Table 9.21).

Table 9.20

Between-Phase Level Change Analysis of Mia's Optional Responses in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	9	19	14	31
Baseline–Maintenance	14	13	14	39
Pre-baseline–Baseline	−9	60	−12	−9
Pre-baseline–Intervention	21	70	18	25
Pre-baseline–Maintenance	26	73	23	30

Table 9.21

Between-Phase Statistical Analysis of Mia's Optional Responses in Online Conversation

Phase Changes	PND (%)	Tau_{novlap}		
		Tau	CI 90%	*p*
Baseline–Intervention	86	0.85	[0.35, 1]	0.005*
Baseline–Maintenance	100	1	[0.40, 1]	0.006*
Pre-baseline–Baseline	0	0.86	[−0.49, 0.67]	0.81
Pre-baseline–Intervention	86	0.87	[0.43, 1]	0.001*
Pre-baseline–Maintenance	100	1	[0.452, 1]	0.003*

Note. *$p < .05$.

9.2.1.4 Question 4.2. Kaylyn: Optional responses. Kaylyn participated in online conversation for 2/37 (5%) weeks of the experiment. Conversations occurred in one week of baseline and one week of intervention. No optional responses occurred during baseline. Optional responses did occur during the conversation that was recorded during the intervention phase.

9.2.1.5 Question 4.2. Summary: Optional responses. Mia and Paul demonstrated clear effects of the intervention using systematic visual analysis, PND and Tau-U (Table 9.22). For Tilly, these effects were only observable using systematic visual analysis from baseline–intervention. For Kaylyn, these effects were not observable. Replication of the intervention effects across three participants was only observed in systematic visual analysis from baseline to intervention. Despite variation across participants when comparing baseline to intervention, combined weighted Tau scores across participants indicated a moderate effect, 0.59, 90% [CI 0.25, 0.92], p = 0.0006. When comparing pre-baseline to intervention, this increased to a strong effect, 0.84, 90% [CI 0.46, 1.00], p = 0. The combined weighted Tau scores and systematic visual analysis confirmed the hypothesis that the e-mentoring intervention increased optional responses taken in online conversation. An increased percentage of optional responses taken in online conversation possibly indicated increased social and self-engagement in online conversation following the e-mentoring intervention. Nevertheless, this finding must be interpreted with caution, given the variability within results for Tilly and Kaylyn (Table 9.22).

Table 9.22

Summary of the Visual and Statistical Analysis of the Percentage of Optional Responses in Online Conversation for all Four Participants

Participant	Pre-Baseline–Intervention			Baseline–Intervention		
	SVA	PND	Tau	SVA	PND	Tau
Tilly[a]				✓	?	×
Paul	✓	✓	✓	✓	✓	✓
Mia	✓	✓	✓	✓	✓	✓
Kaylyn	×	×	×	×	×	×

Note. SVA = systematic visual analysis, PND = Percentage non-overlapping data.

For all comparisons, the effects observed or not observed were the same when comparing from baseline–maintenance and pre-baseline–maintenance rather than to intervention.

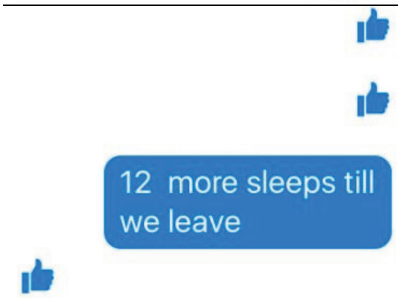
[a]Pre-baseline data were not available for Tilly.

9.3 Question 4.3. Range of Modes

Online conversation transcripts were coded to investigate the modes used (e.g., like, tag, attach photo/video, and use of chat abbreviations). There were 15 different modes coded. Only 8 modes were available on email and 12 on i-message, whereas all modes were available to Tilly (who used Facebook; Table 4.11). The range of modes, or total number of different modes, used in each week of the experiment was plotted to visualise changes across phases of the experiment (Figure 9.16). Specific modes used each week (e.g., text, emoticon, like, tag user, emoji, and sticker) may have varied; the data analysed in the graph represent the numerical range and do not consider the novelty of the modes used each week. Although the range of modes used by Mia in any one week of baseline did not exceed 2, it may be that Mia used more than 2 modes during baseline. For example, the excerpts provided in Table 9.23 both include 2 different modes (text and sticker or text and like), although taken together, a total of 3 modes have been used (text, like, and sticker).

Table 9.23

Example calculation of range of modes

Excerpts from online conversation	Modes used by Mia[a]	Range of modes
	text, sticker	2
	Like, text	2

Note. Mia's turns are aligned to the right of the column.

For two participants, Paul and Mia, an effect was observed between the range of modes and the e-mentoring intervention. The graphs across participants are displayed first. Following this, the systematic visual analysis and statistical analysis are presented, including tables and graphs to display the data for each participant. At the end of this section, the visual and statistical analysis of the range of modes in online conversation is summarised.

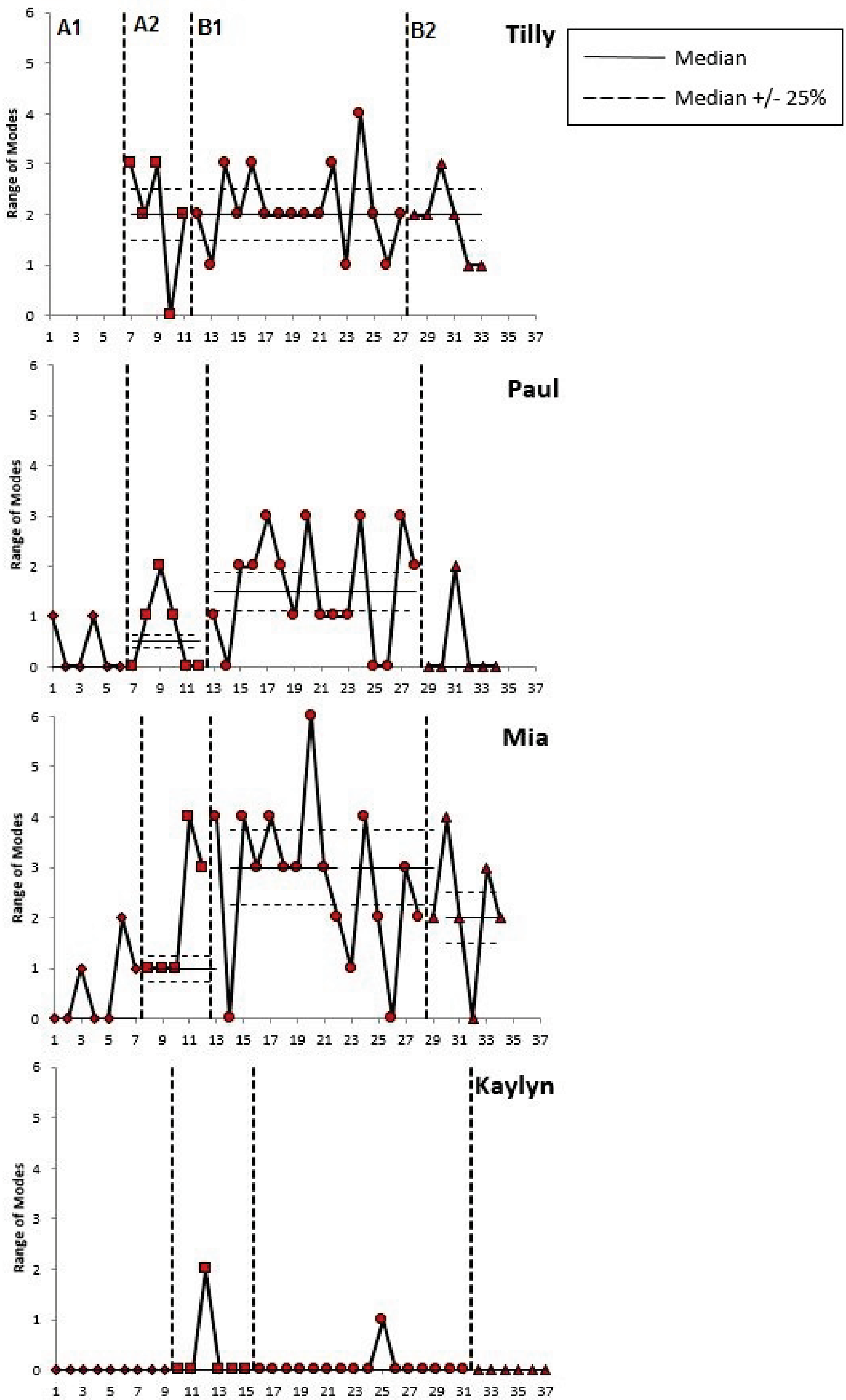


Figure 9.16. Range of modes used by participants in online conversation per week.

9.3.1 Visual inspection of results: Range of modes.

9.3.1.1 Question 4.3. Tilly: Range of modes. Tilly used up to 4 modes in any one week of the experiment, and had 12 modes available on her chosen medium, i-message. Over all the weeks of the experiment, she used 5 modes in total: text; abbreviation; emoticons; image, photo or video; and non-standard punctuation (Table 9.24).

Table 9.24

Range and Type of Modes used by Tilly

Phase	Range	Modes Used
Baseline	4	Text; abbreviation; emoticons; image, photo or video
Intervention	5	Text; abbreviation; emoticons; image, photo or video; non-standard punctuation
Maintenance	3	Text; abbreviation; image, photo or video

9.3.1.1.1 *Within-phase analysis.* Evaluation of each phase indicated data were variable during all phases of the experiment (Figure 9.16 and Table 9.25). Evaluation of level change and trend indicated no change during intervention and negative changes or decelerating trend in baseline and maintenance. Following consideration of a stability envelope that accounted for trend in the data, data remained unstable in all three phases (Table 9.25 and Figure 9.17).

Table 9.25

Within-Phase Analysis of Tilly's Range of Modes in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Baseline	2	2	0-3	40	−1.5	−1	20
Intervention	2	2	1–4	56	0	0	56
Maintenance	2	2	1–3	50	−1	−1	67

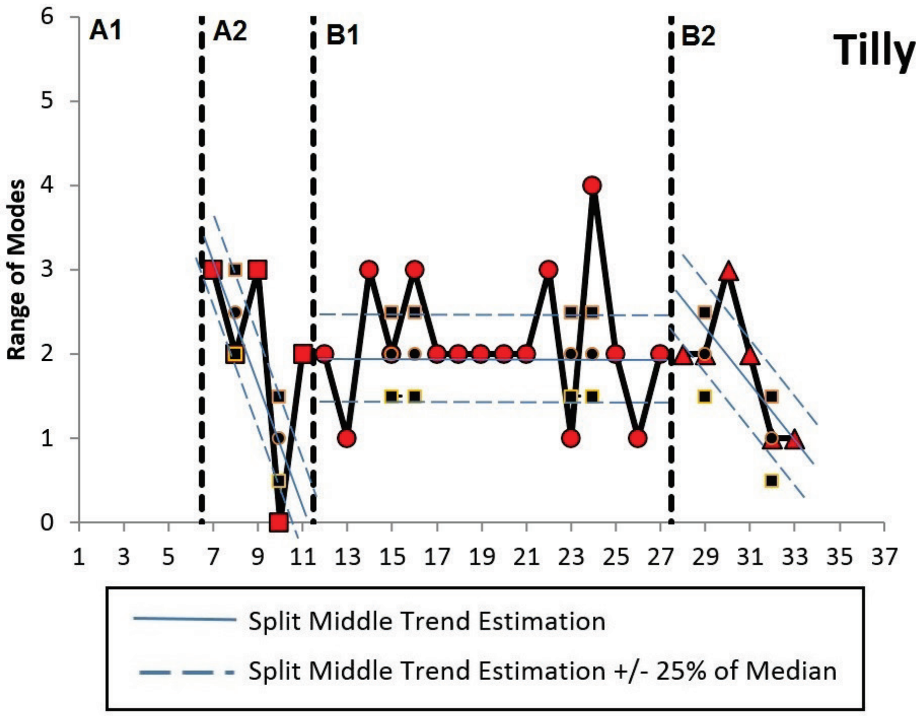


Figure 9.17. Range of modes used by Tilly in online conversation per week, with trend marked.

9.3.1.1.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, a decelerating and deteriorating trend became stable in intervention and returned to be decelerating during maintenance (Figure 9.17). Most level change measures indicated no change across phases, apart from relative change, which reflects the changing trend within phases described above (Table 9.26). Calculation of PND indicated the intervention was not effective (Table 9.27). Tau-U confirmed this result, demonstrating no effect and no significant differences between phases (Table 9.27).

Table 9.26

Between-Phase Level Change Analysis of Tilly's Range of Modes in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	1	0	0	0
Baseline–Maintenance	1	0	0	0

Table 9.27

Between-Phase Statistical Analysis of Tilly's Range of Modes in Online Conversation

Phase Changes	PND (%)	Tau-U		
		Tau-U	CI 90%	p
Baseline–Intervention	6	[a]0.00	[−0.50, 0.50]	1.00
Baseline–Maintenance	0	−0.07	[−0.67, 0.53]	0.86

9.3.1.2 Question 4.3. Paul: Range of modes. Paul used up to 3 modes in any one week of the experiment, 8 modes were available to him on his chosen medium, email. Over all the weeks of the experiment Paul used 5 modes in total: text; emoticon; hyperlink; unconventional punctuation; and image, photo or video (Table 9.28).

Table 9.28

Range and Type of Modes Used by Paul

Phase	Range	Modes Used
Pre-baseline	1	Text
Baseline	2	Text; unconventional punctuation
Intervention	4	Text; emoticon; hyperlink; unconventional punctuation
Maintenance	2	Text; image, photo or video

9.3.1.2.1 *Within-phase analysis.* Evaluation of each phase indicated data were variable during all phases (Figure 9.16 and Table 9.29). Relative level change indicated slight improvement within baseline and intervention phases. Pre-baseline and maintenance indicated no change, and absolute change in pre-baseline was negative

(Table 9.29). Trend estimation indicated a zero-celerating trend during pre-baseline and maintenance, and a decreasing trend during baseline and intervention. When considering stability around the trend line, data remained unstable within all phases (Figure 9.18 and Table 9.29).

Table 9.29

Within-Phase Analysis of Paul's Range of Modes in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Pre-baseline	0	0	0–1	67	0	−1	67
Baseline	1	0.5	0–2	0	1	0	33
Intervention	2	1.5	0–3	0	1	1	38
Maintenance	1	0	0–2	67	0	0	67

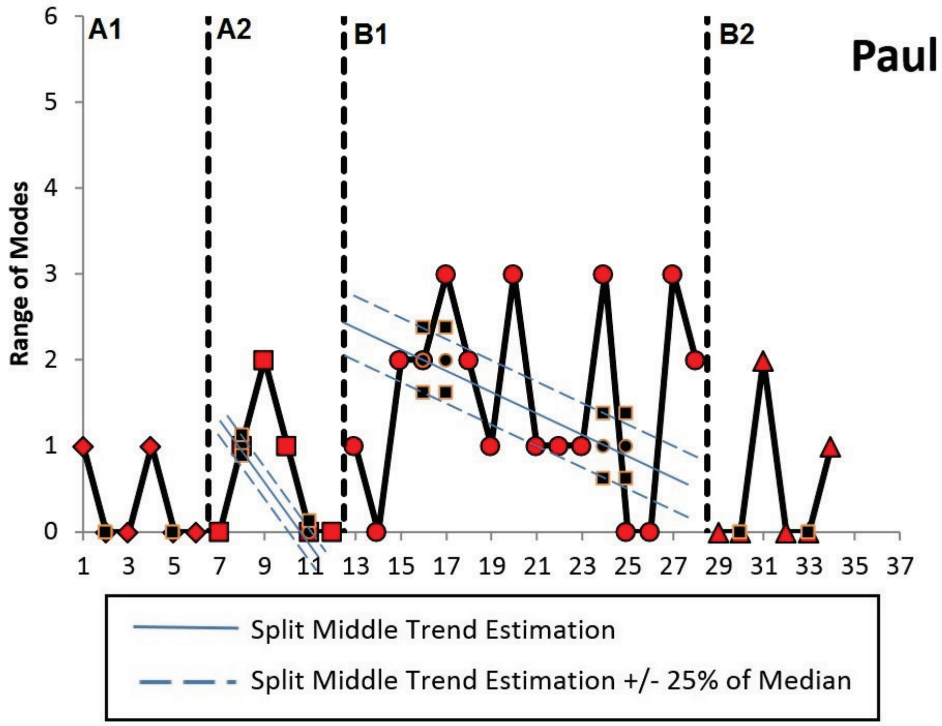


Figure 9.18. Range of modes used by Paul in online conversation per week, with trend marked.

9.3.1.2.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, a constant trend in pre-baseline became decelerating during baseline and intervention and returned to be zero-celerating during maintenance (Figure 9.18). Level change measures indicated small positive, or no change between phases. Calculation of PND indicated the treatment was not effective (Table 9.30). Tau-U indicated a moderate, significant effect between pre-baseline and intervention (Table 9.31).

Table 9.30

Between-Phase Level Change Analysis of Paul's Range of Modes in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	2	1	1	1
Baseline–Maintenance	0	0	0.5	0
Pre-baseline–Baseline	1	0	0.5	1
Pre-baseline–Intervention	2	1	1.5	2
Pre-baseline–Maintenance	0	0	0	1

Table 9.31

Between-Phase Statistical Analysis of Paul's Range of Modes in Online Conversation

Phase Changes	PND (%)	Tau-U		
		Tau-U	CI 90%	*p*
Baseline–Intervention	25	0.5	[0.04, 0.97]	0.08
Baseline–Maintenance	0	−0.06	[−0.63, 0.52]	0.87
Pre-baseline–Baseline	17	0.33	[−0.24, 0.90]	0.34
Pre-baseline–Intervention	25	0.69	[−0.22, 1]	0.015*
Pre-baseline–Maintenance	17	0.17	[−0.40, 0.74]	0.63

Note. Includes correction for trend in baseline.

**p* < .05.

9.3.1.3 Question 4.3. Mia: Range of modes. Mia used up to 6 modes in any one week of the experiment; all modes were available to her on her chosen medium, Facebook. Over all the weeks of the experiment Mia used 10 modes in total: text;

emoticon; emoji; friend linking; image, photo or video; like linking; quoting; sticker; shares; and tag user linking (Table 9.32).

Table 9.32

Range and Type of Modes Used by Mia

Phase	Range	Modes Used
Pre-baseline	2	Text; sticker
Baseline	4	Text; friend; image, photo or video; like linking
Intervention	10	Text; emoticon; emoji; friend linking; image, photo or video; like linking; quoting; sticker; shares; tag user linking
Maintenance	6	Text; emoticon; friend; image, photo or video; like linking; sticker; tag user linking

9.3.1.3.1 *Within-phase analysis.* Evaluation of each phase indicated data were variable in all phases of the experiment (Figure 9.16 and Table 9.33). Level change within pre-baseline, baseline, and intervention was positive, except for relative change within intervention. Trend was accelerating during pre-baseline and baseline, decelerating during intervention, and constant in maintenance. Data remained unstable despite consideration for trend (Figure 9.19 and Table 9.33).

Table 9.33

Within-Phase Analysis of Mia's Range of Modes in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Pre-baseline	1	0	0–2	57	1	1	14
Baseline	2	1	1–4	60	2.5	2	40
Intervention	3	3	0–6	31	−1.5	2	56
Maintenance	2	2	0–4	50	0	0	50

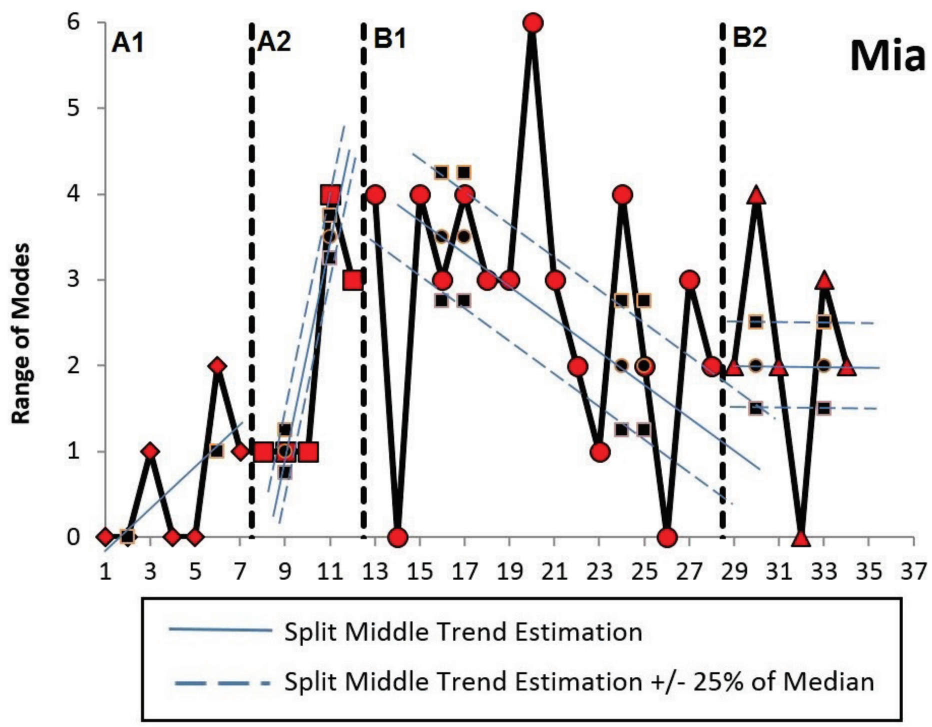


Figure 9.19. Range of modes used by Mia in online conversation per week, with trend marked.

9.3.1.3.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, an accelerating, improving trend changed to a decelerating trend during intervention and became constant in maintenance (Figure 9.19). It may be that initial increases were not maintained throughout the longer intervention. All level changes from pre-baseline to intervention or maintenance indicated improvements (Table 9.34). Level change from baseline to intervention was positive or constant (for relative change). Calculations of PND indicated a questionably effective change between pre-baseline and intervention (Table 9.35). Calculation of Tau-U indicated a moderate and significant effect from pre-baseline to baseline and pre-baseline to intervention (Table 9.35).

Table 9.34

Between-Phase Level Change Analysis of Mia's Range of Modes in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	0	1	2	1
Baseline–Maintenance	−1.5	−1	1	0
Pre-baseline–Baseline	0	0	1	1
Pre-baseline–Intervention	2.5	3	3	2
Pre-baseline–Maintenance	1	2	2	1

Table 9.35

Between-Phase Statistical Analysis of Mia's Range of Modes in Online Conversation

Phase Changes	PND (%)	Tau-U		
		Tau-U	CI 90%	*p*
Baseline–Intervention	6	0.21	[−0.29, 0.71]	0.48
Baseline–Maintenance	0	−0.03	[−0.63, 0.57]	0.93
Pre-baseline–Baseline	40	0.77	[0.19, 1]	0.03*
Pre-baseline–Intervention	63	0.69	[0.25, 1]	0.01*
Pre-baseline–Maintenance	33	0.5	[−0.05, 1]	0.13

Note. *$p < .05$.

9.3.1.4 Question 4.3. Kaylyn: Range of modes. Kaylyn participated in online conversation for one week of baseline and one week of intervention. She used 2 modes (image, photo or video; and text) during baseline and one mode during intervention (text). Up to 8 modes were available to her on her chosen medium, email. Visual and statistical analysis of these results indicates no effect of the intervention on the range of modes used online (Table 9.36).

Table 9.36

Between-Phase Statistical Analysis of Kaylyn's Range of Modes in Online Conversation

Phase Changes	PND (%)	Tau_{novlap}		
		Tau	CI 90%	*p*
Baseline–Intervention	0	−0.11	[−0.58, 0.35]	0.69
Baseline–Maintenance	0	−0.17	[−0.74, 0.40]	0.63
Pre-baseline–Baseline	17	0.17	[−0.35, 0.68]	0.60
Pre-baseline–Intervention	6	0.06	[−0.34, 0.47]	0.80
Pre-baseline–Maintenance	0	0	[−0.52, 0.52]	1

9.3.1.5 Question 4.3. Summary: Range of modes. The limited number of modes used in online conversation and the use of different mediums across participants (i.e., email, Facebook, i-message) complicated the ability to investigate the effect of the intervention on the range of modes used. Although, effects did not seem to be linked to the medium used (e.g., participants with possible intervention effects used email or Facebook and participants with no effects noted used email or i-message) (Table 9.37).

For three participants (Paul, Mia, and Tilly), when comparing from baseline to intervention using systematic visual analysis, data variability complicated the effect to clearly observe an effect of the intervention. For example, within these participants some systematic visual analysis measures indicated a change and others did not. For Paul and Mia, this effect was more clearly observed when comparing from pre-baseline to intervention. Effects were not observed when comparing to the maintenance phase. PND indicated the intervention was not effective for any participant. Tau-U indicated moderate and significant effects for Paul and Mia when comparing from pre-baseline to intervention, and for Mia when comparing from pre-baseline to baseline. When comparing baseline to intervention, combined weighted Tau scores across participants indicated a negligible effect, 0.15, 90% CI [−0.14, 0.44], p = 0.30. When comparing pre-baseline to intervention, a minimal and significant effect was observed, 0.46, 90% CI [0.16, 0.76], p = 0.0025. Calculation of combined weighted Tau across participants confirmed the hypothesis that the range of modes in online conversation increased following the e-mentoring intervention.

Table 9.37

Summary of the Visual and Statistical Analysis of the Range of Modes in Online Conversation for all Four Participants

Participant	Pre-Baseline–Intervention			Baseline–Intervention		
	SVA	PND	Tau	SVA	PND	Tau
Tilly[a]				?[c]	×	×
Paul	✓[b]	×	✓[b]	?[c]	×	✓
Mia	✓	?[b]	✓	?[c]	×	×
Kaylyn	×	×	×	×	×	×

Note. SVA = systematic visual analysis, PND = Percentage non-overlapping data.

[a]Pre-baseline data were not available for Tilly.

For the majority of comparisons, the effects observed or not observed were similar when comparing from baseline–maintenance, with the following exceptions: [b]This effect of the intervention was not observed when comparing from pre-baseline–maintenance. [c]This effect of the intervention was not observed when comparing from baseline–maintenance.

9.4 Question 4.4. Range of Pragmatic Functions

Online conversation transcripts were coded to investigate the pragmatic functions used (i.e., informative, feedback, requests, and social). There were 13 different functions available to be coded (Appendix K). The range of pragmatic functions, or total number of different functions, used each week of the experiment was plotted (Figure 9.20) and analysed using visual and statistical approaches. Similar to the use of the term range in the range of modes section above, the range each week does not necessarily represent the total number of functions used overall (see Section 9.3).

The following conversation excerpts provide examples of each of the functions present in the transcripts (Table 9.38). In example 1, Tilly is sending i-messages and the conversation includes examples of Tilly using informatives and feedback. The communication partner turns provide examples of requests for clarification (both neutral and specific). In Example 2, Paul provides clarification using repetition. He sends the same email twice since he is yet to receive a response. The email provides examples of all three social functions and a request for provision of information. In Example 3, Mia and her friend are arranging a face-to-face catch-up via Facebook Messenger. The conversation includes requests for action and confirmation/denial. The final example is the only example in the transcripts collected of a participant using a request for clarification/confirmation.

An effect of the intervention on the range of pragmatic functions was observed for two participants (Mia and Paul). The graphs across participants are displayed first. Following this, the systematic visual analysis and statistical analysis are presented, including tables and graphs to display the data for each participant. At the end of this section, the visual and statistical analysis of the range of pragmatic function used in online conversation is summarised.

Table 9.38

Examples of Pragmatic Functions Used in Online Conversation of Participants

Conversation Excerpts	Who	Transmission Sent	Function Coded	
			Category	Function
Example 1	Tilly	Have visit	Informative	Provision of information
	Friend 1	What do you mean?	Request	Request clarification–neutral
	Tilly	Have vist today	Informative	Provide clarification–revision
	Friend 1	Cool	Feedback	Acknowledgement
	Friend 2	What is vist	Request	Request clarification–specific
	Tilly	Visitors	Informative	Provide clarification–revision
Example 2	Paul	*Email sent again 5:30pm*	Informative	Provide clarification repetition
		Hi Friend1,		
		I am very sorry i missed the call. I am ready now to talk to you on skype, if you are free.		
		Paul		
		Email sent 4:20pm	Social	Greeting
		Hi Friend1,	Social	Routine
		I am very sorry i missed the call. I am ready now to talk to you on skype, if you are free.	Informative	Provide information
		Paul	Social	Closing

Table 9.38 Continued

Conversation Excerpts	Who	Transmission Sent	Function Coded	
			Category	Function
Example 3	Friend 1	Do you want to catch-up?	Request	Request for information
	Mia	Yes	Feedback	Confirmation/denial
	Mia	Can my mum phone your mum?	Request	Request for object/action
	Mia	*like*		
	Friend 1	Yes	Feedback	Confirmation/denial
	Friend 1	my mum phone number …	Informative	Provide information
Example 4	Tilly	Did you get message	Request Feedback	Request clarification–confirmation
	Tilly	Do you want pick up at museum?	Request	Request object or action
	Friend 1	That sounds great	Informative	Provide information
	Friend 1	Yes please.	Feedback	Confirmation/denial
	Tilly	Cool	Feedback	Acknowledgement
	Friend 1	I can't wait	Informative	Provide information
	Tilly	Me too	Informative	Provide information

Note. See coding manual (Appendix K) for full definitions of functions.

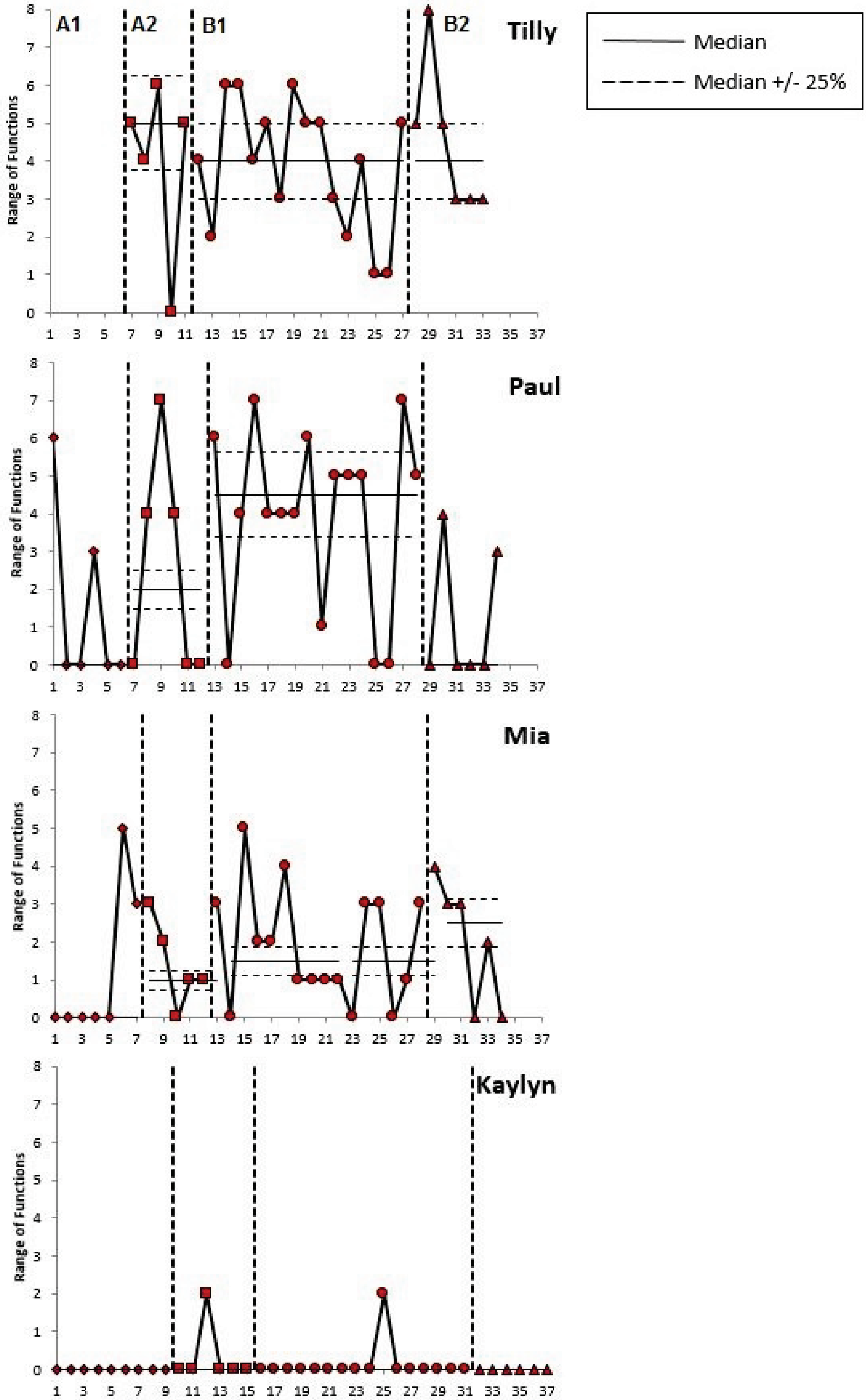


Figure 9.20. Range of functions used by participants in online conversation per week.

9.4.1 Visual inspection of results: Range of pragmatic functions.

9.4.1.1 Question 4.4. Tilly: Range of pragmatic functions. Tilly used up to 8 functions in any one week of the experiment. Over all the weeks of the experiment, Tilly used 11 functions in total, including: informatives (provision of clarification both revision and repetition), requests (request for clarification–confirmation, request for information, and request for object or action), feedbacks (acknowledgement and confirmation/denial), and social functions (closing, greeting, and routines; Table 9.39).

Table 9.39

Functions Tilly Used within the Different Phases of the Experiment

Phase	Range	Function Category	Function
Baseline	7	Informative	Provision of clarification–repetition Provision of information
		Request	Request for information
		Feedback	Acknowledgement Confirmation/denial
		Social	Closing Greeting
Intervention	9	Informative	Provision of clarification–revision Provision of information
		Request	Request for information Request for object or action
		Feedback	Acknowledgement Confirmation/denial
		Social	Closing Greeting Routine
Maintenance	9	Informative	Provision of clarification–revision Provision of information
		Request	Request for information Request for object or action Request for clarification–confirmation
		Feedback	Acknowledgement Confirmation/denial
		Social	Greeting Routine

Note. See coding manual (Appendix K) for full definitions of functions.

9.4.1.1.1 *Within-phase analysis.* Evaluation of each phase indicated data were stable in baseline and maintenance and unstable during intervention (Figure 9.20 and Table 9.40). Evaluation of level change indicated both improvements and deterioration, consistent with the large fluctuations noted in the data (Table 9.40). Trend was deteriorating within all three phases, although consideration of trend reduced stability of the baseline phase (Figure 9.21 and Table 9.40)

Table 9.40

Within-Phase Analysis of Tilly's Range of Functions in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Baseline	4	5	0–6	80	−1	0	33
Intervention	4	4	1–6	56	1	−1	37
Maintenance	5	4	3–8	83	2	−2	83

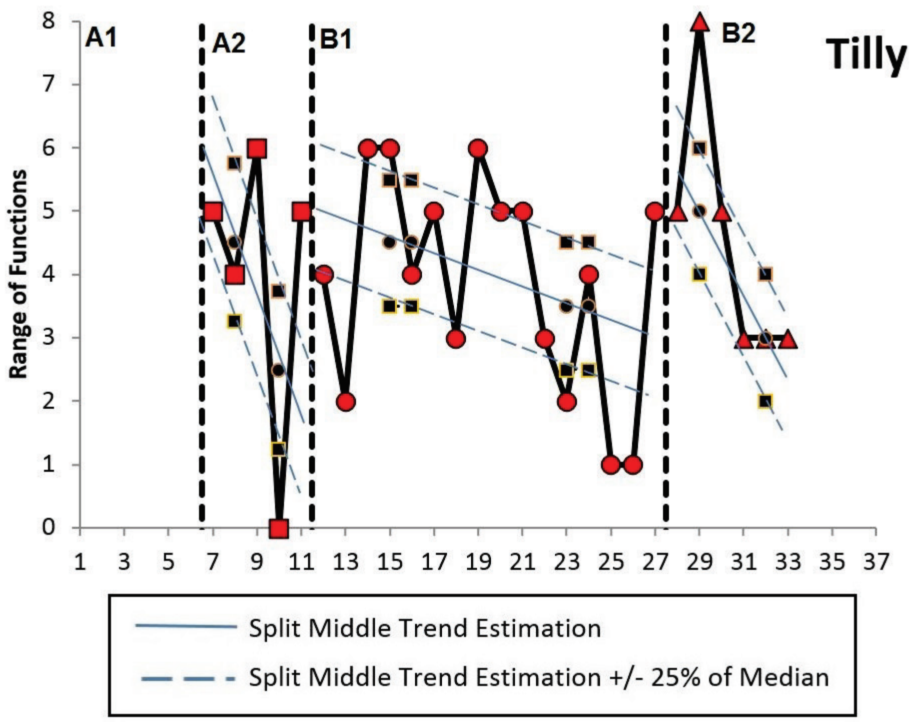


Figure 9.21. Range of functions used by Tilly in online conversation per week, with trend marked.

9.4.1.1.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, a deteriorating trend continued across all three phases (Figure 9.21). Level change measures were small (and both positive and negative), although the total range of functions used in any one week increased across phases (Table 9.41). Calculation of PND indicated the intervention was not effective (Table 9.42). Calculations of Tau_{novlap} consolidated this finding of no effect between phases (Table 9.42).

Table 9.41

Between-Phase Level Change Analysis of Tilly's Range of Functions in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	1	−1	−1	0
Baseline–Maintenance	1.5	0	−1	1

Table 9.42

Between-Phase Statistical Analysis of Tilly's Range of Functions in Online Conversation

Phase Changes	PND (%)	$\text{Tau}_{\text{novlap}}$		
		Tau	CI 90%	*p*
Baseline–Intervention	0	−0.1	[−0.60, 0.40]	0.74
Baseline–Maintenance	17	−0.07	[−0.67, 0.53]	0.86

9.4.1.2 Question 4.4. Paul: Range of pragmatic functions. Paul used up to 7 functions in any one week of the experiment. Over all the weeks of the experiment, Paul used 11 functions in total including: informatives (provision of clarification both revision and repetition); requests (request for specific clarification, request for information, and request for object or action); feedbacks (acknowledgement and confirmation/denial); and social functions (closing, greeting, and routine; Table 9.43).

Table 9.43
Functions used by Paul in the Phases of the Experiment

Phase	Range	Function Category	Function
Pre-baseline	6	Informative	Provision of information
		Request	Request for information
			Request for object or action
		Feedback	Acknowledgement
		Social	Closing
			Greeting
Baseline	7	Informative	Provision of clarification–revision
			Provision of information
		Request	Request for information
			Request for object/action
		Social	Closing
			Greeting
			Routine
Intervention	9	Informative	Provision of clarification–repetition
			Provision of information
		Request	For information
			For object or action
			For clarification, specific
		Feedback	Confirmation/denial
		Social	Closing
			Greeting
			Routine
Maintenance	4	Informative	Provision of information
		Request	For information
		Social	Closing
			Greeting
			Routine

Note. See coding manual (Appendix K) for full definitions of functions.

9.4.1.2.1 *Within-phase analysis.* Evaluation of each phase indicated data were variable within all phases (Figure 9.20 and Table 9.44). Evaluation of level change indicated a range of improvement, no change, and deterioration, although a large deterioration was observed during baseline (Table 9.44). Trend estimation indicated zero-celerating constant trend in pre-baseline and maintenance, deteriorating trend within baseline and accelerating trend during intervention (Figure 9.22). When considering stability around the trend line, data remained unstable (Figure 9.22 and Table 9.44).

Table 9.44

Within-Phase Analysis of Paul's Range of Functions in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Pre-baseline	2	0	0–6	67	0	−6	67
Baseline	3	2	0–7	0	−4	0	33
Intervention	4	4.5	0–7	50	1	−1	50
Maintenance	1	0	0–4	67	0	3	67

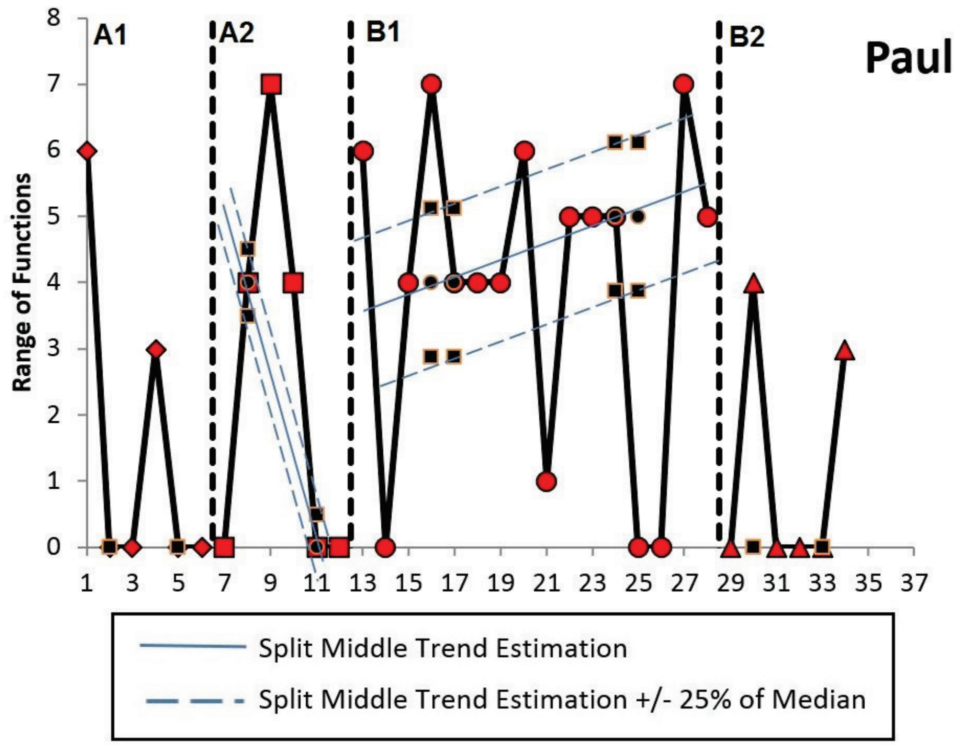


Figure 9.22. Range of functions used by Paul in online conversation per week, with trend marked.

9.4.1.2.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, a change in trend from deteriorating in baseline to accelerating during intervention was observed (Figure 9.22). Level change measures indicated improvements between phases when comparing pre-baseline, baseline, and intervention. Comparisons between baseline or pre-baseline and maintenance indicated some deterioration in median and mean level (Table 9.45). Calculation of PND indicated the intervention was not effective (Table 9.46). Tau-U indicated a moderate and significant effect from pre-baseline to intervention (Table 9.46).

Table 9.45

Between-Phase Level Change Analysis of Paul's Range of Functions in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	4	6	2.5	1
Baseline–Maintenance	0	0	−2	−2
Pre-baseline–Baseline	4	0	2	1
Pre-baseline–Intervention	4	6	4.5	2
Pre-baseline–Maintenance	0	0	0	−1

Table 9.46

Between-Phase Statistical Analysis of Paul's Range of Functions in Online Conversation

Phase Changes	PND (%)	Tau-U		
		Tau-U	CI 90%	*p*
Baseline–Intervention	0	0.38	[−0.09, 0.84]	0.18
Baseline–Maintenance	0	−0.19	[−0.77, 0.38]	0.58
Pre-baseline–Baseline	17	0.36	[−0.21, 0.93]	0.30
Pre-baseline–Intervention	13	0.57	[0.11, 1]	0.04*
Pre-baseline–Maintenance	0	0.11	[−0.46, 0.68]	0.75

Note. Correction for baseline and pre-baseline trend applied.

*$p < .05$.

9.4.1.3 Question 4.4. Mia: Range of pragmatic functions. Mia used up to 5 functions in any one week of the experiment. Over all the weeks of the experiment Mia used 9 functions in total, including: informatives (provision of clarification-revision and provision of information); requests (request for information and request for object or action); feedbacks (acknowledgement and confirmation/denial) and social functions (closing, greeting, and routines; Table 9.47).

Table 9.47

Functions Used by Mia in the Phases of the Experiment

Phase	Range	Function Category	Function
Pre-baseline	6	Informative	Provision of information
		Request	Request for information Request for object or action
		Feedback	Confirmation/denial
		Social	Greeting
Baseline	4	Informative	Provision of clarification–revision Provision of information
		Request	Request for object/action
		Feedback	Confirmation/denial
		Social	Greeting
Intervention	8	Informative	Provision of information
		Request	Request for information Request for object or action
		Feedback	Acknowledgement Confirmation/Denial
		Social	Closing Greeting Routine
Maintenance	7	Informative	Provision of clarification–revision Provision of information
		Request	Request for information Request for object or action
		Feedback	Confirmation/denial
		Social	Greeting Routine

Note. See coding manual (Appendix K) for full definitions of functions.

9.4.1.3.1 *Within-phase analysis.* Evaluation of each phase indicated data were variable in all phases (Figure 9.20 and Table 9.48). Evaluation of level change indicated improvements in pre-baseline and deterioration or no change in baseline, intervention, and maintenance (Table 9.48). Trend estimation indicated an accelerating trend in pre-baseline and a decelerating trend in baseline, intervention, and maintenance, even when considering that the trend line data remained unstable (Figure 9.23 and Table 9.48).

Table 9.48

Within-Phase Analysis of Mia's Range of Functions in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Pre-baseline	1	0	0–5	71	3	3	29
Baseline	1	1	0–3	40	−1.5	−2	60
Intervention	2	1.5	0–5	0	−2	0	31
Maintenance	2	2.5	0–4	50	−3	−4	67

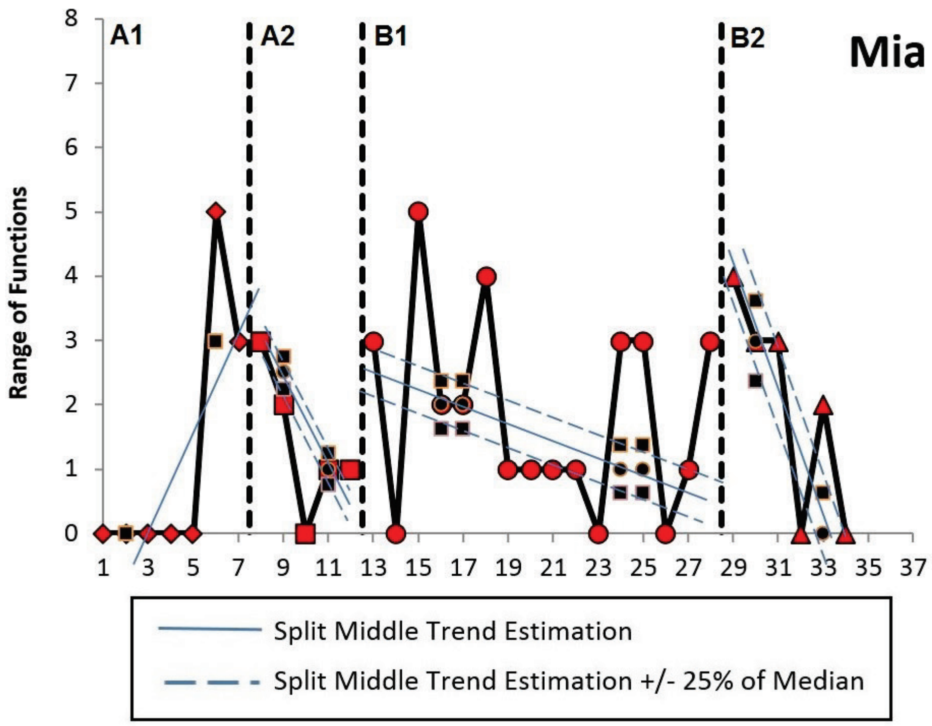


Figure 9.23. Range of functions used by Mia in online conversation per week, with trend marked.

9.4.1.3.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, a change in trend was observed from accelerating in pre-baseline to decelerating in the later phases (Figure 9.23). Level change measures indicated improvements between phases, except for relative and absolute change from pre-baseline, which is explained by the accelerating trend in pre-baseline (Table 9.49). Calculation of PND indicated the intervention was not effective (Table 9.50). Tau-U indicated strong and significant effects from baseline to intervention and pre-baseline to intervention (Table 9.50).

Table 9.49

Between-Phase Level Change Analysis of Mia's Range of Functions in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	1	2	0.5	1
Baseline–Maintenance	2	3	1.5	1
Pre-baseline–Baseline	−0.5	0	1	0
Pre-baseline–Intervention	−1	0	1.5	1
Pre-baseline–Maintenance	0	1	2.5	1

Table 9.50

Between-Phase Statistical Analysis of Mia's Range of Functions in Online Conversation

Phase changes	PND (%)	Tau-U		
		Tau-U	CI 90%	*p*
Baseline–Intervention	31	1.06[a]	[0.56, 1]	0.0004*
Baseline–Maintenance	17	0.4	[−0.20, 1]	0.27
Pre-baseline–Baseline	0	0.06	[−0.52, 0.64]	0.87
Pre-baseline–Intervention	0	0.92	[0.48, 1]	0.006*
Pre-baseline–Maintenance	0	0.0714	[−0.48, 0.62]	0.83

Note. Correction for baseline trend applied.

[a]Tau-U estimate is > 1. See discussion Data analysis section 10.9.1.

*$p < .05$.

9.4.1.4 Question 4.4. Kaylyn: Range of pragmatic functions. Kaylyn participated in online conversation for one week of baseline and one week of intervention (Figure 9.20). She used up to 2 functions in any one week of the experiment. Over the two weeks, she used 3 functions in total including provision of information, request for object or action and social closing. Visual and statistical analysis of these results indicates no effect of the intervention on the functions used online.

9.4.1.5 Question 4.4 Summary: Range of pragmatic functions. An effect of the intervention on the range of pragmatic functions was observed for two participants (Mia and Paul; Table 9.51). This was observed using systematic visual analysis and statistical analysis with Tau-U, although Tau-U was not significant from pre-baseline to maintenance for Mia. PND indicated the intervention was *ineffective* across all participants and comparisons. When comparing baseline to intervention, combined weighted Tau scores across participants indicated a minimal and significant effect, 0.30, 90% CI [0.02, 0.59], $p = 0.04$. When comparing pre-baseline to intervention, this increased to a moderate and significant effect, 0.50, 90% CI [0.16, 0.76], $p = 0.001$. Calculation of combined weighted Tau across participants confirmed the hypothesis that the range of pragmatic functions increased following the e-mentoring intervention.

Table 9.51

Summary of the Visual and Statistical Analysis of the Range of Functions in Online Conversation for all Four Participants

Participant	Pre-Baseline–Intervention			Baseline–Intervention		
	SVA	PND	Tau	SVA	PND	Tau
Tilly[a]				×	×	×
Paul	✓[b]	×	✓[b]	✓[c]	×	×
Mia	✓	×	✓[b]	✓	×	✓[c]
Kaylyn	×	×	×	×	×	×

Note. SVA = systematic visual analysis; PND = Percentage non-overlapping data.

[a]Pre-baseline data were not available for Tilly.

For the majority of comparisons, the effects observed or not observed were similar when comparing from baseline–maintenance, with the following exceptions: [b]This effect of the intervention was not observed when comparing from pre-baseline–maintenance. [c]This effect of the intervention was not observed when comparing from baseline–maintenance.

9.5 Question 4.4. Type of Pragmatic Functions

Changes in types of pragmatic functions were explored (Figure 9.24–Figure 9.28). The hypothesis that provision of feedback using confirmation or denial (FFCD = confirmation/denial, i.e., yes/no responses in conversation) would decrease following the intervention was not confirmed. FFCD functions only occurred to a small percentage across all phases of the experiment, including pre-baseline and baseline (Figure 9.25), a finding that was unexpected. The small percentage observed in pre-baseline and baseline shows that a decrease in FFCD was not a reasonable or desired effect of the intervention. Requests for clarification by participants occurred the least often in the transcripts analysed (Figure 9.25), which may suggest a lack of complexity in the pragmatic function used by participants. Provision of clarification–repetition was also uncommon (Figure 9.25), although this outcome was anticipated given the persistent nature of the transcript, and potentially limited value of repetition as a form of clarification.

Informative functions, specifically provision of information (FPI), changed the most across time (Figure 9.24 and Figure 9.27). FPI functions are plotted (Figure 9.27) and investigated further using visual and statistical analysis. An effect of the intervention on the percentage of provision of information was observed for two participants (Mia and Paul). Note that the observed changes are in the percentage of provision of information functions compared with the total functions expressed in that week. The graphs across participants are displayed first. Following this, the systematic visual analysis and statistical analysis are presented, including tables and graphs to display the data for each participant. At the end of this section, the visual and statistical analysis of the percentage of FPI functions used in online conversation is summarised.

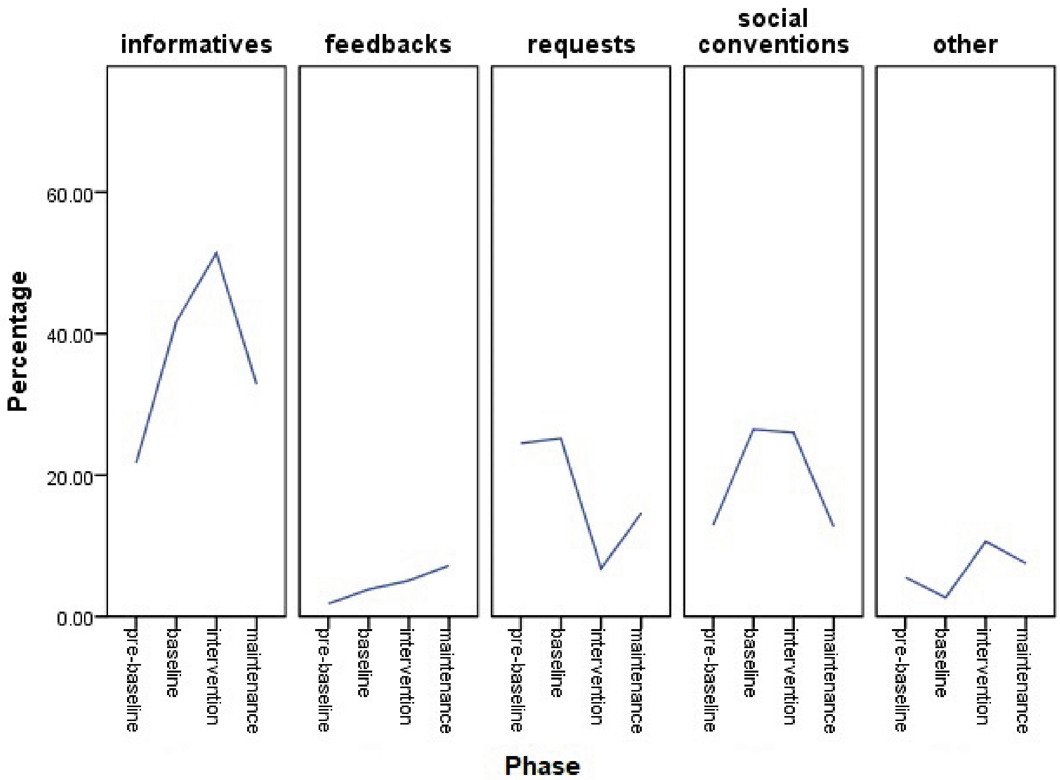


Figure 9.24. Function categories present in online conversation as a percentage of all functions. See coding manual (Appendix K) for definitions of functions.

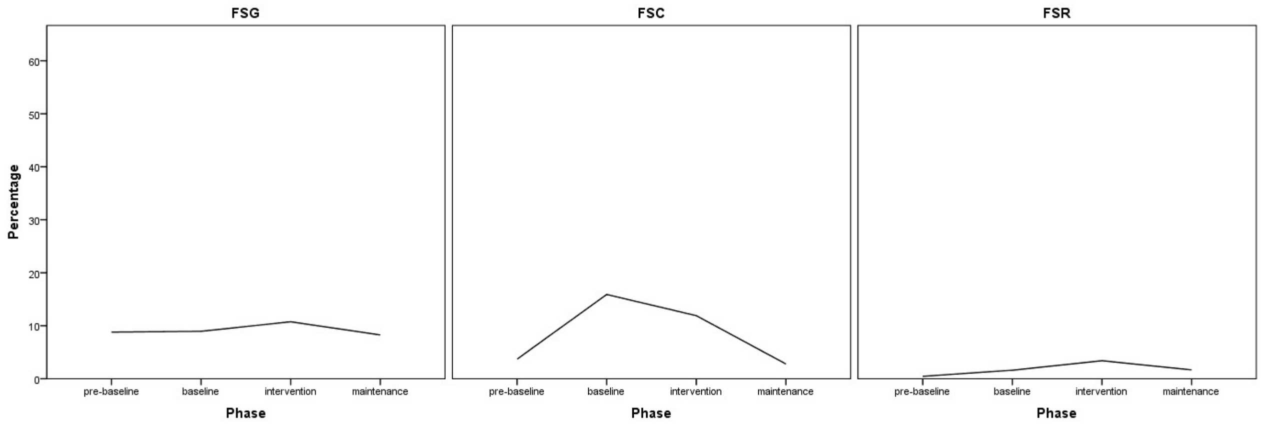


Figure 9.25. Social convention functions present in online conversation as a percentage of all functions. FSG = greetings, FSC = closing, FSR = social routines. See coding manual (Appendix K) for full definitions of functions.

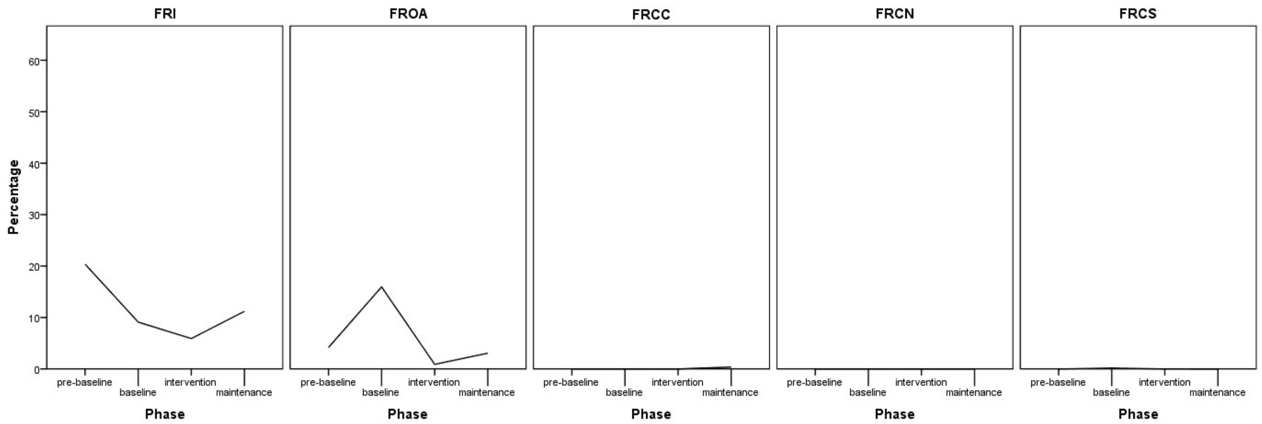


Figure 9.26. Request functions present in online conversation as a percentage of all functions. FRI = request information, FROA = request object/action, FRCC = request clarification–confirmation, FRCN = request clarification–neutral, FRCS = request clarification–specific. See coding manual (Appendix K) for full definitions of functions.

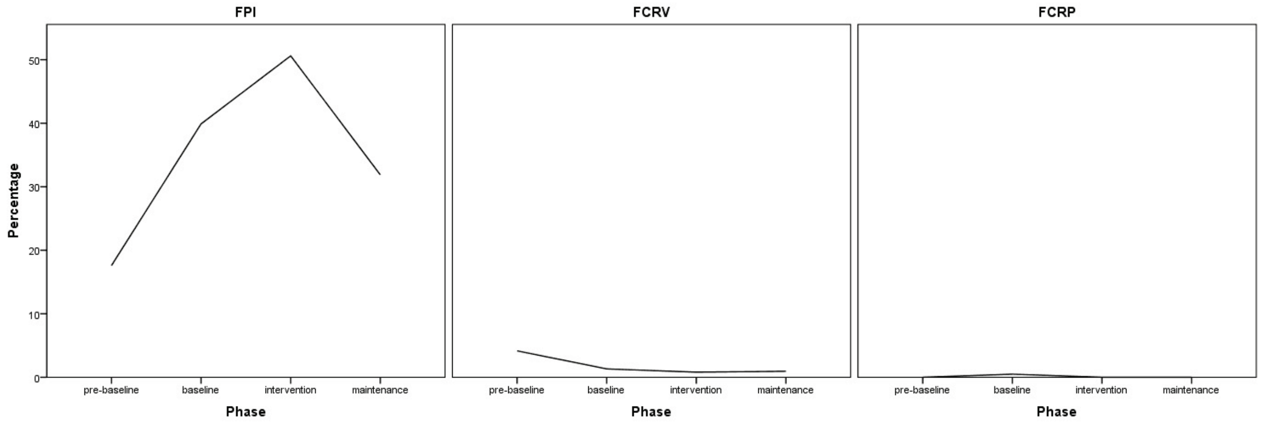


Figure 9.27. Informative functions present in online conversation as a percentage of all functions. FPI = provision of information, FCRV = provision of clarification–revision, FCRP = provision of clarification–repetition. See coding manual (Appendix K) for full definitions of functions.

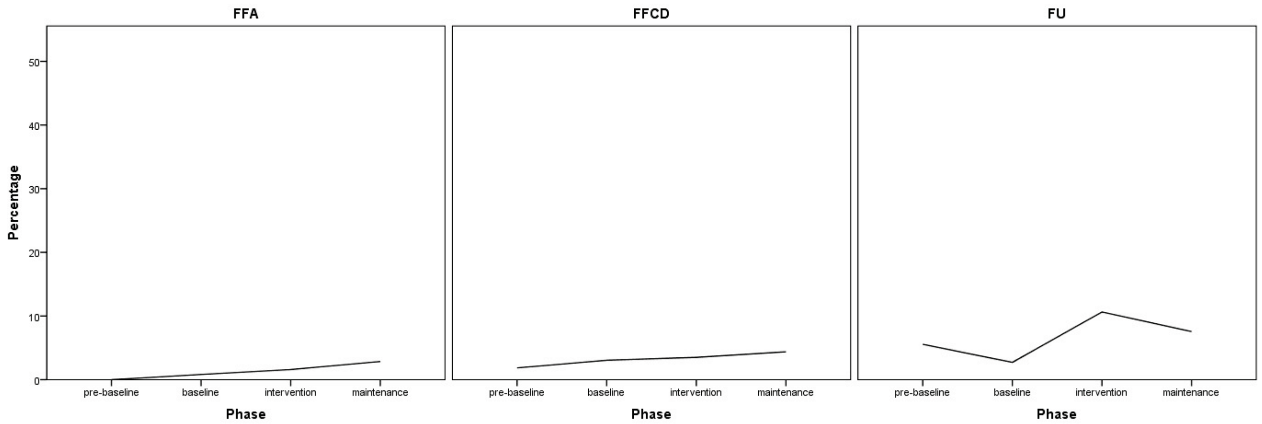


Figure 9.28. Feedback and other functions present in online conversation as a percentage of all functions. FFA = Acknowledgement, FFCD = confirmation/denial, FU = unintelligible or uncodeable. See coding manual (Appendix K) for full definitions of functions.

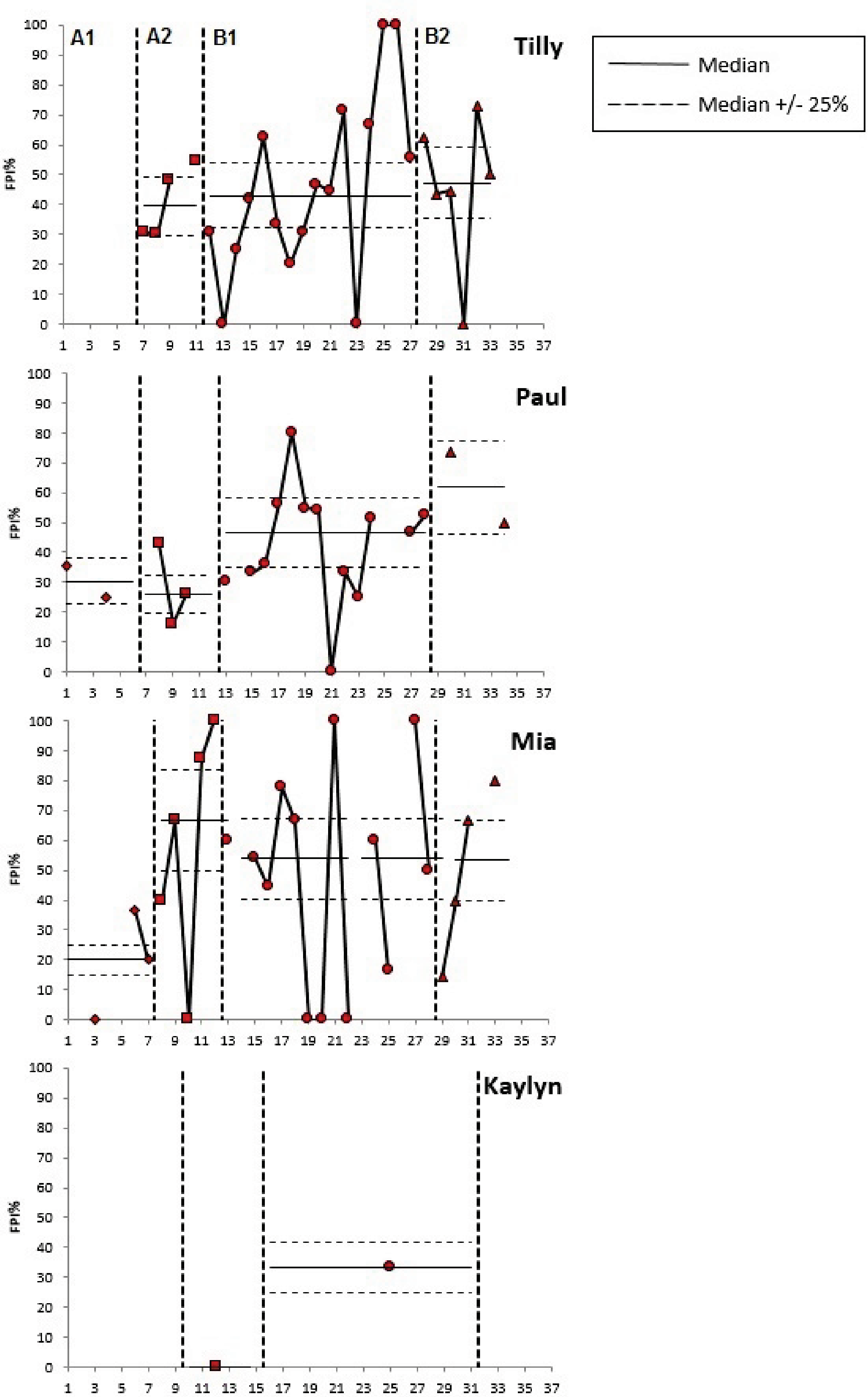


Figure 9.29. Percentage of providing information functions taken by participants in online conversation per week.

9.5.1 Visual inspection of results: Percentage provision of information.

9.5.1.1 Question 4.4. Tilly: Percentage provision of information.

9.5.1.1.1 *Within-phase analysis.* Evaluation of each phase indicated data were variable within all phases (Table 9.52 and Figure 9.29). Evaluation of level change indicated improvements within phases (Table 9.52). This was confirmed by estimation of an accelerating trend within each phase. Following consideration of trend, data remained unstable in all phases (Figure 9.30 and Table 9.52).

Table 9.52

Within-Phase Analysis of Tilly's Percentage of Provision of Information Functions in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Baseline	41	30	30–55	75	25	24	75
Intervention	46	0	0–100	25	30	25	38
Maintenance	46	0	0–73	50	6	13	50

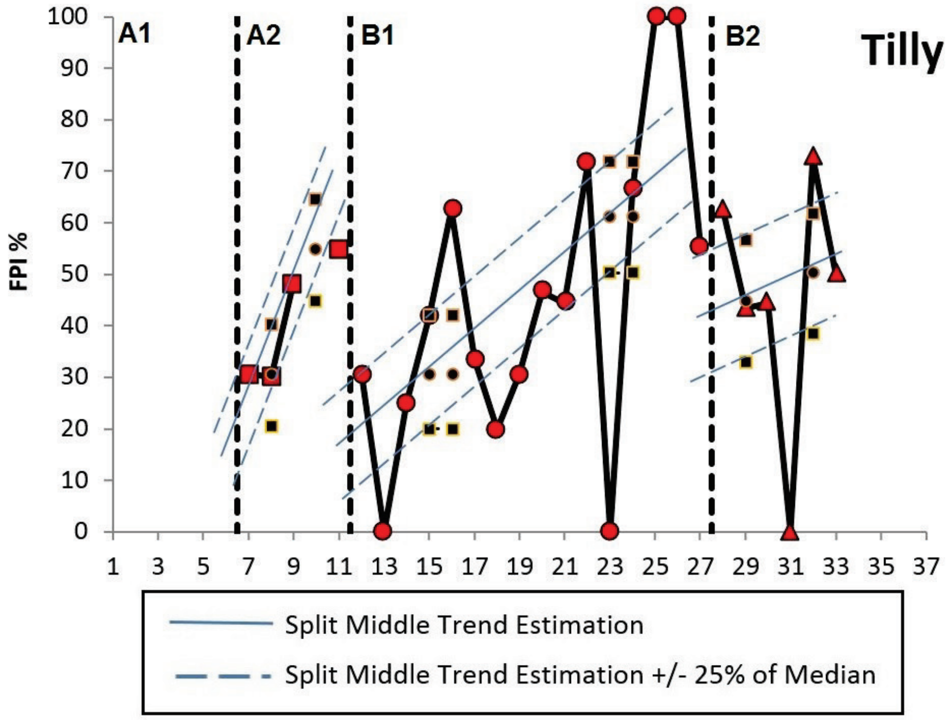


Figure 9.30. Percentage of providing information functions taken by Tilly in online conversation per week.

9.5.1.1.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, an accelerating trend was maintained across all phases (Figure 9.30). Despite an increase within phases, level change measures indicate a relative deterioration between phases, which is explained by the accelerating trend and fluctuations observed within phases (Table 9.53). However, improvements in absolute, median, and mean level change are present when comparing from baseline to maintenance. The overall range of data increased in intervention and maintenance compared with baseline, which may indicate an improving but fluctuating change in percentage of provision of information functions. Calculation of PND and Tau $_{novlap}$ (Table 9.54) indicated no effects of the intervention.

Table 9.53

Between-Phase Level Change Analysis of Tilly's Percentage of Provision of Information Functions in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	−24	-24	-30	5
Baseline–Maintenance	−11	8	5	5

Table 9.54

Between-Phase Statistical Analysis of Tilly's Percentage of Provision of Information Functions in Online Conversation

Phase Changes	PND (%)	Tau $_{novlap}$		
		Tau	CI 90%	*p*
Baseline–Intervention	38	0.03	[−0.47, 0.52]	0.93
Baseline–Maintenance	33	0.13	[−0.47, 0.73]	0.72

9.5.1.2 Question 4.4. Paul: Percentage provision of information.

9.5.1.2.1 *Within-phase analysis.* Evaluation of each phase indicated data were stable in pre-baseline and maintenance and unstable within baseline and intervention (Table 9.55 and Figure 9.29). Level change was variable (Table 9.55). Trend estimation indicated a deteriorating trend in all phases. When considering stability around the trend line, the stability for each phase was unchanged (Table 9.55 and Figure 9.31).

Table 9.55

Within-Phase Analysis of Paul's Percentage of Provision of Information Functions in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Pre-baseline	30	30	25–36	100	−11	N/A	100
Baseline	28	26	16–43	33	26	N/A	33
Intervention	43	47	0–80	54	−14	22	46
Maintenance	62	62	50–73	100	−23	N/A	100

Note. N/A = unable to calculate owing to missing data, or no online conversation occurring in initial or final week of phase.

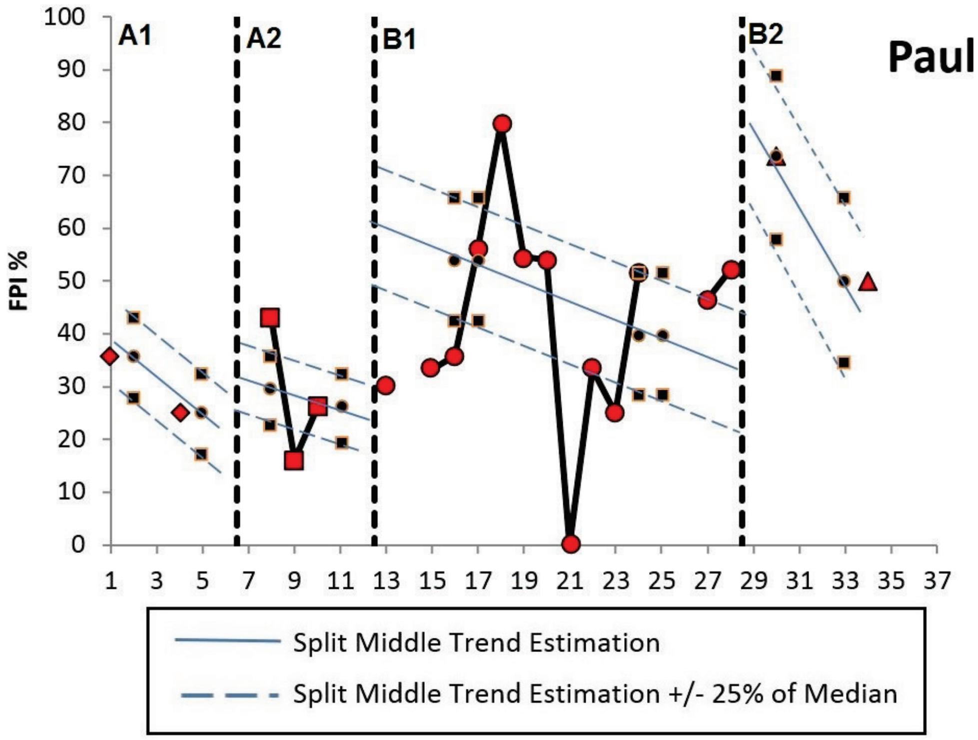


Figure 9.31. Percentage of providing information functions taken by Paul in online conversation per week.

9.5.1.2.2 *Between-phase analysis.* With consideration of within-phase analysis of trend, a deteriorating trend continued through the four phases of the experiment (Figure 9.31). Given that there were several weeks where online conversation did not occur, it was not possible to calculate absolute level changes. Level change measures indicated improvements between phases, except for changes between pre-baseline and baseline, which were relatively small (Table 9.56). Calculation of PND indicated the intervention was questionably effective when comparing baseline–intervention, pre-baseline to intervention (Table 9.57). This increased to *highly effective* when comparing baseline or pre-baseline to maintenance. Tau indicated a moderate and significant effect from pre-baseline or baseline to intervention and a strong and significant effect from pre-baseline or baseline to maintenance (Table 9.57).

Table 9.56

Between-Phase Level Change Analysis of Paul's Percentage of Provision of Information Functions in Online Conversation

Phase changes	Relative	Median	Mean
Baseline–Intervention	28	21	15
Baseline–Maintenance	47	36	34
Pre-baseline–Baseline	4	−4	−2
Pre-baseline–Intervention	29	17	13
Pre-baseline–Maintenance	48	32	32

Table 9.57

Between-Phase Statistical Analysis of Paul's Percentage of Provision of Information Functions in Online Conversation

Phase Changes	PND (%)	Tau		
		Tau	CI 90%	*p*
Baseline–Intervention	53	[b]0.64	[0.17, 1]	0.03*
Baseline–Maintenance	100	[b]1	[0.43, 1]	0.004*
Pre-baseline–Baseline	33	[a]−0.31	[−0.88, 0.27]	0.38
Pre-baseline–Intervention	69	0.68	[0.21, 1]	0.016*
Pre-baseline–Maintenance	100	1.14[c]	[0.57, 1]	0.001*

Note. [a]Tau-U = correction for baseline trend applied. [b]$Tau_{novlap.}$ [c]Tau-U estimate is > 1. See discussion Data analysis section 10.9.1.

*p < .05.

9.5.1.3 Question 4.4. Mia: Percentage provision of information.

9.5.1.3.1 *Within-phase analysis.* Evaluation of each phase indicated data were variable within all phases (Figure 9.29 and Table 9.58). Evaluation of level change indicated large improvements in most phases, except for intervention (Table 9.58). Trend estimation indicated accelerating trend within all phases, although this was close to zero-celerating or constant in intervention. When considering stability around the trend line, data remained unstable (Table 9.58 and Figure 9.32).

Table 9.58

Within-Phase Analysis of Mia's Percentage of Provision of Information Functions in Online Conversation

Phases	Level				Level Change		
	Mean	Median	Range	Stability (%)	Relative	Absolute	Stability (%)
Pre-baseline	19	20	0–36	33	28	N/A	33
Baseline	59	67	0–100	20	41	60	60
Intervention	48	54	40–67	46	1	−10	46
Maintenance	50	53	40–67	50	40	N/A	100

Note. N/A = unable to calculate owing to missing data, or no online conversation occurring in initial or final week of phase.

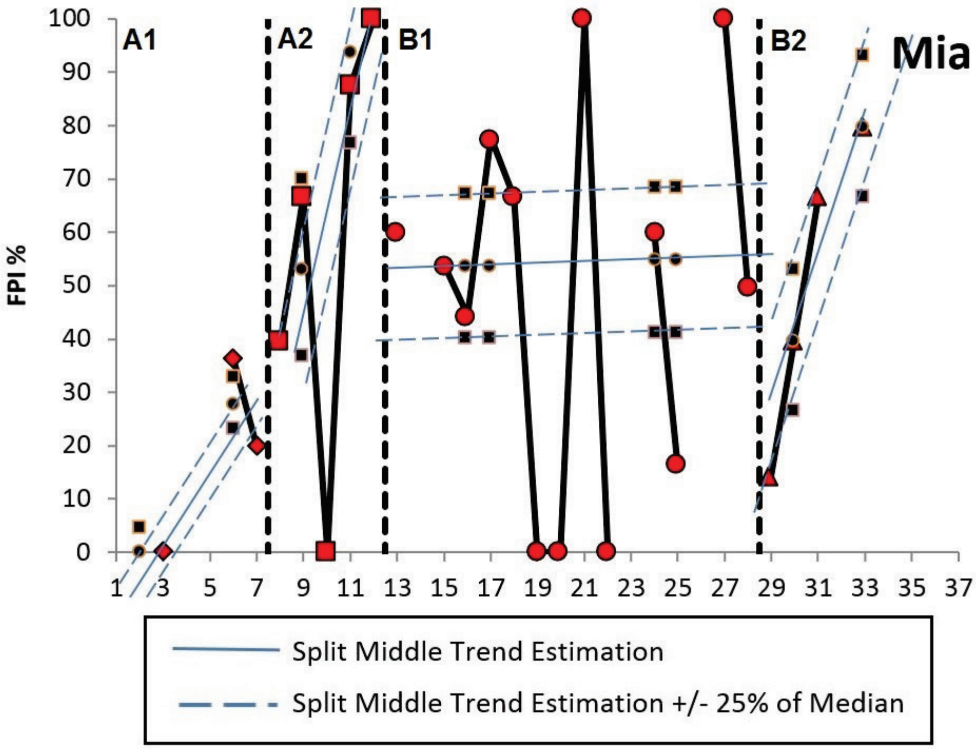


Figure 9.32. Percentage of providing information functions taken by Mia in online conversation per week.

9.5.1.3.2 *Between-phase analysis.*

With consideration of within-phase analysis of trend, an accelerating trend was present across all phases (Figure 9.32). Level change measures indicated deterioration when comparing to baseline and improvements when comparing to pre-baseline (Table 9.59). Calculation of PND indicated the intervention was not effective when comparing to baseline, but this was questionably changed to *fairly effective* when comparing to pre-baseline (Table 9.60). Tau-U indicated a minimal, non-significant intervention effect when comparing pre-baseline to intervention.

Table 9.59

Between-Phase Level Change Analysis of Mia's Percentage of Provision of Information Functions in Online Conversation

Phase Changes	Relative	Absolute	Median	Mean
Baseline–Intervention	−40	−40	−13	−11
Baseline–Maintenance	−54	−86	−14	−9
Pre-baseline–Baseline	25	20	47	40
Pre-baseline–Intervention	26	40	34	29
Pre-baseline–Maintenance	12	-6	33	31

Table 9.60

Between-Phase Statistical Analysis of Mia's Percentage of Provision of Information Functions in Online Conversation

Phase Changes	PND (%)	Tau-U		
		Tau-U	CI 90%	*p*
Baseline–Intervention	0	−0.25	[−0.47, 0.52]	0.41
Baseline–Maintenance	0	−0.4	[−1, 0.20]	0.27
Pre-baseline–Baseline	80	0.37	[−0.21, 0.95]	0.29
Pre-baseline–Intervention	69	0.46	[0.03, 0.90]	0.08
Pre-baseline–Maintenance	75	0.5	[−0.05, 1]	0.13

Note. Correction for trend in baseline and pre-baseline applied.

9.5.1.4 Question 4.4. Kaylyn: Percentage provision of information. Kaylyn participated in online conversation for one week of baseline and one week of intervention (Figure 9.29). No provisions of information were present in her baseline conversations, and this function was present during intervention (33%). Therefore, calculation of PND indicated the intervention was *highly effective*, although this result must be interpreted with caution, given the limited data available. For this reason, calculations of Tau-U were not considered worthwhile.

9.5.1.5 Question 4.4. Summary: Percentage provision of information. Variability in the effects of the intervention was observed across participants (Table 9.61). However, when comparing from pre-baseline to intervention an effect of the intervention on the percentage of provision of information was observed for Paul, which was evident with all three analysis methods, and for Mia using systematic visual analysis and PND (Table 9.61). When comparing baseline to intervention, combined weighted Tau scores across participants indicated a negligible and non-significant effect, 0.15, 90% CI [−0.19, 0.48], $p = 0.39$. When comparing pre-baseline to intervention, this increased to a moderate and significant effect, 0.57, 90% CI [0.19, 0.95], $p = 0.004$. Note that the observed changes are in the percentage of provision of information functions compared with the total functions expressed in that week. The significant combined weighted Tau calculation confirms the hypothesis that the e-mentoring intervention increased the percentage of provision of information functions used in online conversation.

Table 9.61

Summary of the Visual and Statistical Analysis of the Percentage of Provision of Information Functions in Online Conversation for All Four Participants

Participant	Pre-Baseline–Intervention			Baseline–Intervention		
	SVA	PND	Tau	SVA	PND	Tau
Tilly[a]				?	×	×
Paul	✓	✓	✓[b]	✓	?[c]	✓
Mia	✓	✓	×	×	×	×
Kaylyn	×	×	×	×	×	×

Note. SVA = systematic visual analysis, PND = Percentage non-overlapping data.

[a.] Pre-baseline data were not available for Tilly.

For the majority of comparisons, the effects observed or not observed were similar when comparing from baseline–maintenance, with the following exceptions: [b]This effect of the intervention was not observed when comparing from pre-baseline to maintenance. [c]An effect of the intervention was observed when comparing from baseline–maintenance.

9.6 Summary of Linguistic Analysis Results

Systematic visual analysis indicated effects of the intervention on number of days, total hours, and percentage of optional responses in online conversation. Changes observed in the level and trend of these outcomes between phases suggest possible intervention effects that were replicated across three participants, Tilly, Paul, and Mia. Fluctuating changes were observed in the range of modes used in online conversation for the same three participants, suggesting a possible effect of the intervention.

Two non-overlap analyses were used, PND and Tau. Calculations of PND indicated that the intervention was questionably to *highly effective* for the percentage of optional responses used in online conversation across three participants, Tilly, Paul, and Mia. There were no other outcomes for which effectiveness of the intervention calculated using PND was replicated across three participants. The effect observed for optional responses was also present when comparing baseline to maintenance.

Calculations of Tau-U indicated that significant effects observed for individual participants were not replicated across three participants for any of the measures. Replication across three participants is traditionally a requirement to demonstrate effectiveness in SCED; nevertheless, weighted combined Tau effects have also been applied in SCED research to indicate the effectiveness of an intervention (Ganz, Goodwn, et al., 2013). Combined weighted Tau scores across participants are tabled for Question 2 and 4 (Table 9.62 and Table 9.63). When comparing baseline to intervention, significant combined effects were calculated for percentage of optional moves taken in online conversation, range of functions, and hours spent in online conversation (Table 9.62). Significant effects ranged from minimal to moderate and confirm the hypothesis that the e-mentoring intervention affected participation in online conversation (percentage of optional responses, range of functions, and hours). Only the effect for percentage of optional responses was significant when comparing from baseline to maintenance. When comparing from pre-baseline to intervention, combined weighted Tau indicated significant effects for all measures (words, total moves, percentage optional responses, range of modes, range of functions, and percentage provision of information functions; Table 9.63). The significant effects observed ranged from minimal to strong. Only the effects for percentage of optional responses and percentage of provision of information functions remained significant when comparing from pre-baseline to maintenance.

Table 9.62

Combined Weighted Tau Scores across Participants: Comparison to Baseline

Variable	Baseline–Intervention			Baseline – Maintenance		
	Tau	CI 90%	*p*	Tau	CI 90%	*p*
All moves	−0.004	[−0.282, 0.27]	0.98	−0.08	[−0.37, 0.21]	0.66
LRO%	0.59	[0.30, 0.87]	0.0006*	0.73	[0.3912, 1]	0.0004*
FPI%	0.15	[−0.13, 0.43]	0.39	0.26	[−0.08, 0.60]	0.21
Modes R	0.15	[−0.09, 0.39]	0.30	−0.08	[−0.37, 0.21]	0.65
Func R	0.30	[0.06, 0.54]	0.04*	−0.01	[−0.30, 0.28]	0.95
Days	0.25	[0.01, 0.49]	0.09	0.24	[−0.05, 0.54]	0.17
Hours	0.37	[0.13, 0.61]	0.01*	0.33	[0.03, 0.62]	0.07
Words	0.06	[−0.19, 0.30]	0.71	−0.13	[−0.42, 0.16]	0.46

Note. Minimal effect ≥ 0.2, Moderate effect ≥ 0.5, Strong effect ≥ 0.8 (Ferguson, 2009)

**p* < .05.

Table 9.63

Combined Weighted Tau Scores across Participants: Comparison to Pre-Baseline

Variable	Pre-Baseline–Baseline			Pre-Baseline–Intervention			Pre-Baseline–Maintenance		
	Tau	CI 90%	*p*	Tau	CI 90%	*p*	Tau	CI 90%	*p*
All moves	0.32	[0.00, 0.64]	0.10	0.427	[0.17, 0.68]	0.005*	0.17	[−0.14, 0.49]	0.37
LRO%	0.48	[0.070, 0.88]	0.05	0.85	[0.53, 1]	0*	1.07	[0.67, 1]	0*
FPI%	0.03	[−0.38, 0.44]	0.90	0.57	[0.25, 0.89]	0.004*	0.81	[0.42, 1]	0.0007*
Modes R	0.41	[0.09, 0.73]	0.03*	0.46	[0.21, 0.72]	0.003*	0.22	[−0.10, 0.53]	0.25
Func R	0.19	[−0.13, 0.52]	0.32	0.50	[0.25, 0.76]	0.001*	0.06	[−0.26, 0.37]	0.76
Words	0.29	[−0.03, 0.62]	0.13	0.37	[0.12, 0.62]	0.016*	0.12	[−0.20, 0.43]	0.55

Note. Minimal effect ≥ 0.2, Moderate effect ≥ 0.5, Strong effect ≥ 0.8 (Ferguson, 2009)

**p* < .05.

9.7 Overview of Results

The information in the four results chapters aligned with the research questions:

- Chapter 6, Question 1. Activity competence: What is the effect of a cross-age peer e-mentoring intervention on participant goals for online conversation? This chapter reported the goals developed for each participant and the pre-post ratings were reported first within and then across the participants.
- Chapter 7: Question 2. Physical engagement: What is the effect of a cross-age peer e-mentoring intervention on the reported intensity of online conversation?
- Chapter 8: Question 3. Social and self-engagement: What is the effect of a cross-age peer e-mentoring intervention on social and self-engagement in online conversation?
- Chapter 9: Question 4. Social and self-engagement: What is the effect of a cross-age peer e-mentoring intervention on written online conversation of mentees when they communicate with partners other than their mentor on one targeted social networking platform?

Chapter 6 introduced the participants who all used AAC and reported that they were able to communicate effectively with familiar, but not always with unfamiliar, partners (CFCS Level III). The participants all reported barriers in accessing online conversation. Kaylyn was the only participant to report no prior experience using social media. This chapter reported clinically and statistically significant results that confirmed the hypothesis that participants would report positive changes in their perception of performance and satisfaction with performance for their goals for online conversation. Participants progressed in their goals for online conversation following the e-mentoring intervention.

Chapter 7 presented significant results confirming the hypothesis that the e-mentoring intervention increased hours spent in online conversation for three of the four participants.

Chapter 8 reported participants' positive experiences of engagement in online conversation throughout the stages of the research project. Some variation was observed in these reported experiences across time and across participants, although there did not appear to be a clear effect of the intervention. Participants reported a range of facilitators and barriers to engagement in online conversation that may have limited the ability to observe an intervention effect.

Chapter 9 presented combined weighted Tau that indicated significant results across participants, which confirmed the hypothesis that the e-mentoring intervention increased the percentage of optional moves and range of functions used in online conversation. The inclusion of pre-baseline data allowed further combined weighted Tau analysis from pre-baseline to intervention, which confirmed the hypothesis that the e-mentoring intervention increased total moves, percentage of optional responses, percentage of provision of information, range of modes, range of pragmatic functions, and total words written.

Chapter 10: Discussion

This research investigated the effectiveness of a peer e-mentoring intervention in enhancing participation in online conversation by young people who use AAC. In this chapter, the effectiveness of the e-mentoring intervention in facilitating changes to participation in online conversation is discussed. The chapter is divided into the following sections:

1. Each of the hypotheses and their findings are examined and interpreted.
2. The success of the intervention and its possible mechanisms are discussed.
3. Contributions to knowledge of participation-based intervention and research are discussed.
4. Limitations of the research are summarised.
5. Finally, implications for practice and future research directions are also presented.

This research contributed to knowledge in the AAC field in several areas as highlighted below. The current study is the first to report on changes in participation in online conversation following a cross-age peer e-mentoring intervention. It also included thematic analysis of the components of mentoring support provided to young people who use AAC by older mentors who also use AAC and confirmed the positioning of the cross-age peer e-mentors as role models. It is the first study to develop a tool for analysis of online conversation by people who use AAC and apply the newly developed linguistic analysis tool to online conversation.

Participants were observed to have an active role in online conversation throughout the phases of the study, which contrasted with linguistic analysis of face-to-face conversation in this group (Light et al., 1985a). Findings of the linguistic analysis (Question 4) confirmed that participants took active roles when participating in conversation in a computer-mediated environment. Changes observed in participation in online conversation (Question 2, Question 4) suggested effects in physical, social, and self-engagement domains. These findings provide initial evidence that online conversation maybe a valuable real-world context for providing AAC interventions.

One unexpected, but important finding of the research, was the increasing trend observed during the first half of the baseline phase for several of the participants and across several measures. For example, Paul's hours spent in online conversation during baseline followed an increasing trend, reaching 5 hours in Week 3, yet decreased back to 0 hours in the final week of baseline. This finding suggested that support given to the mentees by the researcher prior to the mentoring provided intermediate effects, which may have functioned as pre-conditions for the ultimate effects of the e-mentoring intervention (Schlosser, 2003; Shpigelman, Reiter, & Weiss, 2009). It is suggested that future research investigate intermediate effects of goal setting as a distinct component of AAC interventions.

An important issue for the field, highly relevant in the current study, is the challenge in operationalisation of participation. The research aimed to explore outcomes across the domains of participation (physical, social, and self-engagement), as specifically defined by Kang et al. (2014). The investigation focused on participation in the real-life activity context of online conversation by four young people who used AAC over 6 months. Significant variability was observed across all participants in all phases of the experiment. Applying a pragmatic stance, the current study emphasised the importance of real-life contexts in intervention research and reinforced our understanding of participation as a product of complex, inter-directional relationships between environmental and personal factors, health condition, body, and activity (WHO, 2007).

10.1 Research Hypotheses

The research hypotheses are listed in Table 10.1 and provide an introductory framework for the discussion that follows in this chapter.

Table 10.1

Hypotheses Supported/Not Supported by the Research Findings

No.	Research Hypothesis	Finding	Results
[a]	Mentors would provide the e-mentoring according to the guidelines in the training handbook provided.	Supported	Thematic analysis of mentoring conversations
1[b]	Participants would show positive changes in:		
	• perception of performance; and	Supported	COPM, paired *t*-test
	• perception of satisfaction with performance in identified problem areas in online conversation; and	Supported	COPM, paired *t*-test
	• progress in attainment of goals for online conversation following the intervention.	Supported	GAS, Mean T-score
2[c]	Participants would increase their online conversation in terms of:		
	• the frequency (days per week);	Not supported	Combined weighted Tau-U (Baseline–Intervention/ Pre-baseline–Intervention)
	• duration (in hr); and	Supported	Combined weighted Tau-U (Baseline–Intervention and Pre-baseline–Intervention)
	• total words transmitted in online conversation following the intervention.	Supported	Combined weighted Tau-U (Pre-baseline–Intervention)
3	Participants and their mothers would report positive experiences of participation in online conversation, which would also be positively affected by the intervention, as demonstrated by:		
	• increased ratings on the SEAS-PCS; and/or	Not supported	SEAS Mean ratings
	• increased self & proxy ratings on the engagement probe, following the intervention.	Not supported	Engagement Probe Mean ratings

Table 10.1 Continued

No.	Research Hypothesis	Finding	Results
4	Written online conversation between the participants and other communication partners outside of the mentoring intervention would be enhanced by the e-mentoring intervention.	Supported	as described below for sub-sections of the question
4.1	Participants would increase in their use of online modes (e.g., like, tag, attach photo/video and use of chat abbreviations) in online conversation following the intervention.	Supported	Combined weighted Tau-U (Pre-baseline–Intervention)
4.2[c]	Use of linguistic moves in online conversation would demonstrate increase in:		
	• total moves;	Supported	Combined weighted Tau-U (Pre-baseline–Intervention)
	• assertiveness (e.g., initiations of topic, initiations of conversation); and/or	Not supported	Visual Analysis, Total Functions used for each phase[d]
	• optional/non-obliging move types following the intervention.	Supported	Combined weighted Tau-U (Baseline–Intervention and Pre-baseline–Intervention)
4.3	Use of pragmatic functions in online conversation would demonstrate:		
	• increased range of functions;	Supported	Combined weighted Tau-U (Pre-baseline–Intervention)
	• reduced use of confirmation-denial functions; and/or	Not Supported	Visual Analysis, Total Functions used for each phase
	• increased provision of information functions following the intervention.	Supported	Combined weighted Tau-U (Pre-baseline–Intervention)

Note. Primary hypotheses are highlighted with a specific note, and all other hypothesis are secondary.

[a]This hypothesis relates to the intervention and not to one of the four research questions. [b] Hypothesis 2c (total words) was proposed as the primary hypothesis to measure participation physical engagement or attendance (or attendance as defined by Imms, Granlund, Wilson, Steenburgen, Rosenbaum, & Gordon, 2017). [c] Hypothesis 4.2c

(optional moves) was proposed as the primary hypothesis to measure participation social and self-engagement (Kang et al., 2014, or involvement as defined by Imms et al., 2017). [d] Tau-U analysis was not completed for this measure.

The overarching hypothesis of this research, that the e-mentoring intervention would increase participation in online conversation, was supported by the findings. However, these findings must be interpreted with caution considering the variation within results and limitations of the study detailed further in this chapter.

10.2 Mentoring Intervention Fidelity

10.2.1 Hypothesis: Mentoring intervention fidelity. The hypothesis linked to research question 1: Mentors will provide the e-mentoring according to the guidelines in the training handbook provided. Key findings are summarised and evaluated in the following section.

10.2.2 Key results: Mentoring intervention fidelity.

10.2.2.1 Adherence. The cross-age peer e-mentoring intervention was provided weekly over 16 weeks, with adherence in the current study at 80%, on average. However, there was significant variation in consistency of mentoring contacts across the participants (56%–94%) and challenges in establishing connection with the mentor for Kaylyn. This mentor–mentee pair experienced significant challenges in connecting, particularly during the first half of the programme (with no contact for 5 of the first 8 weeks of the 16-week programme). This mentor–mentee match was changed in the week leading up to the match owing to the initial mentor being unwell and unable to go ahead with the match. The researcher was in contact with the new mentor and parent of the mentee to support them as soon as the initial mentor made the researcher aware that she would be unable to continue her commitment to mentor Kaylyn. Despite these attempts, this disruption possibly contributed to the difficulties in this mentor–mentee pair successfully connecting online in the first weeks of the programme (e.g., in planned matches, the initial online meet-up was scheduled prior to baseline commencing, and this date was negotiated well in advance and designed to be suitable for the mentor and participant; further, in planned matches, the researcher negotiated the best days and times for contacts online between the participants and mentors) well in advance of the intervention. This support process and development of suitable times for online contacts between Kaylyn and her new mentor match required several weeks to establish. This may have been further complicated, given that Kaylyn had no prior social media experience.

Similar challenges in adherence to regular mentoring contacts have been reported by previous cross-age mentoring intervention research in other populations (Raghavendra, Newman, Wood et al., 2015; Stewart et al., 2011; Stinson et al., 2016). For example, Raghavendra, Newman, Wood et al. (2015) reported that 3 of the 10 mentor–mentee pairs did not connect successfully.

Several strategies were included in the current study to support mentees and mentors in arranging contacts including: (a) asking in advance regarding any anticipated absence or holidays over the 16-week period, (b) discussing best times/days for contacts and sharing information with both parties, (c) developing and providing an intervention calendar to participants and mentors and, (d) providing ongoing support and following up missed appointments. Adherence to mentoring contacts may be increased if mentors and mentees have the option of requesting breaks from the intervention to accommodate holidays or illness. Future research may consider implementing further strategies to increase adherence; for example, text message reminders have been successful in increasing adherence for other health interventions (Boksmati, Butler-Henderson, Anderson, & Sahama, 2016). Some research has suggested that interventions delivered online may experience better adherence when compared with face-to-face interventions (Morris et al., 2017). Although not the focus of this research, the pattern of contacts between mentors and mentees suggested that adherence with appointment schedules continued to be a challenge even in the online environment, and similar challenges have been experienced in other online mentoring studies (Stinson et al., 2016). Poor adherence to appointments offline has been suggested to be attributable to forgetfulness, competing work/family commitments, poor health or other adverse events, administrative errors, and patient confusion over dates and times (Hogan, McCormack, Traynor, & Winter, 2008; Lakshminarayana, 2016; Verbov, 1992). These causes are also relevant in the online environment. Further, these challenges may be increased in the online environment by the added complexity of technical problems and Internet access issues faced by novice users (Shpigelman et al., 2008). No minimum threshold of delivery was established in the current study. Thus, future research could be improved by including guidelines regarding low adherence to mentoring contacts.

10.2.2.2 Accessibility of social media environments. The e-mentoring intervention was successfully delivered using a range of mentee-selected social media platforms, namely, Skype, email, and Facebook. However, plans to connect via Snapchat and i-Message were unsuccessful because of challenges with technological compatibility and/or physical access. These social media platforms have been successfully included in previous research using face-to-face interventions with young people with developmental disabilities (Raghavendra, Newman, Wood, et al., 2015). Including more face-to-face support to mentors, and the option for face-to-face contact between mentors and mentees, may have facilitated initial contact and set-up and consequently later e-mentoring support over these platforms (Raghavendra, Newman, Wood, et al., 2015).

These challenges suggest a possible impact of physical impairment on voluntary movement, in accessing these platforms successfully. For example, Tilly, Mia, and Kaylyn all indicated in their goals an interest in using Snapchat, since this application was at the time used commonly by their peers. Snapchat requires participants to accurately select and hold a location on the screen and restricts access up to 10s only. Mia also experienced challenges in accessing the copy and paste feature on her iPad to develop text in her AAC application and copy it into a social media application. Mia found it difficult to press and hold the text to bring up the *paste/speak/copy* options on the iPad. It was also difficult for her to then select paste/copy/speak, since this selection option remains small on the iPad screen, regardless of how large the text on the iPad is set. An alternative option is to swipe down the screen with two fingers to activate the speak screen function. However, Mia found that using this option was also physically challenging. Further, the assistive touch gestures did not include the option to activate the speak screen function. The researcher contacted the developers of Mia's AAC app, who suggested contacting Apple Accessibility. The Apple Accessibility team was also notified of this accessibility problem with the text selection tools on the iPad (copy/select all/paste/speak). The feedback was 'passed along to the appropriate group' (Apple Accessibility, personal communication 13/08/2015). Similar problems with touchscreen access were experienced by Paul, Mia, and Tilly. According to the Convention on The Rights of Persons with Disabilities (2006), application developers are obliged to provide accessibility options for individuals with disabilities. As new social media platforms are developed, there is a role for researchers, clinicians and consumers to provide feedback to developers regarding accessibility concerns of individuals who use AAC. Over time, existing platforms used will be updated by developers to include new features, and new platforms will be developed and become popular. The continual changes in social media platforms present an ongoing challenge in ensuring the accessibility of social media for young people who use AAC.

10.2.2.3 Reading ability. A silent reading assessment was completed with all four participants to describe their reading abilities at the start of the project. Paul (Grade 3) and Tilly (Grade 2) had higher level silent reading skills compared with Kaylyn and Mia, who did not reach the criterion for the lowest level included in the inventory. Outcomes of the intervention were strongest for Paul and Mia, which does not correlate strongly with participant literacy skills. It may be that other factors, such as choice of social media platform or use of an AAC system to access social media, moderated the impact of literacy skills. For example, Mia used an AAC application to write her messages and copied and pasted these messages into her Facebook app. The symbol support provided in her AAC application likely reduced her reliance on traditional literacy skills to access social media. During the project, Mia also learnt to speak aloud messages from communication partners sent in online conversation using text to speech software. Conversely Kaylyn indicated a preference to use email and reported limited ability to use her AAC application. She preferred to directly type into her email rather than use her AAC application. Kaylyn's outcomes show that her use of email was limited to only two weeks over the entire experiment. This limited use of email may have been related to her literacy skills, although this finding must be interpreted with caution, given that other individual factors may have also contributed to Kaylyn's limited success. For example, Kaylyn was the only one of the four participants with no prior social media experience before participation in the research project.

10.2.2.4 Mechanisms of mentoring. The mentoring provided in the current study aligned with the definition provided in the training handbook. The themes identified in online mentoring conversations were similar to those identified in previous research (Raghavendra, Newman, Wood, et al., 2015). The aspect of mentoring found to be most salient in the current study was role modelling by mentors. Role modelling has been identified as an important feature of face-to-face cross-age peer mentoring for young people who use AAC (Ballin et al., 2012; Rackensperger et al., 2005). The three most-coded themes of the current study (role model, guidance, and support and encouragement) were consistent with the most frequent types of mentoring support identified by Raghavendra et al. (2015) in their cross-age peer e-mentoring research (providing information, encouragement, and emotional support).

10.2.2.5 Cost/time benefits of the mentoring approach. E-mentoring health interventions are purported to have greater cost and time benefits in comparison with the delivery of face-to-face and direct health interventions (Moodie & Fisher, 2009). Although not the focus of the current study, the support provided by the researcher to the mentors and mentees in this programme was greater than anticipated, which may have implications for the cost and time benefits of this approach. The researcher was available on call throughout the mentoring intervention, and support provided totalled 26 hours of 1:1 meetings, 265 emails, and 198 phone contacts (see Section 5.2.1). Much of the previous research in the area does not clearly quantify extra supports provided to the mentors, mentees, and family members. For example, Barnfather et al. (2011) reported bimonthly check-in sessions, periodic individual contact, a one-day training session, and support staff available on call at all times during the intervention. Ahola Kohut et al. (2016) report providing two full day and one evening training session (20 hr), an intervention guidebook, support following initial meeting with mentee, and additional support and training as needed. Raghavendra, Newman, Wood et al. (2015) report that support provided by the mentoring project coordinator was more than expected, although they did not quantify the amount of support. Future research may consider an economic evaluation of the benefits of online mentoring compared to face-to-face direct health interventions.

10.2.2.6 Mentoring relationships are a marker for the quality of mentoring interventions. The mentors, mentees, and parents involved in the current study all agreed that mentors and mentees experienced positive relationships. Previous research has suggested that mentors and mentees experience close, positive relationships when online and face-to-face contacts are combined (Schwartz et al., 2014). In the current study, mentors and mentees did not have face-to-face contact, although all mentor–mentee pairs connected on several occasions using Skype, which provides real-time video interaction. In a study by Shpigelman et al. (2008), mentors and mentees expressed the need for visual and vocal connections to allow for the deepening of the online mentoring relationship. Adherence to international benchmarks for mentoring standards (Garringer et al., 2015) is known to positively affect mentoring relationships and may have been a mediating factor to increase reported relationship quality in the current study (Kupersmidt, Stump, Stelter, & Rhodes, 2017).

10.2.2.7 Closure of mentoring relationships. The current study extended an invitation for participants to continue their mentor–mentee contacts beyond the research project. However, only Paul and his mentor exchanged personal contact details and agreed to continue to be in touch. This outcome is similar to that of other studies; for example, only one of the seven mentor–mentee pairs agreed to keep in touch following a similar intervention (Raghavendra, Newman, Wood, et al., 2015). However, other studies have not reported information regarding ongoing contact with mentees and mentors following the programme (Cook & Woodward-Kron, 2013; Stewart et al., 2011, 2013; Stinson et al., 2016). Mentors and mentees reported positive relationships, suggesting that other factors contributed to decisions not to keep in touch following the end of the research programme. Possibly, mentors in the current study were reliant on payments provided by the research to enable them to provide the time for mentees and therefore could not agree to continued contact with the mentees without further payment. However, some mentees also did not wish to continue to connect with their mentor following the research project. Some possible reasons are the perceived time and effort of coordinating online appointments with the mentor without support from the researcher and availability of family members or mentees to meet with mentors online.

10.2.3 Summary: Mentoring intervention fidelity. The current study corroborates previous research findings regarding the feasibility of a cross-age peer e-mentoring approach to health interventions. Importantly, the current study confirms that this approach is applicable for young people and mentors who use AAC. However, there were some challenges in delivery via the full range of social media platforms requested by mentees, which suggested the need for more technical and face-to-face support in future studies.

10.3 Question 1: Online Conversation Goal Attainment

10.3.1 Hypothesis: Online conversation goal attainment. The hypothesis linked to research question 2: Participants would improve in their perception of performance and satisfaction with performance in identified problem areas in online conversation and progress in related goal attainment following the e-mentoring intervention. Key findings are summarised and evaluated in the following section.

10.3.2 Key results: Online conversation goal attainment. Pre- and post-intervention probes were used to identify positive effects of the e-mentoring intervention on activity competence and participation in online conversation. Participants reported self-perceived improvements in identified problem areas related to online conversation using the COPM (Law et al., 2005). GAS (Kiresuk & Sherman,

1968) provided further objective measurement of these improvements in online conversation skills and participation following the intervention. Results suggest that young people who use AAC can benefit from e-mentoring support to address self-identified problems in online conversation. However, these outcomes were variable across participants and individual problem areas and/or goals. Further, there was some disagreement between self-perceived improvements in occupational performance, satisfaction with that performance, and objective measurement using GAS. These inconsistencies between and within the COPM and GAS measures are discussed further below.

10.3.2.1 Focusing on activity vs. participation. A body of research suggests that gains in participation in everyday life activities are only achieved when interventions directly target participation (Adair et al., 2015). Participants in this project, young people who use AAC, contributed meaningful goals through a semi-structured interview, which was part of the administration protocol for the COPM tool (Law et al., 2005). This approach placed the participants as their own experts in identifying focus areas for intervention to improve their online conversation. Goals developed by participants in the current study, with only two exceptions, focused on the activity domain of the ICF model, rather than the participation domain. One of Paul's goals to increase social networks via Facebook specifically targeted increases in his social engagement, which stood in contrast to most goals that typically targeted activity competence, such as Kaylyn's goal to make and receive Skype calls. Although the overarching project aimed to support participation, viewing participants as experts in their own goal development was prioritised over limiting focus areas to the participation domain. It may have been feasible to direct participants to identify only goals within the participation domain. However, the researcher considered that this caveat would have restricted participants from freely expressing their own priorities for online conversation. Adherence to the principles of social validity and preservation of participant psychosocial factors, such as motivation and agency, were prioritised in the research design (Kaiser, 2014), and therefore, no restrictions were imposed on the domain of goal setting, which was determined by the individual participants.

10.3.2.2 Comparing e-mentoring to face-to-face interventions. Mean changes in performance and satisfaction with performance for a range of individually identified problems with online conversation indicated clinically and statistically significant differences following the e-mentoring intervention (Law et al., 2005). In the current study, participant ratings of change in performance were less variable and greater than their ratings of change in satisfaction with performance (Δ performance = 5.33; Δ satisfaction = 3.67). To a lesser extent, this outcome has been observed in previous research employing face-to-face interventions to support social media use (Mean Δ performance = 5.64; Mean Δ satisfaction = 4.89; Raghavendra et al., 2018; Raghavendra, Newman, et al., 2013; Raghavendra, Newman, Grace, et al., 2015).

Aggregated goal attainment, across all participants and goals, was at the level predicted (8/12 goals attained at expected level = 67%, T = 51.54); these outcomes are greater than those reported by a previous study, which provided e-mentoring support to young people with a range of disabilities (11/23 goals = 48%, T = 45.57; Raghavendra, Newman, Wood, et al., 2015). Conversely, previous face-to-face interventions to support social media use have reported higher levels of goal attainment (38/47 goals = 81%, T = 60.27, Raghavendra et al., 2018; 35/50 goals = 70%, T = 58.14, Raghavendra, Newman, et al., 2013; 39/45 goals = 87%, T = 58.14, Raghavendra, Newman, Grace, et al., 2015).

Changes observed in problem areas (COPM performance and satisfaction with performance ratings) and aggregated goal attainment (GAS T-score) were similar to, or lower than, changes that have been observed in face-to-face interventions for social media use (Raghavendra et al., 2018; Raghavendra, Newman, et al., 2013; Raghavendra, Newman, Grace, et al., 2015). One apparent justification for these differences is to conclude that the face-to-face approach to intervention increased the effectiveness of the social media use intervention when compared with online-only approaches. However, another plausible explanation is that there were differences in intervention dose between the studies, different populations were studied, and the provision of assistive technologies was included in the previous study designs but not in the current study (Raghavendra et al., 2018; Raghavendra, Newman, Wood, et al., 2015; Shpigelman et al., 2008). Previous studies reported providing an average of 15 hours face-to-face support over an average of 6 months (Raghavendra et al., 2018; Raghavendra, Newman, et al., 2013; Raghavendra, Newman, Grace, et al., 2015). The current study provided e-mentoring support to participants over 4 months, which included an average of 28 online contacts. This is comparable with cross-age peer e-mentoring provided to young people with a range of disabilities in a previous study, in which an average of 21 contacts were made over 4 months (Raghavendra, Newman, Wood, et al., 2015).

Intervention effects in the current study varied considerably across participants, within participants, and across individual goals. Similar variability has been observed in other studies providing face-to-face interventions to support social media use (Raghavendra, Newman, et al., 2013; Raghavendra, Newman, Grace, et al., 2015). As was the case in previous studies, in the current project, participants varied in their background knowledge and confidence in computer, Internet, and AAC use (Raghavendra, Newman, et al., 2013). The availability of disability services for assistive technology and AAC device support and installation, and ease of social media access are other plausible explanations for variation in the results (Grace et al., 2014). More specifically, technical (i.e., i-message) or physical access (i.e., Snapchat) to some social media platforms hindered goal achievement for some goals, for some participants in the current study. This finding may also be reflective of the differing gross motor, fine motor, and communication abilities of participants in the two studies.

10.3.2.3 Performance vs. satisfaction with performance. The relationship between COPM ratings of performance and ratings of satisfaction with performance has been found to be similar, but distinct enough to warrant the two differing scales (McColl, Paterson, Davies, Doubt, & Law, 2000). Often, changes in performance parallel changes in satisfaction with performance, and increased performance is expected to lead to increased satisfaction with performance (Carswell et al., 2004). Overall mean results followed this trend. However, this was not the case within participants. Tilly and Kaylyn reported changes in satisfaction with performance that were greater than changes in performance. Conversely, Paul and Mia rated changes in performance greater than changes in satisfaction with performance. For one goal each, Paul and Mia reported negative changes in satisfaction following the intervention. For Paul, satisfaction with performance decreased by 2 points but performance increased by 6 points. For Mia, satisfaction with performance decreased by 9 points but performance increased by 4 points.

Another study reported that changes in satisfaction were not parallel to changes in performance and found that in some participants, changes in satisfaction with performance were greater than changes in performance themselves, whereas in other participants, changes in satisfaction with performance were negative despite positive change in performance (Liew, Stewart, Khan, Arnup, & Scheinberg, 2018). Bouffioulx, Arnould, Vandervelde and Thonnard (2010) reported changes in satisfaction were greater in the initial acute to post-acute phase following stroke than in the chronic stage. The authors suggested that at the beginning of the post-acute phase, "patients return to a home environment may have contributed to greater optimism, expressed in their perceived satisfaction with activities and participation" and may have later "changed their perspectives on performance in activities and life situations, reducing the degree of improvement in satisfaction between the post-acute and chronic phases" (Bouffioulx et al., 2010, p. 947). Possibly, decreases in self-rated satisfaction reflect self-evaluative reactions by participants, and hence, a given level of performance no longer corresponds to the same satisfaction. Bandura (1977a) proposed that when learning occurs, individuals may shift their desired level of performance, such that they are "no longer satisfied with it and make further self-reward contingent on higher attainments" (p. 193).

Similar negative changes were observed on some domains of the SEAS-PCS ratings of three of the four participants. For example: (a) Paul reported negative changes following intervention within the personal growth domain. (b) Tilly reported negative changes following intervention in psychological engagement, social belonging, meaningful experiences, and choice and control. (c) Kaylyn reported negative changes following intervention within the meaningful experiences domain. One plausible explanation is that participants became more aware of what they could not do on social media. Initial ratings that were completed when participants were not fully aware of the experience of participating in online conversation are naïve compared with the later ratings when participants are familiar with the experience of participating in an activity. Chan and Lee (1997) also suggested that a lack of insight and experience with the activity context may have affected ratings on the COPM by participants in their study.

10.3.3 Summary: Online conversation goal attainment. Interventions to support online conversation can support young people who use AAC to improve in individually identified problem areas and goals for online conversation. These results are supported by previous face-to-face interventions. The current study adds that similar outcomes can be achieved using an online-only and cross-age peer e-mentoring to intervention.

10.4 Question 2: Frequency and Duration

10.4.1 Hypothesis: Frequency and duration. The hypothesis linked to research question 3: The frequency and duration of online conversation would increase following the e-mentoring intervention. Key findings are summarised and evaluated in the following section.

10.4.2 Key results: Frequency and duration. Small increases were observed in the days and hours that participants spent in online conversation and number of words used following the e-mentoring compared with before the e-mentoring. Increases in days spent in online conversation were replicated across three participants (Tilly, Mia, and Paul) using systematic visual inspection, although this increase was not confirmed when using statistical analysis. The increase in hours spent in online conversation was minimal but significant, combined weighted Tau-U = 0.37 [90% CI 0.13, 0.61], p = 0.01. The effect on the number of words written was negligible, but when compared from pre-baseline, before the participants met the researcher, this effect increased to be minimal and significant. This effect was demonstrated from statistical analysis across participants. However, because of data variability these suggested effects of increase in hours and total words were not apparent and/or replicated across participants when using visual inspection alone.

10.4.2.1 Variability of participation was a constant. Despite obvious baseline variability, no attempt was made to delay intervention. Owing to constraints regarding the feasibility of the mentoring intervention, a delay to the intervention start date was unviable. For example, mentor commitments had been planned around the initially scheduled intervention dates. Given that considerable variability was present throughout the phases of the study, and was not limited to the baseline phase, it seems unlikely that a delay to the intervention start point would have allowed for stability in baseline. Variability was present in the data to the extent that less than one third (27/89) of the phases plotted for visual analysis were considered stable (Lane & Gast, 2014). Variability of participation in online conversation may have been due to factors outside the e-mentoring intervention. For example, opportunity barriers, such as relying on family members to go online, may have been a factor (Hynan et al., 2015). Evidence supporting this explanation for variability within the data is observed in Mia's reported days spent in online conversation. Mia alternated weekly between two houses, and this alternating pattern is evident on visual analysis of her results and suggested that factors within one environment were more supportive of her participation in online conversation. Reliance on family members to access online conversation, or to initiate topics for conversation, has been reported in the outcomes of previous social media use interventions involving young people with a range of disabilities (Raghavendra, Newman, Wood, et al., 2015). Variability in the use of social media was also reported by a similar SCED investigating supports to increase twitter use in adults who use AAC (Hemsley et al., 2018).

10.4.2.2 Reduced physical engagement in online conversation. Across all phases, participants in the current study reported spending 0–6 hours per week in online conversation. A 2016 survey estimated that on average, Australians are spending 12.5 hours per week on Facebook, and that in 2017, Internet users worldwide spent 15.75 hours per week on online social networking (Sensis, 2017). The current study measured time spent in online conversation, which included only blocks of time that included at least one transmission by the participants. For example, if participants spent 30 minutes reading the newsfeed but also made at least one like or comment, then they were instructed to consider the whole time as participation in online conversation. If participants made no transmissions, then they were instructed that this time could not be included as time spent in online conversation. Reports of hours spent on social networking in the comparison studies above did not stipulate that participants had to be interactive users of social media, and hence, it is likely that data included time spent only reading social media and not participating in online conversation. With this distinction in definitions in mind, it still seems likely that despite the focus of intervention to increase online conversation, the time spent in online conversation by participants in the current study may be well below that of their age-matched, typical peers.

Reliance on specialised technologies and family members to use social media is a possible limiting factor to the time spent in online conversation by young people who use AAC. Age-matched peers who are typically developing access online conversation in a comparatively limitless environment. Recent research has confirmed that a trend for increased mobile device use is associated with an increase in hours spent in online conversation (Sensis, 2017). Providing mobile device access to social media, or direct access via a young person's AAC device, is also likely to be a facilitator to participation in online conversation by young people who use AAC and may reduce reliance on family members. However, direct access to the Internet via an AAC device may raise other concerns, such as funding policy restrictions, funding of Internet data, and access or cyber-safety concerns.

The effort and cost involved in supporting access to online conversation for individuals who use AAC has been repeatedly reported by previous research. This finding is confirmed in this study—for instance, the cost of equipment to establish access to online conversation for Paul was over AU$10,000. Additionally, he required family members to support him to access online conversation and benefited from e-mentoring to increase his skills and confidence. Note that this cost does not include the professional time for assessment, prescription, installation, and training in use of the assistive technology, likely requiring both speech pathology and occupational therapy consultation (Pousada, Pereira, Groba, Nieto, & Pazos, 2011). Since online conversation is so easily accessed by typically developing peers, it is likely that these challenges in accessing online conversation are not well understood. Taken together with the similar findings of other studies investigating participation in online conversation by individuals who use AAC, this finding is an important message for stakeholders, such as disability service providers, funders, and developers of social network sites.

10.4.3 Summary: Frequency and duration. Cross-age peer e-mentoring intervention may support young people who use AAC in increasing their participation in online conversation, but this relationship appears to be complicated by other extraneous variables that were not controlled for in this study. Results indicate that even with the research intervention, participants reported that they took part in online conversation less hours each week than their typically developing peers.

10.5 Question 3: Experiences of Participation

10.5.1 Hypothesis: Experiences of participation. The hypothesis linked to research question 4: Participants and their mothers would report positive experiences of participation in online conversation, which would also be positively influenced by the e-mentoring intervention. Key findings are summarised and discussed in the following section.

10.5.2 Key results: Experiences of participation. The current study explored differences in ratings on the SEAS-PCS at repeated time points (T1 = before, T2 = during, T3 = immediately after and T4 = well after the intervention) for the purpose of evaluating the effects of an e-mentoring intervention. The informal engagement probe was developed and administered in the current study to allow for the inclusion of both self- and proxy reporting of experiences of participation in online conversation. Participants in the current study reported positive experiences of participating in online conversation, and the differences observed were varied across SEAS-PCS scales.

The following paragraphs are adapted from an excerpt of the discussion section in the pre-print version of, "Exploring Participation Experiences of Youth who use AAC in Social Media Settings: Impact of an e-Mentoring Intervention", by E. Grace et al., 2019, *Augmentative and Alternative Communication, 35,* 132–141. doi:10.1080/07434618.2018.1557250

10.5.2.1 SEAS-PCS Ratings. The SEAS-PCS provided a situation-specific self-report tool to explore participants' experiences during online conversation. Participants in the current study reported positive experiences of participating in online conversation, which remained relatively stable across all time points. Nevertheless, differences were observed and were varied across the SEAS-PCS domains. At all the time points, when rating experiences of participation in online conversation, ratings were highest for the Psychological Engagement, Social Belonging, and Choice and Control domains, and less positive and more variable for the Personal Growth and Meaningful Interactions domains. This pattern of lower ratings for the latter was similar to ratings reported in previous research across a range of face-to-face activities (G. King, Batorowicz, Rigby, McMain-Klein, et al., 2014; G. King, Batorowicz, Rigby, Pinto, et al., 2014).

The current study is the first to explore the use of the SEAS/SEAS-PCS questionnaire to report on participant experiences before and after an intervention. The authors of the SEAS have laid the foundations for understanding young peoples' experiences of participation through the development of the questionnaire, discussion and data provided in studies that have investigated the use of this tool. The current study found changes in ratings across time, which it discussed for each of the SEAS domains.

Ratings of psychological engagement were highest at T1 and were reduced but remained relatively high at T2, T3, and T4. It is possible that participants were particularly motivated and excited to participate in online conversation, given that at T1 they reported that they had limited or no opportunities to engage regularly in online conversation before, and had volunteered to be involved over a period of almost 6 months. Although ratings of psychological engagement were high across all time points, it is suggested that these ratings were slightly higher at T1 owing to the novelty of engaging in online conversation, and in the research.

Mean ratings for social belonging did not vary greatly but were at their highest during the intervention (T2 and T3). Previous research has found that increases in familiarity with an activity are related to increases in ratings of social belonging (G. King, Batorowicz, Rigby, McMain-Klein, et al., 2014). In the current study, despite increased familiarity with the activity across time, change in social belonging was not maintained at T4. Variability in participant ratings of social belonging increased at T4. At T4, three of the four participants strongly agreed that they experienced social belonging during online conversation. Tilly’s rating at T4 was lower, and she elaborated that she had not received a reply during the 15-min period. Tilly’s experience lowered the overall mean rating for this domain at T4. Changes in the individuals who interacted with participants during their online conversation may have contributed to self-ratings of social belonging. An important finding of this research is that across all time points, participants experienced relatively high ratings of social belonging despite the online-only context for interaction.

The e-mentoring intervention may have positively contributed to reported experiences of choice and control, which increased across time points. For example, the ratings of choice and control may reflect increasing skills, knowledge, or confidence as regards interacting in online conversation. A positive trend as well as variation in scores was observed, particularly at T1 and T3. At T3, Tilly reported reduced voluntary control of movement and increased pain, which may have reduced her experience of choice and control, and overall participation experiences at this time.

Mean ratings on the Personal Growth and Meaningful Interactions domains were lowest during the intervention at T2 and T3. Reported experiences of personal growth (including feeling challenged, experiencing special growth or change and becoming better at something) were highest at T1 and varied the most among all domains. Repeated administration of the SEAS-PCS or increased exposure to the activity of online conversation might have contributed to changes in self-ratings by participants. The 16-week intervention increased exposure to the activity of online conversation, particularly at T2 and T3, and it is proposed that this was reflected in participant ratings, in that the most growth was experienced at the first exposure. For example, responses to the item "I tried something new" (Appendix J) were likely to be highest at the start of the e-mentoring intervention. Lower ratings of meaningful interactions at T2 and T3 reflect that participating in an online conversation may not have been as new as at T1 because of participants having many opportunities for online conversation during the e-mentoring intervention.

This is the end of the excerpt of the discussion section from the pre-print version of, "Exploring Participation Experiences of Youth who use AAC in Social Media Settings: Impact of an e-Mentoring Intervention", by E. Grace et al., 2019,

Augmentative and Alternative Communication, 35, 132–141. doi:10.1080/07434618.2018.1557250

10.5.2.2 Engagement probes. Participation varied across three major dimensions, physical, social, and self-engagement dimensions (Kang et al. 2014). The dimensions of social and self-engagement were measured using an informal engagement probe. Participants and their mothers were largely in agreement in their ratings of fulfilment, connectedness, and attentiveness (involvement). Participant reports confirmed the dynamic theory of participation of Seekins et al. (2007), which suggests that experiences of participatory engagement (e.g., feelings of fulfilment and connectedness) are shaped by the context of the activity (e.g., place, social contacts, facilitators, and barriers). Attentiveness (involvement) was rated highly across all time points, although slightly lower at T4. Ratings of connection were higher at T1, reduced slightly at T2 and T3, and more so at T4. Ratings of fulfilment followed a similar pattern to ratings of connection. Potentially, these experiences decreased as a result of the e-mentoring intervention. As Seekins et al. (2007) suggest, the facilitators and barriers reported are likely to have influenced experiences of fulfilment and connectedness. Facilitators and barriers reported varied across participants. Kaylyn, although delayed in initiating contact with her mentor, did not report any barriers to online conversation, only facilitators. She was the only participant to have no prior experience in using social media, which also seems contradictory to her reporting only facilitators. These facilitators and barriers are mapped against the FPRC that Imms et al. (2014) proposed (see Table 10.2). Similar barriers and facilitators to online conversation have been reported by other young people who use AAC (Caron & Light, 2017; Hynan et al., 2015).

Table 10.2

Facilitators and Barriers Mapped against Participation Related Constructs (Imms, Granlund, Wilson, Steenbergen, Rosenbaum, & Gordon, 2017)

Participation-Related Construct	Facilitators	Barriers/Secondary Conditions
Body		Increased involuntary movement Increased tone
Environment	Freedom to participate in own time	No available communication partners online Keyboard not responding correctly Technical difficulties with computer and AAC device
Context		Timing of activity with medication effects Tired since end of school term Mum supporting access
Personal Factors: Preferences	Like talking to them	
Personal Factors: Sense of self	Feels like a level playing field	Tense because of being observed; pressure of expectations
Activity Competence		Time taken to construct message
Participation: Attendance	New activity, not something we do everyday	
Participation: Involvement	Happy, excited, focused Persistence	Reached limit of concentration Tense because of being observed; pressure of expectations

10.5.3 Summary: Experiences of participation. Participants reported positive experiences of participating in online conversation. Results on the SEAS-PCS questionnaire and engagement probe, both self- and proxy reports, were largely in agreement with each other. Mia's results on the engagement probe seemed to be slightly reduced but not those on the SEAS-PCS. Kaylyn and Paul's experiences were reported to be very positive using both tools. Kaylyn's positive experiences seem to contrast with the challenges in linking up with her mentor during the first 8 weeks of the 16-week intervention programme. Probably, since Kaylyn only participated successfully for 8 weeks with her mentor, the novelty of this experience remained stronger for her than for the other participants who had completed the full 16 weeks of intervention. Tilly's experiences were measured as lower than those of the other participants on both tools. Reported barriers and facilitators were similar across the two tools.

10.6 Question 4: Moves, Modes and Functions

10.6.1 Hypothesis: Moves, modes and functions. The hypothesis linked to research Question 4: Young people who use AAC would become less passive in their conversation. Specifically, they would show an increase in online modes, number of moves, assertiveness (initiations and optional moves), range of functions and use of other functions (i.e., Provision of Information, FPI) and decrease in use of simpler functions (i.e., Feedback Confirmation/ Denial, FFCD). Key findings are summarised and evaluated in the following section.

10.6.2 Key results: Moves, modes and functions. Contrary to expectations, the research found that the young people took an active role in online conversation; these contrasts are described in the following sentences. It was observed that young people who used AAC and participated in online conversation in this research: initiated conversation and topics; were not limited to taking only, or mostly, obligatory turns;

and did not use a minimal range of pragmatic functions. Further, following the intervention, increases in the percentage of optional responses were observed using systematic visual analysis and statistical analysis. This increase was observed using systematic visual analysis and replicated across three participants, Tilly, Paul, and Mia. Increases in optional responses were observed in comparisons from the intervention phase to baseline and pre-baseline phases. Statistical analysis indicated significant effects when comparing pre-baseline to intervention for all moves, total words (duration of online conversation), and range of modes used in online conversation. When comparing from baseline to intervention, significant effects were observed in the percentage of providing information functions and percentage of optional responses; for example, see Table 10.3.

Table 10.3

Example of Linguistic Analysis Codes for Which Significant Effects of the Intervention Were Observed.

Linguistic Analysis Code	Definition	Example
Function - Provision of information	A functional turn is coded as provision of information (FPI) if it is a comment about an object/s, action/s or internal state/s.	Friend 1: What have you been doing (FRI) Tilly: I am going on holiday tomorrow. (FPI) Friend 1: Where at? (FRI) Tilly: *place* bay (FPI)
Linguistic move - Optional response	A functional turn is coded as a response (optional; LRO) if it is an optional response to a previous conversational turn. Social conversation is likely to include strings of responses.	Friend 1: I am going to my presentation night tonight. (LIC) I'm not going to school tomorrow. (LI) Tilly: You are lucky. (LRO) Friend 1: Thanks. (LRO) I didn't want to go. (LRO) Tilly: Fair enough. (LRO)

The ability to observe intervention effects across all participants was affected by the variability of participation in online conversation. For example, Kaylyn participated in online conversation (with communication partners other than the mentor) for only two weeks out of 34 weeks across all phases of the experiment, considerably affecting the effectiveness of the intervention. As discussed in the previous section, several factors might have contributed to this disparate outcome for Kaylyn. For example, Kaylyn was the only participant who had no prior social media experience, did not reach the criterion for the bottom level of the silent reading assessment and was unable to use a symbol based AAC app to support her participation in online conversation, preferring to use letter-by-letter typing. Kaylyn’s limited experience with technology and social media may have influenced the effectiveness of the intervention. Previous research demonstrated similar outcomes where mentors reported that the effectiveness of the online mentoring was linked to the baseline social media and computer/technology skills of the mentees (Raghavendra, Newman, Grace, et al., 2015).

It is unclear why effects on percentage of Provision of Information (FPI) were also not observed for Tilly, who participated in online conversation more consistently than the other participants. However, Tilly was younger than the other participants, which may have affected her baseline computer and social media skills. Nevertheless, a more likely explanation is that Tilly had experienced increased pain and reduced voluntary movement over the phases of the experiment as reported by her mother to the researcher during responses to intervention probes. These changes were connected to complications with her physical disability, which resulted in medical interventions during, and in the months following, the mentoring intervention. However, a range of personal factors affected participation for all the participants in various ways, although exploration of personal factors was beyond the scope of this project. Another participant experienced medical complications during the intervention phase. In this case, the family communicated to the researcher that they were no longer able to prioritise support for her to participate in the project and she subsequently withdrew from the research project.

Increases in optional responses in online conversation with communication partners outside the mentoring intervention were observed for all four participants, using systematic visual analysis and statistical analysis. Previous face-to-face research has suggested that young people who use AAC are more passive than their communication partners and take predominately non-optional turns (Light et al., 1985a). Hence, the increases observed in online participation in optional responses, if replicated in further research, may be important for this group. These increases may be suggestive of increased social and self-engagement (as defined by Kang et al., 2014) or involvement (as defined by Imms et al., 2017) in online conversation.

10.6.3 Summary: Moves, modes and functions. Results suggest that overall, participants took a similar number of moves in online conversation during intervention compared with baseline. Increases in percentage of LRO (optional responses) may suggest that participants were having longer conversations. This pattern appears to be observed more so for two of the four participants.

When comparing from pre-baseline, results indicate that the mentoring intervention and baseline activities combined had a significant impact on improving participation in online conversation with communication partners other than the mentor. When comparing from pre-baseline to intervention, the combined weighted Tau-U analysis indicated significant effects for all measures (Table 9.62 and Table 9.63) indicating that the combined effect of the baseline supports provided by the researcher and the e-mentoring intervention (Table 9.63) was more than that of the e-mentoring alone (Table 9.62).

10.7 Mechanisms of the Intervention

Findings of the current study suggest that the supports provided to participants during the baseline phase of the experiment had an effect of increasing participation in online conversation. When compared with the effects of the intervention or of baseline alone, the combined effect of baseline and intervention demonstrated the strongest and most consistent outcomes on participation in online conversation. Comparisons from pre-baseline to intervention were significant for all measures. Several possible mechanisms of the effects observed are proposed in the following section.

10.7.1 Hawthorne effect. To some extent, participation in online conversation may have increased because of an awareness of this focus of the research, or because of the hope of imminent mentoring support (McCambridge, Witton, & Elbourne, 2014). For example, the novelty of learning to participate in online conversation may have driven initial increases in participation or perhaps participants benefited from the information support and increased confidence. This effect was proposed following historic experiments (Roethlisberger & Dickson, 1939) where workers were observed to increase their productivity based on interaction with the researcher rather than owing to the intended independent variable, the lighting in the room.

In the current study, participation in the research project may have been viewed as providing an opportunity to prioritise this time, with parents and participants focusing more on participating in online conversation together. For one participant (Mia), there seemed to be an effect following the initial phone conversation and booking of the first research appointment that occurred in pre-baseline. Observation of the results demonstrated that words transmitted in conversation began in Week 6 of pre-baseline, the same week as the phone call. The Hawthorne effect has been typically interpreted as an error to be avoided in research. Yet, the applicability of this interpretation outside of laboratory-based experiments, such as in social sciences research, has been questioned (Chiesa & Hobbs, 2008; Sommer, 1968).

Indeed, investigations based in pragmatism, such as the current study, embrace the importance of the environmental context and argue that it is not possible, nor desirable, to isolate intervention effects from the environmental context in which they occur (Dewey, 1916; Glogowska, 2011). Influences such as a natural interest in improving in the area of focus, the benefits of informational support or the novelty of goal setting for online conversation are not specific to the research process and would likely also apply to mentoring interventions provided in a clinical context. Given the reliance of participants on support from family members to participate in online conversation, this aspect of the research, increasing accountability and focus on online conversation, was likely to have contributed to the outcomes observed.

10.7.2 E-mentoring preliminary protocols. Support provided during baseline (included due to ethical and practical reasons) may have acted as an intervention to increase participation in online conversation. The inclusion of a pre-baseline phase in the SCED is a novel aspect of the current study, made possible given the persistent nature of online conversation transcripts. The e-mentoring preliminary protocols provided prior to the baseline phase were necessary since participants had minimal experience and confidence in using online conversation, and these possibly acted as preconditions (Schlosser, 2003; Shpigelman et al., 2009b) to access the e-mentoring intervention. Shpigelman et al. (2009b) proposed extra requirements or preconditions that contribute to the effectiveness of e-mentoring interventions. Similarly, Schlosser (2003) conceptualised the importance of understanding the conditions under which outcomes of intervention research are obtained. Suggested preconditions for the mentoring intervention include (a) appointments to discuss participation in online conversation, (b) cyber-safety training and coaching for parents, (c) support for privacy setting management, (d) social media account creation, and (e) support for individualised goal development for increasing online conversation.

10.7.3 Goal setting. Exploring what young people who use AAC might want to do online in the context of discussing their current activity, interests, facilitators and barriers in online conversation may in itself increase participation (Anaby et al., 2018). For example, the COPM tool used at the start of baseline in this research allows clients to identify their own individualised goals for interventions. This tool is designed to be a collaborative approach to goal setting and involves shared decision-making, and responsibility in this process. This client-centred approach to intervention planning is recognised to increase self-esteem and empowerment (Law et al., 2005). The importance of individualised goal setting in interventions for young people who use AAC has been recognised (Light & McNaughton, 2015). A systematic review of goal setting for interventions in individuals with autism spectrum disorder has indicated that goal setting is typically investigated alongside a co-occurring intervention and not as an isolated intervention (M. Carr, Moore, & Anderson, 2014). Similar conclusions were drawn by researchers completing a systematic review of goal setting in obesity-related interventions (Pearson, 2012). The systematic review of goal setting found that disentangling goal setting from other interventions was not possible, since this was not the specific objective of the included studies (Pearson, 2012).

Goal setting theorists have suggested several mechanisms that may have acted to support participants in enhancing participation in online conversation following completion of the COPM tool. For example, recognition of the problem, strategy formation, and increased self-efficacy (Weber Culen, Baranowski, & Smith, 2001); recognising discontent with the current condition and stating the desire to attain a new outcome (Locke & Latham, 2005); increasing confidence in ability to take steps to learning, and moving from framing as a threat to framing as a challenge (Locke & Latham, 2005). Goals are observed to mediate the effects of other variables (Locke & Latham, 2005). Further, this is consistent with the WHO model of functioning, which suggests several factors that affect participation, such as environmental factors, self-perceptions, and preferences (Imms et al., 2017; WHO, 2007).

10.7.4 Cyber safety and privacy-setting support. The creation of accounts and review of privacy settings may have acted as a problem-solving support, given the complexities of these tasks for parents in the study. Parents and young people may have desired to increase online conversation but felt threatened by safety concerns or other factors. Since participants and parents expressed a desire to use specific social media platforms during the research project, their accounts were created and/or set up including a review of privacy settings prior to the commencement of baseline. This increased the accessibility and availability of these media to them. Having the support of the researcher to review privacy settings may have increased their confidence.

10.7.5 E-mentoring preliminaries may provide digital capitals. Preliminary activities, although an ethical and practical pre-requisite for participating in the e-mentoring, likely also had their own impact on participation in online conversation by improving participants' digital capital (Newman et al., 2017).

Capitals are understood as potential capacity for groups to advance or maintain social position (Bourdieu, 1986). Individuals with disability are known to use the Internet less than their typically developing peers (Australian Bureau of Statistics, 2011). A digital capital perspective promotes the view that use of the Internet and participation in online conversation is not innate but something that can be fostered and advanced through the provision of digital capitals, such as economic, social and disability-specific digital capitals as outlined by Newman et al. (2017). This view is consistent with that of the current study and aligns strongly with the provision of e-mentoring intervention to increase participation in online conversation, whereby such intervention is observed to increase digital social capital. For example: (a) Involvement in the research, including an increased focus on online conversation may have increased cultural digital capital. (b) Support provided by the researcher and in the provision of e-mentoring preliminary protocols may have increased cultural digital capital, social digital capital and disability-specific digital capital (Newman et al., 2017). This interpretation must be considered with some caution, given that participants' reflections regarding their digital capitals was not included in the research findings or analysis. Participants in the current study experienced variability in their digital capitals, which may also explain the variability observed in the outcomes across participants. For example, the intervention was less successful for Kaylyn, who had no previous social media experience.

It would seem reasonable to consider that effects such as accountability, problem-solving support, and collaborative goal setting are central to participation interventions and therefore need not be viewed only as limitations or unintended "effects" of the experiment. Rather, these factors are suggested to be important components of the intervention and the potential focus of future research.

10.7.6 Types/models of mentoring support. The use of online conversation to support participation in online conversation allowed for role modelling to occur naturally. Cross-age peer mentoring in joint activity seems a valid approach for increasing participation within that activity. The specific processes by which mentoring relationships lead to positive outcomes and the relative importance of a developmental (relationship) or instrumental (goal-directed) focus is not well understood (Karcher, 2014; Lyons et al., 2019). However, an important unique aspect of mentoring as an intervention is the emphasis placed on the developing relationship between the mentor and mentee as the primary mechanism of change (Karcher, 2014).

Goals are recognised to increase outcomes in mentoring interventions and were included as a component of the mentoring intervention (Karcher & Hansen, 2014). However, a review of the mentoring transcripts identified that in the current study discussion of goals was not a commonly coded feature of the mentoring provided. Despite the intervention being underpinned by goals to support online contact and provide a direction for mentoring contacts, this lack of instrumental dominance in mentoring conversations has much support in the literature. Further, collaborative balancing of developmental and instrumental activities was in line with the training provided to mentors. Baseline effects observed suggest that participants were motivated by the goals, although this was not a dominant part of the mentoring conversations which prioritised relationship building and role modeling. Theoretical frameworks of mentoring have highlighted the important place of goals in increasing effectiveness of mentoring outcomes but have warned against an overly strong focus on instrumental activities, which may detract from the relational process of mentoring (Karcher & Hansen, 2014). It seems likely that participant goals acted alongside the mentoring support, but were not the dominant component of this support.

Role model support and encouragement provided by mentors was more common than support for goal attainment. The most predominant themes present in mentoring conversations was the positioning of the mentor as a role model. The mentor's role modelled participation in online conversation, use of AAC, and ways to handle mistakes both in using AAC and in online conversation. The value of cross-age peer mentors as role models for young people who use AAC has been suggested in previous literature

(Ballin et al., 2012; Cohen & Light, 2000; Rackensperger et al., 2005) and is also confirmed by the current study. This finding suggested that the position of mentors as cross-age peers, who shared a similar characteristic with the mentees was a crucial mechanism for the mentoring. That is, the predominance of role modelling in the mentoring conversations was made possible because both the mentor and mentee used AAC in the online conversation. For example, mentors provided (a) role modelling of online conversation, (b) role modelling of AAC use, and (c) role modelling of how to manage conversation breakdown.

A review of mentoring interventions highlighted the importance of clearly communicated explanations in increasing the effectiveness of mentoring outcomes (DuBois et al., 2002). Clear expectations for regular contacts are considered a hallmark of successful mentoring interventions (Garringer et al., 2015). More flexible contact guidelines over a longer time may have increased the effects of the mentoring intervention. For Kaylyn, the delay in successfully linking up with her mentor appears to be associated with a delayed increase in the hours spent in online conversation (see Figure 7.12). This finding suggests that stricter guidelines for contacts over a shorter period would also result in effects. However, increasing prescriptiveness of intervention contacts would need to be balanced alongside the intention to provide a mentoring intervention. The hallmark of mentoring interventions is their focus on the primary mechanism of change being the person-based relationships. Creating stricter and less person-based "rules" may result in mentoring interventions becoming more closely comparable to a peer-tutoring intervention (Karcher, 2014).

10.7.7 Summary. In view of the mechanisms of the intervention discussed thus far, a model is proposed to highlight the components of the intervention provided in the current study (Figure 10.1). The following steps are proposed: First, the participants recruited to the current study were interested in increasing their participation in online conversation, which is likely to have contributed to the outcomes (McCambridge et al., 2014; Schlosser, 2003). Second, it seems likely from the pre-baseline to baseline comparisons that collaborative goal setting, although acknowledged to be associated with improved effects of mentoring interventions (Balcazer & Keys, 2014), also acted as an intervention of its own (Anaby et al., 2018). Third, the e-mentoring preliminary protocols created or strengthened preconditions and digital capital, which was imperative to the successful e-mentoring interventions (Newman et al., 2016; Shpigelman et al., 2009b). For example, cyber-safety training and coaching for parents, social media account creation and individualised goal development. Given that the most consistent and significant effects were observed in comparisons from pre-baseline to intervention, it is proposed that these mechanisms acted together with the e-mentoring support to increase participation in online conversation.

Figure 10.1. Suggested mechanisms of intervention to support participation in online conversation that operated in this research.

10.8 The Theory and Measurement of Participation

The ICF model proposes six components of health and functioning, which are suggested to be universally applicable to all people (WHO, 2007). The focus of this research was the activity of online conversation with the overarching goal being to increase participation in this real-life context for communication. Positioning of the research within the paradigm of pragmatism allowed for exploration across the domains of participation (Glogowska, 2011). Results have confirmed the concept of complex and inter-directional relationships between activity, participation, environmental, and personal factors, and this concept is discussed and presented below (Figure 10.2).

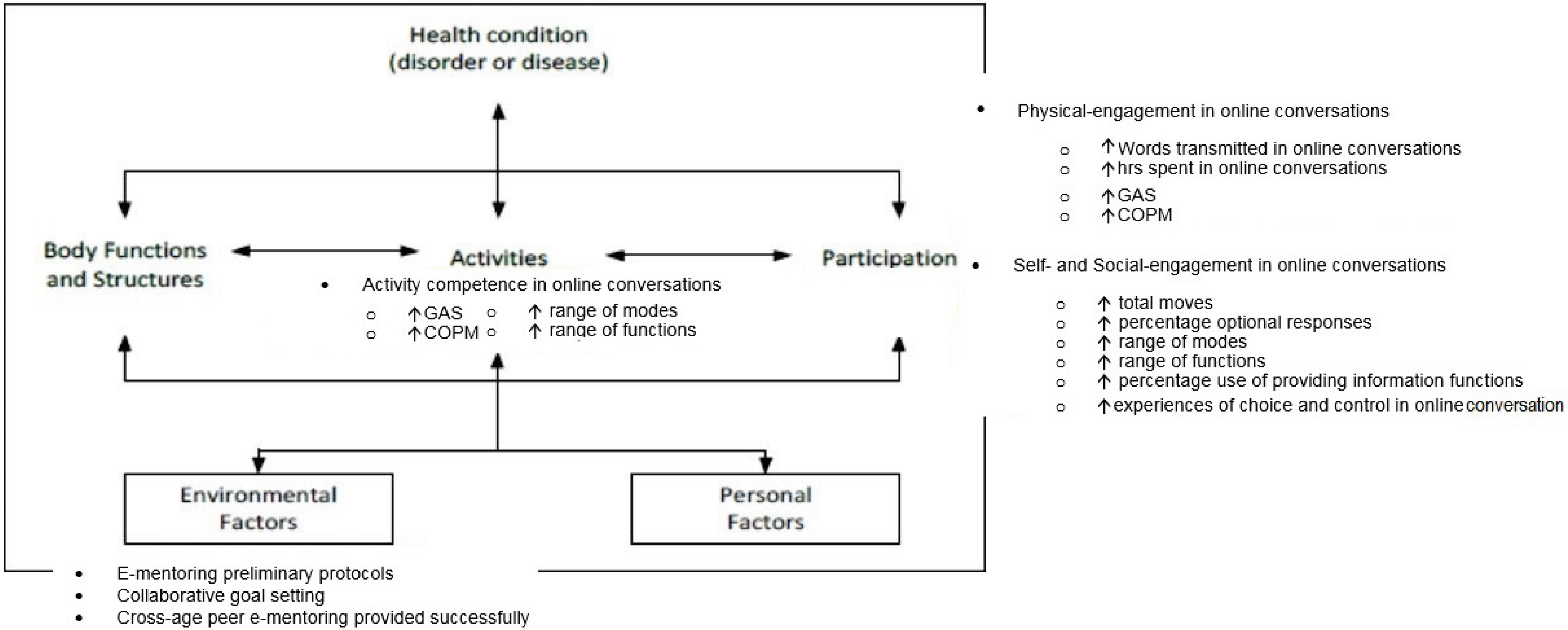


Figure 10.2. Visual summary of results against the ICF framework. Adapted from "International Classification of Functioning, Disability and Health - Children and Youth version (ICF-CY)", by World Health Organization, 2007, p. 17, World Health Organization.

The FPRC model is constructed around the bi-directional relationships between participation and related constructs, and that participation is both a means and an outcome of intervention (Figure 2.7, see Section 2.1.2.5). This model provides a framework to represent the intervention provided and outcomes observed in the current study. Mapping the current study against this framework also enables discussion against the developments related to definitions and understandings of participation that were not available at the time this research was designed (Table 10.4). It is not possible to comment on outcomes relevant to the constructs of preferences or sense of self since these were not included in the data collected.

Table 10.4

Participation-Related Constructs Mapped Against the Intervention and Outcomes of the Current Study

Participation-Related Construct[a]	Means (Intervention)	End (Outcomes)
Preferences	Development of own goals	
Sense of self	Identification of problem areas	
Activity competence	Cyber-safety supports, e-mentoring guidance and instruction	↑GAS, ↑COPM, ↑range of modes, ↑range of functions, ↑LRO%, ↑FPI%
Participation–attendance	E-mentoring conversations	↑ hours, ↑GAS, ↑COPM
Participation–involvement	E-mentoring conversations Experience of a positive online relationship with peer mentor	↑LRO%, ↑GAS, ↑COPM, ↑FPI%, ↑total moves, ↑range of modes, ↑range of functions Positive experiences of motivation, fulfilment, connectedness to others, psychological engagement, social belonging, choice and control, meaningful interactions and personal growth were reported before, during, after and well after intervention

[a]Participation-related constructs from "Participation, Both a Means and an End: A Conceptual Analysis of Processes and Outcomes in Childhood Disability", by C. Imms, M. Granlund, P. Wilson, B. Steenburgen, P. Rosenbaum and A. Gordon, 2017, *Developmental Medicine and Child Neurology, 59*, p. 4. doi:10.1111/dmcn.13237

The intervention and outcomes of the current study focused across the domains of activity and participation. Several outcomes can be understood to indicate improvements not only in physical, social, and self-engagement but also in activity competence. For example, an increased percentage of optional turns indicated that the participants were more actively involved in the conversation. However, increased social and self-engagement in conversation may also be viewed as an increase in communicative competence and therefore increased activity competence (Hoag, Bedrosian, Johnson, & Molineux, 2009). Facilitators and barriers to online conversation were reported to be experienced across the domains of the ICF.

These findings confirm the complex multidirectional relationships between participation and the other ICF components. When interventions occur in real-world contexts rather than “standardised environments”, it seems implausible to isolate one component of the ICF from the others. Interventions that focus on participation need to address all components, including personal and environmental factors, and physical, social, and self-engagement domains of participation. It is proposed that researchers targeting participation as an intervention and/or as an outcome must address and describe the multiple related components, rather than aim to isolate elements within participation, in an effort to ensure the social validity of their research and interventions.

10.8.1 Social validity. Confirming the social validity of interventions is an important aspect of AAC research and ensures the relevance of interventions for individuals who use AAC and their stakeholders (Kratochwill & Levin, 2014; Schlosser, 2003; Wendt & Miller, 2012).

Participation is a gold standard for interventions to support young people who use AAC. Increasing participation in daily situations is relevant to their everyday lives. Increased social participation has been clearly linked to positive health outcomes (Corsano, Majorano, & Champretavy, 2006; Eriksson et al., 2012). The overarching goal of increasing online conversation was thought to be relevant to the target population, given that previous research has indicated that this group desire more supports in learning to use social media (Hynan et al., 2015) and since online conversation is a common daily activity in the lives of young people who are typically developing (Australian Bureau of Statistics, 2016; Sensis, 2017). Participants were recruited using convenience sampling and were therefore motivated to increase their participation in online conversation. The inclusion criteria stipulated that participants in the project should be interested in mentoring support to increase participation in online conversation.

Individualised goals were assumed to be relevant to the participant's everyday lives. Increases in the percentage of optional responses taken in online conversation with peers demonstrated increased engagement. For example, hours spent online or even the total words written may not reflect a participant's engagement in the conversation. It is suggested that the increase in optional turns reflects a change in internal state, implying increased focus or effort, and increased social and self-engagement. Therefore, such changes reflect increased engagement in the conversation. Further, previous research has suggested that increases in optional turns may increase perceptions of competence of individuals who use AAC (Hoag et al., 2009). However, further research is needed to investigate the role of optional turns in online conversation as perceived by communication partners and related to experiences of engagement.

The acceptability of the intervention was high, with adherence at 80% over the 16 weeks. However, as discussed previously (Section 10.2.2) this ranged considerably across participants. A more flexible model may have been more appropriate, particularly when applying e-mentoring interventions outside the research setting. However, the ability to draw conclusions regarding the acceptability of the intervention was not a direct product of this study. Further, opinions of individuals who use AAC and other indirect stakeholders or community members regarding other aspects and outcomes of the intervention method were not directly investigated by this research. Future research may consider using excerpts of online conversations and approaching peers to rate the conversations blinded to the intervention phase or including the perspectives of the participants' online communication partners.

10.8.2 Measurement of participation. Variability in the results raises questions regarding the suitability of the measures to respond to changes in participation in online conversation as a result of the intervention.

The research aimed to investigate three participation dimensions (physical, social, and self-engagement dimensions). However, the ability to measure social, and self-engagement dimensions was limited. The SEAS measure and the collection of online conversation transcripts were used for this purpose. The research included mixed methods to allow for an understanding of changes in social and self-engagement. The original design of this research intended to include qualitative interviews, which were not included in the thesis because of the overall scope of the research. This limited the ability to comment on the changes in participation following the intervention.

Longitudinal studies may be required to determine the role of variables, mediators, and moderators affecting participation (Imms et al., 2017). It seems likely that supports for availability, accessibility, and accommodations have an important role in supporting participation in online conversation.

10.8.2.1 Unintended effects on participation. During the process of requesting ethical approval, the data set was reduced to include conversation on only one chosen social networking platform as selected by the participant, and not all online conversation by each participant. This affected the ability to report on changes in participation in online conversation. For example, one of Paul's goals was to use Facebook, but only conversations via email were collected to investigate his participation online. A decrease in email conversation may be interpreted as a decrease in participation in online conversation and ineffective intervention, but this may reflect increased communications with peers via Facebook and therefore a positive outcome of the intervention. For Kaylyn, the results demonstrate very limited participation in online conversation. However, it is known to the researcher that Kaylyn also began to use other social networking platforms and to use email through other accounts not tracked by the researcher (school and volunteer work email accounts were not included in data collection of online transcripts). Kaylyn and her mother reported to the researcher that Kaylyn used these accounts on a few occasions during the project. The researcher sought permission, post project, to collect these data after the experiment was completed. The participant gave consent to provide these data, but it was not possible for the participant, her parent, or the researcher to access these conversations since Kaylyn was no longer attending school. This issue may have affected the ability to observe any possible changes in Kaylyn's participation in online conversation. This restriction in the research method affected the ability of the researcher to draw conclusions about the influence of the e-mentoring intervention on participation in online conversation.

10.9 Limitations

The current study employed several innovative features to investigate a new cross-age peer e-mentoring intervention for young people who use AAC. The research design included several unique features in consideration of recent discussion regarding the measurement of participation-based intervention and emerging standards for SCED. The findings supported the feasibility of providing intervention in an online context to increase participation outcomes in an online context. However, the limitations associated with the complexities in this novel research design are acknowledged in the following section.

10.9.1 Internal validity.

10.9.1.1 Randomisation of treatment onset. The lack of stable baseline is a limitation of the current study that affects the ability to determine the effectiveness of the e-mentoring intervention. Stability in baseline is a foundation of SCED and critical for visual analysis of the effect of interventions in multiple-baseline design (Kratochwill & Levin, 2014). Baseline phases in the current study were not stable, and staggering of intervention onset was limited across only two data points.

The pressure to start the intervention at the planned time, to avoid compromising its feasibility, is a common experience of SCED researchers who experience challenges with baseline stability (Shadish & Sullivan, 2011). For example, Ganz, Parker and Benson (2009) stated that they minimised baseline length following a lengthy recruitment process. Conversely, Foreman, Arthur-Kelly, Bennett, Neilands and Colyvas (2014) reported continuing baseline as problematic for participants who waited several months before intervention started, which lengthened overall participation. They also described the lengthened baseline as problematic for the research since the follow-up phase was consequently concluded prematurely. The ability to collect pre-baseline data using online conversation transcripts offers a solution to researchers investigating online conversation.

The randomisation of intervention onset across a 5-week window was compromised because of the withdrawal of two of the six participants from the experiment. Both participants that withdrew from the study were allocated to longer baseline phases, and although both provided different explanations for their withdrawal from the project, participation in extended baseline phases may have been a factor in these decisions not to continue with the study.

The allocation of baseline lengths was further compromised owing to a misunderstanding of randomisation of intervention onset in SCED. Randomisation in SCED, although theoretically discussed, and agreed on as an important standard for the field (Tate et al., 2013), has not yet been commonly applied in SCED. The random allocation of treatment onset applied using the ExPRT software package (Version 1.2; Gafurov & Levin, 2014) at the time of project design in 2014, allowed allocation of the same number of weeks in baseline to more than one participant. The current version of the programme (Version 3.0; Gafurov & Levin, 2017) has been rectified to allow only systematic randomisation whereby no two participants are allocated the same random number of baseline weeks. Gafurov and Levin (Version 3.0; 2017) recommend the use of random yet systematic allocation of baseline lengths to maintain the integrity of visual analysis of the multiple-baseline design. In the current study, allocating the same baseline lengths to more than one participant in a random, rather than random but systematic fashion, compromised the ability to calculate randomisation statistics using the ExPRT software (Version 3.0; Gafurov & Levin, 2017). It is uncertain what the outcome would have been had a different random order of intervention onset been used. Nevertheless, the process of randomisation of these allocations across four data points before the start point, and therefore across 20 potential start points, strengthens the internal validity of the design (Edgington, 1987). Although not all researchers agree with the importance of randomisation for SCED, this process of randomisation strengthens the statistical analysis of the data (Edgington, 1987; Heyvaert & Onghena, 2014).

10.9.1.2 Instrumentation and testing. Several tools were used to support the reliability and validity of the data collected. The tools were selected and adapted to suit the research aim of authentically measuring participation in online conversation. This was consistent with the pragmatic approach that places emphasis on maintaining the real-world context for conversation when selecting data collection approaches (Dewey, 1916; Garrett, 2013). Some limitations of these tools are described below for (a) frequency reports, (b) SEAS-PCS, and (c) engagement probe.

10.9.1.2.1 *Frequency reports.* Data reporting the frequency and duration of participation in online conversation were collected using self-report rather than objective measurement. Objective measurement using digital monitoring of time spent in online conversation may have provided a more reliable and accurate measure of frequency and duration. However, a self-report approach was used to minimise the expense and complexity anticipated with an objective approach. For example, purchasing devices specifically for use in the study to track usage or installing software to monitor time spent in online conversation on participants' own computers or devices. Several complexities were anticipated in implementing objective approaches, including: (a) the cost of providing dedicated devices or software for this purpose, (b) ability of the tracking software or technology to distinguish between lurking behaviour and engagement in online conversation, (c) compatibility between dedicated technology or software for tracking and the use of computerised AAC systems, and (d) and use of more than one device.

The following paragraphs are adapted from an excerpt of the discussion section in the pre-print version of, "Exploring Participation Experiences of Young People who use AAC in Social Media Settings: Impact of an e-Mentoring Intervention", by E. Grace et al., 2019, *Augmentative and Alternative Communication, 35,* 132–141. doi:10.1080/07434618.2018.1557250

10.9.1.2.2 *SEAS-PCS.* The SEAS-PCS questionnaire was a previously validated tool, although it had not previously been utilised to measure change from an intervention; therefore, the responsiveness of the tool was unknown. For the preliminary questions, increasingly across time participants reported familiarity with the activity setting at very high or maximum levels on the scale suggesting a ceiling effect (see Table 8.1) changes to the phrasing of this item may improve the ability to measure change in familiarity with the activity setting. For the five domains of the SEAS-PCS, the current study highlights variability in the ratings across time and raises concerns regarding its application as a repeated measure and responsiveness across time. SEAS-PCS ratings are specifically linked to one experience of participation over 15 min or more in duration. Fluctuating personal and environmental factors, both in the daily lives of the participants and also in the social media environments where online conversation took place, may have influenced SEAS-PCS in-the-moment ratings. In this research, environmental factors (i.e., online communication partners and touchscreen responsiveness), activity-related factors (i.e., topic of conversation), and body structure and function (i.e., control of voluntary movement and fatigue) may have introduced extraneous variability into the participant SEAS-PCS ratings. Therefore, variability in the SEAS-PCS ratings across the time points may not have been predominantly related to the e-mentoring. Challenges exist in isolating change in participation as a discrete outcome of intervention, given that participation is a product of complex and inter-directional relationships between environmental and personal factors, health condition, body, and activity (WHO, 2007). Batorowicz, King, Mishra and Missiuna (2016) proposed an integrated model of social environment and social context that describes mechanisms of these inter-directional relationships within the macro social environment (e.g., cultural, economic, political, and technological circumstances and processes). To facilitate the measurement of experiences of participation in online conversation, several avenues are proposed for use in conjunction with the SEAS-PCS questionnaire: controlling further variables, reporting regarding participation for longer than 15 min periods, and longitudinal and qualitative studies to provide increased depth in reporting and/or multiple perspectives.

This is the end of the excerpt of the discussion section from the pre-print version of, “Exploring Participation Experiences of Youth who use AAC in Social Media Settings: Impact of an e-Mentoring Intervention”, by E. Grace et al., 2019, *Augmentative and Alternative Communication, 35,* 132–141. doi:10.1080/07434618.2018.1557250

10.9.1.2.3 *Engagement probe.* The engagement probe allowed for the inclusion of self- and proxy reports but was specifically adapted for the current study and has not been validated. Similar to the SEAS-PCS measure, both types of reports on the engagement probe may have varied because of factors outside the e-mentoring intervention. Further, the language used in the probe title and items within this probe may benefit from updating to reflect developments in the understanding of the definition and description of the dimensions of participation (Imms et al., 2016, 2017). For example, relabelling of the tool as an involvement probe and of the first item as targeting attentiveness or motivation rather than involvement.

10.9.1.3 Data analysis. Given the variability present in the data collected, the systematic approach to visual inspection and use of two non-overlap measures were strengths of the current study, although no inter-rater agreement data were collected for these analyses. The non-overlap approaches selected were PND and Tau-U (Parker, Vannest, Davis, & Sauber, 2011; Scruggs et al., 1987; Vannest et al., 2016). PND is commonly applied in SCED but was unable to take trend into account (Parker, Vannest,

& Davis, 2011). Tau-U was used because of the ability to be interpreted as an effect size, account for trend in baseline and leverage greater statistical power (Ganz, Goodwn, et al., 2013; Parker, Vannest, & Davis, 2011). However, a limitation of Tau-U is the assumption that baseline trend continues throughout the experiment (Parker, Vannest, Davis, & Sauber, 2011). For example, a negative effect of the intervention was calculated for Kaylyn's days per week spent in online conversation, and this outcome was influenced by the assumption of Tau-U that increasing trend in baseline would be maintained.

An online calculator (Version 2.0; Vannest et al., 2016) was used for the calculation of Tau-U and Tau_{novlap} in this study. Since establishment in 2011, the online calculator has been increasingly used in SCED research (i.e., Bowman-Perrott, Burke, de Marin, Zhang, & Davis, 2015; Byrne & Coetzer, 2016; Caldarella et al., 2014; Dart et al., 2015; Ganz, Hong, & Goodwyn, 2013; Huskens, Palmen, Van der Werff, Lourens, & Barakova, 2015; Huskens et al., 2012; Pellerin, Papin-Richard, Guiheneuc, Niel, & Guihard, 2015; Shin & Bryant, 2015; Therrien & Light, 2016; Tunnard & Wilson, 2014; Whalon, Conroy, Martinez, & Werch, 2015; Wolfe et al., 2015). The definition and calculation of Tau-U described by Parker, Vannest, and Davis (2011) and used in the online calculator by Vannest et al. (2016) has recently been questioned. Brossart, Laird, Armstrong and Walla (2018) propose that the method used by the online calculator artificially inflates the effect size. In the formula for Tau-U by Vannest et al. (2016), the number of pairs is calculated by multiplying the number of Phase A data points by the number of phase B data points without also adding the pairs compared within Phase A (i.e., 80 rather than 80 + 10 in the example provided in Table 4.17), resulting in S being divided by 80 rather than 90 and potentially not limiting the effect size between −1 to +1. Brossart et al. (2018) suggest that this approach may cause questions in interpretation of Tau-U as an effect size estimate. On some occasions, the effect size calculations in this research exceeded +1 (see results in Tables 9.18, 9.50, and 9.57). The first author (Vannest, personal communication 02/02/2019) indicated that other authors have recommended use of the online calculator and that she was not previously aware of the discrepancies raised by Brossart et al. (2018) regarding the approach used to calculate Tau-U. As outlined above, the online calculator by Vannest et al. (2016) has been used extensively by SCED researchers to report Tau-U as an effect size. Alternative approaches to calculation of Tau-U, recently published (Version 0.4.1; Pustejovsky & Swan, 2019), that are conducted using R (Version 3.5.0; R Core Team, 2018) implement the same formula for calculation of pairs and provide the same effect size estimates as the online calculator (Vannest et al., 2016) used in the current study. Therefore, despite the suggested limitations (Brossart et al., 2018), in the current study the formula utilised by Vannest et al. (2016) and by Pustejovsky and Swan (Version 0.4.1; 2019) was retained as supported by the current predominance of this approach in the published literature (cited previously in this paragraph).

The use of multiple measures is recommended and commonly applied in research investigating novel interventions and changes in participation. Nevertheless, repeated statistical analysis is a limitation of the current study because it raises concerns regarding the ability to determine significance of the results at the 0.05 alpha level. However, this approach is acceptable in the context that the research is positioned as a feasibility and exploratory study (Korppi & Nuolivirta, 2018). Two hypotheses, (a) words written online measuring physical engagement and (b) optional responses measuring social and self-engagement in online conversation (Table 10.1), were identified prior to the experiment as primary to the research to retain the power of these tests (Streiner & Norman, 2011). One of the primary measures, optional responses, indicated a statistically significant increase in participation.

10.9.2 External validity.

10.9.2.1 Subject generality. The small sample size, common to SCED, limits the applicability of the findings to the greater population of young people who use AAC. This is further limited by the recruitment approach that utilised a convenience sample and specified that participants must: (a) independently use social media, (b) access social media in their home environment, and (c) be available to participate in regular mentoring sessions and data collection over an extended period.

Participants in the current study were recruited from across Australia using a range of approaches. The use of online methods, support of service providers and use of a snowballing approach strengthened recruitment. Participants were self-selecting and already had an interest in linking up with a cross-age peer e-mentor and in learning to participate in online conversation. This increases the social validity of the study because the intervention was important to the participants. However, this prior interest in the area may have influenced the effectiveness of the intervention.

Funding for assistive technology was not available to participants in the current study, and inclusion criteria indicated that participants must already access social media at home. The requirement to have access to a computer and the Internet at home was a barrier to recruitment of participants who desired to be online but did not have the equipment. For example, one potential participant expressed interest in the project but required a joystick costing AU$1,500 to access the computer, not including the cost for professional time in setting this up. This participant, and others in similar situations, were consequently excluded from the study. Limited access to computers and the Internet at home among individuals who use AAC has been previously established by

Pousada et al. (2011). The experiences of recruitment to the current study confirm that this inequity continues. The recruitment bias discussed here is likely to have influenced the results. For example, the benefits of the intervention may have been greater for participants in this research, given the supports in their home environments. However, it is also possible that the effects of the intervention may have been less, given that the participants had already been experiencing these supports and may therefore stand to gain less from the mentoring supports.

The small number of participants and variability of the results limits the ability to generalise the findings. Further replications of the current study are needed to develop an understanding of the possible effects of cross-age peer e-mentoring on participation in online conversation. However, other changes to the design are also warranted before proceeding with any replication studies.

10.10 Implications for Practice

The findings of the current study provide important implications for practice, highlighting the value of online conversation as a context for intervention, an important outcome of intervention, and the applicability and feasibility of e-mentoring as an approach to intervention.

Interventions to support participation in online conversation by young people who use AAC are valuable because they provide a real-life context for communication and social interaction. Young people who use AAC in this study reported positive experiences of participation in this activity context. However, participants also experienced barriers to participation in online conversation that may be important considerations when providing these interventions. For example, young people who used AAC relied on family members to access social media and were unable to access preferred social networking platforms owing to challenges in physical accessibility (i.e., Snapchat). Practitioners can raise awareness of the challenges in access to online conversation experienced by young people who use AAC. This research suggested that participation in online conversation is not only an important outcome of interventions, but also a viable context for intervention.

This study confirmed the acceptability of the cross-age peer e-mentoring intervention and adherence to the intervention over 16 weeks. Thematic analysis of the mentoring conversations confirmed the positioning of the cross-age peer e-mentors, adults who used AAC, as role models for the young people who used AAC. The e-mentoring support in the current study was not provided in isolation. Findings suggest that e-mentoring intervention may require additional supports, such as goal setting interventions and interventions to establish preconditions for e-mentoring (i.e., cyber safety and troubleshooting compatibility and connections between social media platforms and AAC devices). Practitioners implementing mentoring interventions may also need to consider the digital and social capital of young people who use AAC, such as their previous experience in using social media and availability and willingness of family members to support the intervention.

10.11 Future Directions

10.11.1 Areas for intervention research. Systematic reviews have identified the need for intervention research to maximise communicative competence and participation outcomes for individuals who use AAC (Therrien et al., 2016). There is a need for research focusing on interventions, similar to the current study, that: (a) consider psychosocial aspects of communication, such as motivation, (b) occur in real-world contexts, (c) are participation-based, and (d) target increased interactions with peers (Light & McNaughton, 2015).

Cross-age peer e-mentoring of young people who use AAC to increase their participation in online conversation is an approach that aligns with these directions for research. For example, in the current study participants reported highly positive motivation and attentiveness when participating in online conversation with their peers; the intervention was provided, and outcomes were measured, in real-world contexts. In the discussion of the findings thus far, several points have been recommended to inform future research, including:

- to include investigation of intermediate effects of goal setting as a distinct component of AAC interventions;
- to consider strategies to increase adherence to the intervention, such as text message reminders;
- to include guidelines regarding low adherence to mentoring contacts;
- to include economic evaluation of the benefits of e-mentoring;
- to investigate the role of the suggested mechanisms of the intervention, such as cyber-safety interventions and goal-setting interventions;
- to include ratings of online conversation excerpts by peers blinded to the experimental phase;
- to replicate investigation of increased optional responses observed in online conversation;
- to include a comparison with face-to-face conversation; and

The complexity of real-world intervention research investigating multidimensional participation interventions and/or outcomes is challenging for researchers. Given the several constructs related to participation and the multidirectional relationships between them, future research in this field must intentionally balance real-world contexts and the isolation of discrete variables for measurement. Incorporation of mixed methods and/or longitudinal designs in participation-focused intervention research will support researchers in achieving this balance.

10.11.1.1 Mixed-methods research. Several of the outcomes recorded across the current study demonstrated variability that seemed to be outside the intervention. This variability suggested other interconnected influences on participation in online conversation. For example, reported days and hours spent online each week appeared to vary across time, and therefore, the effects of the intervention were not apparent from visual inspection. However, statistical analysis revealed that among the variability, hours spent in online conversation possibly increased. Additional qualitative approaches to data collection and analysis may provide a deeper understanding of participation in online conversation and allow the researcher to further explore the variability observed. This may include semi-structured interviews and/or other multimodal approaches to allow for participants who use AAC to present their own story. For example, it has been suggested that participant-generated photo-elicitation techniques allow for a depth and richness in the perspectives shared by participants that may not be possible with interview alone (Bates, McCann, Kaye, & Taylor, 2017; Clark-Ibáñez, 2004). The use of participant-generated photos has been reported by other researchers working with young people that have communication impairment (M. King, Williams, & Gleeson, 2017). Videos have also been used to provide depth to the understandings of participation in online conversation not possible using only the online transcripts (Paulus, Warren, & Lester, 2016). Including video recording of the participants and their communication partners interacting in an online conversation may provide the opportunity for a qualitative approach to conversation analysis. For example, turns typed but not transmitted, level of support provided by family members, and challenges with the accessibility of technology.

The incorporation of qualitative data and analysis alongside quantitative data and analysis would allow participants to provide valuable feedback regarding the perceived outcomes and increase understanding of variability that may be present in the data. The current study included some qualitative methodological components, but it did not include interviews with individuals who used AAC. Informal feedback from participants was valuable in interpreting these outcomes, such as Mia's alternate living arrangements or Kaylyn's use of alternate email accounts outside of the data collection process. It is likely that some of the variation observed in the outcomes could have been more clearly interpreted had participants' qualitative feedback been incorporated into the research process. Comparison and interpretation of SCED data alongside interviews, or other qualitative data sources, would increase the social validity of the outcomes, and understanding of the application of the results to the everyday lives of young people who use AAC.

10.11.1.2 Longitudinal research. Longitudinal research may buffer against the variability observed in day-to-day use of online conversation. In addition, longitudinal research may provide an avenue to understand how changes in participation correspond to improved developmental outcomes or well-being in young people who use AAC.

10.11.2 Other research (not intervention). Further research is required to explore the factors contributing to variation in the measures of online conversation reported by mentees in the current study, including the accessibility of online conversation, perceptions of communication partners, online networks, and cyber-safety-related experiences of young people who use AAC. In the current study, the accessibility of online conversation was a barrier for Paul, Mia, and Tilly. These barriers are likely to extend to other aspects of their Internet access, such as use of the Internet for employment or banking. Previous research has raised these concerns, and the current study confirms that inequalities are continuing for some young people who use AAC (Bryen, Heake, Semenuk, & Segal, 2010; Pousada et al., 2011). The current study confirms findings of previous research that young people who use AAC can benefit from funding and support to facilitate their access to online conversation and the Internet (Cohen & Light, 2000; Grace et al., 2014).

The current participants and their families benefited from support in navigating privacy settings and principles of cyber safety. However, little is known about actual adverse events or risk experienced by young people who use AAC when using the Internet. It is recommended that future research investigate cyber safety, and/or risks, and management of online risk in young people who use AAC.

Chapter 11: Conclusion

The ICF (WHO, 2007) acknowledges the importance of participation for health outcomes and highlights a range of factors affecting participation outcomes, including environmental factors, personal factors, activity competence, and impairment. This focus on participation emphasises the need for AAC interventions and research to also focus on participation.

This research furthers previous knowledge by investigating the potential strengthening of participation in online conversation by young people who use AAC through a peer e-mentoring intervention. The research questions were structured to investigate the three domains of participation proposed by Kang et al. (2014), physical, social, and self-engagement domains.

Participants in this study reported improvements in individually identified problem areas and related goals for online conversation. Findings also suggest a possible effect of the intervention for increasing participation in online conversation, including physical, social and self-engagement, which was particularly evident when comparing from the pre-baseline phase. Increases in physical engagement (as defined by Kang et al., 2014) or attendance (as defined by Imms et al., 2017) were not observed for the primary measure, words written in online conversation, yet a small and significant increase was observed for hours spent in online conversation each week. Increases in social and self-engagement or involvement (as defined by Imms et al., 2017) were observed for the primary measure, the linguistic measure of optional responses in online conversation. It is recognised that significant variability in baseline compromised the ability to interpret the effect of the intervention in the SCED. Staggering of intervention onset was reduced, complicating the ability to apply visual analysis. To address these limitations, systematic visual analysis was applied and two statistical measures of non-overlap were calculated. Nevertheless, it is unclear to what extent this outcome may apply to other young people who use AAC or to repetitions of the cross-age peer e-mentoring intervention.

This research demonstrated the feasibility of cross-age peer e-mentoring interventions. Findings confirmed that cross-age peer e-mentors and mentees who use AAC can provide/obtain mentoring support, experience positive mentoring relationships, and adhere to a mentoring intervention over 4 months. The current study raised an important issue for the field to consider regarding designing research to enable measurement and understanding of individualised collaborative goal setting as a component of interventions. The coding system adapted and applied to online conversation provides a tool to report on moves, modes, and functions in online conversation that incorporates analysis of the range of unique structures present in online conversation transcripts, such as the use of non-standard orthography and graphical turns. Further, the research confirmed the complexities of operationalising participation in research conducted within real-world contexts.

The mentoring intervention employed in this research met internationally accepted benchmarks for effective practice for mentoring (Garringer et al., 2015). The intervention was successfully implemented with adherence at 80%, and thematic analysis indicated that mentoring occurred as intended. The mentees, mentors, and mentees' mothers reported that they experienced high-quality relationships. Outcomes of this intervention had statistically significant effects on the following two primary outcomes: improvements in participants' perception of performance and satisfaction with performance in online conversation, and an increase in optional linguistic moves taken in online conversation. Importantly for practitioners working with adolescents who use AAC, online conversation was observed to provide opportunities for young people to take an active role in conversation. Further, all participants reported positive experiences of social and self-engagement in online conversation. Taken together these findings provide important evidence that online conversation is a valuable real-world context for providing AAC interventions.

Appendices A to P

Appendix A: Faceted Classification of Online Media Based on Approach Described by Herring (2007)

Table A.1

Medium Factors

	Facebook page	Facebook Messenger	i-message	email
Synchronicity	Asynchronous	Asynchronous	Asynchronous	Asynchronous
Message transmission	Message-by-message	Message-by-message	Message-by-message	Message-by-message
Persistence of transcript	Persistent	Persistent	Persistent	Persistent
Size of message buffer	Large	Large	Large	Large
Channels of communication	Visual: text, graphics (static/animated), video, audio	Visual: text, graphics (static/animated), video, audio	Visual: text, graphics (static/animated), video, audio	Visual: text, graphics (static/animated)
Anonymous messaging	No	No	No	No
Private messaging	No (shared with 'Facebook friends')	Yes	Yes	Yes
Filtering	Available	Available	Available	Available
Quoting	In some cases	No	No	Quoting
Message format	New messages to the bottom of the list	New messages to the bottom of the list	New messages to the bottom of the list	New messages to the top of the list

Table A.2

Situation Factors

	Facebook page	Facebook Messenger	i-message	email
Participation structure	One-to-many semi-public No anonymity Large number of active participants Balance of participation One post; many replies	One-to-one OR one-to-group Private No anonymity Small size Tends to be more one-for-one messages	One-to-one OR one-to-group Private No anonymity Small size Tends to be more one-for-one messages	On-to-one OR one-to-group Private No anonymity Small size Tends to be more one-for-one messages
Purpose	Social Goal: social relationships	Social Goal: social relationships	Social Goal: social relationships	Social Goal: social relationships
Topic or Theme	Social	Social	Social	Social
Tone	Playful, casual, friendly, cooperative	Playful, casual, friendly, cooperative	Playful, casual, friendly, cooperative	Playful, casual, friendly, cooperative
Activity	Social conversation	Social conversation	Social conversation	Social conversation
Norms[a] (examples)	Users only respond to posts of interest to them	Users respond to messages from friends.	Users respond to messages from friends	Users respond to messages from friends
Code	English	English	English	English

Note. Participant characteristics are not discussed in the table. Participants in the conversations are young people who use methods other than speech to communicate and their online communication partners.

[a.] An example of a group norm is provided for each media. A full discussion of the norms of these media is not within the scope of this study.

Appendix B: Systematic Review Protocol—Peer Mentoring in Young People With Communication Disability: What do we Know About the Effectiveness and Outcomes of This Intervention Approach?

B.1 Definition of Terms

Communication disability includes speech, language and/or communication difficulties, including complex communication needs. The group also includes people with a hearing impairment as their primary disability who use alternate modes to communicate. This scope does not include individuals with primarily learning disorders (e.g., dyslexia) or mental health disorders (e.g., anxiety).

Peer mentoring is defined as mentoring that meets all the following criteria:

1. The mentee and mentor will share a similar characteristic/s (C. Dennis, 2003).
2. As defined by Rhodes (1994), there is "an older, more experienced mentor and an unrelated, younger" mentee.
3. The mentor provides "ongoing guidance, instruction, and encouragement aimed at developing the competence" of the mentee (Rhodes, 1994, pp. 188–189). Specifically, instruction is focused around the mentee's goals to develop the use of social media.
4. As defined by Jacobi (1991), mentoring will include:
    a. supports and help to the mentee more broadly;
    b. a mentor who has more experience and skills in the area of mentoring focus; and

c. provision of role modelling (i.e., an example in the area of mentoring focus that is intended to effect the mentee's attitudes, skills, or knowledge).

B.2. Background

B.2.1 Mentoring. Currently, mentoring interventions are common in society, and the literature has recommended several best practice features for mentoring interventions. A systematic review of youth mentoring interventions completed by DuBois, Holloway, Valentine, & Cooper (2002) suggested that the following programme features may be particularly important for positive outcomes:

- ongoing training for mentors;
- structured activities for mentors and youth;
- clear expectations regarding frequency of contact;
- structures for support and involvement of parents; and
- monitoring of the overall programme implementation.

The authors highlight the importance of a structure to support the formation of mentoring relationships (e.g., initial training and orientation for mentors and ongoing training opportunities; Dubois et al., 2002). They also draw attention to the potential importance of relationship features for positive mentoring outcomes (e.g., frequency of contact, emotional closeness and longevity).

B.2.2 Mentoring support for people with communication disability. An informal review of the literature has identified a limited number of papers describing the potential benefits of e-mentoring for individuals with complex communication needs (Cohen et al., 2003; Cohen & Light, 2000; Light et al., 2007). The papers described potential benefits of mentoring across a range of outcomes (e.g., for improvements in transition, employment or, sociorelational and problem-solving skills; Cohen et al., 2003; Cohen & Light, 2000; Light et al., 2007). Ballin and colleagues have also published a group of papers describing the benefits of providing face-to-face mentoring support to three young people (14–32 years) with complex communication needs (Ballin et al., 2009, 2013a, 2013b; Ballin, Balandin, Stancliffe, & Togher, 2011, 2012). Results of this face-to-face mentoring intervention demonstrated that peer mentoring has the potential to improve conversation skills and confidence in people with complex communication needs (Ballin et al., 2013a). Given the potentially small number of previous studies providing mentoring support to young people with complex communication needs, this review has been broadened to include young people with a range of communication disabilities (as defined above) and includes both face-to-face and e-mentoring interventions.

B.2.3 Application of recommended mentoring practice to young people with communication disability. Recommendations from previous reviews of mentoring regarding the outcomes of mentoring and importance of certain mentoring intervention features have been presented generally for programmes including a range of young people. The outcomes of mentoring have not been reviewed specifically in relation to programmes including young people with communication disability. This systematic review of the literature regarding previous mentoring interventions with young people with communication disabilities will inform the effectiveness of mentoring in this population and the extent to which the features recommended by Dubois et al. (2002) have been applied in mentoring interventions for young people with communication disability.

This systematic review will inform the design of a research project providing e-mentoring to young people with complex communication needs.

B.3 Main Question

What is the effectiveness of peer-mentoring support for young people (aged 10–25 years) with communication disability across a range of outcomes?

B.4 Sub-Questions

1. What are the outcomes investigated in previous research?
2. How have best practice principles recommended for mentoring interventions (Dubois et al., 2002) in the general population been applied and used in peer-mentoring interventions with young people with communication disability?

B.5 Method

B.5.1 Inclusion.

- only research published from 1985 until date;
- young people aged 10–25 years;
- communication disability (as defined above);
- experimental or quasi-experimental design (SCED or group designs);
- intervention studies investigating effectiveness/outcomes of peer mentoring (as defined above);
- where information for computation of effect sizes is not available, articles will be retained to be reviewed for the list of outcomes measured and the use of best practice programme features (articles will be excluded from the calculation of effect size); and
- peer mentoring the primary intervention, or measures report specifically regarding the outcomes of the peer-mentoring component of the intervention.

In addition, studies included may use group mentoring or paired mentoring models:

- face-to-face peer mentoring;
- online peer mentoring;
- group peer mentoring; and
- paired peer mentoring.

B.5.2 Exclusion.

- focus of peer mentoring solely family members and not the young person;
- no specific outcome listed to investigate the effectiveness of the peer-mentoring intervention; and
- published in a language other than English.

Search Method:

The search method of this study is described below.

1. The researcher has identified an initial list of terms for each key concept (see Table B.1) that will be further developed and tailored for individual databases.

Table B.1

Search Terms for Key Concepts

Concepts	
Mentoring	Communication Disability
Mentor	AAC
Peer support	Alternative communication
Peer mediated	Augmentative communication
Mentee	Non-verbal
Protégé	Nonverbal
Support group*	Complex communication needs
Role model*	CCN
	Communication skill*
	Speech-generating device*
	SGD
	Communication aid*
	Sign language
	Communica* disorder*
	Speech disorder*
	Language disorder*
	Articulation disorder*
	Language delay
	Speech delay
	Speech impairment*
	Language impairment*
	Cerebral palsy
	Autism
	Hearing impairment*
	Deaf
	Developmental disabilit*
	Aphasia
	Dysphasia
	Dyspraxia
	Apraxia
	Brain injur*
	Voice Disorder*
	Stutter*

2. The following databases have been identified for inclusion in this review
    - Medline;
    - CinAHL;
    - PsycInfo;
    - Eric (ProQuest);
    - Eric (Ovid);
    - Scopus; and
    - Web of Science.
3. The researcher will complete a grey literature search, including an advanced Google search and search of repositories for theses and reports.
4. The researcher will complete a manual search of the online table of contents pages for the following journals to identify potential articles.
    a. *Augmentative and Alternative Communication*
    b. *Disability and Rehabilitation. Assistive Technology*
5. Results of all searches will be saved, and lists of included and excluded studies will be maintained using EndNote. The titles of all search results will be reviewed to identify relevant articles.
6. Abstracts will be reviewed to identify relevant articles.
7. Where indicated, the full-text articles will be reviewed to identify relevant articles. Where a full text is not available from the Flinders library. a request will be made to source this article via the library document delivery system. Where the Flinders library is unable to source an article, this will be noted and it will not be possible to include the paper in this review.

8. The researcher will review all reference lists of all included articles. Where new article titles are identified as potentially relevant, the abstract and then the full text will be reviewed to determine the inclusion or exclusion of the study.
9. A second reviewer will review the inclusion and exclusion process to demonstrate its integrity. The first reviewer will provide two sub-lists, one of "clearly irrelevant studies and duplicates" and another of "potentially relevant studies"; this strategy will reduce the time commitment required of a second reviewer (Petticrew & Roberts, 2008, p. 120). A second reviewer will briefly and informally check the list of clearly excluded studies and then will formally review 20% of the potentially included sub-list to determine the inclusion or exclusion of studies; level of agreement will be reported. Finally, the second reviewer will cross-check all articles identified for inclusion. In case of disagreement, the first and second reviewers will meet together with a third party, discuss the study and arrive at an agreement (Petticrew & Roberts, 2008; Schlosser, Wendt, & Sigafoos, 2007; Wendt & Miller, 2012).

B.6 Tools

A coding form has been developed to describe and evaluate the mentoring intervention and outcomes and to extract data from the studies included in this review. See the study information and data extraction form.

Effect size for SCEDs will be calculated using PND and reported as a mean and range. Effect size for group studies will be reported using Cohen's *d* ($n \geq 20$) and Hedges *g* ($n < 20$).

In the final analysis, data extraction will be reported separately for SCED and group designs since there is no accepted method for combining these aggregated results (Schlosser & Wendt, 2008).

B.6.1 Methodological rigour. A recent review of appraisal tools relevant to SCED identified several possible tools that were considered for inclusion in this review (Wendt & Miller, 2012). From these potential options, the Evaluative method tool has been selected for use in this review because the tool can be applied to single-case experimental and group designs and because of the reliability data available and high-quality endorsement provided by the review for this tool.

An independent coder will complete the two forms: (1) data extraction and (2) evaluative method forms for 20% of the included studies. Cohen's Kappa will be calculated to determine whether a significant level of agreement exists between raters (above 0.75; Schlosser et al., 2007).

B.7 Summary

This systematic review will investigate the main question, "What is the effectiveness of peer-mentoring support in facilitating young people (aged 10–25years) with communication disability?". A wide range of relevant databases will be consulted, and in addition, grey literature and hand-searching strategies will be included. References from all included studies will also be reviewed to identify further relevant research. Included studies will be reviewed to report the effect size of mentoring interventions provided, outcomes measured and use of best practice features in the design of the mentoring programs. The results will be disseminated and used to inform the design of an e-mentoring intervention for young people with complex communication needs.

B.8 References

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Rhodes, J. (1994). Older and wiser: Mentoring relationships in childhood and adolescence. *Journal of Primary Prevention, 14*, 187–196. doi:10.1007/BF01324592

Schlosser, R. & Wendt, O. (2008). Effects of augmentative and alternative communication intervention on speech production in children with autism: A systematic review. *American Journal of Speech-Language Pathology, 17*, 212–230. doi:10.1044/1058-0360(2008/021)

Schlosser, R., Wendt, O., & Sigafoos, J. (2007). Not all systematic reviews are created equal: Considerations for appraisal. *Evidence-Based Communication Assessment and Intervention, 1*, 138–150. doi:10.1080/17489530701560831

Wendt, O., & Miller, B. (2012). Quality Appraisal of single-subject experimental designs: An overview and comparison of different appraisal tools. *Education and Treatment of Children, 35*, 235–268. doi:10.1353/etc.2012.0010

Appendix C: Ethical Approval

Emma Grace

From:	Human Research Ethics
Sent:	Monday, 1 September 2014 4:06 PM
To:	Emma Grace; Pammi Raghavendra; Lareen Newman
Subject:	6535 Final approval granted (1 September 2014)
Importance:	High

Dear Emma,

The Chair of the Social and Behavioural Research Ethics Committee (SBREC) at Flinders University considered your response to conditional approval out of session and your project has now been granted final ethics approval. This means that you now have approval to commence your research. Your ethics final approval notice can be found below.

FINAL APPROVAL NOTICE

Project No.:	**6535**
Project Title:	Young people with Complex Communication Needs: Investigating participation in online conversations through e-mentoring
Principal Researcher:	Ms Emma Grace
Email:	emma.grace@flinders.edu.au

Approval Date:	1 September 2014	Ethics Approval Expiry Date:	**31 December 2018**

The above proposed project has been **approved** on the basis of the information contained in the application, its attachments and the information subsequently provided with the addition of the following comment:

Additional information required following commencement of research:

1. Provision of a copy of the ethics approval notice from the Novita Children's Services Research Committee *on receipt*. Please note that data collection should not commence until the researcher has received the relevant ethics committee approvals (items D8, G1 and Conditional approval response – number 6).

RESPONSIBILITIES OF RESEARCHERS AND SUPERVISORS

Figure C.1. Final ethical approval by the Social and Behavioural Research Ethics Committee at Flinders University.

Appendix D: Service Providers Requiring Further Ethical Approval

Table D.1

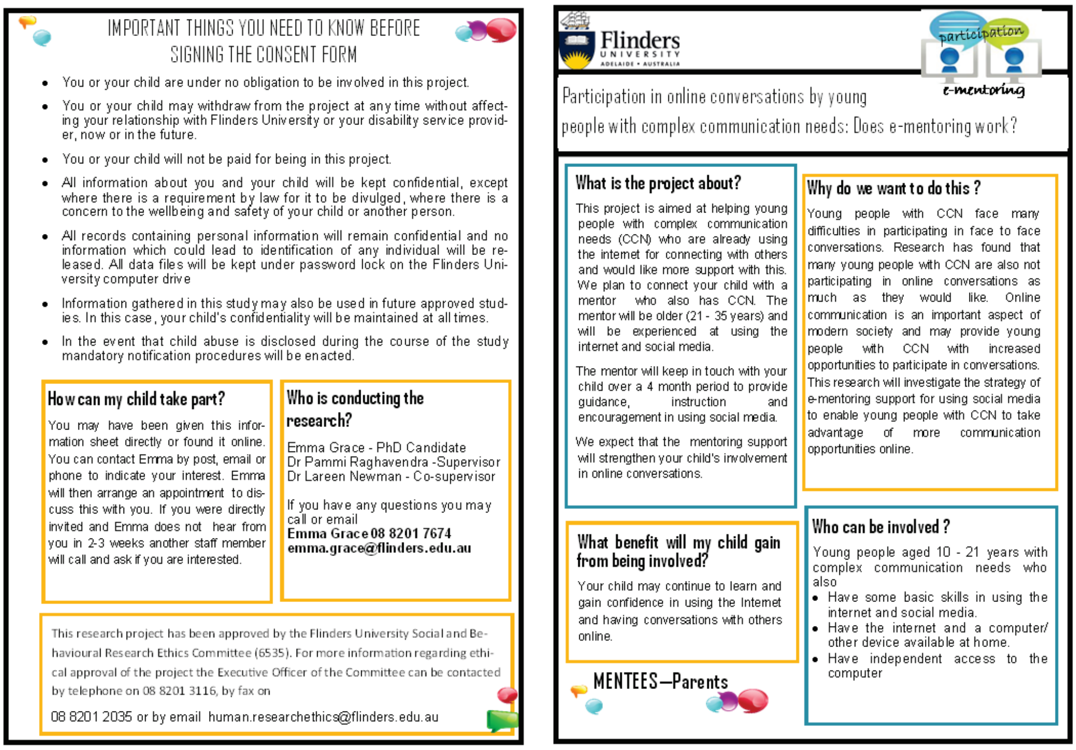
Service Providers Approached for Recruitment of Participants and/or Mentors

Provider	Length of Further Application	Time for Approval (days)	Invited Participants	Comments
1	n/a	3	Yes	
2	12 pages	38	Yes	
3	n/a	28	Yes	No suitable mentee participants able to be identified; invited mentor participants.
4	n/a	16	No	No suitable mentee participants able to be identified.
5	3 pages	31	No	Declined approval.
6	n/a	0	No	Suggested recruitment via an alternative service provider.
7	6 pages	120	No	Approved if payment provided for time spent with recruitment, but given time delay at the time of approval, this was no longer feasible to arrange. Agreed to post online recruitment but not to directly invite relevant participants.
8	n/a	44	No	Agreed to post online recruitment but not to directly invite relevant participants.
9	n/a	no response	No	
10	8 pages	154	No	Requested modifications to research protocol, but given time delay, it was not feasible to follow through on this.
11	n/a	1	Yes	
12	n/a	28	Yes	
13	11 pages	11	No	

Table D.1 Continued

Provider	Length of Further Application	Time for Approval (days)	Invited Participants	Comments
14	n/a	8	Yes	
15	n/a	no response	No	
16	n/a	9	Yes	
17	n/a	9	Yes	
18	n/a	16	No	
19	n/a	0	Yes	
20	n/a	2	Yes	
21	n/a	No response	No	
22	n/a	0	Yes	
23	24 pages	62	Yes	Application via same organisation as 24
24	24 pages	62	No	Application via same organisation as 23
25	n/a	32	Yes	No suitable mentee participants able to be identified; invited mentor participant.

Appendix E: Project Information Sheet



IMPORTANT THINGS YOU NEED TO KNOW BEFORE SIGNING THE CONSENT FORM

- You or your child are under no obligation to be involved in this project.
- You or your child may withdraw from the project at any time without affecting your relationship with Flinders University or your disability service provider, now or in the future.
- You or your child will not be paid for being in this project.
- All information about you and your child will be kept confidential, except where there is a requirement by law for it to be divulged, where there is a concern to the wellbeing and safety of your child or another person.
- All records containing personal information will remain confidential and no information which could lead to identification of any individual will be released. All data files will be kept under password lock on the Flinders University computer drive
- Information gathered in this study may also be used in future approved studies. In this case, your child's confidentiality will be maintained at all times.
- In the event that child abuse is disclosed during the course of the study mandatory notification procedures will be enacted.

How can my child take part?

You may have been given this information sheet directly or found it online. You can contact Emma by post, email or phone to indicate your interest. Emma will then arrange an appointment to discuss this with you. If you were directly invited and Emma does not hear from you in 2-3 weeks another staff member will call and ask if you are interested.

Who is conducting the research?

Emma Grace - PhD Candidate
Dr Pammi Raghavendra -Supervisor
Dr Lareen Newman - Co-supervisor

If you have any questions you may call or email
Emma Grace 08 8201 7674
emma.grace@flinders.edu.au

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (6535). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 08 8201 3116, by fax on 08 8201 2035 or by email human.researchethics@flinders.edu.au

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participation e-mentoring

Participation in online conversations by young people with complex communication needs: Does e-mentoring work?

What is the project about?

This project is aimed at helping young people with complex communication needs (CCN) who are already using the internet for connecting with others and would like more support with this. We plan to connect your child with a mentor who also has CCN. The mentor will be older (21 - 35 years) and will be experienced at using the internet and social media.

The mentor will keep in touch with your child over a 4 month period to provide guidance, instruction and encouragement in using social media.

We expect that the mentoring support will strengthen your child's involvement in online conversations.

Why do we want to do this?

Young people with CCN face many difficulties in participating in face to face conversations. Research has found that many young people with CCN are also not participating in online conversations as much as they would like. Online communication is an important aspect of modern society and may provide young people with CCN with increased opportunities to participate in conversations. This research will investigate the strategy of e-mentoring support for using social media to enable young people with CCN to take advantage of more communication opportunities online.

What benefit will my child gain from being involved?

Your child may continue to learn and gain confidence in using the Internet and having conversations with others online.

Who can be involved?

Young people aged 10 - 21 years with complex communication needs who also

- Have some basic skills in using the internet and social media.
- Have the internet and a computer/ other device available at home.
- Have independent access to the computer

MENTEES—Parents

Figure E.1. Front of information sheet for mentee parents.

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participation e-mentoring

Participation in online conversations by young people with complex communication needs: Does e-mentoring work?

What is involved in the project?

1. Emma will meet with you and your child at a time and place convenient to you to discuss your eligibility and consent. We will discuss the best ways the e-mentor can support your child.
2. At this time we will ask your child to have some conversations online. Directly following this we will ask both you and your child to respond to some questions and then rate how involved they felt in the online conversations. This whole process may take 2-4 hours and may take place over more than one appointment. Later in the project Emma will repeat the questions about online conversations again 3 more times, during the mentoring, after the mentoring and at the very end of the study. This may take 1/2—1 hour each time.
3. Before you start Emma will complete an assessment of your child's literacy skills. She will provide you with a report on the results. This may take 1 - 3 hours and may take place over more than one appointment. Emma will repeat this at the end of the mentoring support.
3. Emma wants to look at how things change for you over time before, during and after your child receives support from an online mentor. Emma will ask you to wait for a randomly allocated period of time between 5 - 9 weeks before she introduces your child to the mentor.
4. Emma will match your child with a peer mentor. The peer mentor will provide guidance, instruction and encouragement aimed at helping your child use Internet social media more. Your child will be asked to interact online with their mentor and/or other young people with disabilities in the project for up to an hour per week for 4 months (16 weeks). During the 4 months of the project Emma will monitor all online conversations with the peer mentor.
5. Before, during and after the mentoring support Emma will phone or message you once a week before, during and after the mentoring support. This may take 5-10 minutes of your time. Emma will ask you and your child about their online conversations.
6. Over the time you are in the project (7-8 months) Emma will collect the conversations your child has online. She will do this for one social networking platform only. Emma will talk to you about the best way for her to collect these conversations. In any online conversations, names of people or other personal details will be removed.
7. When the mentoring program finishes Emma will arrange to visit you and your child again. At this appointment Emma will interview you and your child to discuss how your child may have benefited from the e-mentoring programme. This may take 2 – 4 hours and will take place over more than one appointment.

All written conversations between your child and the mentor will be accessed by Emma online. The mentor will also be asked to record any online voice conversations and forward these to Emma. All conversation transcripts will be saved on a password protected computer and used to describe how your child's involvement in online conversation changes over time. You and your child will be given the opportunity to review transcripts of all conversations and correct or remove information.

One month prior to the end of the project your child and the peer mentor will be reminded that the project is almost over. At the end of the project your child and the peer mentor may choose to continue to keep in touch online but these conversations will no longer be via the sites monitored by the researchers. If either you, your child or the mentor do not want to continue the relationship after the project we will provide you with ideas about other opportunities for your child to be involved in other mentoring programs.

Are there any risks or discomforts ?

We anticipate few risks from your child's involvement in this study. One risk is that during the project your child may become tired or disinterested; they may get upset if it is hard to have conversations online. The peer mentor will give encouragement and support online. If your child becomes frustrated or is having difficulties with the mentoring conversations or technology you or your child can contact Emma by sending an email to SNmentor@gmail.com or by contacting Emma by phone (08 8201 7674).

Peer mentors will have a police clearance certificate for work with children. They will attend a training course and be provided with ongoing training and support from Emma. As all online conversations between the peer mentor and your child will be monitored. Any inappropriate use of language or issues of concern will be addressed by Emma.

There are also safety issues around using the Internet. You can find more information about safety online on the Australian Communication and Media Authority site: www.cybersmart.gov.au/Parents.aspx

If you are concerned about your child's mental health and well-being, you could raise this with your child's GP. You can also contact the Child and Adolescent Mental Health Services in your area each area's contact details are available online: http://www.wch.sa.gov.au/services/az/divisions/mentalhealth/consuminf/index.html

Figure E.2. Back of information sheet for mentee parents.

Things you should know about this research project

What if I don't want to be in the project?

You don't have to be in this project if you don't want to. You can stop at any time and get out of the project. This will not affect the disability services you receive.

Will I be paid? No. You will not be paid for being in this project.

What happens to information about me?

If you give us any personal information, like your name and address, we will keep this information safe. The mentor will be given your name, online contact details and preferred social networking sites.

We will not give out your personal information to anyone else or use it for anything else. In any reports we write information will be written so that nobody knows who was in the project.

We may tell others about you and the project if we are worried about your safety or the safety of other people.

Information from this project may be used in future approved research projects

How can I take part?

You can contact Emma by post, email or phone to indicate your interest.

Emma will then call you and make a time to visit and talk to you about this project.

Who are researchers?

Emma Grace - PhD Candidate
Dr Pammi Raghavendra - Supervisor

If you have any questions you may call or email Emma:

Emma Grace 08 8201 7674
emma.grace@flinders.edu.au

A special committees called the Flinders University Social and Behavioural Research Ethics Committee (6535) has looked at the way this project will be done.

The Committee wants to make sure that everyone's rights will be protected.

If you are worried about how your rights are being protected you can contact: The Executive Officer at Flinders University by phone 08 8201 3116, by fax on 08 8201 2035 or by email human.researchethics@flinders.edu.au

Flinders UNIVERSITY ADELAIDE • AUSTRALIA

participation e-mentoring

Participation in online conversations by young people with complex communication needs: Does e-mentoring work?

Why do we want to do this ?

Other young people with CCN have told experts that they don't use the internet as much as they would like.

We want to help young people with CCN to use social media more.

Do you have any questions about this?

If you have any questions you can call Emma. You can also talk to someone at home or to your disability service provider. That person can then talk to Emma for you.

Will there be any good things for me if I am in the project?

You may learn more about using the Internet and chatting online.

MENTEES — over 18

What is this information about?

We are inviting you to be part of this research project.

The project is about connecting you to a an online support person (21 - 35 years old) who also uses AAC.

This support person will be called your mentor.

They will chat to you online to encourage and help you use social media more.

Who are we looking for ?

We are looking for young people aged 10 - 21 years with complex communication needs who also

- Have previously received help to use social media.
- Have the Internet available at home.
- Have independent access to the computer

Figure E.3. Front of Mentees–over 18 information sheet.

Flinders UNIVERSITY ADELAIDE • AUSTRALIA

participation e-mentoring

Participation in online conversations by young people with complex communication needs: Does e-mentoring work?

What's involved in taking part?

If you are involved in this project the following things will happen:

- Emma will connect you with an adult who uses AAC and is experienced in using the Internet. They will be your support person and mentor. You will talk with them and other young people who use AAC over the Internet for up to an hour/ week for 4 months.
- Your mentor will encourage you to use social media and the Internet over 4 months. Emma will also see a copy of all the conversations between you and the mentor
- Before you start Emma will meet with you, confirm your eligibility, discuss and obtain your consent. She will talk to you about cybersafety and how you are using the internet. Emma will also complete an assessment of your literacy skills, she will provide you with a report on the results. This may take 3—5 hours and may take place over more than one appointment. Emma will repeat the literacy assessment at the end of the mentoring support (1-3 hours).
- Emma will also ask you to have some conversations on the internet. She will ask you how you feel when having conversations on the internet. She will ask your family member about this as well. This may take 1/2 — 1 hour and can be over more than one appointment. Emma will repeat this 3 more times, during the mentoring, after the mentoring and at the very end of the study.
- Because this is a research project Emma wants to look at how things change for you over time before, during and after you have support from your mentor. Emma will ask you to wait between 5-9 weeks before she introduces you to your online support person.
- Emma will phone or message you and a family member once a week before, during and after the mentoring support. This may take 5-10 minutes of your time. Emma will ask you about your online conversations.
- Over the time you are in the project (7-8 months) Emma will collect the conversations you have online. She will do this for one social networking platform only. Emma will talk to you about the best way for her to collect these conversations. In any online conversations Emma collects, names of people or other personal details will be removed. At the very end of the project Emma will print all the conversations and send them to you. If you want to fix or remove any conversations you can do this.
- At the end of the mentoring support Emma will ask you and a family member some questions about your conversations with others on the internet. She will audiotape with your permission what you say so that she can write it down later.

Before the end of the project you and the peer mentor will be reminded that the project is almost over.

At the end of the project you and your peer mentor may choose to continue to keep in touch online. These conversations will no longer be via the sites monitored by the researchers.

You, or the mentor may choose not to keep in contact after the project. If one of you wants to find a new mentor or mentee we will provide you with ideas about opportunities to be involved in other mentoring programs.

Will any bad things happen to me if I am in this project ?

Figure E.4. Back of Mentees–over 18 information sheet.

IMPORTANT THINGS YOU NEED TO KNOW BEFORE SIGNING THE CONSENT FORM

- You are under no obligation to be involved in this project.
- You may withdraw from the project at any time without affecting your relationship with Flinders University or your disability service provider, now or in the future.
- All information about you will be kept confidential, except where there is a requirement by law for it to be divulged, where there is concern to the safety & wellbeing of the mentees and/or you.
- All records containing personal information will remain confidential and no information which could lead to identification of any individual will be released. All data files will be kept under password lock on the Flinders University computer drive
- Information gathered in this study may be used in future approved studies. In this case, your confidentiality will be maintained at all times.
- In the event that child abuse is disclosed during the course of the study mandatory notification procedures will be enacted by the research team.

How can I take part?

You may have been given this information sheet directly or found it online.

You can contact Emma by post, email or phone. Emma will then arrange an appointment to discuss this with you.

If you were directly invited and Emma does not hear from you in 2-3 weeks another staff member will call and ask if you are interested.

Who is conducting the research?

Emma Grace - PhD Candidate
Dr Pammi Raghavendra -Supervisor
Dr Lareen Newman - Co-supervisor

If you have any questions contact
Emma: **08 8201 7674**
emma.grace@flinders.edu.au

Emma Grace
Disability & Community Inclusion
Flinders University,
GPO Box 2100
SA 5001

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (6535). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 08 8201 3116, by fax on 08 8201 2035 or by email human.researchethics@flinders.edu.au

Flinders UNIVERSITY ADELAIDE • AUSTRALIA

participation e-mentoring

Participation in online conversations by young people with complex communication needs: Does e-mentoring work?

What is the project about?

This project is aimed at helping young people with complex communication needs (CCN) who are already using the internet for connecting with others and would like more support with this. We plan to connect young people (10 - 21 years) with a mentor who also has CCN. The mentor will be older (21 - 35 years) and will be experienced at using the internet and social media.

The mentor and mentee will keep in touch over a 4 month period to provide guidance, instruction and encouragement in using social media.

We expect that the mentoring support will strengthen the mentee's involvement in online conversations.

Why do we want to do this?

Young people with CCN face many difficulties in participating in face to face conversations. Research has found that many young people with CCN are also not participating in online conversations as much as they would like. This research will investigate the strategy of e-mentoring support for using social media to enable young people with CCN to take advantage of more communication opportunities online.

Who can be involved ?

We are looking for one to two adults with disabilities between the ages of 21 and 35 who will become mentors to young people with disabilities between 10 - 21 years of age.

MENTORS

The mentors need to be...

- Skilled and confident users of Internet technology
- Use a variety of social networking applications on a regular basis
- Have access to a computer and Internet at home
- Interested in being a mentor
- Have police clearance or willing to undertake a police check for working with young people under 18 years of age
- Willing to provide social and information support over the internet to 4 or less young people with CCN who are learning to use the Internet.

Figure E.5. Mentor information sheet front.

Flinders UNIVERSITY ADELAIDE • AUSTRALIA

participation e-mentoring

Participation in online conversations by young people with complex communication needs: Does e-mentoring work?

What is involved in the project?

Emma will call and arrange to meet with you to confirm your interest and eligibility and obtain your consent to participate in the project. She will also find out more about how you use the internet.

Training will be provided on how to provide support to the young people including a focus on ethical considerations and strategies for facilitating conversations. It will include role-play scenarios and individual feedback will be provided. Training will focus on: selecting potential topics for discussion with mentees, how to provide information and the importance of showing respect to others. This will happen in Adelaide over 1/2-1 day. Emma will ask you to provide some feedback about the training that was provided. Emma will also provide you with ongoing support online or on the phone during the four months as needed. You can contact Emma at anytime if you need help.

You will be asked to provide online mentoring support to 4 or less young people (mentees) with CCN over a 4 month period (16 weeks). The young people will be introduced to you at different times staggered over a 5 week period and so the mentoring support will continue over a total of 21 weeks. You will be asked to come online once a week for a set hour and get discussion going, respond to questions by the mentees, provide support and encouragement. You will also be asked to make and respond to periodic individual contact from mentees. You must only contact participants using the research project internet accounts. This will take a commitment of 1-2 hours per week for 21 weeks.

All your conversations online with the mentee on the project accounts will be monitored and saved by Emma. Contact Emma if you have any concerns regarding mentees' behaviour online and she will help you to address the issues. Emma will also look at your conversations with the mentee to describe the type of mentoring support that has been provided.

When there is 1 month to go Emma will remind you that the project is nearing completion. You may continue to keep in touch with mentees after the 4 month period, however Emma will not be able to continue to monitor and support this when the project has finished. If either you, the mentee or the mentee's caregiver do not want to continue the relationship after the project we will provide you or the mentee with ideas about other opportunities to be involved in community mentoring programs outside of the research project.

At the end of the project Emma will visit and interview you to discuss how your online conversations with the mentee developed during the program. Emma will also ask you to rate how you felt about the mentoring. This will take approximately 30 minutes. Emma will audiotape these interviews with your permission, so that she can write down what was said.

Are there any risks or discomforts ?

We anticipate few risks from your involvement in this study.

If you have any concerns regarding anticipated or actual risks or discomforts, please raise them with Emma. If you are concerned about your mental health and well-being you could raise this with your GP.

Will I benefit from being involved in this project?

You may enjoy the opportunity to provide support to young people with disabilities who can learn from your valuable support, information and personal experiences You will be given an honorarium for your involvement.

Will I be paid for being involved in this project?

Yes. You will be given an honorarium for the hours ($35 per hour) you work on this project, up to a maximum of 42 hours. If you do not already have a police clearance you will also be reimbursed for expenses associated with undertaking a police clearance security check for this project. The project can help you in applying for this clearance if required.

Figure E.6. Mentor information sheet back.

Appendix F: Letter of Invitation From Flinders University

Flinders
UNIVERSITY

School of Health Sciences
GPO Box 2100
Adelaide SA 5001
Tel: 08 8201 3426
Fax: 08 8201 3646
Parimala.raghavendra@flinders.edu.au
www.flinders.edu.au
CRICOS Provider No. 00114A

24/11/2014

To Parent,

My name is Pammi Raghavendra. I work in Disability and Community Inclusion in the School of Health Sciences at Flinders University in Adelaide.

I would like to introduce you to Emma Grace who is a PhD candidate within the department of Disability and Community Inclusion. Emma is conducting a research project to investigate the effectiveness of a peer e-mentoring program supporting young people with complex communication needs to access social media as a strategy to increase participation in online conversations.

Emma is looking for young people with complex communication needs who are interested in receiving mentor support to learn more about using the internet for social networking. We would be grateful if you and your child would consider participating in the project.

Included with this letter is:
1. An information brochure detailing what would be involved in participating in this project,
2. A postal slip to respond and reply paid envelope to indicate your interest.

If you have any questions about the project, you can call Emma on 08 8201 7674, by fax on 08 8201 3646 or by email (emma.grace@flinders.edu.au).

Please respond to this invitation before Friday 30/01/2015 using the reply paid envelope, phone or email contacts.

Thank you for your help.

Yours sincerely

Dr.Parimala (Pammi) Raghavendra
Associate Professor
School of Health Sciences

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 6535). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 08 8201 3116, by fax on 08 8201 2035 or by email human.researchethics@flinders.edu.au.

ABN 65 524 596 200 CRICOS Provider No. 00114A

inspiring achievement

Figure F.1. Letter to parents for mentees under 18.

Flinders UNIVERSITY

Communicate more online!

School of Health Sciences
GPO Box 2100
Adelaide SA 5001
Tel: 08 8201 3426
Fax: 08 8201 3646
Parimala.raghavendra@flinders.edu.au
www.flinders.edu.au
CRICOS Provider No. 00114A

11/05/2015

To Participant,

This is Pammi Raghavendra.

Thanks for being part of the country social network project. You have met Emma through this project. Emma is also a PhD student and is doing another research project. The project will aim to connect young people with complex communication needs with an online mentor. The project will investigate if help provided by a mentor to use internet social media also increases frequency and involvement in online conversations.

Emma is inviting you to be part of her project. You have recently completed being part of the country social networks project. If you participate in this project there will be a new online mentor to meet and new activities to do. Details about the project are provided on the information sheet with this letter. We would be grateful if you would think about participating in the project. **You can choose if you want to be involved or not.**

Included with this letter is:

1. An information sheet that tells you more about this project,
2. A reply slip and reply paid envelope that you can send back to Emma to indicate your interest.

If you have any questions about the project, you can call Emma on 8201 7674, by fax on 8201 3646 or by email (emma.grace@flinders.edu.au).
Please reply to this invitation by 20/05/2014
You can reply by sending your reply in the post, by talking to Emma on 8201 7674 or emailing her emma.grace@flinders.edu.au

Thank you for your help.

Yours sincerely

Dr.Parimala (Pammi) Raghavendra
Associate Professor
School of Health Sciences

A special committees called the Flinders University Social and Behavioural Research Ethics Committee (6535) has looked at the way this project will be done.

The Committee wants to make sure that everyone's rights will be protected.

If you are worried about how your rights are being protected you can contact:

The Executive Officer at Flinders University by phone 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au

Figure F.2. Letter to participants for mentees over 18.

Flinders UNIVERSITY

School of Health Sciences
GPO Box 2100
Adelaide SA 5001
Tel: 08 8201 3426
Fax: 08 8201 3646
Parimala.raghavendra@flinders.edu.au
www.flinders.edu.au
CRICOS Provider No. 00114A

participation
e-mentoring

Date

Dear *name*,

My name is Pammi Raghavendra. I work as Senior Lecturer in Disability and Community Inclusion in the School of Health Sciences at Flinders University in Adelaide.

I would like to introduce you to Emma Grace who is a PhD candidate within the department of Disability and Community Inclusion. Emma is conducting a research project to investigate the effectiveness of a peer e-mentoring program supporting young people with complex communication needs to access social media as a strategy to increase participation in online conversations.

Emma is looking for young adults with complex communication needs who are interested in providing mentor support to the young people in her research project. We would be grateful if you would consider participating in the project. Given the significant involvement of time involved in providing mentoring support there will be offered an honorarium for your time (see information sheet for details).

Included with this letter is:

1. An information brochure detailing what would be involved in participating in this project
2. A postal slip to respond and reply paid envelope to indicate your interest.

If you have any questions about the project, you can call Emma on 8201 7674, by fax on 8201 3646 or by email (emma.grace@flinders.edu.au).

Please respond to this invitation by xx/xx/2014 using the reply paid envelope, phone or email contacts

Thank you for your help.

Yours sincerely

Dr.Parimala (Pammi) Raghavendra
Associate Professor
School of Health Sciences

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 6535). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au.

ID#

Figure F.3. Letter to mentors.

Appendix G: Letter of Support From the Service Provider

Date

Dear parent,

Re: Invitation to Participate in e-mentoring Research Project

Organisation Name has been invited by Flinders University researchers to take part in this exciting project ‘

This project will help young people with complex communication needs who are already using the internet for connecting with others and would like more support with this. The researcher, Emma Grace, will connect your child to an online mentor who will be 21–35 years of age, will be experienced at using the internet and social media and will also have complex communication needs.

The researchers are seeking children and families interested in participating, and we have identified that you and your child may be interested in being part of this project. With this letter, you will find:

- letters of introduction from Flinders University;
- information brochures with more details about the project; and
- a reply-paid envelope.

Please read the attached information about the project. You and your son/daughter are under no obligation to take part in this project. If you chose not to be involved, your relationship with, and services from, *Organisation Name* will not be affected in anyway.

Yours sincerely,

* Representative from organisation*

Appendix H: An Expression of Interest Slip

Flinders UNIVERSITY

Expression of Interest in participating in a research project

Communicate more online!

Participation in online conversations by young people with complex communication needs: Does e-mentoring work?

☐No I am not interested in participating in this project.

☐Yes I am interested. Please contact me to discuss participation in this research further.

Name: ______________________________

Parent Name (if under 18): ____________________

Contact Number: ________________________

Please complete this form and return in the reply paid envelope. Alternatively you may contact Emma by phone or email to respond to this invitation. T: 08 8201 7674 E: emma.grace@flinders.edu.au

Figure H.1. Expression of interest slip.

Appendix I: Modified Self-Report Descriptors for MACS, CFCS and GMFCS

How I move around. Tick one box that best describes you. I...

- ☐ Have difficulty controlling any of my head and body movements (eg lifted or hoisted by another person or equipment)
- ☐ Can move myself around using a powered wheelchair but do not stand or walk without significant support.
- ☐ Can stand on my own and only walk using a walking aid. I prefer to use a wheelchair for traveling longer distances.
- ☐ Can walk on my own without using walking aids but often find it difficult on uneven surfaces, slopes or in crowds.
- ☐ Can walk on my own, can run and jump although my speed, balance and coordination may or may not be limited.

How I use my hands in daily activities (eg such as to eat with a spoon, pick up small objects, open doors, turn pages of a book, handle buttons or zips on clothes, etc.) Tick one box that best describes you. I ...

- ☐ Have difficulty handling all objects and require help from someone else. (eg It's difficult for me to make simple actions but at times I might be able to press a button or hold something in my hand)
- ☐ Can handle a small number of objects but need help and/or use special equipment to help me all the time.
- ☐ Can handle objects but with difficulty, it takes me longer and it's hard for me to complete things.
- ☐ Can handle most objects but it takes me longer and with reduced accuracy.
- ☐ Can handle most objects easily and successfully, with speed and accuracy.

How I communicate (eg say what I want and understand messages others). Tick one box that best describes you. ...

- ☐ I am rarely able to say what I want and get my message across. My communication is difficult for others to understand. I have a limited understanding what other people say to me, including people who I know well.
- ☐ I have some success in saying what I want or understanding messages from other people who I know well.
- ☐ People who I know understand what I say and I understand them. I have difficulty at times and am not always able to communicate effectively with strangers or people who I don't know well.
- ☐ People who I know and who I don't know understand what I say and I understand them, but it takes me longer to share my message.
- ☐ I can maintain a comfortable conversational pace all the time. I can say what I want and people who I know and who I don't know understand what I say and I understand them.

Figure I.1. Self-report ability descriptors.Self-report descriptors for the Communication Function Classification System (CFCS) were adapted from Hidecker et al. (2011); for the Gross Motor Function Classification System (GMFCS) were adapted from Palisano, Rosenbaum, Bartlett and Livingston (2008); and for the Manual Ability Classification System (MACS) were adapted from Eliasson et al. (2006).

Appendix J: SEAS Domain Examples

This appendix is from the pre-print version of, ”Cross-Age Peer E-Mentoring to Support Social Media Use: A New Focus for Intervention Research”, by E. Grace, and P. Raghavendra, 2019, *Communication Disorders Quarterly, 40*, 167–175. doi:10.1177/1525740118760216

Table J.1

Example Item From Each of the SEAS Domains

SEAS Domain	Key Descriptors	Example Item
Personal growth	New skill	With respect to doing the activity, I felt...I learned a new skill/I didn’t learn a new skill.
	Special growth or change	Sometimes, we have really cool experiences that are out of the ordinary…While doing the activity I felt I grew or changed/I didn’t grow or change.
	Better	With respect to doing the activity, I felt…I became better at something/I didn’t become better at anything.
Meaningful interactions	Special	Sometimes, we have really cool experiences that are out of the ordinary. While doing the activity, I felt...I shared something special/I didn’t share something.
	Good conversations	With respect to people, I felt…I had good conversations with others/I didn’t have good conversations with others.
	Sharing ideas	With respect to people, I felt…I shared ideas about things important to me/I didn’t share ideas about things important to me.
Choice and control	Control	For the most part, while doing the activity I felt...I was in control/I lacked control.
	Choice	With respect to choices and opportunities, I felt…I could choose what to do for the most part/I couldn’t choose what to do.
	Had a say	With respect to choices and opportunities, I felt… I had a say in things/I didn’t have a say in things.

Table J.1 Continued

SEAS Domain	Key Descriptors	Example Item
Psychological engagement	Excited	What kind of overall mood were you in when you were doing the activity? I felt...excited/bored.
	Fun	For the most part, while doing the activity I felt…I was having fun/I wasn't having fun.
	Interested	For the most part, while doing the activity I was interested/I was disinterested.
Social belonging	Got along	With respect to people, I felt...I got along with others/I didn't get along with others.
	Supported	With respect to people, I felt…I was supported and encouraged by others/I wasn't supported and encouraged by others.
	Valued	With respect to people, I felt…I was valued by others/I wasn't valued by others.

Note. Examples items and key descriptors selected from King et al. (2014). Development of a measure to assess youth Self-reported Experiences of Activity Settings (SEAS). *International Journal of Disability, Development and Education, 61*, p. 53.

Appendix K: Coding Manual—Conversations with Peers

Coding Manual—Conversations with Peers General

K.1 Conversation (CV*) or (CVP*)

Transcripts are organised in conversation or conversation attempt sections. A conversation occurs when two people interact actively online (e.g., both people must transmit something online using any mode). Online conversations can be asynchronous or synchronous, and therefore, the start and end of a conversation cannot be decided using the parameter of time. A new conversation must begin with an initiation and not a follow-up or response to a previous message. Conversation initiations may or may not require a response and may or may not include a greeting. Synchronous transmissions are included as the same conversation, regardless of content. Asynchronous transmissions are included in the conversation if they follow-up or respond directly to the previous transmission. Therefore, a synchronous initiation is considered a continuation of the current conversation, but an asynchronous initiation marks the beginning of a new conversation with one exception. An exception occurs if this initiation is not responded too, but rather is followed by responses or follow ups to prior transmissions. This is the only case when an asynchronous initiation does not begin a new conversation.

K.1.1 Boundaries of a conversation via the medium of a Facebook post. In some cases, likes are of interest and included as part of the conversational interaction. This is when the participant likes something or when others like something that has been posted by the participant. Other likes are not included in the transcript. Only some comments on posts are included in the transcript. All comments on posts made by participants are included, and any comments made by participants are included. In addition, any comments or likes made on posts by a participant's parent that tag the participant are also included in the transcript, because at times parents post in a way that may be viewed as being on behalf of the participant. Further, all likes and comments on posts that tag the participant exclusively are included in the transcript.

K.1.2 Coding in NVivo to enable auto counting of codes. Conversation codes start at the beginning of the first transmission and end at the end of the final transmission included as part of that conversation. Conversations are coded in numerical order with Conversation 1 being the first conversation that occurs during the baseline period. Given the late addition of pre-baseline data, conversations in pre-baseline are coded using the letter P (e.g., Conversation P1 is the first conversation in pre-baseline):

- CVP1: Conversation P1
- CVP2: Conversation P2 (numbering continues)
- CV1: Conversation 1
- CV2: Conversation 2 (numbering continues)

K.2 Conversation Attempt (CVA)

A conversation attempt (CVA) is coded where a conversation is initiated but no active response is received from any communication partners.

K.3 Transmission Unit (TU)

All content sent online at one time is coded as a transmission unit (TU). For example, clicking like, sending a post that includes any tag, hyperlink or photo that is included at the same time or an entire email. This includes the message content and the transmission information.

K.4 Weeks (W*)/ (WP*)

A transmission is coded by the week that it was sent in. Weeks begin at 1 from the date the mentee begins baseline. As a pre-baseline phase has been added these weeks are numbered using P before the number. (See dates below under experimental phases)

1. Week P1
2. Week P2
3. Week P3
4. Week P4
5. Week P5
6. Week P6
7. Week P7
8. Week P8
9. Week P9
10. Week 1
11. Week 2
12. Week 3 (continues to Week 28)

K.5 Experimental Phase

K.5.1 Pre-Baseline (EP). Before original experiment started. The weeks leading up to the date when the participant met Emma. Note that there is a gap when the preliminary protocol occurred between pre-baseline finishing and baseline starting. Conversations in this period have been collected but are not included in the analysis. The pre-baseline period is randomised to continue for 5–9 weeks.

K.5.2 Baseline (EB). A transmission is coded as baseline phase (**EB**) if it is sent after the mentee has completed all pre-assessments and begun reporting weekly measures but before the mentoring intervention starts. The period for baseline was randomised to 5–9 weeks.

K.5.3 Intervention (EI). A transmission is coded as intervention phase **(EI)** if it is sent during the mentoring intervention (including the first and final days). Mentoring continues for 4 months.

K.5.4 Maintenance (EM). A transmission is coded as maintenance phase **(EM)** if it is sent the day after the mentoring intervention or during the 6 weeks following this.

K.6 Synchronicity

K.6.1 Synchronous (SS). A transmission is coded as **synchronous (SS)** if another transmission has been received from a communication partner within or equal to **30 minutes** before or after.

K.6.2 Synchronous-Delayed (SD). A synchronous delayed message is always the continuation of the same conversation. A transmission is coded as synchronous-delayed **(SD)** if another transmission has been received from a communication partner within or equal to **30 minutes** after the message but not before. The message is delayed from the previous message sent by the communication partner. It is synchronous because the message following is received less than or equal to 30 minutes later.

K.6.3 Asynchronous (SA). A transmission is coded as **asynchronous (SA)** if another transmission has been received from a communication partner more than **30 minutes** before or after.

K.7 Transmitter Categories

K.7.1 Mentee (TM). The transmission is coded as transmitter mentee if sent by the mentee **(TM).**

K.7.2 Parent (TP). The transmission is coded as transmitter parent if sent by the mentee's mother or father **(TP).**

K.7.3 Sibling (TS). The transmission is coded as transmitter parent if sent by the mentee's brother or sister **(TS).**

K.7.4 Other (TO). The transmission is coded as transmitter other **(TO)** if sent by a communication partner other than the mentee, the mentee's parents or siblings (e.g., mentee's peers, mentee's uncle/aunty, etc).

K.8 Communication Partner (CP*)

For the purpose of counting numbers of unique communication partners, the transmitters are also coded by their de-identified user names as recorded in the conversation transcript.

- Friend 1 (CP1)
- Friend 2 (CP2)
- etc

K.9 Word Count (WC)

For the purpose of using NVIVO auto count to count all words in the conversation transcripts, the word count **(WC)** code is used to accurately code only the words in the transcript. Transmission information is excluded from the word count. Non-words are excluded from the word count (e.g., where no understandable message can be determined: vvvvvsssss, saaaaas). Automated words are excluded (e.g., sent from my iPhone, address and contact information or automated signature at bottom of email). Onomatopoeic expressions are counted as words (e.g., Oh, Aw). Abbreviated spellings are included as words (e.g., OMG = 3 words; R u ok? = 3 words; How r u = 3 words; Wet n Wild = 3 words). Hyperlinks are counted as one word; emoticons are counted as one word. Quotations are included, and the words in the quotation are counted as part of the message.

K.10 Non-Words Count (NWC)

Text is coded as a non-word where no understandable message can be determined (e.g., vvvvvsssss, saaaaas).

Medium and Mode

K.11 Facebook: Posts (MeFP)

The transmission is coded as Medium Facebook Post **(MeFP)** if activity occurs on Facebook outside the personal message chat function.

K.12 Facebook: Messages (MeFM)

The transmission is coded as Medium Facebook Messages **(MeFM)** if activity occurs using the Facebook personal message chat function.

K.13 Email (MeE)

The transmission is coded as Medium Email **(MeE)** if sent using an electronic mail system.

K.14 i-message (Mei)

The transmission is coded as Medium i-message **(Mei)** if sent over the Internet using the i-message app.

K.15 Mode

K.15.1 Text (MoTx). The relevant section of the transmission is coded as mode text **(MoTx)** if it uses keyboard characters. Numerals are coded as text (e.g., 11am, 1–3). Five exceptions are to be considered when coding text. These are listed directly below and include abbreviations, quotations, emphasised spellings, emoticons and other unconventional uses of punctuation marks.

K.15.2 Abbreviations (MoAb). The relevant section of the transmission is coded as mode text abbreviation (**MoAb**) if conventional spelling has been shortened or if an acronym is used in place of words. For example, RU ok, OMG.

K.15.3 Quotations (MoQu). The relevant section of the transmission is coded as mode text quotation (*MoQu*) if the message quotes another person's message, as is the case in a forwarded message.

K.15.4 Emphasised spelling (MoES). The relevant section of the transmission is coded as mode text emphasised spelling (**MoES**) where conventional spelling has been changed. For example, Ooooooh, Soooooooo, Awwwwww.

K.15.5 Emoticon (Moem). The relevant section of the transmission is coded as mode text emoticon **(Moem)** if it uses keyboard characters (i.e., ASCII) to illustrate facial nonverbal behaviour, although these may be used for a wider range of functions.

K.15.6 Unconventional uses of punctuation marks (Moup). The relevant section of the transmission is coded as mode unconventional uses of punctuation marks **(Moup)** if punctuation marks are used unconventionally (e.g., repeated to show excitement: !!!!!!!)

K.15.7 Image (MoI). The relevant section of the transmission is coded as mode image **(MoI)** if a photo or other image file has been sent or received. This includes images uploaded or shared from another user but does not include stickers or emoji provided by the app.

K.15.8 Video (MoV). The relevant section of the transmission is coded as mode video **(MoV)** if a video file has been sent or received.

K.15.9 Like (MoLe). The relevant section of the transmission is coded as mode likes (**MoLe**) where the mentee or communication partner have "liked" something (i.e., on Facebook or iMessage).

K.15.10 Friend (MoF). The transmission is coded as mode friends **(MoF)** where the mentee or communication partner have sent, received or accepted a friend request (i.e., a Facebook post).

K.15.11 Tags user (MoTU). The relevant section of the transmission is coded as mode tags user **(MoTU)** where another person (this may or may not be the communication partner/s or mentee) has been tagged (i.e., as part or all of a Facebook post).

K.15.12 Tag place (MoTP). The relevant section of the transmission is coded as mode tags place **(MoTP)** where a location or place has been tagged (i.e., as part or all of a Facebook post).

K.15.13 Link (MoLn). The relevant section of the transmission is coded as mode link **(MoLn)** where a hyperlink is included in the transmission.

K.15.14 Emoji (MoEj). The relevant section of the transmission is coded as mode emoji **(MoEj)** where a pictograph has been included in the transmission (e.g., picture of face with expression: emoticon emoji, picture of ghost, picture of animal).

K.15.15 Sticker/ Including moving stickers (MoS). The relevant section of the transmission is coded as mode sticker **(MoS)** where a sticker has been included in the transmission. Moving stickers and stickers are coded in the same manner since the screen-captured transcripts may or may not allow for an observable difference between these two features. Stickers are specific to apps (e.g., Facebook stickers).

Functional Turns

- A “:functional turn” “is understood here as the smallest interactionally relevant complete linguistic unit in a given context” (Herring & Androutsopoulos, 2015, p. 136).
- One functional turn may continue over more than one transmission or may be only one part of a longer transmission that includes multiple functional turns.
- Functional turns are not specifically coded since they can be counted by adding all Move codes **OR** all Function codes together.
- All Move codes and function codes are applied to only one and all of one functional turn.

K.16 Oblige [O]

A functional turn is coded as Oblige **[O]** if it obliges a response from the communication partner (e.g., asks a direct question or is a greeting). All turns that are not coded as oblige will be considered non-obliging turns in the analysis.

Example:

P05: I’m back from holiday today I)

Friend 1: How was it (O, LRO)

P05: Great (LR)

P05: How was your day? (O, LI)

Linguistic Move

K.17 Initiation of New Conversation (optional) (LIC)

A functional turn is coded as an initiation of a new conversation **(LIC)** if it opens the conversation. Initiations usually request a response but do not have to.

Example:

Conversation 66

Wed 30 Dec 7:13 pm

P05: Hi girls (O, LIC) Happy New Year (O, LI)

Friend 1: You too. (LR) How r ur holiday's going back (O, LI)

K.18 Initiation of New Topic (Optional) (LI)

A functional turn is coded as an initiation of a new topic (**LI**) if it occurs part way through a conversation and functions to introduce a new topic (for that conversation). Initiations usually requests a response but do not have to (Clarke & Kirton, 2003).

Example:

P05: Hi girls (O, LIC) Happy New Year (O, LI)

Friend 1: You too. (LR) How r ur holiday's going back (O, LI)

K.19 Response (Obligatory) (LR)

A functional turn is coded as a response (**LR**) if it is an obligatory reply. The backward-linking turn must oblige a response (Clarke & Kirton, 2003). Responses do not necessarily oblige a forward-linking response of their own but may do this

Example:

P05: Hi girls (O, LIC)

How was your day? (O, LI)

Friend 1: My day was good thanks (LR)

Example:

Friend 2: Yes (LR) I would love to but what are the approximate start and finish times (O, LRO)

Fri 11 Dec 8:15 am

P05 (Mother): Hi girls. (O, LI) **P05 Mo** her. (LI) Great you can both come. (LRO) We can be flexible with time whatever suits (LR)

Maybe pick up at 11am back by 3. (O, LR)

K.20 Response (Optional) (LRO)

A functional turn is coded as a response (optional) (**LRO**) if it is an optional response to a previous conversational turn. Social conversations are likely to include strings of responses. Responses do not necessarily oblige a forward-linking response of their own but may do this (Clarke & Kirton, 2003). Responses are supporting or challenging moves in the conversation, and this move turn is separate from the pragmatic function (e.g., requests for information or provisions of information may play the role of a response move in a conversation).

Example:

Friend 1: I am going to my presentation night tonight. (LIC) I'm not going to school tomorrow. (LI)

P05: You are lucky. (LRO)

Friend 1: Thanks. (LRO) I didn't want to go (LRO)

P05: Fair enough (LRO)

It may also be possible to respond to your own utterance. For example:

P05: Hi girls (O, LIC

How was school (LI)

What did you do at school today? (LRO)

I watched movies (LRO)

K.21 Follow-Up (optional) (LF)

Note that follow-up moves are always optional. A functional turn is coded as a Follow-up **(LF)** if it acknowledges the previous utterance, and requires no obligatory response. No new or additional information is provided. This may be the repetition of a previous utterance if the purpose of the repetition is to feedback or acknowledge the response, but is not requesting clarification. For example, this commonly occurs in a classroom environment (e.g., Teacher: What is the Capital of SA? (Initiation), Student: Adelaide (Response). Teacher: Yes, that's right it's Adelaide (Follow-up)

AAC user: "I'M NOT SURE (produced on AAC)" **(Response)**

Peer: "not sure" **(Follow-up)**

At times, if a speaker takes a turn, the partner does not respond, and so, the speaker takes a second turn, for example,

Peer: "no,it's not time to go home" **(Response)**

(15 sec pause)

Peer: "got another . . . er two hours before we go home" **(Follow-up)**

(Clarke & Kirton, 2003)

K.22 Turn Opportunity (LT)

Where a turn change is signalled but no reply is made by the partner, there is a breakdown in conversation. The name of the communication partner/s is recorded in the transcript and coded as No response **(LT)**. Note that this code is used only for obligatory turns where an initiation has been transmitted to the communication partner directly or the communication partner has been tagged in the transmission that requires a response. (Clarke & Kirton, 2003)

Example:

P05: Hi girl (O, LI)

What did you do today (O, LI)

No Response by Friend 1 or Friend 2 (LT)

Function—Pragmatic Analysis

Social Conventions (Light, Collier, & Parnes, 1985)

K.23 Greetings (FSG)

A functional turn is coded as a greeting if it functions to greet, ask about or wish someone well-being. (Herring, Das, & Penumarthy, 2005–GREET; Light et al., 1985). Note that greetings such as Happy New Year and Merry Christmas are taken to be greetings that wish someone well-being. Note for the purpose of the linguistic moves they are also considered to oblige a response.

Examples:

P05: Hi girl (FSG)

What did you do today (FRI)

P05: Merry Christmas (FSG)

Friend1: Thanks (FSR) you too (FSG)

K.24 Closing (FSC)

A functional turn is coded as a closing (**FSC**) if it functions to signal the end or to close the conversation (Herring et al., 2005: MANAGE; Light et al., 1985).

Examples:

P05: Talk again tomorrow (FSC)

Friend 1: Yep sure (FFCD)

P05: Goodnight girls (FSC)

Bye (FSC)

Friend 1: Night. (FSC) Miss you lots (FPI)

K.25 Social Routines (FSR)

A functional turn is coded as a social routine **(FSR)** if it acts as social etiquette. For example, to thank or apologise (Herring et al., 2005: THANK, APOLOGISE; Light et al., 1985).

Example:

Friend 2: I like it :) (FPI)

P05: Thank you (FSR)

Requests (Bunning & Ellis, 2010; Clarke & Kirton, 2003; Light et al., 1985; Lund & Light, 2007)

K.26 Request Information (FRI)

A functional turn is coded as request information **(FRI)** if it elicits a response from the communication partner (Herring et al., 2005: INQUIRE; Light et al., 1985).

Example:

Friend 2: How was shopping!!!! (FRI)

P05: Great (LR, FPI)

K.27 Request Object Action (FROA)

A functional turn is coded as a request object action **(FROA)** if the transmission expresses desire for object or physical action (Herring et al., 2005—REQUEST, DIRECT, INVITE; Light et al., 1985).

Example:

P05: Do you want u pick up at museum? (FROA)

Friend 1: That sounds great (FFCD)

K.28 Request Clarification

A functional turn is coded as a type of request clarification **(FRCC/FRCN/FRCS)** if the transmitter expresses that they have not understood the previous utterance and need clarification. (Herring et al., 2005: REPAIR; Light et al., 1985)

K.28.1 Request clarification–confirmation (FRCC). A functional turn is coded as request clarification–confirmation **(FRCC)** if all, or part of, the previous message is repeated to check understanding; this is usually answered by yes or no. This also includes the speaker repeating an assumed message as they have interpreted it.

Example:

P05: Hasn't stopped raining here (FPI)

Friend 1: Oh really (FRCC)

Example:

P05: Did you get message (FRCC)

K.28.2 Request clarification–neutral request (FRCN). A functional turn is coded as request clarification–neutral request **(FRCN)** if the transmitter prompts their communication partner to repeat the whole utterance.

Example:

P05: Have visit (FPI)

Friend 1: What do you mean? (FRCN)

P05: Have vist today (FCRV)

Friend 1: Cool (FFA)

Friend 2: What is vist (FRCS)

K.28.3 Request clarification–specific request (FRCS). A functional turn is coded as request clarification–specific request **(FRCS)** if it prompts repetition or rephrasing of part of the message, asking about a detail within the message that was not understood.

Example:

Friend 2: What is vist (FRCS)–see above example for conversation context

Informatives (Bunning & Ellis, 2010; Light et al., 1985; Lund & Light, 2007)

K.29 Provision of Information (FPI)

A functional turn is coded as provision of information **(FPI)** if it is a comment about an object/s, action/s or internal state/s. This includes answers to requests for information, unless it is confirming/denying (see separate code **FCD**). Since functional units only have one functional code, it is important to note several exceptions where a functional turn meets the definition for Feedbacks **(e.g., FFA, FFCD)** or provision of clarification **(e.g., FCRV, FCRP)** codes, it is coded as this and not in the more general category of providing information **(FPI;** Herring et al., 2005: INFORM, CLAIM, DESIRE, ELABORATE, REACT, MANAGE; Light et al., 1985; Nastri et al.,, 2006: quotation)

N.B. The purpose of an elaboration may be to provide clarification or information.

Example:

Friend 1: What have you been doing (FRI)

P05: I am going on holiday tomorrow. (FPI)

Friend 1: Where at? (FRI)

P05: **place** bay (FPI)

K.30 Provision of Clarification

A functional turn is coded as a type of provision of clarification if the transmitter repeats or revises a previous message. (Herring et al., 2005: REPAIR, ELABORATE; Light et al., 1985)

N.B. The purpose of an elaboration may be to provide clarification or information.

K.30.1 Revision (FCRV). A functional turn is coded as a provision of clarification–revision **(FCRV)** if the content or mode used to clarify differs from the original message.

Example:

P05: Have visit (FPI)

Friend 1: What do you mean? (FRCN)

P05: Have vist today (FCRV)

Friend 1: Cool (FFA)

Friend 2: What is vist (FRCS)

P05: Visitors (FCRV)

Example:

Friend 1: Yes please. I did get the message (Note that this is revising the lack of taking a turn and is therefore considered a revision)

K.30.2 Repetition (FCRP). A functional turn is coded as a repetition **(FCRP)** An exact repetition of the original message.

Feedback (Clarke & Kirton, 2003; Light et al., 1985; Lund & Light, 2007)

K.31 Acknowledgement (FFA)

A functional turn is coded as an acknowledgement **(FFA)** if it is a response to a previous utterance or action where **no additional information is provided**. (If a turn comments about an object/action/internal state this is coded as FPI.) Note that the response may convey or confirm understanding of previous utterance/action.

Example:

Friend 1: I'm so sorry I can't make it, so hopefully we can catch up again very soon. Xxxxx (FSR)

P05: That's ok (FFA)

P05: Yep (FFCD)

Note: Cool can sometimes be used as an acknowledgement (FFA), and at other times, to provide a positive reaction (FPI) To understand whether cool is used as FFA or understood as providing positive information, it is important to consider the conversational context. The communication partner's response is to be used to determine whether the comment has been taken just as an acknowledgement. For example:

Example of Cool used as acknowledgement:

Sat 5 Sep 5:57

P05: Have visit (FPI)

Friend 1: What do you mean? (FRCN)

P05: Have vist today (FCRV)

Friend 1: Cool (FFA): functions to acknowledge the revision

Friend 2: What is vist (O, LRO, FRCS)

P05: Visitors (LR, FCRV)

Friend 1: That sounds great (LRO, FPI)

P05: Mums old boss**Name** and his wife **Name** (LRO, FPI)

Friend 1: Cool (FFA): functions to acknowledge the previous turn

End of conversation.

Example of cool used as providing a positive comment (i.e., FPI):

P05: How was your day? LI FRI

Friend1: It was good. FPI, I'm going to **place** for a week on Saturday FPI

P05: Cool LF FFA: functions as a positive comment given the response below it.

Friend 1: I can't wait FPI

K.32 Confirmation–Denial (FFCD)

A functional turn is coded as Confirmation–Denial **(FFCD)** if it is an evaluation of a previous turn/action: Affirmation, agreement, rejection or disagreement. Note that the function may also be to reject an object or activity. (Herring et al., 2005—ACCEPT, REJECT; Light et al., 1985)

Example:

P05: Do you want u pick up at museum? (FROA)

Friend 1: That sounds great (FPI)

Friend 1: Yes please. (FFCD) I did get the message (FPCRV)

Example:

P05: Yep (FFCD)

Other (Bunning & Ellis, 2010; Light et al., 1985; Lund & Light, 2007)

K.33 Unintelligible or Uncodeable (FU)

A functional turn is coded as unintelligible or uncodeable **(FU)** if the transmission has no interpretable meaning to the coder or communication partner. If the message receives a response indicating that the listener has understood, the message is coded as the listener interpreted it.

Example:

Tyioohuu

Qrtyyyy

Topics of Conversation

Every functional turn will be allocated a topic code. No prior codes are provided. Codes are determined using a bottom-up approach where the topic of interest is identified based on reviewing the predominant key words in a segment of the conversation transcript. The topic code identifies the theme: what the transmission is about (e.g., the weekend) and not what is said about the theme (e.g., visiting friends).

Codes for topic include the word topic (e.g., **To**pic–**sp**ort, **To**pic–**so**cial).

Topics will later be combined into overarching topics that will be checked back against the original transcript.

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Appendix L: Systematic Visual Analysis (Lane & Gast, 2014): Sample Worksheet

Table N.1

Section 1. Within-Phase Analysis (Step 1 & 2)

Step 1: Notations	A2 – Baseline B1 – Intervention B2 – Maintenance
Step 2: Number of Observations	Total observations in A2 = 5–6 Total observations in B1 = 16 Total observations in B2 = 6

Table N.2

Section 1. Within-Phase Analysis (Steps 3–7)

Mia	A2	B1	B2
Step 3: Mean (M) Median (Med) Range (R) Stability Envelope (Sta) Percent On or Within the Stability Envelope	 M = 1 Med = 1 R = 0-3 Sta = 0.75-1.25 2/5 = .4 40%	 M = 4 Med = 4 R = 1-7 Sta = 3-5 11/16 = .69 69%	 M = 3 Med = 3 R = 0-4 Sta = 2.25-3.75 0/6 = 0%
Step 4a: Level Change Within Median Of 1st Half Median Of 2nd Half Relative Change	 Med = 2 Med = 1.5 Δ = -0.5 Deteriorating	 Med = 4.5 Med = 3.5 Δ = -1 Deteriorating	 Med = 4 Med = 2 Δ = -2 Deteriorating
Step 4b: First and Last Value First Last Absolute Change	 A = 1 Ω = 1 Δ = 0 Stable	 A = 5 Ω = 2 Δ = -3 Deteriorating	 A = 4 Ω = 2 Δ = -2 Deteriorating
Step 5: Split-Middle Trend Estimate. Mid-Date 1st Half Mid-Rate Median Value 1st Half Mid-Date 2nd Half Mid-Rate Median Value 2nd Half	 Week 2 Med = 2 Week 4 Med = 1.5	 Week 9.5 Med = 4.5 Week17.5 Med = 3.5	 Week 23 Med = 4 Week 26 Med = 2
Step 6: % of Data Points Within Stability Envelope	 1/5 = 20%	 10/16 = 56%	 2/6 = 33%
Step 7: Direction Stable or Variable? Multiple Paths Within Trend?	 Decelerating Variable Alternating pattern	 Decelerating Variable Alternating pattern	 Decelerating Variable Alternating pattern

Table N.3

Section 2. Between-Phase Analysis

Mia	B-I		B-M		I-M	
Step 9: Trend Direction	Decelerating Deteriorating	Decelerating Deteriorating	Decelerating Deteriorating	Accelerating Improving	Decelerating Deteriorating	Accelerating Improving
Step 10: Trend Stability	Unstable	Unstable	Unstable	Unstable	Unstable	Unstable
Step 11a: Relative Level	Relative level change 4.5-1.5 = +3 Improving		Relative level change 4-1.5 = +2.5 Improving		Relative level change 4-3.5 = 0.5 Improving	
Step 11b: Absolute Level	Absolute level change 5-1 = +4 Improving		Absolute level change 4-1 = +3 Improving		Absolute level change 4-2 = +2 Improving	
Step 11c: Median Level	Median level change 4-1 = +3 Improving		Median level change 4.5-1 = +3.5 Improving		Median level change 4.5-4 = +0.5 Improving	
Step 11d: Change in Mean Level	Mean level change 4-1 = +3 Improving		Mean level change 4-1 = +3 Improving		Mean level change 4-4 = 0 No Change	
Step 12: Non-Overlap	PND = 56% Tau-U = 0.7375, 90% CI [0.239, 1], p = 0.0149		PND = 67% Tau-U = 0.5, 90% CI [-0.101, 1], p = 0.1709		PND = not calculated Tau-U = not calculated	

Appendix M: Elements of Effective Mentoring Benchmarks Table

Table M.1

Did the Programme Meet the Elements of Effective Mentoring Practice Benchmarks (Quoted from Garringer, Kupersmidt, Rhodes, Stelter, & Tai, 2015)?

Standard	Benchmarks	Met[a]
1. Recruitment	“Mentor Recruitment	
“Recruit appropriate mentors and mentees by realistically describing the program’s aims and expected outcomes.” p. 10	B.1.1 Program engages in recruitment strategies that realistically portray the benefits, practices, supports and challenges of mentoring in the program.	✓
	B.1.2 Program utilises recruitment strategies that build positive attitudes and emotions about mentoring.	✓
	B.1.3 Program recruits mentors whose skills, motivations and backgrounds best match the goals and structure of the program.	✓
	B.1.4 Program encourages mentors to assist with recruitment efforts by providing them resources to ask individuals they know, who meet the eligibility criteria of the program, to be a mentor.	✓
	B.1.5 Program trains and encourages mentees to identify and recruit appropriate mentors for themselves, when relevant.	✓
	Mentee and Parent or Guardian Recruitment	
	B.1.6 Program engages in recruitment strategies that realistically portray the benefits, practices, supports and challenges of being mentored in the program.	✓
	B.1.7 Program recruits mentees whose needs best match the services offered by the program.” p. 11	✓

Table M.1 Continued

Standard	Benchmarks	Met[a]
2. Screening	"Mentor Screening	
"Screen prospective mentors to	B.2.1 Program has established criteria for accepting mentors into the program as well as criteria for disqualifying mentor applicants.	✓
determine whether they have the time,	B.2.2 Prospective mentors complete a written application that includes questions designed to help assess their safety and suitability for mentoring a youth.	×
commitment, and personal qualities to	B.2.3 Program conducts at least one face-to-face interview with each prospective mentor that includes questions designed to help the program assess his or her suitability for mentoring a youth.	✓
be a safe and effective mentor and screen prospective	B.2.4 Program conducts a comprehensive criminal background check on prospective adult mentors, including searching a national criminal records database, along with sex offender and child abuse registries and, when relevant, driving records.	✓
mentees, and their parents or guardians, about whether they	B.2.5 Program conducts reference check interviews with multiple adults who know an applicant (ideally, both personal and professional references) that include questions to help assess his or her suitability for mentoring a youth.	×
have the time, commitment and	B.2.6 Prospective mentors agree in writing to a one-year (calendar or school) minimum commitment for the mentoring relationship, or a minimum time commitment that is required by the mentoring program.	✓
desire to be effectively mentored" p. 24	B.2.7 Prospective mentors agree in writing to participate in face-to-face meetings with their mentees that average a minimum of once a week and a total of four or more hours per month over the course of the relationship, or at a minimum frequency and number of hours that are required by their mentoring program.	✓

Table M.1 Continued

Standard	Benchmarks	Met[a]
	Mentee Screening	
	B.2.8 Program has established criteria for accepting youth into the program as well as criteria that would disqualify a potential youth participant.	✓
	B.2.9 Parent(s)/guardian(s) complete an application or referral form.	×
	B.2.10 Parent(s)/guardian(s) provide informed permission for their child to participate.	✓
	B.2.11 Parent(s)/guardian(s) and mentees agree in writing to a one-year (calendar or school) minimum commitment for the mentoring relationship, or the minimum time commitment that is required by the mentoring program.	✓
	B2.12 Parents(s)/guardian(s) and mentees agree in writing that mentees participate in face-to-face meetings with their mentors that average a minimum of once a week and a total of four or more hours per month over the course of the relationship, or at a minimum frequency and amount of hours that are required by the mentoring program." p. 25	✓

Table M.1 Continued

Standard	Benchmarks	Met[a]
3. Training	“Mentor Training	
“Train prospective mentors, mentees, and mentees’ parents (or legal guardians or responsible adult) in the basic knowledge, attitudes and skills needed to build an effective and safe mentoring relationship using culturally appropriate language and tools.” p. 34	B.3.1 Program provides a minimum of two hours of pre-match, in-person, mentor training.	✓
	B.3.2 Program provides pre-match training for mentors on the following topics:	✓
	a. Program requirements (e.g., match length, match frequency, duration of visits, protocols for missing, being late to meetings and match termination)	
	b. Mentors’ goals and expectations for the mentee, parent or guardian and the mentoring relationship	
	c. Mentors’ obligations and appropriate roles	
	d. Relationship development and maintenance	
	e. Ethical and safety issues that may arise related to the mentoring relationship	
	f. Effective closure of the mentoring relationship	
	g. Sources of assistance available to support mentors	
	h. Opportunities and challenges associated with mentoring specific populations of youth (e.g., children with an incarcerated parent, youth involved in the juvenile justice system, youth in foster care, high school dropouts), if relevant	
	i. Initiating the mentoring relationship	
	j. Developing an effective, positive relationship with mentee’s family, if relevant	

Table M.1 Continued

Standard	Benchmarks	Met[a]
	B.3.3 Program provides pre-match training for the mentor on the following risk management policies that are matched to the program model, setting, and population served: a. Appropriate physical contact b. Contact with mentoring program (e.g., who to contact, when to contact) c. Relationship monitoring requirements (e.g., response time, frequency, schedule) d. Approved activities e. Mandatory reporting requirements associated with suspected child abuse or neglect, and suicidality and homicidality f. Confidentiality and anonymity g. Digital and social media use h. Overnight visits and out of town travel i. Money spent on mentee and mentoring activities j. Transportation k. Emergency and crisis situation procedures l. Health and medical care m. Discipline n. Substance use	✓

Table M.1 Continued

Standard	Benchmarks	Met[a]
	o. Firearms and weapons	✓
	p. Inclusion of others in match meetings (e.g., siblings, mentee's friends)	
	q. Photo and image use	
	r. Evaluation and use of data	
	s. Grievance procedures	
	t. Other program relevant topics	
	B.3.4 Program uses training practices and materials that are informed by empirical research or are themselves empirically evaluated." p. 35–36	✓

Table M.1 Continued

Standard	Benchmarks	Met[a]
4. Matching & Initiating “Match mentors and mentees, and initiate the mentoring relationship using strategies likely to increase the odds that mentoring relationships will endure and be effective.” p. 54	“B.4.1 Program considers the characteristics of the mentor and mentee (e.g., interests; proximity; availability; age; gender; race; ethnicity; personality; expressed preferences of mentor, mentee and parent or guardian; goals; strengths; previous experiences) when making matches. B.4.2 Program arranges and documents an initial meeting between the mentor and mentee as well as, when relevant, with the parent or guardian. B.4.3 Program staff member should be on site and/or present during the initial match meeting of the mentor and mentee, and, when relevant, parent or guardian. B.4.4 Mentor, mentee, a program staff member, and, when relevant, the mentee’s parent or guardian, meet in person to sign a commitment agreement consenting to the program’s rules and requirements (e.g., frequency, intensity and duration of match meetings; roles of each person involved in the mentoring relationship; frequency of contact with program), and risk management policies.” p. 55	✓ ✓ ✓ ✓

Table M.1 Continued

Standard	Benchmarks	Met[a]
5. Monitoring and Support "Monitor mentoring relationship milestones and child safety; and support matches through providing ongoing advice, problem-solving, training and access to resources for the duration of each relationship." p. 60	"B.5.1 Program contacts mentors and mentees at a minimum frequency of twice per month for the first month of the match and once a month thereafter.	✓
	B.5.2 At each mentor monitoring contact, program staff should ask mentors about mentoring activities, mentee outcomes, child safety issues, the quality of the mentoring relationship, and the impact of mentoring on the mentor and mentee using a standardised procedure.	✓
	B.5.3 At each mentee monitoring contact, program should ask mentees about mentoring activities, mentee outcomes, child safety issues, the quality of the mentoring relationship, and the impact of mentoring on the mentee using a standardised procedure.	✓
	B.5.4 Program follows evidence-based protocol to elicit more in-depth assessment from mentors and mentees about the quality of their mentoring relationships, and uses scientifically tested relationship assessment tools.	×
	B.5.5 Program contacts a responsible adult in each mentee's life (e.g., parent, guardian, or teacher) at a minimum frequency of twice per month for the first month of the match and once a month thereafter.	✓
	B.5.6 At each monitoring contact with a responsible adult in the mentee's life, program asks about mentoring activities, mentee outcomes, child safety issues, the quality of the mentoring relationship and the impact of mentoring on the mentee using a standardised procedure.	✓

Table M.1 Continued

Standard	Benchmarks	Met[a]
	B.5.7 Program regularly assesses all matches to determine if they should be closed or encouraged to continue.	✓
	B.5.8 Program documents information about each mentor-mentee meeting including, at a minimum, the date, length and description of activity completed.	✓
	B.5.9 Program provides mentors with access to relevant resources (e.g., expert advice from program staff or others, publications, Web-based resources and experienced mentors) to help mentors address challenges in their mentoring relationships as they arise.	✓
	B.5.10 Program provides mentees and parents or guardians with access or referrals to relevant resources (e.g., expert advice from program staff or others, publications, Web-based resources and available social service referrals) to help families address needs and challenges as they arise.	✓
	B.5.11 Program provides one or more opportunities per year for post-match mentor training.	×
	B.5.12 Program provides mentors with feedback on a regular basis regarding their mentees' outcomes and the impact of mentoring on their mentees to continuously improve mentee outcomes and encourage mentor retention" p. 61	✓

Table M.1 Continued

Standard	Benchmarks	Met[a]
6. Closure “:Facilitate bringing the match to closure in a way that affirms the contributions of the mentor and mentee, and offers them the opportunity to prepare for the closure and assess the experience.” p. 70	“B.6.1 Program has a procedure to manage anticipated closures, when members of the match are willing and able to engage in the closure process. B.6.2 Program has a procedure to manage unanticipated closures, when members of the match are willing and able to engage in the closure process. B.6.3 Program has a procedure to manage closure when one member of the match is unable or unwilling to engage in the closure process. B.6.4 Program conducts exit interview with mentors and mentees, and when relevant, with parents or guardians. B.6.5 Program has a written policy and procedure, when relevant, for managing rematching. B.6.6 Program documents that closure procedures were followed. B.6.7 Regardless of the reason for closure, the mentoring program should have a discussion with mentors that includes the following topics of conversation: a. Discussion of mentors’ feelings about closure b. Discussion of reasons for closure, if relevant c. Discussion of positive experiences in the mentoring relationship d. Procedure for mentor notifying the mentee and his or her parents, if relevant, far enough in advance of the anticipated closure meeting to provide sufficient time to adequately prepare the mentee for closure	

Table M.1 Continued

Standard	Benchmarks	Met[a]
	e. Review of program rules for post-closure contact	
	f. Creation of a plan for post-closure contact, if relevant	
	g. Creation of a plan for the last match meeting, if possible	
	h. Discussion of possible rematching, if relevant	
	B.6.8 Regardless of the reason for closure, the mentoring program should have a discussion with mentees, and when relevant, with parents or guardians that includes the following topics of conversation:	
	a. Discussion of mentees' feelings about closure	
	b. Discussion of reasons for closure, if relevant	
	c. Discussion of positive experiences in the mentoring relationship	
	d. Procedure for notification of mentor, if relevant, about the timing of closure	
	e. Review of program rules for post-closure contact	
	f. Creation of a plan for post-closure contact, if relevant	
	g. Creation of a plan for the last match meeting, if possible	
	h. Discussion of possible rematching, if relevant	
	B.6.9 Program has a written public statement to parents or guardians, if relevant, as well as to mentors and mentees that outline the terms of match closure and the policies for mentor/ mentee contact after a match ends (e.g., including contacts using digital or social media)" pp. 71–72.	

Note. ✓ = standard was met in the current study, × = standard was not met in the current study

Appendix N: GAS Parent Letter

xx/xx/2015

Dear *Parent*,

E-mentoring to learn more about online social media

Participant is **due to begin** the mentoring program online with a Skype call to *Mentor* planned for x**:xx PM on Sunday xx/xx/xxxx**.

It is anticipated that *Participant* and *Mentor* will be in touch online approximately weekly over a 4-month period (e.g., one week they may send each other a written message; one week they may make a video call). *Mentor* will support *Participant* to learn more about using social media and will provide support as a role model and older peer who also uses Augmentative and Alternative methods to communicate and is a skilled user of the internet and social media.

The mentoring program **will finish** with a final Skype call to *Mentor* x:xx PM on Sunday xx/xx/xxxx**.**

Mentoring Goals:

The mentoring program has specific goals for learning social media that we developed together at the start of the project. A special tool called *Goal Attainment Scaling* has been used to make a table for each goal that describes a range of five possible outcomes. At the end of the mentoring, I will use these descriptions to measure progress made towards goals in learning to use social media.

The goal outcomes descriptions are listed against five categories.

−2 Baseline	An outcome if the current situation didn't change at all
−1 Better than Baseline	An outcome where some progress has been made towards the goal
0 Expected Outcome	The outcome expected to be achieved
+1 Greater than expected outcome	An outcome slightly above what's expected
+2 Much Greater than expected outcome	An outcome even further above what's expected

Please contact me if you have any suggestions for changes to the goals and range of outcomes listed or if you need to make a change to the mentoring start or finish dates.

Kind Regards,

Emma Grace

PhD Candidate (Disability & Community Inclusion Unit)

Certified Practising Speech Pathologist

Goal Attainment Scale for: *Participant* **Date: xx/xx/xxxx**

1. By the end of the mentoring, *Participant* sends photos **on Snapchat** by herself.
2. By the end of the mentoring, *Participant* **makes and answers** video calls on Skype by herself.
3. By the end of the project, *Participant* **reads and responds** to personal Facebook messages and browses and actively participates in the newsfeed.

1. Behavioural Goal: By the end of the mentoring *Participant* sends photos **on Snapchat** by herself

	Predicted Level of Attainment
+2	By the end of the mentoring, *Participant* has shared photos on Snapchat with her mentor and at least 2 other contacts* (e.g., mother, brother, friend or other mentee/s in project; e.g., she may use cards with visual steps or indirect prompts).
+1	By the end of the mentoring, *Participant* has shared photos on Snapchat with her mentor and at least 1 other contact* (e.g., mother, brother, friend or other mentee/s in project; e.g., she may use cards with visual steps or indirect prompts).
0	By the end of the mentoring, *Participant* has shared photos on Snapchat with her mentor by herself (e.g., she may use cards with visual steps or indirect prompts).
-1	By the end of the mentoring, *Participant* has shared a photo on Snapchat with her mentor or the researcher with support from her mentor and/or family member (e.g., direct guidance for steps to share a photo, press the arrow at the bottom).
-2	By the end of the mentoring *Participant* is not yet using Snapchat. Accounts have been set up for her to use and are installed on her iPad.

−2 = baseline, −1 = better than baseline, **0 = expected outcome,** +1 or +2 = better than expected outcome

*other contact: does not include sending snaps to Emma or *Mentor*

2. Behavioural Goal: By the end of the mentoring *Participant* **makes and answers** video calls on Skype by herself

	Predicted Level of Attainment
+2	By the end of the mentoring, *Participant* makes or answers video calls online from more than 2 other contacts independently (may be indirectly prompted to do this) on the iPad/Computer.
+1	By the end of the mentoring, *Participant* make or answers video calls online from 1–2 other contacts independently (may be indirectly prompted to do this) on the iPad/Computer.
0	By the end of the mentoring, *Participant* makes and answers video calls online from/to her mentor independently (may be indirectly prompted to do this) on the iPad/Computer.
-1	By the end of the mentoring, *Participant* has a Skype account and answers a video call online from her mentor independently (may be indirectly prompted to do this) on the iPad/Computer.
-2	By the end of the mentoring, *Participant* has a Skype account set up and has observed her mum or been directly prompted to **make and answer** a video a call online from/to project staff on the iPad and computer.

−2 = baseline, −1 = better than baseline, 0 **= expected outcome,** +1 or +2 = better than expected outcome

3. Behavioural Goal: By the end of the project, *Participant* reads and responds to personal Facebook messages and browses and actively participates in the newsfeed.

	Predicted Level of Attainment
+2	By the end of the project, *Participant* reads and responds to personal Facebook messages and browses and actively participates in the newsfeed (e.g., likes/comments, posts her own update or like, photo or link) by herself and without indirect prompting to do so.
+1	By the end of the project, *Participant* reads and responds to personal Facebook messages and browses and actively participates in the newsfeed (e.g., likes/comments, posts her own update or like, photo or link). *Participant* is supported by her mentor or mum to do this for 0–24% of the steps. Maybe indirectly prompted (Do you want to reply to that message?).
0	By the end of the project, *Participant* reads and responds to personal Facebook messages and browses and actively participates in the newsfeed (e.g., likes/comments, posts her own update or like, photo or link). *Participant* is partly supported by her mentor or mum to do this for 25–49% of the steps.
-1	By the end of the project, *Participant* reads and responds to personal Facebook messages and browses and actively participates in the newsfeed (e.g., likes/comments, posts her own update or like, photo or link). *Participant* is fully supported by her mentor and mum to do this for 50–74% of the steps.
-2	By the end of the project, *Participant* reads personal Facebook messages and browses newsfeed posts. *Participant* does not respond to messages or the news feed without fully supported by her mum for 75–100% of the steps.

−2 = baseline, −1 = better than baseline, **0 = expected outcome,** +1 or +2 = better than expected outcome

A direct prompt is when you show *Participant* where to press/what to do next directly (press this button here).

What is an Indirect prompt?

For example, “It’s time for your Skype call”, “Now you need to select who you will send your message too” and “What’s the next step?”

Possible online friends/contacts suggested when setting goals

- List removed for confidentiality.

Steps to use Facebook (used to determine goal outcome):

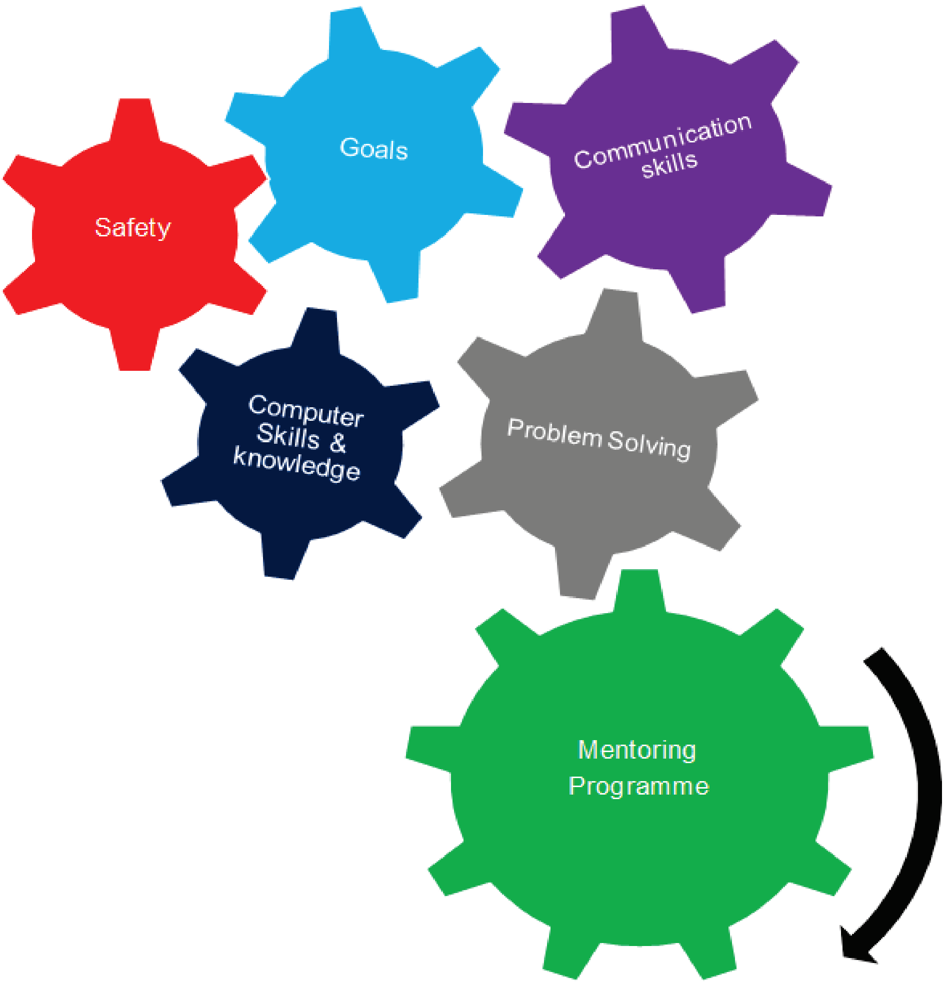
1. Open App.
2. Open message/post on newsfeed.
3. Highlight text and select copy.
    i. Paste text for reading (e.g., temporarily paste into message window).
    ii. Select speak selection to read text.
    iii. Delete pasted text.

3. Or instead use speak screen by swiping screen **all the way down (from border to border on your iPad)** with two fingers. (You are unable to highlight text on newsfeed to read so would have to do it this way).

4. Press home button once.
5. Open Proloquo2go.
6. Write message in Proloquo2go and read final message aloud.
7. Copy message text.
8. Press home button once.
9. Open Facebook/Messenger.
10. Paste message text.
11. Send message.

Appendix O: Mentor Training Handbook

Handbook for e-mentors



June 2015

MENTOR NAME

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Developed by Emma Grace for the project: 'Participation in online conversations by young people with complex communication needs: Does e-mentoring work?'

Thanks to Vanessa Kirkham from DECD e-mentoring Program and Sandy Williams, Julia Farr Purple Orange Mentoring for their generous support in the development of this training resource.

Expectations of Peer Mentors

O.1 How much time should I spend being a mentor?

We expect this project will take 1–2 hours of your time each week for 4–5 months.

At the start, Emma will meet with you and provide some training.

At the end, Emma will meet with you and interview you about your experiences as a peer e-mentor.

We expect that:

1. You will meet the mentees online for the first time in August. Each mentee has a different starting date. (see end of booklet).
2. Keep in touch with each mentee on about a weekly basis. This may sometimes be **synchronous** contact (e.g., a 1:1 video call or a group video call with all the mentees & you at the same time) and other times **asynchronous** (e.g., a post on Snapchat/a Facebook or Skype message, or sending an email).
3. Keep in touch with Emma about how things are going and if you need any support.
4. Always reply or respond to contact from mentees.
5. You will help the mentees with their goals about learning to use social media.
6. You will chat to the mentees about other interests or questions too.

Emma will be in touch with you during the programme:

- Emma is continually monitoring all conversations between you and the mentee.
- For video calls or snap chat messages you will need to provide Emma with a copy of the conversation. (see more information later).
- If we haven't been in touch otherwise Emma will send you an email/ call at least every two weeks.

O.2 Help and support

- If there is something you want to prepare for your mentee (e.g., they need some pictures and instructions for how to send a photo on Facebook), Emma can do this for you to save you time.
- If you are confused or upset by something that happens during the project, please let Emma know.
- Emma will contact you at least fortnightly to check how things are going.
- You can email or call Emma at any time.

  Emma Grace

  Phone: 8*** **** or 04** *** ***

  Email: Emma.Grace@flinders.edu.au

O.3 Honorarium payment

You will be paid an honorarium for your involvement in this project. This will be paid electronically in two instalments. You will need to provide your account name, BSB and account number.

- 2 months (October): $735
- 4 months (December): $735

What is Peer Mentoring?

Who is a peer mentor? Somebody:

- with a shared understanding;
- who is older or more experienced; and
- who is not a family member.

A peer mentor:

- provides support & encouragement;
- shares from their own experience and is a role model;
- helps the mentee with their social media goals and other questions;
- provides guidance & instructions in using social media; and
- keeps in touch regularly over a period.

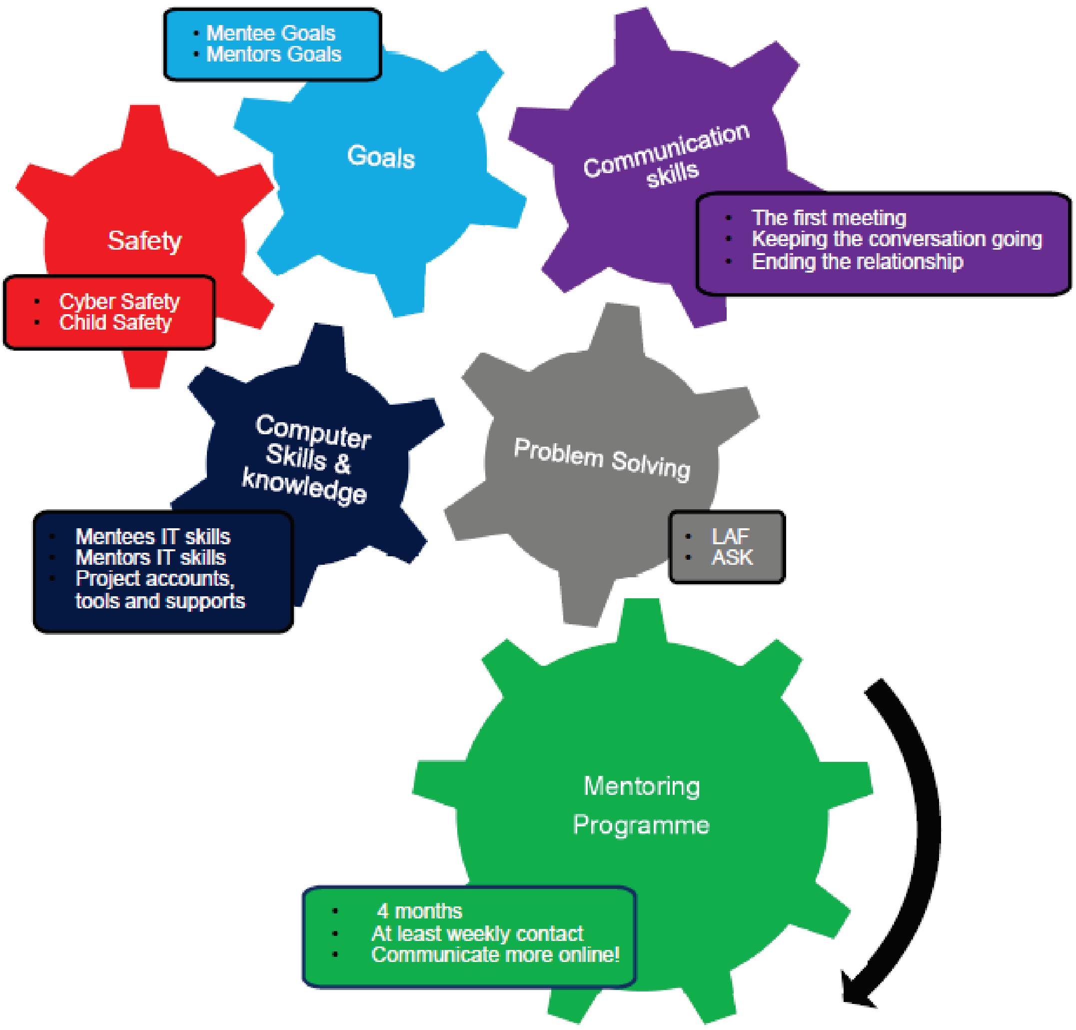
A peer mentor is:

- Trustworthy: Very important! Be there online. Respond to all posts.
- Genuine: Be yourself & Have Fun!!
- Understanding: Think what it was like when you first started using the internet.
- Reliable.
- Supportive.
- A good listener.

O.4 Four things to avoid when you are a mentor

1. Using your position as a mentor to make someone do something you want. (e.g., asking them to believe or do something that is your idea or belief and not theirs).
2. Breaking the boundaries of the relationship (e.g., promising too much, giving incorrect information instead of just saying you're not sure or trying to be something you're not: A mentor is not a parent, therapist, doctor or a superhero!).
3. Breaking a promise to your mentees (e.g., not being online when you said you would be or not sending a response).
4. Leaving the program unexpectedly. (If something happens and you can't continue, it's best if you and Emma make a plan for it in advance.)

What Makes the Project Move Forward?



Safety: Rules and Responsibilities

O.5 What are your responsibilities as regards Safety?

- Record **all** your conversations with the mentees.
- Keep information about the mentees **confidential**.
- Be a good role model online & follow cyber safety rules.
- Keep in touch with Emma about any concerns (e.g., if a young person. is not being safe online or is upset by something online).
- Let Emma know in advance if you are unavailable or need to stop.

O.6 Project rules

1. Do not provide your personal contact (e.g., phone number, email address) to the mentees.
2. **Do not** use your personal internet accounts to contact the mentees.
3. **Do not** contact or promise to contact the mentee in other ways or at other times (e.g., ring or meet up).
4. Do not change passwords on project accounts unless you discuss this with Emma.
5. Only use the project internet account for mentoring not for contacting others.
6. You can send photos or make video calls with your mentees.
7. You can make group emails or group video calls between mentees and introduce them to each other.
8. Record all video conversations using a screen recorder and send the file to Emma as soon as possible (e.g., on a provided USB in a provided reply-paid envelope, or by sharing online through your Gmail Google drive).

O.7 Emma will monitor all conversations…Why?

1. Emma will be collecting a copy of all written conversations and provide this to mentors, mentees and their parents at the end of the project. Mentors, parents and mentees can ask for parts of the conversations to be removed from the final project record.
2. Emma will look at the conversations and report on the mentoring provided and changes in the young person's conversations over time.
3. A mentee may share that they are at risk of harm from someone else or themselves. Emma will be responsible to take action and support you if this happens.

If a young person shares that they are at risk, you could ask them if they have told anyone else and remind them that it's important to talk to someone you can trust when you have feelings like this.

Contact Emma and let her know as soon as possible

Email: Emma.Grace@flinders.edu.au Mobile: 04** *** ***

O.8 Cyber safety

Each young person has agreed to follow their own cyber safety house rules. Examples of some possible rules are listed below.

- Think before you post/send a message.
- Ask an adult you trust what to do before you give anyone personal details (e.g., date of birth, phone number, address or school details).
- Be careful who you trust online/Tell ____ who you talk to online.
- Always keep your password a secret.
- Set your profile privacy settings/Have an agreement about your privacy settings.
- If someone is nasty, offensive or makes you uncomfortable don’t respond (ask someone about what you can do; for example, you might want to block them).
- Don’t open messages you are unsure of.
- Tell someone if you are upset by something you see online.

You can ask Emma for more cyber-safety resources or activities to help mentees.

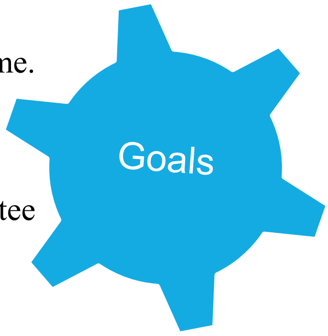
You can find more cyber safety guidelines and resources at:

http://www.cybersmart.gov.au/parents.aspx

Goals for Mentors and Mentees

Mentor Goals

As a mentor you may also like to set some goals for yourself or think about what you'd like to learn from being in the programme.



Mentee Goals

The mentees are learning to use social media. Each mentee has up to three goals they would like to achieve.

O.9 Information about mentees

****Participant****

First Day: xx/xx/2015

Final Day: xx/xx/2015

Internet Accounts (Emma will add all contacts to project accounts):

1. Apple Email
2. i-message**
3. Facebook
4. Skype

**We can talk about how you might be able to send i-message using your mentoring Gmail. You could use the project Apple ID or your own Apple ID as long as you select to send the iMessage from your project Gmail. It may be more complicated to sign in and out of different Apple IDs and easier to temporarily add the project Gmail as an option to your Apple ID. I'm happy for you to use either strategy; it depends what is easiest for you or even to avoid using i-message if it's too complex.

Goals:

1. **Using strategies to send messages more efficiently** (e.g., sending i-message or Facebook message; using AAC device to write message rather than typing letter

by letter on iPad screen keyboard, learning how to pre-store text to send in messages, for instance, you could save text on AAC device and could also learn to copy and paste test from a saved note on the iPad; maybe you have some other ideas of ways to do this).

2. **Learning how to be responsible on Facebook so that I can use my own account.** (We have set *Participant* up her own new Facebook account. She will need to demonstrate that she can be responsible with this: posts appropriate messages, careful about who she adds as a friend, etc. If she is able to do this during the project, she will be allowed to continue using her own account.)
3. **Knowing about other ways to keep in touch with friends & family on social media**. *Participant* was keen to talk to you about other social media that you use and what she might be able to use. She was interested maybe in trying out using Instagram or Snapchat but rather than pick one thing, she wanted to learn about other options.

Participant uses an AAC device with a keyguard. She also uses the onscreen keyboard on her iPad. She can access her iPad using her middle knuckle and this works to type a message. She can't use more complex access on the iPad (e.g., can't select text and copy and paste or select to read text aloud).

Conversation ideas:

Participant sometimes misses/double-hits keys on her AAC device (e.g., she accidently cleared her message when she was preparing something to say to me. She wanted to ask you whether you can undo this if you accidently clear a message. She thought you might have other ideas about using the AAC device as well (e.g., for storing prepared messages).

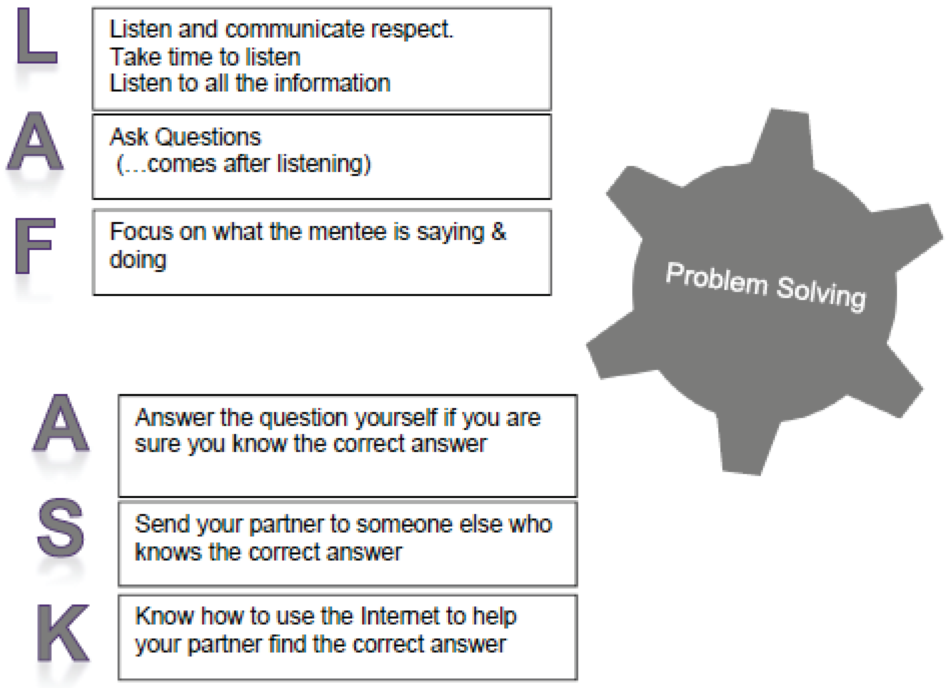
Participant lives ****. She wondered whether you've been to *****? She could tell you about where she lives.

Do you have any pets?

Problem Solving

O.10 Strategies

The following strategies are from *The Mentor Project* by Light et al. (2000). For more information, you can view the online training course developed by this programme at http://mcn.ed.psu.edu/~mentor/training/intro.html



For example:

The mentee says that their grandma is unwell.

The mentee doesn't use their communication device but shows you what looks like a movie ticket.

The mentee and mum ask you about the up-and-coming group titled, "Does it cost money to make a group call on Skype?" "Will I be able to see the others on video?"

The mentee asks about sending SMS messages from the communication device.

Communication Skills

O.11 Keeping the conversation going

- Encourage the mentee/s to initiate conversations.

  Indirect: I'd love to hear from you.

  Direct: Send me a picture of your pet.

- Share something about yourself.

  a. an experience using your AAC device;
  b. communicating with your carers; and
  c. learning to use social media.

- Don't just guess what they might want to say.

Encourage the mentee to use the AAC system they have available (e.g., use their communication device, type their message using text help/ other software, show or point when on video or use key word signs, share a photo). Be patient it will take time for the mentees to construct their message.

Direct your conversations to the mentee not their parents

- Ask genuine & specific questions, open questions.

Instead of "Tell me about yourself", ask something like "Do you have any pets?" or "How many people in your family?"

- Think about your Yes/No questions.

Yes/No questions may help sometimes when the mentee is a bit shy or you need to clarify something efficiently. But don't always ask Yes/No questions. We all want the chance to say more than just Yes/No!!

- Make a comment on what they are interested in; don't always ask questions.

Cool :) I like it! That would have taken a long time. You know lots about that.

Use emoticons to keep it fun.

- Where possible, match the length of your sentences with theirs.

Mentee: cooking school pizza will made next weeks.

Mentor: Cool, Sally. ☺ What pizza do you like? OR

Yum! Making pizza sounds fun! ☺

- Set up a group conversation so your mentees can meet each other.

Emma will coordinate dates for you in advance! Don't spend all your time and messages arranging video call times.

- Practice doing something online together.

Send a snap chat to your mentee while you are on Skype and help them send you one back.

O.12 Positive feedback

Be an encourager:

- Make positive comments about the mentees.
- Make positive comments about their online behaviour.
- Make positive comments about the conversations you share together.

O.13 Suggested topics of conversation

- Have a show-and-tell time where you show some photos/objects/things you like and the mentee does the same (e.g., on Skype or by sharing a photo).
- Share a favourite website/YouTube video/blog.
- Talk about cyber safety.
- Talk about one of the goals/things the mentee has learned.
- View the ideas suggested by the mentee (under goals).

O.14 Saying goodbye at the end of the project

- Remember how it can feel to say goodbye?
- What can we do?
    - Warn.
    - Be clear about expectations.
    - Highlight achievements.
    - Think of the positives.
    - Celebrate the ending.

The ending may be

1. Planned—this programme is planned to continue for 4 months only.
2. Unplanned, owing to changes in life circumstances; for example, somebody moves out of the area or becomes unwell.

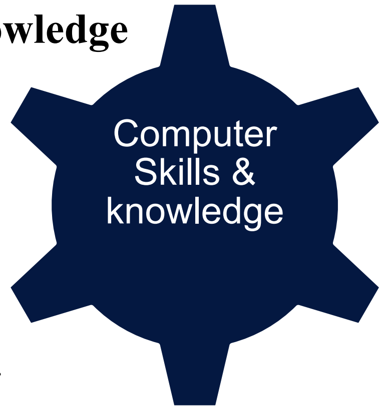
3. Unplanned, because of a difficulty in the relationship; for example, not responding to messages and perceived lack of mentee motivation.

If any reasons come up that may mean the relationship will end before the planned time let Emma know as early as possible. This means we can make a plan together and then let the mentee/s know.

Emma will contact all mentees and mentors when there is 1 month to go to remind you that the project will be ending soon. We can make a plan for how you can celebrate the end of the programme with the mentees.

What are some ideas for the final contact with your mentee?

Computer Skills & Knowledge



O.15 Screen recording

Screen Recording

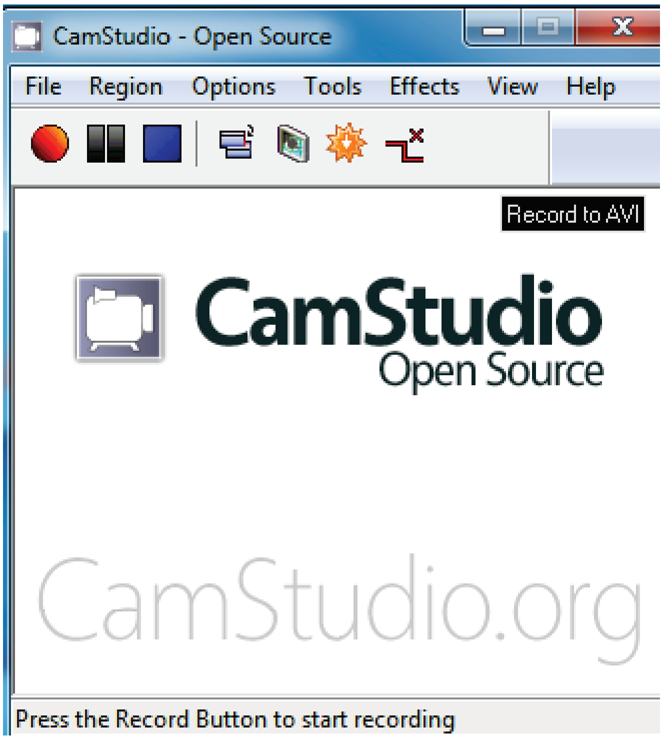
1. Install Cam studio/BB Flash/similar programme.

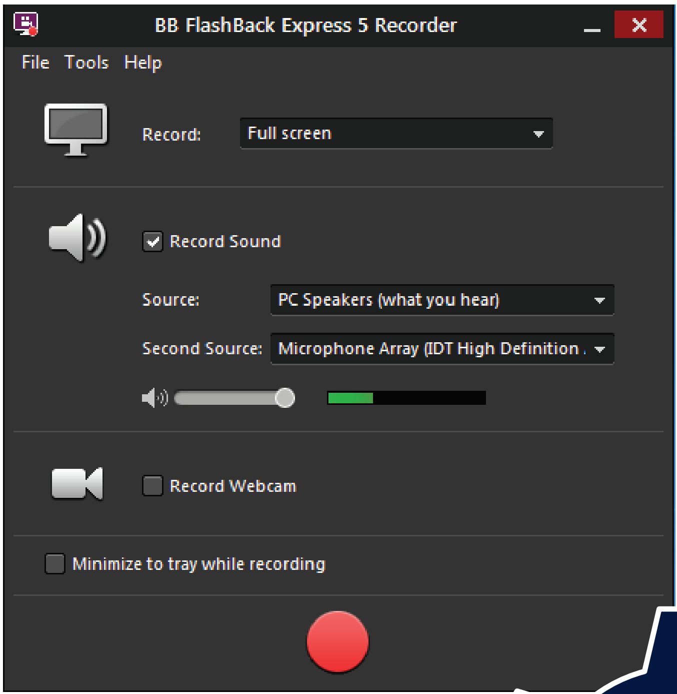
   (Be careful to download a screen reader from a reputable site).

2. Press record when you start your Skype call.

3. Save the file and Emma will collect this from you.

   You can call Emma if you want to practice or need help with this.





O.16 Internet accounts

O.16.1 Gmail.

Username: *Mentor* @gmail.com

Password: ********

O.16.2 Facebook (shared).

Email: *Mentor*@gmail.com

Password: ********

O.16.3 Skype.

Username: *Mentor*.mentor

Password: ********

Project Profile Picture

If you want to create a new account for project use please discuss this with Emma. Email: Emma.Grace@flinders.edu.au, *8* ****, 04** *** ***.***

The week that mentoring is due to start, Emma will add the mentee contacts to your account.

Other social media that the mentees may be interested in…

- Edu Blogs (web browser, apple app)
- Flickr (web browser, apple app, android app)
- Twitter (web browser, apple app, android app)
- Star Bright World (web browser, can use on iPad)
- Livewire (web browser)
- Snap Chat (iPad app)
- Instagram (iPad app)

Mentoring Programme

O. 17 Let's work through some potential scenarios…

O. 17.1 Scenario 1: Introductions & your first meeting. Here are some ideas to help get started and first introduce yourself to your mentees.

- Emma will set up a real time or video chat early on and every now and then if possible. Emma could even join in for your first conversation if you/ the mentee would like.
- Keep your introductions informal, casual and fun rather than trying to be too professional or direct (e.g., about their goals). The most important thing is that your interactions are supportive, encouraging and fun!
- It's a good idea to use emoticons and pictures in your communication. Don't make it all written words.
- Maybe the mentee could show you something they have nearby that shares about them (e.g., their communication device or something they have nearby).
- Remember to include positive comments.
- Show that you are interested in your mentees:
  - Find some mutual interests.
  - Find out about what your mentees like/don't like.
  - Tell them you're interested to get to know them.

O.17.2 Scenario 2: Email from mentee.

If you got this message what would you write back?

i had good day. angry with brother don't listen respect. Wow

O.17.3 Scenario 3: What if you can't get in touch online?

You're online waiting for a Skype call but your mentee doesn't come online.

O. 17.4 Scenario 4: You want to help your mentee with a goal.

See goals section.

Training Evaluation

Please feel free to give Emma some feedback about the training today (at the end or throughout).

Emma will also email a brief electronic evaluation form to get some more formal feedback on the training.

Appendix P: Codes for Thematic Analysis of Mentoring Transcripts

Codes for Importing into NVIVO

1. Was peer mentoring provided?
   - 1.1. Provide support & encouragement (Be Supportive).
   - 1.2. Make positive comments about the mentees.
   - 1.3. Make positive comments about their online behaviour.
   - 1.4. Make positive comments about the conversations you share together.
   - 1.5. Encourage the mentee/s to initiate online conversations. (Don't always initiate yourself.) Do not provide your personal contact (e.g., phone number and email address) to the mentees.
   - 1.6. Share from own experience.
   - 1.7. Is a role model:
     - 1.7.1. of how to have an online conversation; and
     - 1.7.2. of appropriate and safe online behaviour.
   - 1.8. Do not use your personal internet accounts to contact the mentees.
   - 1.9. Do not contact, or promise to contact, the mentee in other ways or at other times (e.g., ring or meet up):
     - 1.9.1. Of using AAC
   - 1.10. Helps
     - 1.10.1. with social media goals; and
     - 1.10.2. with other questions
   - 1.11. Provide guidance & instructions in using social media:
     - 1.11.1. Practice doing something online together. (e.g., Use Snapchat while on Skype etc.)
   - 1.12. Be reliable / trustworthy.
     - 1.12.1. Respond to all posts.
     - 1.12.2. Follow through on promises
   - 1.13. Be Genuine, be yourself:
     - 1.13.1. Share something about yourself.
   - 1.14. Have fun:

1.14.1. Use emoticons to keep it fun. 

1.15. Be understanding: <u>think</u> what it was like when you first started using the internet.

1.16. Be a good listener/communication partner:

1.16.1. Make a comment on what they are interested in and don't always ask questions.

1.16.2. Ask genuine and specific questions, open questions (e.g., rather than all Yes/No questions).

1.16.3. Where possible, match the length of your sentences with theirs.

1.16.4. Don't just guess what they might want to say, but encourage them to communicate/use their AAC system.

1.16.5. Direct your conversations to the mentee, not their parents.

2. Recommended features of the mentoring programme:

2.1. Safety

2.2. Goals

2.3. Computer Skills & Knowledge

2.4. Communication Skills

2.5. Problem Solving

2.5.1. LAF: Listen and communicate respect, Ask questions, Focus on what the mentee is saying.

2.5.2. ASK: Answer the question yourself, Suggest someone else who knows the answer, Know how to use the internet to help the mentee find the correct answer.

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Endnotes

1. [1]Instagram is a social networking platform where users share and respond to photos and video. www.instagram.com
2. [2]Skype is a social networking platform where users can connect with other individuals or groups using text, voice, or video. www.skype.com
3. [3]Facebook is a social networking platform where users can share and respond to posts (e.g., text, photo, and video). www.facebook.com
4. Bold text is used to emphasise the importance of this definition for the research.
5. [5]Gmail is an email platform. www.gmail.com
6. [6]i-message, [7]Mail and [20]iPad are products of Apple Inc., Cupertino, CA. www.apple.com
7. [8]Snapchat is a social networking platform where users can share photos or video. www.snapchat.com
8. [9]Outlook.com is an email platform. www.outlook.com
9. [10]Twitter is a social networking platform where users post and respond to publicly available short messages and photos. www.twiter.com
10. [11]Ability Online is a monitored social networking platform where young people with disabilities and their parents can interact with others with disabilities. www.abilityonline.org
11. [12]YouTube is a social networking platform where users can view, share and comment on videos. www.youtube.com
12. [13]Club Penguin is a monitored social networking platform, designed for children, where subscribers can pay to play games and interact with other subscribers. www.clubpenguin.com

13. [14]GoToMeeting is a social networking platform where users join with other users in private meeting rooms. www.gotomeeting.com
14. [15]Google Hangouts is a social networking platform where users can connect with other individuals or groups using text, video or voice, www.hangouts.google.com
15. [16]The SEAS-PCS is available at https://flintbox.com/public/project/25724/
16. [18]DynaVox Maestro and PCS[17] are products of the Mayer-Johnson, a Tobii Dynavox Company, Pittsburgh, PA. www.tobiidynavox.com
17. [19]PODD is an AAC system and tool developed by G. Porter, and published and distributed by the Cerebral Palsy Education Centre of Melbourne, Victoria. www.cpec.org.au/podd/podd/
18. [21]Proloquo2go is an AAC application from AssistiveWare, Amsterdam, the Netherlands, www.assistiveware.com
19. [22]Accent and Unity[23] are manufactured by the Prentke Romich Company of Wooster, OH. www.prentrom.com
20. [24]Key2go keyboard for the iPad is manufactured by the Hama GmbH & Co KG Company of Monheim, Germany. www.hama.com