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The social interaction of an adolescent who uses augmentative and alternative communication: The evaluation of a peer training programme

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Table of Contents

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List of Tables

List of Figures

List of Appendices

The appendices are on the CD ROM

List of Photographs

Abstract

The social interaction of children and adolescents who have little or no functional speech (LNFS) and use augmentative and alternative communication (AAC) systems is often severely limited. Deficits in terms of their interactions with peers in the natural settings of classrooms and playgrounds are well documented. Adolescents who do not have the opportunities or skills to socially interact with peers do not develop the social and communicative skills and abilities that are required for positive social and personal adjustment in adulthood.

In this study a peer training programme was designed and implemented with the Grade 8 peers of an adolescent who had severe physical disabilities and used AAC. The study used a single subject experimental design whereby the interaction between the adolescent who used AAC and his classroom peers was investigated before and after implementation of the peer training programme. An analytical model to describe the interactions and potential changes in the interactions of adolescents who use AAC was developed. The model also included various measures to evaluate pertinent psychosocial factors of the interactions of a person using AAC with peers. These measures were qualitative in nature and included self evaluative measures of the adolescent who used AAC in addition to measures to determine the perceptions of his peers, his teachers and parents.

Results of the observational data reflected an increase in the frequency of interactions as indicated by the number of messages per minute and the extent of the interactions as signified by an increase in the number of messages per interchange. Changes were also noted in terms of the discourse and communication functions achieved by the interactions, the modes of communication used by the adolescent who used AAC and the responses of his peer partners. Changes included an increase in the primary participant's use of requesting or asking questions, showing feelings and emotions and his use of humour. The peer partners increased their initiations with the adolescent who used AAC and responded more appropriately to him as the research process progressed with a

concurrent positive decline in the peer response of ignoring the adolescent who used AAC.

The research study is evaluated, clinical implications are considered and recommendations for further research are discussed.

Key Terms: Adolescence, augmentative and alternative communication, communication competence, communication partners, little or no functional speech, multi-modal communication, peer training, self concept, social interaction, and voice output.

Opsomming

Die sosiale interaksie interaksie van kinders en adolessente met min of geen funksionele spraak wat gebruik maak van aanvullende en alternatiewe kommunikasiestelsels (AAK) is dikwels uiters beperk. Die agterstand in hul interaksie met hul portuurgroep in natuurlike omgewings soos die klaskamer en die speelterrein is reeds goed gedokumenteer. Adolessente wat nie die geleentheid of die vaardighede het om sosiaal met hul portuurgroep te verkeer nie, ontwikkel nie die sosiale en kommunikasievaardighede en -vermoëns wat noodsaaklik is vir positiewe sosiale en persoonlike aanpassing in volwassenheid nie.

'n Opleidingsprogram is in dié tesis ontwerp en ge ïmplementeer onder die portuurgroep (medeskoliere in Graad 8) van 'n ernstig liggaamlik gestremde adolessent wat deur middel van 'n AAK-stelsel kommunikeer. Die studie maak van 'n enkelonderwerp-eksperimentele ontwerp gebruik, waarkragtens die interaksie tussen 'n adolessent wat 'n AAK-stelsel gebruik en sy klasmaats ondersoek word, sowel voor- en nadat die portuurgroep 'n opleidingsprogram deurloop het. 'n Analitiese model is ontwikkel om die interaksies, en potensiële veranderings in die interaksies, van adolessente wat AAK-stelsels gebruik, te beskryf. Die model sluit ook verskeie meetinstrumente in waarmee die belangrikste psigososiale faktore van die interaksie van 'n persoon wat AAK-stelsels met die portuurgroep gebruik, geëvalueer kan word. Dié meetinstrumente was kwalitatief van aard is het voorsiening gemaak vir self-evaluering deur die adolessent wat AAK-stelsels gebruik, asook vir meetinstrumente om die persepsies van maats, onderwysers en ouers te bepaal.

Die waarnemingsdata het op 'n vermeerdering in die frekwensie van dié interaksies gewys, gemeet aan die aantal boodskappe per minuut en die omvang van die interaksies, soos aangedui deur die toename in die aantal boodskappe per interaksie. Nog veranderings wat bespeur is, was in die gespreksvoerings- en kommunikasiefunksies wat deur die interaksies bewerkstellig is, die kommunikasiemodaliteite wat gebruik is deur die adolessent wat AAK-stelsels gebruik, en die reaksies van sy portuurgroep. Die

veranderings het ook 'n toename in die aantal versoeke wat gerig of vrae wat gestel is deur die primere deelnemer ingesluit; hy was ook meer geneig om gevoel en emosie te toon en humor te gebruik. Met verloop van die navorsingsproses is waargeneem dat die portuurgroep meer gereeld interaksie inisieer met die adolessent wat AAK-stelsels gebruik en op 'n toepasliker wyse teenoor hom optree, met 'n gepaardgaande positiewe afname in die neiging van die portuurgroep om die adolessent wat AAK-stelsels gebruik, te ignoreer.

Die navorsingsprojek word geëvalueer; die kliniese implikasies word oorweeg; en aanbevelings vir verdere navorsing word bespreek.

Sleutelwoorde: Adolessensie, aanvullende en alternatiewe kommunikasie, kommunikasiebevoegdheid, kommunikasievennote, min of geen funksionele spraak, multi-modale kommunikasie, opleiding van die portuurgroep, selfkonsep, sosiale interaksie, en spraakuitset.

CHAPTER 1
ORIENTATION

1.1 INTRODUCTION

This introductory chapter provides the background and purpose of the research. It also includes an overview of the contents of the chapters included in the study.

1.2 THE CONTEXT AND STATEMENT OF THE PROBLEM

The ultimate goal of Augmentative and Alternative Communication (AAC) is to enable the person with little or no functional speech (LNFS) to communicate effectively in their daily interactions with others. The person using AAC needs to successfully interact and communicate with both familiar and unfamiliar partners in everyday situations within the natural contexts of home, school/work and the community.

Communication is the essence of being: We communicate in order to share our basic wants and deepest needs, to reveal our thoughts and ideas, to express our feelings and emotions, to disclose our likes and dislikes, to share our joys and sorrows, to reflect our personalities and most importantly to connect – to touch others and to be touched by them. People who have LNFS have often been described as living silent, isolated existences and AAC has often been described as the "magic" that can transform their lives. Yet there is no magic if the AAC system does not allow persons who use AAC to communicate easily with those whom they come into daily contact. People who use AAC often have extremely limited social networks and many only communicate with immediate family or caregivers and with those who are paid to communicate with them. Children and adolescents who use AAC often have no real interaction with peers or with the wealth of unfamiliar partners that typically developing children and adolescents engage with in the community.

AAC clinicians frequently execute extensive assessment procedures that result in detailed plans for the implementation of multi-modal systems of AAC to meet the communication

needs of children and adolescents with LNFS. Yet, despite the provision of extensive AAC systems and intensive training of the children and adolescents to promote communication competence, peer interaction remains problematic. Both clinicians and researchers have confirmed inadequate or a total lack of interaction between disabled children who use AAC and their peers.

To achieve an acceptable level of social communicative competence it has become increasingly apparent that the training of communication partners is an essential component of effective AAC intervention. Empirical research and clinical experience have proved that intervention directed solely at the person who uses AAC is insufficient to ensure social competence (Light, Dattilo, English, Gutierrez, & Hartz 1972; McNaughton & Light 1989). It has become clear that it is as critical to address partner training as it is to address the skills and strategies involved in the development of the social competency of the person using AAC. This ensures the optimum outcomes for both children and adolescents who use AAC.

The pattern of typical development clearly demonstrates that interactions with peers become increasingly important as the child matures and are considered of utmost consequence during adolescence. The development of psychosocial abilities required for positive adulthood depends on the ability to interact appropriately with peers during adolescence. The development of training programmes for the peers of children and particularly adolescents who use AAC is thus essential. Best practice suggests that AAC intervention for children and adolescents needs to be twofold: (a) addressing the needs and building the competencies of the person using AAC and (b) instruction and training of significant communicative partners including parents, teachers, facilitators and peers (Carter & Maxwell 1998; Light, et al., 1992; McEwen & Karlan, 1990). As Sack and McLean (1997) point out professionals in the field of AAC must conceive an expanded role that includes training and supporting daily communication partners of people who use AAC in addition to teaching new interaction skills and communication strategies to the person who uses AAC. Although partner training is widely recommended in current AAC literature, there are few studies describing partner training and even fewer studies on peer programmes (Sack & McLean 1997).

In order to develop effective AAC intervention programmes involving children and adolescents who use AAC and their peers we need to gain insight into what actually happens when children and adolescents who use AAC communicate with their peers. Both problematic and successful interactions in daily situations need to be studied to assist us to gain perspective on the efficacy of our AAC interventions with children and adolescents who have LNFS. It is not possible to measure the success of AAC interventions within a closed setting such as "the therapy room" or the "research laboratory". Certain aspects such as accuracy in retrieving vocabulary or measuring the increased rate of message formulation may be assessed but as AAC clinicians and researchers we need to observe and understand the interaction opportunities and challenges faced by the person using AAC in their natural settings. We need to gain knowledge of how to improve the effectiveness with which children and adolescents who have disabilities and use AAC manage their daily interactions and discourse with peers.

In South Africa learners with disabilities have experienced great difficulty in gaining access to education (Department of Education, 2001). The Education White Paper 6 on special needs education indicates that currently an estimated minimum number of 280,000 learners with disabilities do not have access to either special or mainstream education (Department of Education, 2001). The report bases this figure on World Health Organisation projections that between 2.2% and 2.6% of learners in any school system could be identified as disabled, and that only 64,200 learners with disabilities or learning impairments are presently enrolled in the 380 special schools in South Africa (Department of Education, 2001). The report acknowledges that support and preparation are required for inclusion to be a successful experience for both the learners with disabilities and their typically developing peers. At present few learners with LNFS have been included in mainstream schools but the results of a prevalence study indicated that 39% of the students in schools for children with severe cognitive impairments in the Pretoria area had LNFS (Alant, 1999).

For children and adolescents with LNFS, irrespective of concurrent cognitive impairments, to be socially included in an inclusive educational system the following areas need to be addressed:

i. Facilitation of positive attitudes of the typically developing children and adolescents to their peers with disabilities including LNFS.
ii. Direct AAC intervention for children and adolescents with LNFS including the provision of AAC systems and training in linguistic, operational, strategic, and social competency skills to ensure the optimal communicative competency of the child or adolescent who uses AAC.
iii. The training of peers.
iv. The training of significant adults including teachers and facilitators within the educational setting and parents.

A barrier to improving the interaction of children and adolescents who use AAC through peer training is the lack of validated peer training guidelines, procedures and materials. This study is an attempt at describing the interactions of an adolescent who uses AAC with his peers within the natural setting of his classroom and the effects of a peer training programme on the interactions of the adolescent with his peers. The peer training programme was devised and implemented as part of the study and aspects of the psychosocial background are also described. The possible impact of the effects of the programme on the interactions of the adolescent who used AAC are evaluated by means of an analysis of observational data derived from extensive videotaping in the classroom as well as by evaluation procedures carried out with the adolescent who used AAC, his peers, teachers and parents.

1.3 OUTLINE OF CHAPTERS

Chapter 1 provides the background and the motivation for the study. Chapter 2 describes the theoretical issues related to the importance of the development of communication and social skills in adolescence, the necessity to train partners and the rationale of peer training. Chapter 3 discusses the complexity of describing and analysing interactions involving a person using AAC, including the issues of notation, transcription and segmentation of discourse involving AAC. In addition, the theoretical basis for the evaluation of the psychosocial background of the person using AAC is briefly discussed.

In chapter 4 the methodological procedures applied to the study are presented. The main study is described in detail and data collection and analysis procedures are presented. The results and the relevant discussion of the results are discussed in chapter 5. Chapter 6 concludes the study with a discussion of the integration of the results, the evaluation of the study, the clinical implications and recommendations for further research.

1.4 DEFINITION OF TERMS

The following key terms are used frequently and require clarification:

i. **Adolescence:** A normal developmental period of transition between childhood and adulthood that is characterised by rapid changes in physiological, psychological and social development (Whitmire, 2000).

ii. **Augmentative and Alternative Communication:** '(1) The supplementation or replacement of natural speech and/or writing using aided and/or unaided symbols. The use of aided symbols requires a transmission device whereas the use of unaided symbols requires only the body. (2) The field or area of clinical/educational practice to improve the communication skills of individuals with little or no functional speech' (Lloyd, Fuller, & Arvidson, 1997, p. 524).

iii. **Behaviour rehearsal:** This involves the practicing of a modeled skill in a simulated or natural setting with reinforcement and feedback (Cartledge & Milburn, 1995).

iv. **Communication:** In this research proposal it is considered to be a multimodal composite of behaviours for the purpose of exchanging thoughts or ideas from one person to another irrespective of the means e.g. speech, gestures, writing or graphic representations. Communication may or may not be linguistic and takes place between people to achieve the communicative functions of the expression of needs, the transfer of information, the promotion of social closeness and to meet social etiquette norms.

v. **Initiation:** An attempt using any mode to instigate an interactional event by either the person who uses AAC to a peer or by a peer to the person who uses AAC.

vi. **Interaction:** 'The process that occurs when people come together' (Bullowa 1979). It does not necessarily imply that words are spoken but that a cyclical interplay of actions and reactions between two or more people takes place (Kraat, 1987).

vii. **Interchange:** Defined for this study as a single initiation, or a series of initiations and responses that are thematically related and have discernible boundaries between the person using AAC and one or more peers. Interchanges thus correspond to a single initiation of a series of turns referred to as a conversational interchange within the field of conversational analysis. A single initiation is included as it is regarded as an attempt to initiate an interchange. Interchange is a term used in discourse analysis to describe a "coherent segment of interaction" (Stubbs, 1983). The interchange is usually further divided into smaller units for analysis. In this study interchanges were divided into "messages", the basic unit of analysis.

viii. **Message:** A message can be either an initiation or a response or a follow-on and is the smallest unit of analysis. Message is equivalent to the term "utterance" in spoken language studies where one or more messages constitute a communicative turn.

ix. **Reinforcement:** This procedure includes arranging relevant settings for the adolescent to practice the social skills with different partners in various settings. Once skills are learnt additional strategies to promote generalisation and maintenance may be required (Cartledge & Milburn, 1995).

x. **Response:** Any endeavour of a peer or peers to react to an initiation by the person using AAC or any endeavour of the person using AAC to act in response to an initiation by a peer or peers.

xi. **Social modeling:** Also referred to as learning by imitation involves the production of a social behaviour to facilitate learning through observation and imitation by another (Cartledge & Milburn, 1995).

xii. **Voice Output:** The output mode of a communication device that utilises either digitized or synthetic speech output. Digitized speech is 'electronically produced when the human voice is recorded and digitized' (Lloyd, Fuller, & Arvidson, 1997, p. 528). Synthesized speech is 'artificially produced (e.g. by electronic means) rather than by the human vocal tract. It is highly flexible and can use text-to-speech to produce virtually any typed message. There is a wide range of quality depending on the rules/algorithms stored in the computer memory. In general the intelligibility of synthesized speech is not as high as digitized speech' (Lloyd, Fuller, & Arvidson, 1997, p. 540).

1.5 ABBREVIATIONS

AAC	Augmentative and Alternative Communication
CP	Cerebral Palsy
I/R	Initiation followed by response
I/R/F	Initiation-response-follow-up exchange
LNFS	Little or no functional speech
MSCS	Multidimensional Self Concept Scale
OBE	Outcome based education
PACT	Partners in Augmentative Communication Training
SDQ II	Self Description Questionnaire II
SEM	Standard error of measurement
VOCA	Voice output communication aid

1.6 SUMMARY

This chapter provided the motivation and background to the study. The focus was on the necessity to train partners of individuals who use AAC, in particular the peers of adolescents who use AAC. A brief outline of the chapters included in the study was provided. The key terminology used in the study was then defined and followed by an explanation of the abbreviations used in the study.

CHAPTER 2
THE SOCIAL INTEGRATION OF AN ADOLESCENT WHO USES AAC: THE NECESSITY OF PEER TRAINING

2.1 INTRODUCTION

The social integration of an adolescent who uses AAC, even if he or she has gained a high degree of operational, strategic and linguistic competency skills, cannot be assumed and is unlikely to occur without effective peer training. This chapter discusses the importance of social interactions with peers during adolescence for the development of mature social, cognitive and linguistic abilities required in adulthood. The skills required by adolescents to interact socially are considered, as well as the influence of peer attitudes on the interactions of adolescents. The interaction patterns of children and adolescents who use AAC are described, and the necessity to train the communication partners of adolescents who use AAC is highlighted. Finally the rationale and the underlying principles for peer training programmes are discussed.

2.2 ADOLESCENCE AND THE IMPORTANCE AND FUNCTION OF PEER GROUPS

Adolescence, more than any other period of development, is strongly linked to the importance of the peer group. As a normal developmental period of transition between childhood and adulthood adolescence is characterised by rapid changes in physiological, psychological and social development (Whitmire, 2000). It differs markedly from both childhood and adulthood and has distinct developmental objectives in cognitive, linguistic and social areas that involve identity formation, the foundation of personal beliefs and value systems as well as a deeper understanding of society and socio-cultural conventions (Whitmire, 2000). Deficient experiences in adolescence can result in alienation from parents and society and it is crucial that the goals of adolescence are positively accomplished for the individual to successfully transition to adulthood.

One of the primary goals of adolescence is the realisation of self and personal identity (Harter, 1990; Whitmire, 2000). The development of mature self-conceptualisation is engineered through multiple and varied peer interactions and relationships that are invariably accompanied by changes in the parental and family relationships of the individual (Whitmire, 2000). Overall, adolescent parent relationships are positive but the nature of the relationships change and become more reciprocal and equal than those of children and their parents (Whitmire, 2000). Successful adolescent peer relationships form the foundation for positive relationships in adulthood just as early positive family relationships contribute to successful adolescent peer interaction (Whitmire, 2000). Peer relationships in adolescence are more complex and differ in both quality and quantity from those of childhood (Meyer, Minondo, Fisher, Larson, Dunmore, Black, & D'Aquanni, 1998).

In early adolescence small groups of friends function as the primary base of interaction with peers and allow for regular interaction that is more spontaneous and relaxed than that with adults (Nippold, 2000; Whitmire, 2000). For the purpose of this study the definition of a group by Sherif and Sherif (1973) was adopted. They state that a group is a social unit which consists of a number of individuals who stand in definite status and role relationships to one another and which possesses a set of values or norms of its own, regulating the behaviour of individual members (Sherif & Sherif, 1973). Early adolescent groups are generally comprised of only one gender. Groups of adolescent boys are generally fairly structured with some members having more prestige and status than others and it is through communicative interactions that individuals assert their dominance within the group (Romaine, 1984).

These peer groups give adolescents the opportunity to develop social skills, share personal problems, support one another and develop mutual intimacy allowing the adolescents to develop autonomy from parents (Nippold, 2000; Whitmire, 2000). As they develop adolescents spend significantly greater amounts of time socialising with friends (Nippold, 2000; Rubin, Bukowski, & Parker 1998). The development of social competency skills and mature social behaviours in typically developing adolescents is dependent on peer interactions and relationships (Bigelow & La Gaipa 1980; Cartledge &

Milburn, 1995). Both friendships and peer group acceptance are important influences on the development of social competence and on the self esteem of the adolescent (Azmita, Kamprath, & Linnet, 1998). Peer acceptance also has a dynamic influence on adolescent friendships (Asmita et al., 1998).

Adolescents and children who have disabilities and LNFS have limited opportunities to interact in peer group and this negatively influences the development of social and communicative abilities (Beukelman & Mirenda, 1992). Adolescents and young adults who use AAC have described feelings of isolation, barriers in getting to know peers, barriers to meeting and making friends, frustrations with respect to initiating and maintaining relationships with peers and profound frustration with negative experiences related to attempts at peer acceptance and socialisation (McCarthy, Light, & McNaughton 2002).

2.3 SOCIAL COMPETENCE OF THE ADOLESCENT

Social competence impacts significantly on social acceptance. Adolescents who have developed the interaction skills of employing appropriate greetings, making eye contact, complimenting, answering peers questions, listening attentively and taking conversational turns rank high on social acceptance by peers. Research on social status has shown that popular children and adolescents expect to be accepted by peers, have greater self-esteem, use more varied initiation strategies, are more responsive and throughout their interactions show more communicative competence (Ramsay, 1991). They are described as positive, considerate, emotionally appropriate and confident (Ramsay, 1991).

Many of the characteristics that determine the social competence of children and adolescents in the opinion of peers involve communication skills (Cartledge & Milburn, 1995). The ability to be outgoing, the capacity to amuse peers, the ability to actively participate in peer activities, the nature and extent of the adolescent's vocabulary as well as the content and use of language all determine the social competence of typically developing adolescents (Cartledge & Milburn, 1995).

The growth of such sociolinguistic skills is totally dependent on social interaction (Romaine 1984). It is through competent communication skills that children and adolescents explore and manipulate their social environments and establish their status and role relationships within these environments (Romaine, 1984). Communication competence therefore implies not only interactional and linguistic skills but social cultural skills as well. This is particularly true of adolescents who develop distinctive in-group vocabulary, language forms and ways of communicating that are important and help to identify their position within the social group. This use of slang or in-group vocabulary by adolescents maintains their identity with the peer group (Whitmire, 2000). To be considered communicatively competent, an adolescent must not only know how to interact with adults in varied settings and degrees of formality but also how to interact with his peers both when in the presence of adults and when within familiar groups. Research into non-standard language use by adolescents has shown the language used to be as structurally complex and rule-governed as the standard language (Romaine, 1984).

The acquisition of adult norms in sociolinguistic patterning takes place mainly between 10 and 15 years of age (Romaine 1984). However, from a young age children are able to monitor and even correct linguistic errors such as mispronunciations. Adolescents become far more skilled as they develop in the evaluation of their own language and communication and that of their peers. They learn to make judgments about the appropriateness of their communication, taking situational variables such as audience into account (Romaine, 1984). Thus correlations between language use and social structure, 'sociolinguistic patterns', comprise part of communicative competence (Romaine, 1984). Adolescent peer verbal input is therefore important in facilitating emerging communicative competence (Romaine, 1984). Peer pressure within same-sex adolescent groups ensures the use of communication behaviours that are conformist as part of the socialisation process (Romaine, 1984). Adolescents even adapt their communication to indicate to which peer groups they belong (Romaine, 1984). Thus the development of peer group communication styles is a significant part of the socialisation process.

Peer groups during adolescence enforce the use of specific vocabulary and precise forms of interaction to denote in-group membership of that age range. During adolescence peers become more important than adults in providing models. Sociolinguistic research on the structure of intragroup communication has disclosed that both the nature of peer group interactions and the constant monitoring that occurs amongst members of the group is important to the evolvement of communicative competence (Romaine, 1984). Thus conformity with peer group pressures results in changes in the manner, style and linguistic content of communication by the adolescent.

The goal of communication which aims to develop interpersonal relationships is particularly relevant to the adolescent phase compared to the goals of expressing needs and wants, exchanging information and meeting social etiquette or norms. It is in meeting the goal of developing social closeness that people communicate to initiate, develop or sustain personal relationships and friendships (Light, 1988). The focus of the communication is on the interpersonal relationship and the content of the interaction is not significant (Light, 1988). Thus, in considering the relative importance of the four objectives of communication at different stages of life, communication to develop social closeness with peers is of supreme importance for adolescents (Light, 1997a). Social closeness is critical for adolescents as it is during this life period that peer relationships and peer acceptance assume prominence and take priority over family relationships (Fine, 1980).

Different forms of peer interaction reflect the development of social-cognitive skills and acceptance into a close and integrated group of peers is essential to the founding of mature adult relationships (Bigelow & La Gaipa, 1980). Thus, meaningful participation of adults in varied roles in family, social and community contexts is dependant on the development of interpersonal skills during adolescence (Meyer et al., 1998). Numerous correlation studies investigating the association between early peer relationships and later social disorders have indicated that problematic classroom peer relationships are related to poor social adjustment in adults (Ladd & Asher, 1985).

Communicative interaction is essential to develop friends and certain adolescents find it difficult to interact and make friends, later becoming socially detached and as adults have poor interpersonal relationships (Meyer et al., 1998). Although the lack of social development may be due to the individual adolescent's personal deficiencies it is widely accepted that environmental circumstances may be responsible for an adolescent's inability to progress socially (Meyer et al., 1998). These environmental situations are generally beyond the control of the individual adolescent and include the interactions and attitudes of peers to adolescents with disabilities (Meyer et al., 1998). Limitations in peer interactions by adolescents who use AAC may be due to limited opportunities to interact with peers, limited social competency skills of the adolescent who uses AAC or limited understanding and abilities of the peers to interact with the adolescent who uses AAC. Peer attitudes to communicating and developing interpersonal relationships with adolescents who use AAC are an additional important consideration.

2.4 THE IMPORTANCE OF PEER ATTITUDES

To understand the influence of the attitudes of adolescents to their peers we need to look at how attitudes influence behaviour. The ABC model of attitudes helps us to understand this influence as the model suggests that any attitude has three interrelated elements, namely an affective, a behavioural and a cognitive component (Feldman, 1993). The affective component comprises the emotional feeling, whether positive or negative, the behavioural component is the predisposition to act in a way that is relevant to an attitude, and the cognitive component refers to the thoughts and beliefs relative to the attitude. Every attitude an individual has consists of all three components but in varying degrees of prevalence (Feldman, 1993). Attitudes revealed by behavioural responses to a person situation or issue, are often those of which an individual may not be fully conscious (Aitkin, 1996).

Attitudes influence the interaction of peers in terms of the partners they select and how they interact with them. This profound effect of attitudes on interactions highlights the need to improve the attitudes of typically developing adolescents to their peers who have

disabilities including those with little or no functional speech (LNFS). Extensive research findings substantiate negative attitudes toward disabled persons as well as the modification of the social behaviour of typically developing adolescents when in the presence of disabled peers (Bender, 1980; Fiedler, & Simpson, 1987; King, Rosenbaum, Armstrong, & Milner, 1989; Warrick, 1988). More specifically, negative attitudes of typically developing children to peers with even mild speech disorders were found to be prevalent (Kalinowski, Lerman, & Watt, 1991; Lass, Ruscello, Bradshaw, & Blankenship, 1991; McKinnon, Hess, & Landry, 1986; Williams, & Dietrich, 1996).

Adolescents with poor communication skills are unable to engage in strategic peer interactions, which results in feelings of lower status and being ignored or rejected (Whitmire, 2000). Without the emotional support of peer group friends they are not able to develop their self identity and separate from their families (Whitmire, 2000). In addition they are unable to establish the interpersonal skills that they will require for mature, adult relationships (Whitmire, 2000).

The behavioural interaction between the peer partner and adolescent with disabilities is strongly influenced by attitude. The attitudes of children and adolescents to peers with disabilities are multidimensional with several factors having been identified as influencing these attitudes. The importance of the communication competence of children with disabilities, when peers assign status to them, has been highlighted (Horne, 1985; Romaine, 1984). Modified social behaviours by peers to adolescents with disabilities include reduced eye contact, shortened interaction time and decreased verbal communication. These behaviours arising from attitudes are barriers to peers' communication with children who have disabilities including those with LNFS. There is a need to understand how attitudes can be made more positive in order to facilitate positive interaction with resultant peer acceptance and the formation of friendships.

Although the potency of the link between an attitude and the resultant behaviour does vary, people generally maintain consistency between their attitudes and behaviour, which form a logical behavioural framework (Feldman, 1993). It would therefore seem logical that if behaviour is to change it will occur in response to a change in attitude.

Researchers in the field of social cognition have investigated the mental processes by which we understand, process information, and make judgments and decisions about our social world. They have determined that adults and children develop complex schemas about people and social experiences. These schemas regulate information and memories and provide a framework for categorising and interpreting social stimuli (Feldman, 1993). It is recognised that it is these schemas that have to be changed when dealing with the attitudes to peers with disabilities including LNFS. Mere exposure to children with disabilities is not effective in improving peer attitudes, rather contact has to be interactive and to extend over a prolonged period (Armstrong, Rosenbaum, & King, 1987).

2.5 THE INTERACTION OF ADOLESCENTS WHO USE AAC

Studies of children and adolescents who use AAC seldom describe communication between individuals of equal status. Generally, the partners described were adults and were familiar to the child or adolescent who used AAC. The social relationships of the dyad were usually asymmetric, with the partner being of a higher status (Light 1988). In the school setting, children using AAC are rarely described interacting with their peers, interactions taking place mainly with teachers (Harris, 1982). Kraat (1987) confirmed this contention and stated that in most of the interactive research studies of children using aided systems, the children communicated in a dyad with a staff member or caregiver.

In addition, research into the interaction patterns of individuals who use AAC and their speaking partners have shown that the partners generally dominate and take control of the conversation (Buzolich & Lunger, 1995). Children and adolescents who use AAC have been described as passive, responding rather than initiating interaction and giving short often yes/no responses (Buzolich & Lunger, 1995). Different partners do vary in the way they interact with children and adolescents who use AAC and partners can determine whether the interaction is successful or not (Kraat, 1987; Light, 1988).

The child or adolescent with LNFS is at risk of becoming socially incompetent as studies show that positive peer relationships are necessary for social learning and development (Ladd & Asher, 1985; Romaine, 1984). Adolescents who use AAC, like their typically

developing peers, must function effectively from a social perspective if they are to become productive adults in society and it is essential to determine which strategies and techniques contribute to communicative competence (Light, 1988). Communicative competence implies that the adolescent who uses AAC is able to achieve their communication goals including the goal of social closeness (Light, 1997).

Communicative competence for a person who uses AAC was defined by Light (1989) as consisting of linguistic competence, operational competence, social competence and strategic competence. However, the communicative competence of the adolescent who uses AAC is only part of the equation for successful interaction with peers. Calculator (1999) discusses five sets of variables that may influence interaction:

i. Features of the AAC system or device
ii. The characteristics of the adolescent who uses AAC including abilities, personality, motivation and attitudes.
iii. The characteristics of communication partners including their attitudes, perceptions, knowledge, style of interaction and motivation to interact with adolescent who uses AAC. In addition, the character, experience and the familiarity of the peer partner with the adolescent who uses AAC as well as the level of the support they have received are important.
iv. The quality and content of the instruction given to both the adolescent who uses AAC and the partners.
v. Additional associated variables such as opportunities and reasons to communicate and so forth.

Thus it can be seen that achieving successful communication for adolescents who use AAC is a complex and demanding process.

2.6 THE NECCESSITY TO TRAIN COMMUNICATION PARTNERS

Communication cannot occur in the absence of a partner. The importance of the communication partner or partners in influencing the success or failure of the interactions of adolescents who use AAC has been found to be decisive by many researchers (Bedrosian, Hoag, Calculator, & Molineux, 1992; Light, 1988). Some partners are

instinctively far more competent in adapting to the distinctive requirement of interacting with a person who uses AAC, whereas other partners need to receive effective training in strategies to improve communication with persons who use AAC (McNaughton & Light, 1989). A survey of persons responsible for the implementation of AAC indicated a great need for skills in methods to train communication partners as well as methods to support people who used AAC in their daily interactions (McCall & Moodie, 1998). This survey highlighted the specific need for training of the professionals in methods to support the communication of persons who used high-technology AAC and had C.P (McCall & Moodie, 1998). The value of training the peer partners of children or adolescents who use AAC is clearly evident when looking at outcomes of students who use AAC in inclusive classrooms. With respect to the participation of AAC students in inclusive classrooms in America, Calculator (1999) observed two possible outcomes: (i) little or no evidence of social inclusion of some students using AAC despite good operational competency skills and (ii) students using AAC who are active participants in academic and other activities and who interact by initiating and responding to varied partners including peers (Calculator, 1999).

There is an interactive effect between the competence of the peer partner and the competence of the person using AAC, each impacting on the other. The development of communicative competence is therefore inseparable from socialisation and partner interaction (Butterfield, Arthur, & Sigafoos, 1995; Whitmire, 2000). The adolescent with LNFS needs to be an active participant with peers in the communicative processes in order to develop the required social skills (Nippold, 2000). Learning of these social processes can only take place by regularly interacting with and developing friendships with peers. The necessary processes can only be assimilated by adolescents who use AAC if he/she is an interactive and integral member of a social peer group. Furthermore, to enable adolescents who use AAC to generalise communication skills, it is essential that opportunities exist with varied peer partners in natural settings. Thus communication and social skill learning cannot be considered as goals in themselves but as interactive processes essential to social participation (Butterfield et al., 1995).

To be effective AAC intervention should address communication competency skills through direct training of the significant communication partners as well as the adolescents who use AAC (Light et al., 1992; Mc Naughton & Light, 1989). Whereas in the past focus has been placed on training the person using AAC these issues are equally important and it is essential that peer training be addressed if AAC intervention is to be meaningful. Although both aspects need to be integrated into the AAC intervention of adolescents who have LNFS, the latter issue is the main topic of this study.

2.7 THE TRAINING OF PARTNERS IN AAC RESEARCH

Training of communication partners has been addressed in different ways in the field of AAC. Training partners with a focus on creating opportunities for communication has been the promoted as particularly relevant for individuals who use AAC and have severe cognitive disabilities (Arthur, Butterfield, & McKinnon, 1998; Butterfield, Arthur, & Sigafoos, 1995; Light et al., 1992; Calculator, 1988; Sigafoos, 1999).

Training of significant adults (including staff and/or parents) in appropriate communication strategies has also received attention (Arthur et al., 1998; Butterfield et al., 1995; Calculator & Luchko, 1983; Culp, 1989, Culp & Carlisle, 1988; Granlund, Terneby, & Olsson, 1992; Light, Collier, & Parnes, 1985 (b), NcNaughton & Light, 1989).

With respect to creating opportunities for communication for individuals with developmental disabilities in communication Sigafoos (1999) highlights the importance of developing training programmes and support for peers. Five typically developing adolescents acted as peer facilitators in a study by Hunt, Alwell, & Goetz (1988) to encourage the conversational interactions of three adolescent students with severe cognitive disabilities and limited speech. In a later study, the same authors trained regular education peer students as peer tutors to facilitate the conversational exchanges of three children (Hunt, Alwell & Goetz, 1991). Buzolich and Lunger (1995) did not use direct training of peer partners but trained the adolescent who used AAC to recognise the interactive patterns of her peer partners and to use direct and indirect strategies to gain

increased conversational control with her peer partners. Another approach proposed by Van Tatenhove (1992) was to use persons who were competent in their use of AAC as peer trainers and mentors.

Although widely advocated training of peer partners of children and adolescents has received little attention. One study that focused exclusively on training peer partner skills to increase the interaction of four children, three 5-year-old boys and a girl of nine years of age, was conducted by Carter and Maxwell (1998). The intervention did not address the communication skills of the children who used AAC and the results indicated that improving the partner skills resulted in increased interaction of the children who used AAC and their peers (Carter & Maxwell, 1998). During their baseline observations the peers seldom waited for a response from the child using AAC and frequently ignored the communication initiations of the child using AAC (Carter & Maxwell, 1998). An increase in the use of the communication strategies that had been taught to the peers was noted following the intervention (Carter & Maxwell, 1998). There was also an increase in the social interaction of the children who used AAC and Carter and Maxwell (1998) suggest this might have been due to one or more of the following reasons:

i. Increase in the number of opportunities for interaction.
ii. Imitation of the peers who demonstrated the interaction strategies they had been taught.
iii. As a process of natural peer reinforcement that occurred when the children using AAC attempted to communicate.

Butterfield et al. (1995) emphasize three aspects related to partner skills, (i) attitudes, (ii) knowledge/information and (iii) increasing opportunities to communicate. These three aspects are interrelated, as providing information and knowledge about the peer with LNFS has a positive effect on attitudes to the individual with LNFS (Gorenflo & Gorenflo, 1991). Providing information and knowledge of how peers can improve their ability to communicate with the adolescent with LNFS will generate increased opportunities of such interactions (Butterfield et al., 1995). Adolescents who use AAC frequently lack opportunities for interaction and partner expectations, internal states and

the demands of the environment all influence opportunities for communication (Zangari & Kangas 1997).

Additional characteristics of conversational partners mentioned by Calculator (1999) that could be addressed in peer training include familiarity with the AAC system, motivation to communicate with the adolescent who uses AAC and the nature of the messages including the verbal input of the partners. It would appear imperative to address all of these issues in the peer training component of AAC intervention with adolescents who use AAC and to increase the peers' awareness of the value of their own skills as communication partners. In developing training programmes for adolescents who use AAC it is imperative to identify the requirements of training and to ensure the training as well as the training procedures have a sound theoretical basis.

2.8 THEORY AND PRINCIPLES OF PEER TRAINING

Models for peer training to improve social and communicative skills have developed from behavioural, cognitive and affective theories of learning. There is evidence that approaches based on all three of these areas need to be included for the most efficacious training (Cartledge & Milburn 1995). Social perception and social learning are developmental processes that are affected by the behavioural, affective and cognitive status of the individual and the peers. Vygotsky (1962) offers a developmental theory that assists us to understand how socially more developed behaviours, emotions and thought processes can be developed through peer interaction.

2.8.1 Vygotsky's Developmental Theory and Zone of Proximal Development

Facilitating more socially mature processes in adolescents is more likely to occur when they are guided, given a model to imitate or in co-operation with more advanced individuals (Cole &Wertsch 2000). Vygotsky's theory forms the theoretical basis for the presentation and teaching of interaction skills within the adolescent peer group, using the context of the classroom and culturally acceptable tools and games (Cole & Wertsch, 2000). Central to Vygotsky's social developmental theory of learning is the construct

that the process of becoming socialised gives rise to individual growth that is fundamentally mediated by ideas, words or objects (Cole & Wertsch, 2000). Vygotsky theorised that cognitive development is profoundly influenced by social interaction (Riddle & Dabbagh, 1999). Vygotsky explains this process of how an individual's cognitive (intramental) development is acquired as a result of interpersonal (intermental) processes in his general genetic law of cultural development (Cole & Wertsch, 2000). Vygotsky (1962) proposed the idea of a zone of proximal development (ZPD), which he defined as the discrepancy between the level of actual development and potential development. It gives theoretical validity to the principle of peer training. It is within this zone of proximal development that the adolescent who uses AAC can develop from his current level of interactive skills to a potential level of interactive skills that may ultimately influence the development of social and cognitive skills. According to Vygotsky's theory less highly developed individuals can participate in developmentally higher social processes with more capable individuals than they would be capable of, alone (Cole & Wertsch, 2000). Through this social process individuals learn to become more competent (Cole & Wertsch, 2000).

Thus an adolescent can perform a task or solve a problem with peer collaboration or under adult guidance that he/she could not accomplish alone (Riddle & Dabbagh, 1999). Learning in a reciprocal way with joint attention and shared problem solving is fundamental to both social skills training and cooperative learning models.

2.8.2 Social Skills Training Approaches

Social skills do not only consist of overt observable behaviours, but also of non-observable cognitive factors, such as interpretation of feedback from others in the environment, thinking of the next response as well as affective elements (Cartledge & Milburn, 1995). The training process must therefore help to make the adolescents aware of the thoughts and feelings they experience during peer interactions as well as developing behaviours that will facilitate positive interaction.

The social skills training model includes procedures such as social modeling, behaviour rehearsal and reinforcement (Cartledge & Milburn, 1995).

- Social modeling or learning by imitation involves the production of a social behaviour to facilitate learning through observation and imitation by another. It is the typical method that children and adolescents instinctively use to learn social skills through the imitation of the social behaviours of others including peers, parents, siblings, teachers and even behavious to which they are exposed by the mass media. Extensive use of this method has been documented in teaching children and adolescent specific social skills and behaviours from simple greetings to conversational skills (Cartledge & Milburn, 1995).
- Behaviour rehearsal is the practicing of the modeled skill in a simulated or natural setting with reinforcement and feedback.
- Reinforcement often includes arranging relevant settings for the adolescent in order to practise the skills with different partners in various settings. Once skills are learnt additional strategies to promote generalisation and maintenance may be required.

In preparation for modeling a new skill, it has proven effective to discuss the reason and potential benefits of the goal behaviour. Providing a rationale that is meaningful to those learning the skill not only increases their motivation but also encourages the development of cognitive problem solving of social interactions (Cartledge & Milburn, 1995). In preparatory discussions it is also helpful to identify specific components that may make up the targeted social skill. This is particularly relevant if the social skill involved is complex, for example conversational skills.

Peers are used in social skills training as they have considerable influence over the social behaviours of other adolescents. It is important that the peer group understand the target social skill and how to provide support and encouragement. Appropriate social interaction and communication is likely to be reciprocated by peers, and in this way reinforces the social interaction, helping to maintain the new skills. Training a group of peers as peer models has proved highly effective in social skills training (Cartledge & Milburn, 1995). In this way appropriate interaction by the trained peers with adolescents

who use AAC should result in peer imitation by other peers, thereby increasing interactions.

Using a game format is effective in teaching social skills, as it is motivating to adolescents and allows preferred behaviours to be practiced (Cartledge & Milburn, 1995). Games have been well documented for teaching skills such as turn taking in addition to simulating real life situations (Cartledge & Milburn, 1995). Games provide an opportunity to practise social skills in a fun situation and allow adolescents to learn the consequences of behaviour. However, the application of skills learnt in games to real life situations does need to be made clear to facilitate generalisation (Cartledge & Milburn, 1995). Competitive games involving win/lose scenarios are less effective than cooperative games, which are preferred, as they promote positive social interaction (Cartledge & Milburn, 1995). Cooperative games involve cooperative learning.

2.8.3 Cooperative Learning Model

Cooperative learning is defined as adolescents working together for mutual benefit, encouraging and supporting each other. In addition the individuals assume responsibility for their own and each other's learning, employ group related social skills such as decision making and trust building, and evaluate the groups' progress (Johnson & Johnson, 1989). Cooperative activities where responsibility and work are shared and where each participant has the opportunity to progress, is the basis for successful interpersonal communication and relationships (Johnson, & Johnson, 1989). Research on cooperative learning activities has indicated positive outcomes in terms of friendships and peer relations (Cartledge & Milburn, 1995). Furthermore, there is a direct correlation between the usefulness the adolescent attributes to the target social skill and that individual's eagerness to learn and apply the skill. Group cohesiveness is essential to facilitate cooperative learning. Everyday at school, adolescents work to maintain and establish interpersonal relationships with peers and to develop their social identity and sense of belonging through interactions with their peer group (Hallinan 1980). This process of developing group cohesiveness should be deliberately facilitated both by the

behaviour and enthusiasm that is modeled by the group leaders and by specific group strategies as presented in Table 2.1 to provide a suitable environment for peer learning.

Table 2.1 Strategies to promote group cohesiveness

Strategy	Description
Circle seating arrangement	All discussion type activities should take place with everyone seated in a circular arrangement to: ▪ Differentiate the peer training group from normal class groupings, ▪ Promote a sense of equality as the leader becomes more of a group member ▪ Facilitate communication as everyone can hear and see the person speaking more easily ▪ Enable each member to make eye contact with every other member ▪ Eliminate the physical barriers between members (Cartledge & Milburn 1995).
Rounds	This technique is aimed at giving every individual the opportunity to make a comment on the specific topic being discussed. One student should be nominated to offer a suggestion, make a comment or respond to a set question. Proceeding clockwise or anti-clockwise each member then has the opportunity to offer their contribution knowing that they would be listened to attentively. The negative aspect of rounds is that anxious learners may feel stressed, as they have to make a contribution.
Brainstorming	Each member can call out his/her idea, which is recorded by a nominated scribe or the group leader. Ideas are given but no commenting takes place during brainstorming as the aim of brainstorming is to generate ideas for later discussion or comments. (Rose, 1998).

2.8.4 Underlying Principles and their Application in Peer Training Programmes

Potential underlying principles and their application in the programme are presented in table 2.2.

Table 2.2 The underlying principles and their theoretical basis

Principles	Theoretical bases
Social modeling involves the practice of teaching a behavior by presenting a model to be observed and imitated. (Cartledge & Milburn, 1995).	Most social behaviours are learned by social modeling (Cartledge & Milburn, 1995). Adolescents imitate the behaviours of significant others including parents, teachers and peers. (Cartledge & Milburn, 1995).
Behavior rehearsal is considered crucial to ensure that social skills, including communication skills, are learnt effectively (Cartledge & Milburn, 1995).	Children and adolescents should be given opportunities to practise new or adapted interactive behaviours and responses (Cartledge & Milburn, 1995). When individuals practice modeled behaviours they are more likely to remember them (Bandura, 1977).
The principle that eliciting observations and potential solutions is a far more effective way to learn new behaviours than if they were suggested by the trainer. .	The group discovery process is a exceptional method of teaching adolescents concepts (Hess, 1993).
The principle that adolescents learn and maintain behaviours far better when cognitive understanding is engendered (Bandura, 1977).	By evaluating different outcomes, individuals develop theories concerning the most appropriate responses, which then influence future actions (Bandura, 1977). Assisting adolescents to understand the essential aspects and applications of interactive behaviours allows them to conceptualise their experiences and apply leant skills to real-life situations effectively (Cartledge & Milburn, 1995).
The principle of using games is an effective tool to increase rapport with adolescents and to improve their effort in learning social skills (Malouff & Schutte, 1998).	Using games improves the motivation of adolescents in learning interactive behaviours (Cartledge & Milburn, 1995). Games provide opportunities to practise social skills and develop positive peer interactions (Cartledge & Milburn, 1995).
The principle that problem solving is an important component in promoting supportive peer relations and a necessary means to promote social cognition.	Problem solving involves decision making in selecting potential solutions and evaluation of the potential success of the proposed solutions (Rose, 1998). Problem solving with adolescents improves interpersonal relations of adolescents and reduces labeling (Rose, 1998).
The principle that short term groups with a specific goal are suitable for developing skills and are time efficient.	Time-limited, closed-ended (thematic) groups are appropriate for training specific skills and are time proficient (Rose, 1998).

2.9 THE EVALUATION OF PEER TRAINING PROGRAMMES

The evaluation of expected outcomes and objectives is a basic requisite of peer training programmes in order to determine the effects of the training. Evaluation procedures that have been used with adolescent peer training programmes have included one or more of the following procedures:

(i) Evaluation questionnaires (Epstein, Borduin, & Wexler, 1985).

(ii) Specific tests administered pre and post intervention (LeCroy & Rose, 1986).

(iii) Focus interviews of participants and /or parents (Epstein, Borduin, & Wexler, 1985).

(iv) Direct observation (Ladd & Asher, 1985).

(v) Behavioural and socio-metric measures (Ladd & Asher, 1985).

(vi) Rating scales (Cartledge & Milburn, 1995).

Calculator (1988) suggests that the AAC intervention could be evaluated in terms of changes in the social roles and self concept of the person using AAC as well as the perceptions of others. Calculator (1988) contends that the effectiveness of the AAC intervention (whether instruction is directed at the person using AAC or his/her communication partners) should be evaluated in terms of functional outcomes for the person using AAC.

2.10 SUMMARY

This chapter aimed to provide a theoretical framework for the need to train the adolescent peers interacting with an adolescent who uses AAC. The crucial importance of social interaction with peers and the influence of peer attitudes during adolescence were emphasized. Findings of researchers investigating the communication of adolescent who use AAC and the training of communication partners were briefly reviewed. Vygotsky's theory of developmental learning and the models of social skills training and cooperative learning were discussed. The chapter ended with the presentation of relevant theoretical principles of a peer training programme.

CHAPTER 3
DESCRIBING PEER INTERACTIONS WITH A PERSON WHO USES AAC: MOVING TOWARDS AN ANALYTICAL SYSTEM

3.1 INTRODUCTION

A comprehensive description of interaction between a person who uses AAC and his/her peers requires an analysis of the immediate interaction, but also necessitates some information about the peers, their attitudes towards the individual who uses AAC in addition to the perspective of the person using AAC.

This chapter focuses on the description of measures that could be used to describe the psychosocial background of peer interaction, for example the self-evaluation of the person who uses AAC as well as factors that need to be considered in the development of an analytic system for interaction. Firstly, measures for illustrating the psycho social background are described after which information is provided about analytical systems that can be used to describe interaction between a person who uses AAC and peers in natural contexts, such as the classroom.

3.2 THE COMPLEXITY OF COMMUNICATION

Communication is a dynamic, complex and multi-faceted interactive process that takes place between two or more persons. Each person brings to the interaction their attitudes, beliefs, perspectives, prior experiences, knowledge of their relationship with the other interactants, unique communication style, range of communication strategies, world knowledge, understanding of socio-cultural norms, motivations and aims or goals for the interaction. Communication is achieved by a variety of different modes and the interactive behaviours of the individuals involved constantly effect the understanding and behaviours of the other individuals involved in a complicated process that is primarily managed by the codes and rules of social interaction (Kraat, 1987).

Different contexts require different forms and content of language necessitating not only knowledge of language but of the social cultural rules of language within social contexts (Kraat, 1987). Every individual has his or her own style of interaction and chooses the language and modes needed in attempting to accomplish the specific function of the interaction (Kraat, 1987). During all stages of life but particularly in adolescence, the social functions achieved through interactions are important (Light, 1997a). It is also during adolescence that the value placed on the psychosocial goals of interaction such as reflecting the individual's personality, status or role relationships are intense. Interactions between adolescent peers are directly influenced by self-evaluation, appraisal of one another and the socio-metric status of the peers involved in the interaction. These psychosocial dimensions must also be investigated and described in studies involving the description of interactions involving adolescents who use AAC.

The environment in which communication occurs also influences the interaction, and social rules dictate what is appropriate for a specific environment. Different contexts within the environment will result in adaptations to the language used, the time, style and length of the interaction (Kraat, 1987). Within the classroom environment very different interactive behaviours could be expected between the same peers depending on the context, for example during a test as opposed to working on a group project. Knowledge of appropriate interaction behaviours for given situations and contexts increases during adolescence.

Interactions involving persons who use AAC are inherently multifaceted by virtue of the multimodal nature of AAC and the effect of the AAC system used on the interactional process itself. Some of the factors that impact on the communication process include:

i. the attitudes and beliefs of the communication partner
ii. the behaviours of the speaking partner
iii. the multiple modes of communication some used simultaneously
iv. the use of a device and the characteristics of the device
v. the format of the message formulation and transmisson
vi. issues of positioning and mobility.

All of the above factors as well as the abilities of the person using AAC have differential effects on the communication process and descriptions of interactions need to address how the interactants adapt to each other in negotiating meaning and achieving their goals of communication.

Communicating by means of multi-modal AAC systems allows certain aspects of conversation to be successfully achieved whereas other components remain difficult or impossible (Kraat, 1987). Even those aspects completed successfully require both the person using AAC and the communication partner to make adaptations to interact successfully (Kraat, 1987). Voice output communication devices are far from equivalent to natural speech with a major constraint being the slower rate of communication (Kraat, 1987).

Thus the researcher using observational data to investigate interactions between persons using AAC and speaking partners needs to make decisions regarding:

i. measures to define and describe the psychosocial background of the person using AAC
ii. the optimal method of collecting the observational data
iii. the notational system that will be used in recording the data
iv. the transcription system and principles including the division of the transcript into segmental units
v. the coding of the transcript and finally
vi. the analytical system to be applied to the coded data.

The importance of each of these factors will be determined largely by the purpose of the specific research project.

3.3 MEASURES TO DESCRIBE THE PSYCHOSOCIAL BACKGROUND

Relationships develop between speaking persons when there is sharing, interaction or participation between the individuals. This is also true of relationships between a person who uses AAC and speaking partners (Warrick, 1988). Interactions and relationships between individuals have the potential to further psychosocial growth (Warrick 1988). There is a plethora of measures used to describe the psychosocial background of interactants. Measures that appeared pertinent to describing the psychosocial background of adolescents who use AAC are briefly described within the framework of:

(i) peer referenced assessment procedures,
(ii) self-report measures and
(iii) techniques to describe the evaluation by significant adults of the social interaction of an adolescents who use AAC with his/her peers.

3.3.1 Peer Referenced Assessment and Evaluation

Peer-referenced assessment strategies have been used extensively to identify the socio-metric status of children and adolescents for social skills training, to select children and adolescents for social skills training as well as to measure the outcomes of social skills training programmes (Gresham & Little, 1993).

3.3.1.1 Sociometric measures

The degree to which peers accept an adolescent or pre-adolescent into their group indicates that individual's social status. Peers have an unequaled position in assessing another's social status and behaviour (Gresham & Little, 1993).
Possible socio-metric measures include:

i. Simple Nomination procedures

Peer nomination procedures are the most commonly used socio-metric measure to gauge whether children are liked or disliked by their peers (Gresham & Little, 1993). This generally involves asking members of a group, for example a class, to nominate one or more children according to set criteria such as who they like

to play with or would prefer to do a project with. Options include a fixed or unlimited number of nominations, the inclusion of negative evaluations, or a weighting system such as allocating rank order to the nominations (Gresham & Little, 1993).

i. Peer rating measures

In peer rating measures each member of a peer group rate every other member of the group on a Likert-type scale according to set parameters such as how well they like the peer (Gresham & Little, 1993).

ii. Peer Assessment

Using either open-ended descriptions, structured questionnaires or interviews group members rate peers on their behaviour as opposed to their attraction to the peer (Gresham & Little, 1993).

3.3.1.2 Peer evaluation of communication of adolescents using AAC

No specific measures were found relating to the peer evaluations of the communication of adolescents who use AAC. The Partners in Augmentative Communication Training (PACT), child and partner rating scales were published as part of the PACT resource guide for interaction facilitation training for children by Culp and Carlisle (1988). The rating scales were piloted in July 1986 with a sample group of 11 children and their primary care takers, 10 mothers and one father (Culp & Carlisle, 1988). The PACT rating scales were designed to evaluate the attitudes of specific dyads, a child who uses AAC and a communication partner (Culp & Carlisle, 1988). The child's perception of the attitudes of the partner to their communication and the partner's perception of the child's attitudes to communication are also investigated by the PACT scales (Culp & Carlisle, 1988).

3.3.2 Self-report

Numerous self-report questionnaires and scales are used in the assessment of social skills, self concept, attitudes and values of both adolescents and children (Gresham & Little,

1993). Self-report measures are an import source of information as they offer the unique perspective of the person himself.

3.3.2.1 Multidimensional self concept scale

The Multidimensional Self Concept Scale (MSCS) was devised to provide a multidimensional assessment of self concept (Bracken, 1992). It presumes that self concept develops in an organised way according to behavioural principles (Bracken, 1992). The MSCS consists of a 150-item, 4-point Likert-type self report scale. It was designed as a comprehensive assessment of global self concept and as a measure of six dimensions of self concept, namely: social, competence, affect, academic, family and physical (Bracken, 1992). It was devised for children and adolescents from Grade 5 through Grade 12 (ages 9-19 years) and was standardised on a sample of 2501 students of both regular and special education programmes in major centers of the United States of America (Bracken, 1992).

3.3.2.2 Self description questionnaire ll

The Self Description Questionnaire ll (SDQ ll) is a 102–item self report scale that was designed to measure multiple dimensions of self-concept (Marsh, 1990). It was devised for adolescents in Grades 7 through 10 and a 6-point Likert scale format is used (Marsh, 1990). The SDQ ll assesses three areas of academic self concept, seven areas of non-academic self concept and a general self concept (Marsh, 1990). It consists of the following 11 scales, physical abilities, physical appearance, opposite-sex relations, same-sex relations, parent relations, honesty-trustworthiness, emotional stability, math, verbal, general school and general self concept (Marsh, 1990). Results on these scales are summed to yield a total self concept scale. Norms are based on the responses of 5,494 Australian students and are presented for each of the scales and for the total self concept scale (Marsh, 1990).

3.3.2.3 Interviews

Interviewing is a widely used technique by researchers to elicit qualitative information. According to Miller (1991) interviews may take one of three formats as outlined in Table 3.1.

Table 3.1 Interview Formats

Interview Type	Method
Structured Interview (Formal interview)	A detailed instrument that contains closed and /or open questions that have been prepared by the researcher and are usually presented in a pre-determined sequence. This is the most highly structured format and may include socio-metric scales or questionnaires.
Focused Interview (Intensive interview)	The researcher knows in advance which topics, experiences or themes he wants to investigate and focuses attention on these. Less rigid than the structured interview and probing for more information by encouraging respondents to digress or expand on themes is encouraged.
Free Story Interview	The least structured format in which the interviewee(s) are encouraged to speak openly expressing their opinions about the subject under investigation. Completely open ended and used when the researcher wishes to examine in depth the opinions or experiences of individual respondents.

Interviews may be completed individually or in small groups. Whether the interview is successful or not will largely depend on the ability of the interviewer to establish rapport with the respondents and to listen attentively and actively to respondents (Miller, 1991). The analysis of data obtained by this method, especially where open ended questions are used, needs to be carefully coded and independent raters are required in order to establish the reliability of the coding the validity of the results (Miller, 1991).

3.3.2.4 PACT user scale

Discussed in 3.3.1.2 the PACT includes a user scale to determine the attitudes of the child or adolescent who uses AAC in addition to those of the communication partner (Culp & Carlisle, 1988). The child's perception of the attitudes of the partner to their communication is also investigated by the PACT scales (Culp & Carlisle, 1988).

3.3.3 Evaluation of Social Interaction by Significant Adults

3.3.3.1 Interactive checklist for augmentative communication

The Interactive Checklist for Augmentative Communication (INCH) was designed to assist AAC clinicians to asses and describe the factors required for successful AAC in natural settings (Bolton & Dashiell, 1991). It concentrates on three major areas of interaction referred to by the authors as strategies, modes and contexts (Bolton & Dashiell, 1991). It was designed as a flexible tool and does not have standardised norms or standardised procedures of administration and is designed to provide a description of the baseline interactive skills of the person using AAC (Bolton & Dashiell, 1991). The INCH also provides a framework for building communication competence within the natural settings based on the checklist findings of which strategies need to be trained; who needs to be trained (person using AAC and/or the partners) and the contexts in which the strategies need to be trained (Bolton & Dashiell, 1991)

3.3.3.2 PACT partner scales

As discussed in 3.3.1.2 the PACT rating scales were designed to evaluate the attitudes of any specific dyad of a child who uses AAC and a communication partner (Culp & Carlisle, 1988). They are thus appropriate for determining attitudes of significant adults to a child or adolescent who uses AAC

3.3.3.3 Interviews

The strategy of using interviews was discussed in 3.3.2.3. It is a powerful and appropriate tool to probe attitudes (Miller, 1991). Some of the pertinent advantages and disadvantages of interviews are presented in Table 3.2 below.

Table 3.2 Advantages and Disadvantages of Interviews

Advantages of Interviews	Disadvantages of Interviews
Supplementary information can be obtained by probing opinions or beliefs expressed by respondents.	Especially in less structured interviews the respondent may go off topic leading to insufficient or superfluous data.
More spontaneous responses are captured as opposed to written questionnaires or scales (Miller, 1991).	They are time consuming.
Recall of relevant information is facilitated by orientating the respondent to the topic.	Data may be distorted by interviewer bias.
The interviewer is able to observe the emotional responses to questions. The topic or situation may be handled more carefully leading to greater insight.	
Open ended questions or probing can elicit information that might otherwise not have been revealed leading to greater depth of data.	
Misinterpretations of questions can be rectified.	

3.4 TOWARDS A SYSTEM FOR DESCRIBING INTERACTIONS INVOLVING A PERSON WHO USES AAC

To consistently and accurately describe the complexity of the interactions of a person who uses AAC with peers requires the following:

i. A reliable method to accurately record the multimodality of interactions of the person using AAC and his/her partner(s) for later observation and analysis.
ii. The spatial layout and terminology to be used in the transcript.
iii. The notational conventions to be used in the transcript.
iv. The theoretical and methodological basis for the transcript
v. The basis for the segmentation of the transcript into segments and units that will allow for further coding and analysis.

3.4.1 Recording Observational Data

Recording interactions of persons using AAC with speaking partners in natural contexts presents difficulties. Using only audiotapes has been found to be unsatisfactory due to the lack of information recorded with respect to non-verbal modes of communication and contextual information (Kraat, 1987). Videotaping has been widely used and recording with audiotapes and observational techniques, including on-line coding, in addition to

videotapes has been found to be necessary in some studies (Kraat, 1987). To measure the influence of AAC intervention in a natural context such as the classroom it would be necessary to accurately record the interactions of adolescents who use AAC with peers.

The evidence would need to be accurate and verifiable so that measurements could accurately reflect both:

i. increases in the frequency and extent of successful initiations with peers by the adolescents who use AAC
ii. increases in the number of initiations and responses made to the adolescents who use AAC by peers (Calculator, 1999).

In order to closely compare relatively large segments of interaction, videotaping would provide both verbal and non-verbal information that could be carefully reviewed as often as necessary to provide an accurate portrayal of interactions taking place between AAC users and peers. Videotaping would provide a permanent record that would be open to verification by inter-raters, research participants as well as other researchers.
Videotaping would be the preferred means of recording interactions due to the wealth of information that is recorded by this method compared to audiotaping and other observational recording methods.

3.4.2 Definitions

The problem of technical definitions and terminology describing communication is exceptionally intense as research in this area has been carried out by different disciplines including psychologists, educationalists, sociologists, linguists and anthropologists (McTear, 1985). Research into natural conversations has led to the prolific creation of terminology and classification systems that are frequently used with conflicting definitions (McTear, 1985).

The problem is exacerbated when terminology and classification systems from research into spoken communication are transferred to the field of AAC and applied to situations that are very different in nature (Smith & Grove, 2001). The word 'utterance' refers to spoken words and is therefore not suited to persons who use AAC who typically use

multi-modal means of conveying messages. Within AAC research, alternatives to utterance have included "communicative function episode" (Letto, Bedrosian, & Skarakis-Doyle, 1994); "message formulation episode" (Higginbotham, 1989) and "discourse unit" (Light, Collier, & Parnes, 1985a).

3.4.3 Notational Conventions

Various notational conventions when transcribing the discourse of persons who use AAC and their speaking partners have been used by researchers. Selected notation conventions used by AAC researchers in transcribing interactional behaviours are detailed in Table 3.3.

Table 3.3 Definitions of notations and theoretical basis

Notation Convention used	Meaning of the notation	Theoretical basis
Words italicized	Naturally spoken utterance	Von Tetzchner, & Jensen (1996).
Words in quotation signs	Meanings of words produced by facial expressions or body movements e.g. shakes head "no".	Von Tetzchner, & Jensen (1996).
Words/sentences italicized and in quotation signs	Words/sentences in synthesized speech using DeltaTalker™	Von Tetzchner, & Jensen (1996).
Words with each letter separated by a hyphen and underlined	Words that were spelled out e.g. O-k-a-v-a-n-g-o	Von Tetzchner, & Jensen (1996).
Words or text marked by a pair of angle brackets marked with a capital letter X e.g. <X becauseX>	Words that are not clearly audible to the transcriber i.e. their accuracy is not certain but they represent the best guess of the transcriber	Du Bois, Schuetze-Coburn, Cumming, & Paolino (1993).
Words or parts of words represented by the capital letter X.	Words and or syllables that were not intelligible and could not be deciphered either by the transcriber or person using AAC.	Du Bois, Schuetze-Coburn, Cumming, & Paolino (1993).
A # signifies the end of an interactional event.	The end of a single or series of initiations and responses that constitute an interactional event.	Du Bois, Schuetze-Coburn, & Paolino (1993) The # was used as the morphosyntactic boundary of a clause.
L = movement towards left R = movement towards right ↑= movement or eye-gaze up ↓= movement or eye-gaze down → =eye-gaze to right ← = eye-gaze to left □ = eye-gaze to camera	Hand movements, body orientation, facial expressions and eye-gaze notated.	Kraat (1987).

3.4.4 Transcription in Interactive Research

Research into the complex processes of AAC should be theoretically grounded (Müller & Soto, 2001). The bias and the assumptions that support the methodology should also be explained (Higginbotham, Mathy-Laikko, & Yoder, 1988). Light (1988) suggests that more than a third of research studies involving the interaction of individuals who use AAC have omitted analysis of the partner behaviours. In determining the communicative competence of a person who uses AAC it is vital to consider the interactive process from a social perspective, including the perspectives of both persons using AAC and their partners (Light 1988). Discourse analysis considers the structure, context and processes of conversations between speaking partners from a social perspective and could provide a methodological basis for the analysis of interactions of persons who use AAC with their speaking partners (Müller & Soto, 2001).

Discourse analysis presumes language as constructing social life and not merely as reflecting it (Coyle, 1995). Discourses are viewed as the basic elements that construct social reality and by examining discourses analysts can gain understanding of social interactions and social life (Coyle, 1995). It thus focuses on how people use language to construct social realities by selecting from their linguistic resources to create their version of events within social settings (Coyle, 1995). A further assumption of discourse analysis according to Coyle (1995) is that all discourses have an action orientation in that they are used to achieve social purposes (Coyle, 1995). Adapted systems of discourse analysis have been used in AAC research, for example, in a study on the discourse patterns of young children who had physical disabilities and LNFS when interacting with their primary caregivers (Light et al., 1985a). Within the field of discourse analysis many systems of transcription are employed and the way researchers select to present their data has significant consequences for the interpretation of data (Müller & Soto, 2001).

As transcripts of videotapes provide the primary data for interactive research involving AAC and constitute the central evidence it is crucial to determine the optimal system for transcribing, coding and analysing data obtained from videotapes. Müller and Soto (2001) contend that research in AAC requires a systematic and standardised approach to both notation and transcription of data. Yet, according to Hunt Berg (2001) there are no standardised coding and transcription system that are flexible enough to adequately describe and interpret the variety and complexity of the communication modes and strategies employed by AAC users. Thus, the development of systems of outcome measurement is critical, as these systems will determine whether the changes attributed to AAC interventions are valid. Selected methods should be well defined, precise and applied consistently (Smith & Grove, 2001). To summarise, it is vital that researchers in AAC clearly describe the theoretical and methodological basis that they select for the collection, transcription and coding methods selected (Soto & Grove, 2001).

3.4.4.1 Principles of transcription employed in AAC research

The theoretical basis of transcription principles used by AAC researchers in transcripts is described in Table 3.4.

Table 3.4 Definitions of transcription principles and theoretical basis

Principle Used	Theoretical Basis and Rationale	Reference
The transcription should provide a functional perspective of the interactive behaviours of the participants. A macro rather than micro analysis should be provided.	Focused on the management of interactions by the participants at relational, content and outcome levels irrespective of the mode of communication used	Gumperz & Berenz (1993).
The context is an important and integral part of the interaction behaviour and must be included in the description of interactions in the transcript	Context to include the physical environment including access to communication techniques and strategies by the person using AAC; the functional context including the activity during which the interactions take place, the social context including whether the interaction took place between peers who were friends or assigned to work together; the language context including use of other languages and the cultural context including the adolescent peer group and teacher's values and expectations.	Light (1997b). (Contexts of language learning)
The verbal and nonverbal actions of the communication partner(s) should be included in the transcript of the interaction behaviours of the AAC user.	Communication is a transactional and dynamic process between 2 or more individuals and the partner's actions and responses are integral to understanding the interactional behaviours of the person using AAC. The shared knowledge and assumptions between the participants is an integral part of the interaction.	Kraat (1987). McTear (1985). Stubbs (1983).
The coding of each message should adequately describe it in a systematic way.	The coding should outline three levels of description: (i) the topics such as the mode, (ii) the categories within a topic such as vocalization, facial expression etc. and (iii) the codes, that is the numeric abbreviation that forms the coding record itself.	Lampert & Ervin-Tripp (1993).
The spatial orientation of the transcript layout should reflect: i. Interactions of the person using AAC and partenrs should be aligned in same column in sequential order, left to right and top to bottom. ii. Verbal and nonverbal behaviour should be presented in running text format. iii. Verbal and non-verbal behaviour to be placed in same column. iv. Context to be described briefly with respect to interactions	i. Equal prominence given to both augmented user and speaking peers. ii. Equal value given to both verbal and non verbal interactive behaviour. More readable and non verbal behaviour of equal visual saliency. iii. Interactive behaviours shown as integrated and complementary. iv. Context revealed as vital component of the interactive behaviours.	Müller & Soto (2001). Edwards & Lampert (1993). Müller & Soto (2001). Bloom (1993).

3.4.4.2 Segmentation of interactions

Before videotaped discourse can be analysed it is necessary to select suitable coding and transcription systems to provide a framework for organising the discourse. At the research symposium of the International Society for AAC in August 2000 the difficulties in transcribing the interactions of AAC users with respect to the following issues were highlighted:

(i) the difficulty establishing the unit of analysis,

(ii) the tendency to privilege augmented spoken utterances over non-verbal forms of communication, and

(iii) the difficulty inherent in transcribing simultaneous multi-modal communicative behaviour using traditional orthography to represent nonverbal modes" (Soto & Grove, 2001, p.12).

The problem of defining both turns and utterance boundaries as units of analysis was noted to be particularly relevant (Smith & Grove, 2001).

The preparation of a transcript begins with the decision of how to divide up the transcript into the basic unit of analysis which can be of any size for example an exchange, utterance or word etc. depending on the purpose of the transcript (Lampert & Ervin-Tripp, 1993). However, the unit of analysis must remain constant and be consistent with the objectives of the study (Lampert & Ervin-Tripp, 1993). From a developmental perspective the most elementary form of turn taking is the initiation followed by a response (I/R) (McTear, 1985). Conversational exchanges develop from the I/R to the three part initiation-response-follow-up exchange (I/R/F) (McTear, 1985). Following this developmental progression the next stage includes utterances that not only respond to the preceding utterance but also at the same time initiate a further response and in this way create continuity in conversation leading to open ended exchanges (McTear, 1985).

In other discourse analysis systems the process of transcribing begins with the segmentation of the interaction into coherent experiential segments, termed events (Gumperz & Berenz, 1993). Such extended segments may be referred to as interchanges

(Stubbs, 1983). In the analysis of spoken discourse these events are generally related to both content order and rhythmic regulation (Gumperz & Berenz, 1993). These events or interchanges are then segmented into smaller units for analysis. In the analysis of spoken conversation or discourse there are established conventions for segmentation into "conversational turns" which in turn consist of one or more "utterances" (Smith & Grove, 2001).

Many factors are used to determine turn boundaries in spoken language including pausing, changes in prosody such as tone or rhythm, grammatical clues, semantic criteria and gestural or other non-verbal cues (McTear, 1985; Smith & Grove, 2001). Different researchers into spoken language have defined utterance boundaries in different ways and the identification of utterances within a conversational exchange may differ significantly (Smith & Grove, 2001). Pausing, by the holding of manual signs or hand relaxation, is among the many ways that signers signal turn and utterance boundaries in sign languages (Smith & Grove 2001). But Smith and Grove (2001) point out that to determine boundaries in both spoken and signed discourse can be very difficult. When discourse involves an individual using AAC the difficulty in identifying boundaries is compounded (Smith & Grove, 2001).

The proposed solutions to defining segmental boundaries within previous AAC research are summarised in Table 3. 5. Please note that for accuracy in reflecting what was proposed the terminology used in the table is that of the referenced researchers and reflects some terminology that is not used currently.

Table 3.5 Definitions of segmental boundaries in AAC Research

AAC Method	Description of Definition	Study	Researchers
Communication board	Utterances are composed of one or more events (exchanges). Communication board users often require several events by both partners to complete a single utterance due to direct repetitions of the word(s) pointed to on the board. Explicit feedback from the aided communicator to signal that a turn or utterance is finished.	Strategies for the prevention and repair of communication breakdown in interactions with communication board users	Fishman, Timler, & Yoder (1985).
Communication board	Guidelines for determining utterance boundaries: i. As a convention, the first communication by the nonspeaking board user (NSP) is considered the beginning of an utterance. ii. Communication by the NSP following the completion of a previous utterance is considered the beginning of the next utterance. iii. Events produced by the speaking partner that function as a check on the accuracy with which the message was received, are considered components of the NSP's utterance since they serve to prevent breakdowns. iv. When a speaking partner (SP) attempts to guess an unintelligible or incomplete message, the NSP must also confirm the accuracy of the guess before the utterance is completed. v. A simple response to a yes/no question is considered one completed utterance. This is in contrast to a confirmation, which occurs within the breakdown. vi. The completion of an utterance may be determined by the onset of a new utterance. vii. Confirmations are often embedded in utterances. Several small breakdowns or strategies used to prevent breakdowns may occur within the formulation of one utterance. viii. Elaborations by the SP are not included in the NSP utterance if they add new information. ix. On occasion, breakdowns cannot be repaired and an intended utterance is abandoned. These are coded as incomplete utterances.	Strategies for the prevention and repair of communication breakdown in interactions with communication board users	Fishman et al., (1985).

AAC Method	Description of Definition	Study	Researchers
Communication board using Blissymbol display or Blissymbol and picture displays	Communicative turn: a unit of discourse " defined by a pronounced pause in which the partner might or might not take the floor" (Kaye & Charney, 1980, p.214 quoted in Light, Collier and Parnes 1985 a) Turn boundaries were demarcated either by a partner taking the floor or by a pause of 1 second or greater in length.	Communicative interaction between young nonspeaking physically disabled children and their primary caregivers: Part I – Discourse patterns.	Light et al., (1985a).
Communication boards with or without electronic output display	Message formulation episodes	The interplay of communication device output mode and interaction style between nonspeaking persons and their speaking partners.	Higginbotham (1989).
Use of real object in structured play situation.	Turns for the partner were defined as speech/vocal and/or gestural possession of the floor. Turns for the child were defined as vocal, smile, eye gaze, and/or gestural possession of the floor. Within each turn, one or more message units were transcribed and segmented. Segmentation procedures were as follows: i. a message unit for speech productions involved a complete or incomplete utterance as defined by terminal intonation contours and pause time (Miller, 1981). ii. a vocal message unit involved the production of a vowel, consonant, or any combination of the two as defined by pause time iii. a gestural message unit included a single gesture on the part of the child iv. an eye gaze message unit involved the child's use of direct eye contact with an object on the communication board v. a message unit for a smile involved any extension of the lips away from rest position as well as any retraction of the lips to rest position	Application of Vygotskian developmental theory to language acquisition in a young child with cerebral palsy.	Letto et al., (1994).
VOCA (LightTalker ™)	"Speaking " turns for the AAC user were defined as: i. when linguistic output was encoded on her communication system ii. verbal speech approximations for "yes" in response to yes/no questions. Feedback including vocalizations did not constitute a turn. Non verbal and verbal interactions for the purpose of clarifying messages were not considered a speaking turn but were recognised as within turn signals.	Empowering system users in peer training.	Buzolich & Lunger (1995).

AAC Method	Description of Definition	Study	Researchers
Communication books with PIC signs (Graphic picture symbols)	Dialogues between parents and children. The children indicated (pointed) to picture symbols or used head movements e.g. to indicate 'no', smiled, or vocalized. All referred to as "turns".	Words and strategies: Conversations with young children who use aided language. (Chapter 4)	Von Tetzchner & Martinsen (1996).
Manual signs (Makaton signs based on British sign language)	Utterance length was calculated as the number of signs and points (to objects, people and locations) produced per communication turn.	The two-word stage in manual sign language development in signers with intellectual impairments.	Grove, Dockrell, & Wold (1996).
Manual signs and communication boards with graphic signs (PIC, PCS) and photographs.	AAC user's communication referred to as "utterances". Modes e.g. manual signs, body movements, vocalization or pointing to graphic conveyed by notation.	Allowing for developmental potential: A case study of intervention change.	Møller & Von Tetzchner (1996).

3.4.5 Proposed Model for the Segmentation of Interactions

A possible model for the segmentation of interactions involving a person who uses AAC with a speaking partner(s) is represented in Figure 3-1.

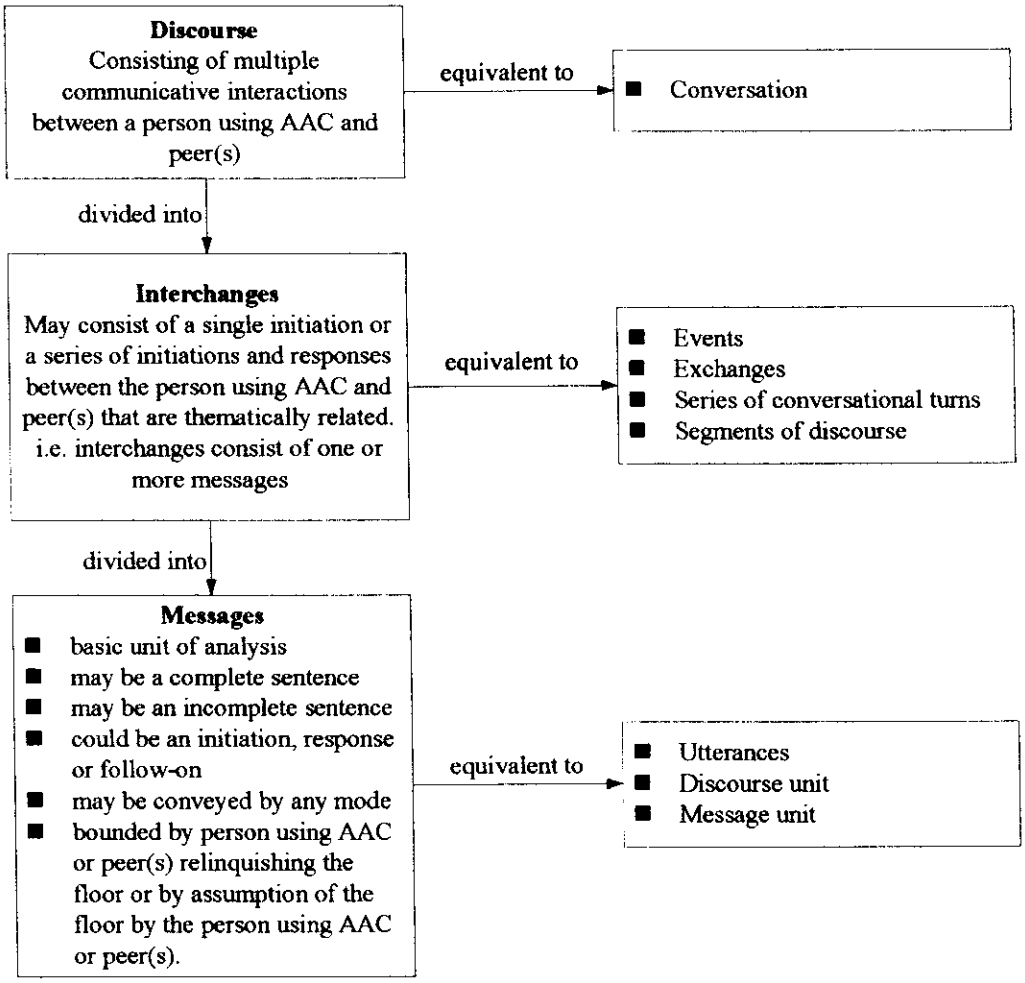


Figure 3.1 Schematic representation of division of discourse into segmented units.

In this model the term "interchange" is used to describe a coherent segment of interaction as adopted from the terminology of Stubbs (1983). Interchanges are further divided into "messages", the smallest unit of analysis in the study. "Message" is therefore synchronous to the tern "utterance" in spoken language studies where one or more messages constitute a communicative turn. In the proposed model one or more messages by one or more partners constitute an "interchange". A message can be either an

initiation or a response or follow-on and an "interchange" a combination of these. An interchange is defined as a single initiation, or a series of initiations and responses between the AAC user and one or more peers that are thematically related and have discernible boundaries. Interchanges thus correspond to a single initiation or a series of turns referred to as a conversational interchange within the field of conversational analysis. A single initiation is included as it is regarded as an attempt to initiate an interchange.

Embedded in the above definition are initiations and responses that are defined as follows for the purpose of the proposed model.

- Initiations are an attempt using any mode to instigate an interactional event by either the person who uses AAC to a peer or a peer(s) to the person who uses AAC. Modes of interaction may include vocalizations, verbalizations, body movements, facial expressions, VOCAs, use of eye-gaze or computer generated initiations.
- Responses are endeavours of a peer or peers to react to an initiation by the person using AAC or any endeavor of the person using AAC to act in response to an initiation by a peer or peers.

Once transcriptions are segmented into these units each message can be further coded as required by the researcher to best meet the specific purposes of the research, for example the modes or communication functions employed by the person using AAC. Once the method of coding is established, coded data can be analysed further.

3.5 SUMMARY

This chapter began by described the difficulties involved in accurately describing interactions involving persons who use AAC. Peer referenced assessments and other possible strategies to portray the psychosocial background of the person who uses AAC were then discussed. The issues and selection of notational and transcription schemes for use in studies involving AAC were described. The difficulties of the segmentation of transcripts involving AAC interactions were reflected and the chapter ended with the description of a possible model of segmentation of discourse involving AAC.

CHAPTER 4
RESEARCH METHODOLOGY

4.1 INTRODUCTION

The focus of this study was the question of whether a training programme, designed to empower peers to communicate with an adolescent who used AAC, would result in increased social interaction of the adolescent who used AAC. This chapter discusses and validates the methodology selected to investigate the above research question. The varied and extensive procedures that were used to describe changes in the interaction patterns of the adolescent who used AAC within the classroom are explained. Objective quantitative measures are discussed and operational definitions of the interactive behaviours and the procedures used to measure them are defined. Qualitative analysis processes are detailed for the observational data and the pre and post measures employed in the main study.

4.2 AIMS

4.2.1 Primary Aim

The primary aim of the study was to determine the impact of a peer training programme on the interaction patterns of an adolescent who used AAC.

4.2.2 Sub-aims

The above aim was achieved in terms of the following sub-aims:

i. To determine the peer interaction patterns of the adolescent who uses AAC.
ii. To investigate the impact of a peer training programme on the interaction of the adolescent who uses AAC in terms of:
    - The frequency of interactions
    - The number of messages per interchange
    - The discourse function
    - The communicative function served and
    - The primary mode of communication used.

iii. To investigate the impact of a peer training programme on the self concept of the adolescent who uses AAC

iv. To determine the impact of a peer training programme on the peers' evaluation of the socio-metric status of the adolescent who uses AAC.

v. To determine the parents' and teachers' rating of the social interaction of the adolescent who uses AAC with peers and their evaluation of the impact of the peer training on his interaction with peers.

vi. To investigate the impact of a peer training programme on the self perception of the adolescent who uses AAC.

4.3 RESEARCH DESIGN

The study used a single subject experimental design whereby the interaction between an adolescent who uses AAC, the primary participant and his classroom peers is investigated before and after implementation of a peer training programme. Interactional behaviours were described during pre-intervention (A), intervention, (B), post intervention (A2) and post withdrawal (A3) phases of the study. The post withdrawal followed the research phase of withdrawal that lasted for a period of seven weeks. Measurements were qualitative in nature and describe in depth the interaction between the adolescent who used AAC and his peers. Changes in the frequency of interactions and in the extent of interactions (the number of messages per interchange) were quantified using descriptive statistics. Additional descriptive parameters of the observed interactions that were analysed included the discourse functions, communication functions and modes of communication of the primary participant as well as the responses of peers. Observational data were obtained from extensive videotaping in the natural context of the classroom during all phases of research except for the withdrawal phase. The perceptions of the peers, teachers and parents with regard to the interactions and social skills of the primary participant, were measured before and after the intervention using qualitative measures. Additional qualitative pre and post measures included standardised self concept scales and self evaluation procedures that were completed by the primary participant. In depth descriptive data on the social interaction of the primary participant was obtained by multiple methods including videotaping during varied classroom contexts, peer referenced assessment procedures, as well as questionnaires and interviews with the

primary research participant, his teachers and his parents. The phases of research and measurements that were applied are represented in Table 4.1.

Table 4.1 Research aims and measuring instruments

Phase	Aims	Measurements	Participants	Parameters Analysed
A1 Pre Intervention Phase	Primary Aim Sub-aim i Sub-aim ii	Qualitative analyses of videotaped interactions	Adolescent who uses AAC (Primary participant). Peers	Frequency of interactions Number of messages per interchange Discourse function Communication function Mode of communication Partner Responses
	Sub-aim iii	Multidimensional Self Concept Scale	Adolescent who uses AAC	Self Concept of the adolescent who uses AAC
	Sub-aim iii	Self Description Questionnaire II	Adolescent who uses AAC	Self Concept of adolescent who uses AAC
	Sub-aim iv	PACT User Rating Scale	Adolescent who uses AAC	Communication attitudes of the adolescent who uses AAC
	Sub-aim v	PACT Partner Rating Scale - Peers	Peers	Partner communication attitudes The perception of the adolescent who uses AAC of his partner's attitudes
	Sub-aim vi	PACT Partner Rating Scale - Teachers	Teachers	
	Sub-aim vi	PACT Partner Rating Scale – Parents	Parents	Partner perceptions of the communication attitudes of the adolescent who uses AAC
	Sub-aim v	Peer Nominations	Adolescent who uses AAC. Peers	Socio-metric status of the adolescent who uses AAC
	Sub-aim iv	Interview with Adolescent who uses AAC	Adolescent who uses AAC.	The perception of the adolescent who uses AAC of his social interaction with peers
	Sub-aim vi	Interviews with teachers of adolescent who uses AAC	Teachers	Teacher's perception of the social interaction of the adolescent who uses AAC with his peers
	Sub-aim vi	Interviews with parents of adolescent who uses AAC	Parents	Parents' perception of the social interaction of the adolescent who uses AAC with his peers
B Intervention Phase (8 x 1 hour sessions)	Primary Aim Sub-aim i Sub-aim ii	Qualitative analyses of videotaped interactions -	Adolescent who uses AAC. Peers	Frequency of interactions Number of messages per interchange Discourse function Communication function Mode of communication Partner Responses

Phase	Aims	Measurements	Participants	Parameters Analysed
A2 Post Intervention Phase (2 weeks)	Primary Aim Sub-aim i Sub-aim ii	Qualitative analyses of videotaped interactions–	Adolescent who uses AAC . Peers	Frequency of interactions Number of messages per interchange Discourse function Communication function Mode of communication Partner Responses
	Sub-aim iii	Multidimensional Self Concept Scale	Adolescent who uses AAC	Self Concept of the adolescent who uses AAC
	Sub-aim iii	Self Description Questionnaire II	Adolescent who uses AAC	Self Concept of the adolescent who uses AAC
	Sub-aim iv	PACT User Rating Scale	Adolescent who uses AAC	Communication attitudes of the adolescent who uses AAC Partner communication attitudes The perception of the adolescent who uses AAC of his partner' attitudes Partner perceptions of the communication attitudes of the adolescent who uses AAC
	Sub-aim v	PACT Partner Rating Scale - Peers	Peers	
	Sub-aim vi	PACT Partner Rating Scale - Teachers	Teachers	
	Sub-aim vi	PACT Partner Rating Scale – Parents	Parents	
	Sub-aim v	Peer Nominations	Peers Adolescent who uses AAC	Socio-metric status of the adolescent who uses AAC
	Sub-aim v	Peer Ratings	Peers Adolescent who uses AAC	
	Sub-aim iv	Interview with adolescent who uses AAC	Adolescent who uses AAC	The perception of the adolescent who uses AAC of his social interaction with peers
	Sub-aim vi	Interviews with teachers of adolescent who uses AAC	Teachers	Teachers' perceptions of the social interaction of the adolescent who uses AAC with his peers
	Sub-aim vi	Interviews with parents of adolescent who uses AAC	Parents	Teachers' perception of the social interaction of the adolescent who uses AAC with his peers
Withdrawal Phase		None		None
A3 Post-Withdrawal Phase	Primary Aim Sub-aim i Sub-aim ii	Qualitative analyses of videotaped interactions	Adolescent who uses AAC Peers	Frequency of interactions Number of messages per interchange Discourse function Communication function Mode of communication Partner Responses

The single-study design was appropriate to this research project as it:

i. Facilitate the exploration of variables responsible for changing behaviour. The dependent variables being the interaction or discourse skills of the adolescent who uses AAC and the primary independent variable the peer group training programme.
ii. The opportunity to conduct an in-depth analysis of the functional effect of the treatment variable (peer group programme) on the behaviour of the adolescent who uses AAC.

To effectively document the relationship between the communication partner training programme and the outcomes it was necessary to analyze the quality of evidence associated with the intervention and observed changes. Different sources and analyses were used to provide a comprehensive perspective. This triangulation of data and methods was aimed at improving the validity of the findings and to provide depth to the understanding of both the processes and outcomes of the study through corroborative and elaborative analysis.

4.4 PILOT STUDY

4.4.1 Objective of the Pilot Study

The main objective of the pilot study was to determine the optimal system for transcribing, coding and analyzing the interactions of the adolescent who used AAC and his peers from the videotaped material. Additional objectives were to identify any potential problems in terms of the practicality or feasibility of the proposed research, including:

i. possible difficulties experienced by the video technician with respect to the videotaping in the classroom; and
ii. any responses by the peers to the videotaping that might bias the study.

The objectives, method, results and recommendations of the pilot study are shown in Table 4.2 on the following page.

Table 4.2 Objectives, method, results and recommendations of pilot study

Objectives	Method	Results	Recommendation
With respect to the transcription system			
To assess whether the temporal segmentation into 1-minute sections was feasible.	Videotapes were viewed and reviewed marking both 1-minute and 2-minute segments.	It was more practical to demarcate timed sections in units of 2 minutes.	Demarcate 2-minute segments. Where the interactional context changed during the 2-minute segment, 1 minute should be allocated to each context.
To determine whether it was possible to establish the boundaries of an interchange by content alone.	Examination of the interactions of the adolescent who uses AAC with his peers on videotape.	Certain interchanges were clearly bounded but not only by content. Multimodal behaviours such as extended pausing, turning-away from communication and /or changes in facial expression together with content indicated interchange boundaries. A number of interchanges were not clearly bounded.	Single and or multiple indications should be used to determine interchange boundaries. Where, despite the use of multiple regulation cues, the interchange boundaries cannot be clearly demarcated, the specific interchange should be viewed by the adolescent who uses AAC and the boundaries determined by him.
To evaluate the proposed division of communicative opportunity contexts.	Analysis of the videotapes with respect to the proposed contexts relating to opportunities for peer communication: i. Teacher directed ii. Working in pairs context iii. OBE Small Group context iv. Informal context	The proposed category of working in a dyad during OBE groups was not applicable as even if the adolescent was paired with a peer his facilitator was frequently also involved so that in effect a small group was formed. There was not a significant difference between communication opportunities in the proposed 'working in pairs' and 'small group OBE' contexts.	The OBE dyad and small groups should be included in the single category of OBE Small Group discussion context. Contexts to be: i. Teacher directed i. OBE Small Group discussion context ii. Informal context
To evaluate the proposed notation system	Videotapes were transcribed using the proposed notation system	Notation system fairly easy to apply consistently.	The same notation system to be used in the main study. In instances where the message of the adolescent who used AAC was not clear, it should be notated with ??? < >??? until clarified by the adolescent himself. .
To evaluate the effectiveness of the proposed spatial layout of the transcript.	Using prepared formats to transcribe the interactions of the adolescent who used AAC with his peer(s).	The proposed format proved adequate.	No changes were necessary to the spatial layout and proposed format of the transcripts.

Objectives	Method	Results	Recommendation
With respect to discourse structure:			
To assess the appropriateness of the proposed coding system.	Once the transcript had been prepared the tapes were reviewed and the codes for discourse structure, communication function, mode of communication and partner response were applied.	It proved difficult to differentiate in practice between certain of the codes. For example, requests for assistance and requests for information were indistinguishable; vocalizations and verbalizations were impossible to differentiate. The adolescent who used AAC frequently used simultaneous modes of communication with equal input, and the primary mode could not be distinguished..	Attracting attention (no message) and initiation should be combined as a single code. *With respect to communication function:* Requests for assistance and requests for information should be combined. The category of "Socialises" was deemed to be integral to other communication functions and the code should be deleted. *With respect to modes of communication* Vocalisation and verbalizations be combined under code 1. *With respect to Partner responses* Code or partner initiation needed to be added. Partner not waiting for adolescent who used AAC to complete message should be included in the code of 'partner ignores user'. Partner completes message of the adolescent who used AAC was reformulated as part of the category of 'partner clarifies message of adolescent who uses AAC'.
With respect to the video-technician and the process of filming-			
To establish any difficulties in filming the class.	By viewing the tapes to determine the quality of both the visual image and the sound	In times of high background noise levels the verbalizations of the Adolescent who uses AAC could not be heard.	A directional microphone and a lapel microphone were provided.
With respect to the response of the peers			
To asses the response of the peers to being videotaped, to evaluate any bias towards the study	Several hours of videotaping were studied.	For approximately the first two hours there appeared to be a "halo effect" in that class members appeared to be on best behaviour and frequently looked at the camera.	The pre intervention data should only be coded from when it was apparent that the class had become habituated to being videotaped.

4.4.2 Summary of the Pilot Study

Following the pilot study the spatial layout, notation conventions and transcription codes were adapted. In addition, a directional microphone and later a lapel microphone were provided to improve the sound recording of the videotapes. Partner attitudes, partner competencies and the environmental demands determine the communication opportunities within a natural context such as the classroom. In order to effectively compare the interaction of the adolescent who used AAC with his peers pre and post intervention it was necessary to determine contexts that reflected differing levels of opportunity for communicative interactions. The pilot study established that only three different contexts within the classroom allowed for varying densities of communication opportunities. These were defined as follows:

i. *Teacher directed time* included periods of teacher instruction as well as periods when the learners were engaged in independent academic tasks. Teachers expected that during these times learners would not speak and peer interactions were discouraged. This context was designated as Context 1 and allowed for minimal peer interaction.

ii. *Outcome based educational (OBE) small group discussion context* during which the class was divided into small groups. Group members were expected to contribute suggestions and comments with respect to the specified task. This context encouraged peer interactions related to the task and was designated as Context 2. Group members were not always constant and some dyads were included.

iii. *Informal time context* included times when no teacher was present, for example before or immediately after a specific lesson as well as times when a teacher was present as occurred during packing up time. This context was designated as Context 3 and allowed learners to choose whether they wished to interact or not. Learners also had relative freedom to choose with whom they wanted to interact, about what and how they wished to interact. Peer interactions during this time were voluntary.

4.5 MAIN STUDY

4.5.1 The Primary Research Participant

The primary research participant was a male adolescent who uses AAC, "S.E". He was 15 years 2 months old at the onset of the peer training programme. He had severe athetoid cerebral palsy and was the only learner in the class who required AAC. He had little functional use of his arms and legs and was dependent for all activities of daily living. S.E. required the assistance of a facilitator or a peer to pack his schoolbooks and to set up his computer and DeltaTalker™. Unable to remain in a sitting position unaided, he had a customised seating support and independently steered his power wheelchair by operating a joystick with his left hand. He utilised a headpointer to directly select the keys on both his computer keyboard and DeltaTalker ™. All of his teachers remarked on his dedication, perseverance and determination in completing schoolwork and one teacher noted he was very anxious to achieve, and was creative and original. Prior to the study S.E. had achieved above class average results in standardised tests and examinations.

S.E. was a multi-modal communicator whose preferred method of communication was speech, despite the fact that his speech lacked intelligibility. When communicating spontaneously he tended to use full sentences and had few repair strategies, tending to repeat himself verbatim when not understood. If the partner failed to understand messages repeated several times he would resort to spelling out the message letter by letter, word for word. On occasion he demonstrated passivity in that he did not protest blatantly incorrect misinterpretations of his message. At other times he would persist until understood. His awareness that peers and teachers did not understand what he had said appeared inconsistent.

Other modes of communication used by S.E. included facial expressions, eye-gaze, body movements, computer and VOCA. He was operationally competent in using the DeltaTalker™ with Unity 128 software. S.E. had mastered a core vocabulary of approximately two thousand words and short phrases using Unity 128. This software

encodes words and common phrases by using sequences of pictures (icons). He understood the rationale of how the vocabulary was organised and was able to customize the software by storing specific vocabulary according to his individual needs. His rate of communication was slow as he made frequent errors in accessing the keys with his headpointer. If he had forgotten a specific sequence of icons for a word or phrase he readily changed to the alternate spell mode. He had attended a DeltaTalker™ support group at which the focus had been on mastering core vocabulary using Unity 128 and social competency skills.

His teachers described his personality as positive, very friendly, warm, affectionate, a likeable person who was fond of jokes and had an excellent sense of humour. S.E. stated he particularly enjoyed interaction with peers and familiar adults but was perceived by his teachers and parents as having poor peer relationships and no friends within his school peer group by his teachers and parents.

At home he had few social contacts. His parents described him as an affectionate and loving child. S.E. had one sibling, a brother who was two years younger. His family was English-speaking and his leisure pursuits included listening to instrumental music, exploring new computer software, designing web pages, surfing the internet and watching television. The potential changes in his level of social interaction with peers in the natural setting of the classroom were of primary concern in this study.

4.5.2 The Peer Group

The adolescent who uses AAC and his peers attended a school for learners with physical disabilities. The school followed the national school curriculum and children who could not meet the required academic standard were accommodated in special classes. At the school there was only one Grade 8 class consisting of 14 learners including S.E. There were eight boys and six girls in the class. At the onset of training the ages of the peer group varied from 12 years 7 months to 16 years 8 months. The mean age of the class was 14 years 0 months. The ages and gender of the children are presented in Table 4.3.

Table 4.3 Grade 8 learners, their ages, gender and medical diagnoses

Male	Diagnosis	Age	Female	Diagnosis	Age
S. E.	Cerebral Palsy	15 years 2 months	Peer 8	Congenital Amputee	14 years 9 months
Peer 1	Cystic Fibrosis	14 years 1month	Peer 9.	Cerebral Palsy	14 years 1 month
Peer 2	Cerebral Palsy	14 years 4 months	Peer 10.	Post head injury	14 years 3 months
Peer 3	Poliomyelitis	13 years 7 months	Peer 11	Visual impairment	14 years 8 months
Peer 4	Haemophilia	16 years 8 months	Peer 12.	Diabetis insipidus	15 years 5 months
Peer 5	Cerebral palsy	12 years 7 months	Peer 13	Visual impairment	15 years 8 months
Peer 6	Cleft Palate	14 years 5 months			
Peer 7	Diabetis insipidus	16 years 0 months			

The medium of instruction at the school was English. Five of the children were from Zulu speaking families, two were from homes where both English and Afrikaans were spoken and the remaining seven were from homes where English was the first language. Diagnoses of the learners in Grade 8 included diabetes insipidus, haemophilia, congenital upper limb amputation, cystic fibrosis, poliomyelitis, head injury, visual impairment and four members of the class were cerebral palsied. Twelve members of the class were ambulatory and two learners, including the adolescent who used AAC, utilised power wheelchairs.

4.5.3 The Teachers

At a meeting with the Grade 8 teachers prior to the study to explain the goals of the research three teachers volunteered to be videotaped and interviewed before and after the peer training programme. All three were female teachers, who had extensive teaching experience and had taught at the specific school for more than three years. The fourth teacher who was videotaped was a young African female teacher who replaced the Science teacher when she took an unexpected leave of absence. During the pilot study this replacement teacher had initially been employed as a joint facilitator for the primary participant and another Grade 8 learner. Teachers A and B were over 50 years of age, teacher C was between 30 and 40 years of age and teacher D was under thirty years of age.

4.5.4 Ethical Issues

4.5.4.1 In relation to the primary research participant

Informed voluntary consent was obtained from the primary research participant. The identity of the adolescent who used AAC was protected and he is only referred to as S.E. The nature and purpose of the study were explained to him and he was assured that he could withdraw from the study at any point. Ongoing collaboration with the primary research participant took place with respect to all applicable research issues including data collection procedures, the content of the training programme and the implications of the research findings. His parents, academic and support staff were also consulted. In addition, written consent was obtained from his parents, the principal of the school and the KwaZulu-Natal Education Department. The video technician signed a contract of confidentiality as did the inter-raters.

4.5.4.2 With respect to the peers

Signed parental consent was obtained for both the peer training programme and the evaluation processes. The project was fully explained in an interview with the school principal and a written proposal was provided to both the school principal and the KwaZulu-Natal Education Authority.

4.5.4.3 With respect to the teachers

Only teachers who volunteered to be videotaped were filmed. The content of the interviews and videotapes was treated as private and confidential and only analysed data was reported.

4.5.5 Equipment and Materials

4.5.5.1 Video-recorder

The videotapes of the class were recorded on TDK Mini Digital videotapes using a Sharp Digital Video camera; model VLPD6H, which was used with an additional super cardiode directional microphone to ensure audio clarity of interactions of the primary research participant.

4.5.5.2 Audio tape recorder

A Sony M-430 micro-cassette recorder was used to record the teacher, parental and research participant interviews on high quality TDK micro-cassette tapes for later transcription.

4.5.5.3 Multidimensional self concept scale

This test was one of two self concept scales selected in the absence of South African standardized self concept scales. The American age for Grade corresponds closely to the South Africa norm and the English speaking contexts are similar. However, results should still be interpreted with caution. The scale was also selected and adapted for ease of completion by the adolescent who used AAC as no comprehensive self concept scales have been developed or standardized for adolescents who use AAC systems.

The psychometric properties of internal consistency and stability were considered to be most relevant. The alpha coefficients for the individual scales and total scale of the MSCS for grade 7 pupil and the total sample (grades 5 to 12) range from .97 to .99 for the full scale and .85 to .97 for the subscales. Test/ re-test reliability of .90 was demonstrated for the full scale over a 4-week period (Bracken, 1992).

An additional measure, the standard error of measurement (SEM) was employed and the SEM's are quoted as 4.74 for the Social, 5.40 for the Competence, 3.97 for the Affect, 4.5 for the Academic, 2.6 for the Family, 4.24 for the Physical and 2.12 for the total scale (Bracken, 1992). The SEM is directly proportional to the scale's reliability with the lowest score indicating the greatest reliability (Bracken, 1992).

Both norm referenced and ipsative interpretation of test scores is possible. Norm referenced refers to the evaluation of an individual's test performance contrasted with that of peers and ipsative interpretation contrasts the individual's performance on each individual scale with his or her overall performance on the test (Bracken, 1992).

To enable the primary research participant to independently complete the MSCS it was formatted as a Word document and downloaded onto his home computer. This enabled the research participant to independently read and respond to each statement. He indicated his response by changing his selection to bold type using his headpointer to access the computer keyboard.

4.5.5.4 Self description questionnaire II

Psychometrically the SDQ II was reported by Marsh (1992) to have internal consistency reliability coefficients ranging from .83 to .91 and a mean alpha for the 11 scales of .87. Test/re-test reliability based on a small sample at seven weeks ranged from .73 to .88 with an overall mean coefficient of .80. According to Marsh (1992) strong support for the construct validity of the SDQ II was demonstrated. Standard errors of measurement (SEM) of the *T* scores range from 3.0 (Physical Appearance) to 4.1 (Emotional stability) and the standard error is 2.4 for the total concept scale.

To enable the primary research participant to independently complete the SDQ II it was formatted as a Word document and downloaded onto his home computer. This enabled the research participant to independently read and complete the questionnaire. He indicated his response by typing an 'X' in the selected column using his headpointer to access the computer keyboard.

4.5.5.5 Partners in augmentative communication training rating scale

This scale was briefly discussed in 3.2.1.2. The rating scales were not designed as pre and post measures but rather as a way to highlight conflicting child and partner attitudes or perceptions as a basis for further investigation (Culp & Carlisle, 1988). For the purposes of this study the scales were adapted by the researcher for use by the adolescent who used AAC, his peers, teachers and parents. The purpose of the rating scales was to evaluate the attitudinal patterns between the adolescent who used AAC and his peer partners and also the perceptions of his teachers and parents regarding his communication with his peer partners. Statements included items regarding the attitudes of his peers, parents and teachers to his communication using speech as well as his communication using his DeltaTalker™. The PACT scales were presented both before and after the peer training to review any possible changes in the attitudes of the adolescent who used AAC, his peers, teachers and parents. Statements related to the use of speech and the VOCA for communication by the adolescent who used AAC. Four copies of the PACT peer rating scale were printed in enlarged format for the Grade 8 learners with visual impairments.

4.5.5.6 Peer nominations

Procedures used for the peer nominations and friendship rankings were based on those described by Gresham and Little (1993) in their review of peer-referenced assessment strategies. The method of peer nominations involving multiple criteria as opposed to a single criterion was selected as this improves the reliability and validity of the results (Gresham & Little, 1993). Three of the statements required nominations related to academic roles and five were related to aspects of social closeness (see Appendix A). A fixed-choice procedure with three nominations was specified for seven of the questions and a single nomination for one question was used. No negative evaluations were required. The statements used for the peer nominations were evaluated by two Grade 8 teachers as being appropriate and relevant to the experiences of Grade 8 learners. Two English language teachers including the class English teacher also rated the vocabulary and language as being well within the reading ability and understanding of Grade 8

learners. Four copies of the nomination forms were printed in large format to facilitate completion by the learners with visual impairments.

4.5.5.7 Interviews

Interviews, as referred to in chapter 3, were conducted by the researcher with the adolescent who used AAC, his teachers and parents. Interviews were held pre and post intervention and the focused interview format was adopted to meet the following criteria:

i. Specific issues relating to the social interaction and communication skills of the primary participant could be addressed. Topics were pre-determined by the researcher and open ended questions were formulated prior to the interviews. Additional questions relating to the personality and attitudes of the main participant were formulated for the pre-intervention interviews with parents and teachers.
ii. The format allowed for follow-up probes relating both to topics that were pre-determined by the researcher and to issues raised by the interviewees.

Interviews were conducted individually with the primary participant and his parents at their home. Interviews with each parent lasted between 30 and 35 minutes. The pre and post intervention interviews with the main participant lasted 40 and 42 minutes respectively. The interviews with the teachers took place during recess in the school waiting room or empty classrooms at times designated by the teachers and lasted between 25 and 30 minutes. All the interviews were audiotaped and transcribed verbatim.

4.5.6 The Peer Training Programme

The study required the development of an eight-week peer training programme. The detailed rationale was described in Chapter 2.

4.5.6.1 The theoretical basis for the peer training programme

The theoretical basis for principles that could apply to a peer training programme was presented in Table 2.1. The application of the selected principles in the current study is presented in Table 4.4.

Table 4.4 The underlying principles and their application in the programme

Principles	Application
Social modeling involves the practice of teaching a behavior by presenting a model to be observed and imitated. (Cartledge & Milburn, 1995).	The researcher modeled ways to interact with the AAC user and methods to clarify his messages during the progress of the workshops. Using excerpts of the videotape "Face to Face" showed unfamiliar peers modeling specific interaction strategies.
Behavior rehearsal is considered crucial to ensure that social skills, including communication skills, are learnt effectively (Cartledge & Milburn, 1995).	After skills had been introduced and demonstrated activities were structured to enable the peers to practise these skills e.g. after introducing taking conversational turns (turnabouts) learners practised the skill using topic cards.
Eliciting observations and potential solutions is a far more effective way to learn new behaviours than if they were suggested by the researcher (Hess 1993).	Open-ended questions were used to elicit comments. Any contribution was validated and through the process of reflecting the comment back to another student the group discovery process was facilitated.
Adolescents learn and maintain behaviour far better when cognitive understanding is engendered (Bandura, 1977; Cartledge & Milburn, 1995).	Throughout the sessions group discussions were facilitated to facilitate meta-communication skills by asking learners to define "conversation", the "tasks of the speaking partner", "contingent questions" an so forth. In addition the pertinence of each of the target skills was verified through group discussions to encourage the participants to attach relevance to the skill and so improve motivation
Using games is an effective tool to increase rapport with adolescents and to improve their effort in learning social skills (Malouff & Schutte, 1998).	Games were used frequently during the programme e.g. "the common pool" a game devised by Malouff and Schutte (1998) to enhance peer cooperation
Problem solving is an important component in promoting supportive peer relations and a necessary means to promote social cognition (Rose, 1998).	Many of the discussions required the peers to identify both problems and their possible solutions.
Short term groups with a specific goal are suitable for developing skills and are time efficient (Rose, 1998).	Eight, 50-minute sessions were planned to teach specific interaction skills to the peers of the Grade 8 learner who uses AAC.

4.5.6.2 Group strategies to promote cohesiveness.

The rationale behind the use of these strategies was discussed in chapter 2. Circle seating was used during group discussion times. The use of the technique "rounds" proved an effective strategy in facilitating sharing and self discovery and required structured turn taking. As each person knew they would have a turn there was less pressure and few interruptions. "Brainstorming" was used to encourage increased awareness of, and possible solutions for, the difficulties experienced by the peer with LNFS.

4.5.6.3 The goals of the peer training

The goals of the peer training were determined by the difficulties the adolescent who used AAC identified in his interactions with his peer group. The identified difficulties were matched with the desired interaction behaviours of peers as in Table 4.5 below.

Table 4.5 Issues of communication and desired behaviours of peers

	Difficulties Identified by the Adolescent who used AAC	Desirable Interaction Behaviours of peers
i	Inadequate time was given to him to formulate what he wanted to say during small group discussions, especially when using the DeltaTalker™.	Peers to be more aware of the time taken to interact using AAC strategies and to allow time for the adolescent who uses AAC to formulate messages especially when using the DeltaTalker™.
ii.	Insufficient opportunities to initiate interactions about topics of concern	Increasing awareness of their behaviours that block conversations with the adolescent who uses AAC. Improved listening and negotiation skills.
iii.	Peers often addressed the adolescent who uses AAC and asked him a question but left before he could answer their questions.	Peers to learn the strategy of waiting for a response from the adolescent who uses AAC.
iv.	Peers pretended to understand his message when they had not done so.	Increase peers' awareness of how frustrating it is for a person not to be understood. Peers to learn importance of telling the adolescent who uses AAC that they have not understood him and to learn methods to assist in clarification of his messages.
v.	Certain class peers avoided talking to him	Increasing peers' awareness of the difficulties of using AAC and strategies of co-operation. Researcher to model interactive behaviours and validation of the adolescent who uses AAC.
vi.	Peers sometimes addressed him as if he was far younger than they were and for example, one peer would pat him on the head	Peers to be made aware of the frustration of the adolescent who uses AAC with these behaviours and to facilitate more mature interactional strategies including conversation maintenance, increasing the frequency and quality of contingent questions and comments etc.
vii.	Peers become distracted, "sidetracked" by other peers while chatting to him.	Peers to learn strategy of waiting for adolescent who uses AAC to complete message and to improve listening skills.
viii.	Peers interrupted him and certain peers, chiefly some of the girls, completed his messages for him, often incorrectly	Peers to learn strategy of asking whether they may complete the message for the adolescent who uses AAC for him and the strategy of clarifying whether they have completed the message correctly.
ix.	Peers avoid him at breaktime leading to intense feelings of loneliness.	Through group processes and activities to encourage interaction and facilitate possible friendships between the adolescent who uses AAC and liked peers.

	Difficulties Identified by the Adolescent who used AAC	Desirable Interaction Behaviours of peers
x	Peers used his computer without requesting that they may do so.	Peers to learn to ask the adolescent who uses AAC, just as they would another peer, whether they might use his computer. Peers to be more aware of the way the adolescent who uses AAC expressed emotions and to respond appropriately to him.
xi	Peers were not taking the adolescent who uses AAC seriously and did not validate his contribution.	Peers to develop strategies for reaching consensus in group activities and to learn to give due consideration to his contributions to group discussions.

4.5.6.4 The structure of the communication workshops

The peer training programme consisted of eight workshops of 50 minutes in duration, the set length of one school period. The objectives were grouped according to specific goals and themes so that each workshop formed a cohesive unit. The units included:

i. Conversation: Turnabouts
ii. Behaviours that block communication
iii. Listening skills
iv. Conversation maintenance
v. Group consensus
vi. Feedback and Clarification and
vii. Rate Enhancement and negotiation.

The final workshop included activities to recall and review aspects of the previous seven workshops. Each workshop was planned according to the following structure:

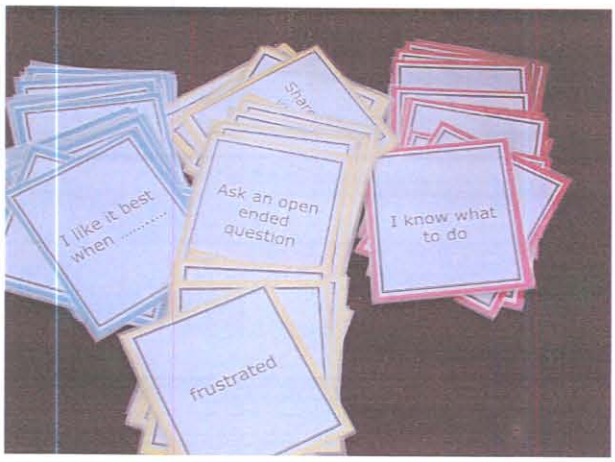
- Objectives
- Activity Sequence
- Materials Required
- Detailed Procedures including a closure activity for the end of each session.

(See Appendix B for communication workshop planners 1-7).

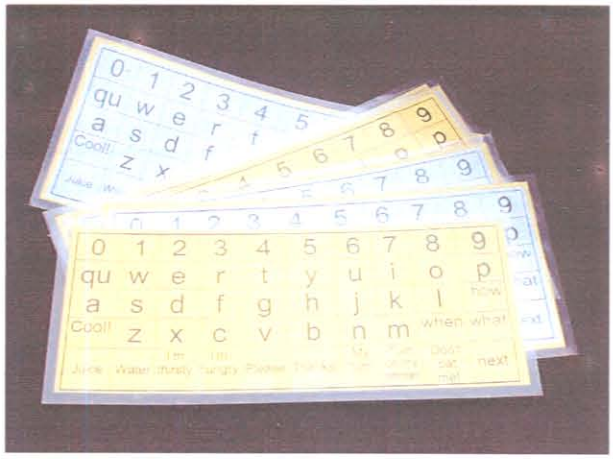
4.5.6.5 The materials used in the communication workshops

The required materials included worksheets, cards and other materials that were prepared by the researcher. These materials were carefully designed, multi-coloured, attractive, well presented and suitable for the adolescents with normal visual functioning as well as

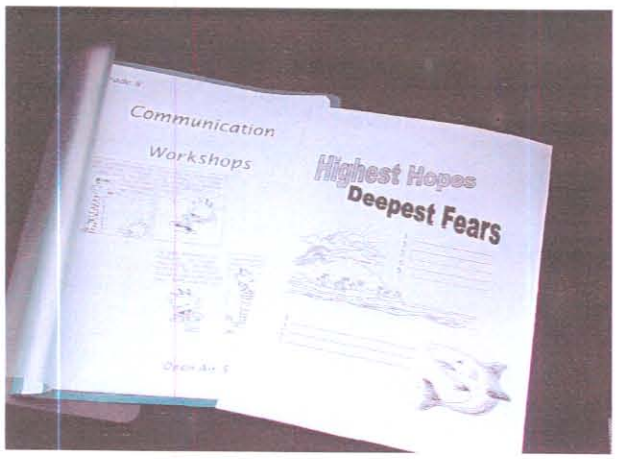
those with visual impairments. Some of the materials are shown in the following photographs.



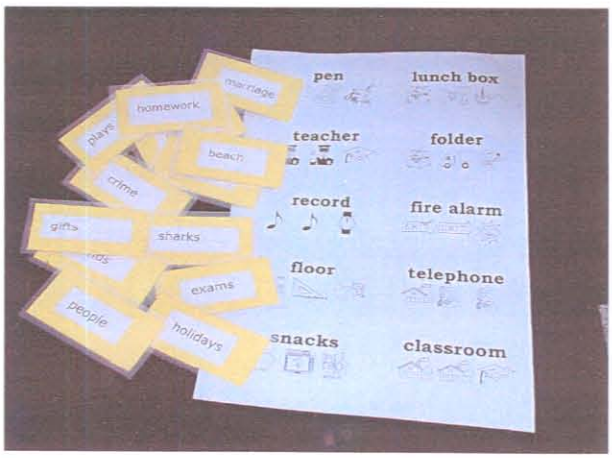
Photograph 1. Materials made for the peer training programme including the following cards: (i) unfinished sentences, (ii) emotions, (iii) contingent responses and (iv) statements.



Photograph 2. Alphabet and word communication boards.



Photograph 3. Additional materials showing copy of handout and a worksheet.



Photograph 4. Topic cards and minspeak symbol sheet.

The desired interactive behaviours and the additional outcomes of facilitating group cohesiveness and promoting more positive, friendlier interactions between the peers were integral to the programme. At the beginning of the first workshop each student was required to introduce himself or herself and give one goal of what he or she hoped to achieve after matric. At the beginning of each subsequent workshop a quick recap of the previous unit took place. Handouts were prepared after the workshops and related specifically to what had taken place in the group. Contributions were recorded in a personal way mentioning the specific adolescent's name so that they would be more motivated to read the handouts and would identify more closely with the material. Each handout was headed Communication Workshop and the relevant number followed by the date, the names of the Grade 8 participants for that session (this served as a record of which peers had attended each session). A description of the main topic(s) included a discussion of what had transpired during each session. The handouts were kept short, 1 or 2 pages (see Appendix C for a sample handout). Three were illustrated. The front cover included an appropriate cartoon and each pupil was provided with an attractive folder with his or her name on it in which they filed the handouts for future reference. Four copies of the handouts were printed in large type for the learners who had visual impairments.

4.5.6.6 Summary of the peer training programme

The specific goals, aims, procedures and materials used in the peer training programme are summarised in Table 4.6.

Table 4.6 The objectives, procedures and materials of the peer programme

Objectives	Procedures	Materials
Increase peers' awareness of how long it takes to formulate a message (communication turn) using AAC including the DeltaTalker ™	i. Discussion of interaction with the adolescent who used AAC in class highlighting the need to give the adolescent who used AAC time to formulate his message ii. In pairs, using an alphabet communication board to speak and to "listen" to the other person by "reading" the message as it is spelled out. Topics and pairs changed after 5 minutes. iii. Building Minspeak sentences iv. Contest between adolescent who uses AAC and "the rest of Grade 8" in building learnt sequences for specific vocabulary	Flip chart Alphabet communication boards and straws Minspeak icon cards from BUILLD™
Peers to learn strategy of waiting for a response from the adolescent who uses AAC.	i. Discussion of interaction with the adolescent who uses AAC in class highlighting the need to give the adolescent who uses AAC time to formulate his message ii. In pairs, each to use an alphabet communication board to speak and to "listen" to the other person by "reading" the message as it is spelled out. Topics and pairs changed after 5 minutes.	Flip chart Alphabet communication boards and straws Topic cards
Learners to be able to identify "turnabouts" in conversations	i. Class asked to define "conversation" From this an explanation and discussion of turnabouts was facilitated. ii. Identification of turnabouts by students while watching segments 1& 3 of the video "Face to Face". iii. Practice in using turnabouts as described.	Flip chart Face to face video
Learners to identify behaviours that block conversation	i. Identification of behaviours that block conversation following viewing of segments 2& 4 of the "Face to Face" video. ii. Circle discussion on identified behaviours that block interaction	Flip chart
Learners to recap and practice "turnabout" behaviours taking equal responsibility to continue the interaction	i. Students to interact in dyads by finding out 5 facts about each other's interests, family etc. ii. Feedback of each student about the partner's interest, family etc.	None
Increase awareness of peers that not waiting for a reply from the adolescent who uses AAC is unfriendly and leads to the adolescent who uses AAC feeling frustrated and rejected.	i. Discussion of conversation blocking behaviours as related to interactions with the adolescent who uses AAC.	None

Objectives	Procedures	Materials
Increase peer's awareness that turning away from the adolescent who uses AAC and not responding limits interactions	i. Discussion of conversation blocking behaviours as related to interactions with the adolescent who uses AAC.	Flipchart
Students to identify good listening skills Students to determine how good listening skills facilitate conversation	i. Brainstorm session on good listening skills and why these facilitate conversation ii. Identify poor listener in segment from Face to Face video	Flipchart
Increase peer's awareness of how frustrating it is for the adolescent who uses AAC not to be understood	i. "I can't understand" you – game format ii. "The opposite" – game format. iii. Discussion on the games and the feelings they engendered iv. "Broken telephone" – game format	None
Peers to learn to signal the adolescent who uses AAC that they have not understood a particular message	i. Discussion to elicit ways to signal the adolescent who uses AAC that he has not been understood. ii. Discussion on positive ways to ensure the adolescent who uses AAC is understood during the following week.	None
Learners to identify and practise making contingent comments	i. Brainstorm on how to keep topics of conversation going ii. Praise Bombardment iii. Kaleidoscope card game – game format	Two decks of cards: One with unfinished sentences One with strategies for contingent comments e.g. add something to the topic, share an experience etc,
Peers to learn to increase the frequency and quality of contingent comments when interacting with the adolescent who uses AAC	i. Fun activity using quiz format about strategies and examples of contingent comments	None
Peers to learn the strategy of asking open-ended questions during conversations with the adolescent who uses AAC	i. Watching of segment 5 of Face to Face video to introduce contingent questions ii. Discussion to elicit identification of open-ended questions iii. Following praise bombardment everyone to ask adolescent who uses AAC contingent question related to himself	Face to Face video Flip chart
Students to identify and develop strategies for reaching consensus in group activities	i. Viewing segments 26 & 27 of the Face to Face video	Face to face video

Objectives	Procedures	Materials
Students to learn the value of cooperation	i. The Common Pool – game format ii. Discussion on competitiveness and cooperation following the common pool game	1c coins
Peers to learn to ask for clarification if they do not understand the adolescent who uses AAC	i. Discussion and role play activity	None
Peers to learn the strategy of offering to facilitate the use of the VOCA for clarification	i. Modelling of "Would you like to use your DeltaTalker™ as I do not understand?"	None
Learners to identify how to provide feedback during conversations. Emphasis on reflecting emotional feelings.	i. Completion of "Highest Hopes/ Deepest Fears" worksheet in dyads. ii. Roleplay of different emotions activity iii. Discussion of feedback strategies and how changing the emotional tone of a statement can change the meaning	Highest Hopes/Deepest Fears worksheets 2 sets of cards – one set with simple statements, the second set with different emotions
Peers to learn to ask the adolescent who uses AAC whether they may guess the message he is formulating	i. Unfinished sentence activity	Unfinished sentence cards
Peers to learn to confirm whether they have correctly anticipated the message being formulated.	i. Unfinished sentence activity ii. "What is my future" – panel discussion game	Unfinished sentence cards
Peers to learn the rate enhancement strategy of asking yes/no questions in appropriate settings.	i. "What is my future?" – panel discussion game	None
Learners to identify behaviours that result in successful and unsuccessful negotiation with a peer	i. Viewing of segments 7 & 8 of Face to Face Video ii. "Rounds discussion" iii. 'Well of unfinished sentences': Activity involving negotiation in pairs	Face to Face video Flipchart

4.5.6.7 The Evaluation of the Peer Training Programme

The effectiveness of the peer training was ultimately evaluated in terms of the changes noted in the social interaction of the adolescent who uses AAC. Evaluation of this

functional outcome is discussed fully in the data analysis section, section 4.5.8 of this chapter. These measures determined whether the peer training programme reached its proposed outcome. In addition the programme needed to be evaluated in terms of whether the specific objectives of the peer training programme were met. Strategies included the focus interviews, socio metric measures and the analysis of the responses on the PACT partner rating scales. Systematic evaluation of the process of the peer training programme was also to be determined. For this purpose a member of the professional school staff, a Speech and Language Therapist, was requested to evaluate independently whether the aims and objectives of each communication workshop were achieved.

4.5.7 Data Collection Procedures

4.5.7.1 Videotaping of interactions

The videotaping took place in the classroom during the normal school timetable. Filming was carried out during the teaching periods of three teachers across four school subjects, English, Drama, Human Social Studies and Science. This strategy allowed for varied peer interaction opportunities, which were rated by the head of department for Grade 8 as being representative of typical interaction opportunities throughout the normal school programme. The video technician was positioned near the open door of the classroom and gave the appearance of filming the entire class although the camera was focused on the adolescent who used AAC.

The videotapes were then viewed repeatedly and transcribed verbatim according to the notation and transcription principles discussed in chapter 3. Further viewing resulted in the coding procedures being applied. Any interactions not readily understood by the researcher were then shown to the primary participant who clarified the content and intent of ambiguous interactions. Twelve percent of the videotapes were re-coded after an interval of twelve weeks to establish intra-rater reliability. Two qualified Speech and Language Therapists independently coded 12% of the videotapes to establish inter-rater reliability.

Table 4.7 reflects the dates and duration of the filming of the videotapes

Table 4.7 Record of filming of the videotapes

Phase of Research	Tape	Date	Duration	Teacher
Pre-intervention	1P	22.03.2001	42 minutes	A
Pre-intervention	2P	23.03.2001	52 minutes	A
Pre-intervention	3P	23.03.2001	40 minutes	C
Pre-intervention	4P	02.04.2001	47 minutes	B
Pre-intervention	5P	03.04.2001	52 minutes	B
Pre-intervention	6P	20.04.2001	46 minutes	C
Intervention Phase	1I	04.05.2001	48 minutes	C
Intervention Phase	2I	07.05.2001	54 minutes	A
Intervention Phase	3I	22.05.2001	58 minutes	A
Intervention Phase	4I	22.05.2001	46 minutes	C
Intervention Phase	5I	23.05.2001	41 minutes	C
Intervention Phase	6I	08.06.2001	30 minutes	A
Intervention Phase	7I	12.06.2001	54 minutes	B
Intervention Phase	8I	18.06.2001	54 minutes	A
Post Intervention Phase	1A	25.06.2001	58 minutes	D
Post Intervention Phase	2A	25.06.2001	50 minutes	B
Post Intervention Phase	3A	26.06.2001	52 minutes	B
Post Intervention Phase	4A	27.06.2001	40 minutes	B
Post Intervention Phase	5A	27.06.2001	46 minutes	A
Post Intervention Phase	6A	27.06.2001	48 minutes	D
Post Withdrawal Phase	1W	15.08.2001	48 minutes	B
Post Withdrawal Phase	2W	15.08.2001	52 minutes	A
Post Withdrawal Phase	3W	15.08.2001	42 minutes	D
Post Withdrawal Phase	4W	21.08.2001	48 minutes	A
Post Withdrawal Phase	5W	21.08.2001	50 minutes	D
Post Withdrawal Phase	6W	22.08.2001	46 minutes	A

4.5.7.2 Peer nominations and peer PACT scales

The peer nominations and PACT peer rating scales were completed in class as part of the normal curriculum. They were presented to the class by the English teacher to reduce any possible bias and were completed as part of the English curriculum on "completing documents". Specific printed instructions were supplied to the teacher (see Appendix D). The teacher read these instructions to the class verbatim. Absences due to illness resulted in 11 peers completing the PACT partner scales in both the pre intervention phase and post intervention phases.

4.5.7.3 Self concept scales

The completion of the MSCS and SDQ II took place at the primary participant's home during two separate sessions. Both the MSCS and the SDQ II were typed on computer using Microsoft Word and downloaded on disk so that the adolescent who used AAC could complete them independently. The researcher sat quietly in the same room as the adolescent so that she was readily available to answer any queries. During the pre-training session the primary participant queried the meaning of only one statement on the SDQ II.

4.5.7.4 Interviews

The pre and post training interviews with the main participant were completed at his home. A flexible approach was adopted and after an initial open ended question the researcher allowed him to introduce topics and concerns. The parental interviews also took place at their family home during weekends and the parents completed the PACT parental rating scales during the same meetings. Although the researcher had outlined a series of possible questions for the parents, a flexible approach was adopted and the researcher picked up on issues and comments of the parents. In this way the researcher was able to listen to and respond to the parents, facilitating a more in-depth interview.

The teacher interviews took place in the school waiting room or in an empty classroom during recess periods and the teachers completed the PACT partner schedules after school. Several open ended questions and topics had been pre-selected by the researcher to facilitate the interviews with the teachers. However, these were not rigidly adhered to and the researcher adopted a friendly and relaxed approach, encouraging the teachers to express their own concerns and to voice their opinions. Teacher C was replaced by teacher D due to an unexpected leave of absence resulting in the pre and post interviews being conducted with different individuals as depicted in Table 4.7. All of the interviews were audio recorded for later transcription and analysis. During the pre intervention interviews with the teachers and parents information was also elicited about the

personality of the primary participant. The process of the pre and post measures is reflected in Table 4.8.

Table 4.8 Process of pre and post measures.

Measurement	Participants	Pre intervention	Post Intervention
Multidimensional Self Concept Scale	Main participant	18.03.2001	09.07.2001
Self Description Questionnaire 11	Main participant	25.03.2001	10.07.2001
Peer nominations and Rankings	Peers	04.04.2001	20.06.2001
Adapted PACT scales	Main participant and Peers	04.04.2001	20.06.2001
Adapted PACT scales	Teacher	23.03.2001	22.06.2001
Adapted PACT scales	Parents	24.03.2001	15.07.2001
Interview	User	24.03.2001	29.06.2001
Interview	Teacher A	19.03.2001	27.06.2001
Interview	Teacher B	03.04.2001	27.06.2001
Interview	Teacher C	26.03.2001	
Interview	Teacher D		26.06.2001
Interview	Parents	25.03.2001	29.06.2001

4.5.8 Data Analysis

4.5.8.1 The analysis of the videotape transcriptions

The duration of each videotape was calculated. Each videotape was divided into 2-minute segments. Each 2-minute segment was coded according to one of three contexts that occurred within the classroom; teacher directed context, small group OBE context and informal time context.

Each videotape was then analysed as follows:

i. The total time of each context i.e. teacher directed, OBE small group and informal context was calculated in minutes and expressed as a percentage of the total time of the videotape.

ii. The frequency of interactions was calculated by totaling the number of messages per hour for each context represented. Messages included those of the adolescent who uses AAC and the peer(s) who interacted with him.

iii. The mean number of messages per interchange was calculated by adding the number of messages per interchange and dividing the total by the number of interchanges.

Each message was then further analysed according to the discourse structure, the communication function and the mode used by the main participant as well as the response of the partner according to parameters as reflected in Table 4.9.

Table 4.9 Description of the divisions of each category and the coding structure

Category	Division	Code	Description
Discourse Function	Initiation of interaction	1	Irrespective of mode, the primary participant initiates an interaction with a peer(s). Initiation contains discernible message. Coded whether peer(s) respond or not.
	Re-initiation of interaction	2	The adolescent who uses AAC repeats initiation a second time. Only coded if peer did not respond to initial interaction attempt.
	Response by main participant to peer(s).	3	The primary participant responds to an initiation of interaction by a peer(s).
	Discourse Maintainer	4	The primary participant responds to a previous message of peer(s), or continues his turn with a new message. The message may introduce a new topic or serve any other communicative function.
Communication Function	Social Greeting	1	The primary participant initiates a greeting or meets any socially expected norm of response to a peer(s)
	Answers yes/no question	2	Irrespective of the mode used the adolescent who uses AAC answers 'yes' or 'no' to a question of a peer(s).
	Answers open ended question	3	Gives response using any mode to an open ended question of a peer(s).
	Requests information Asks questions	4	The primary participant, irrespective of mode, asks for assistance, asks a question or with respect to a specific need requests some form of information from a peer(s).
	Offers Information	5	The primary participant, irrespective of mode, gives information, whether in response to the question of a peer(s) or spontaneously.
	Gives Opinion	6	This pragmatic skill suggests the primary participant knows his partner's perspective and voices his opinion on the topic of discourse.
	Expresses feelings or emotions	7	Where the message is used chiefly by the primary participant to express feelings or emotion.
	Teases or pretends (humour)	8	Any form of joking or interacting in a teasing or playful manner. Includes sarcasm
	Interrupts conversation	9	Deliberately and successfully interjects or interrupts the conversation of peers.

Category	Division	Code	Description
Mode of Communication	Natural voice: Vocalisation Verbalisation	1	Any sound, word or word approximation, made by the primary participant with the intention of communicating a specific message.
	Facial Expression	2	Use of facial expressions as the primary means of communicating a message.
	Body movement	3	Deliberate movements of a body part to signal a message.
	DeltaTalker™	4	Formulation and activation of a message using his VOCA.
	Eye-gaze/eye pointing	5	Use of eyes as primary means of expressing a message to peer(s).
	Computer	6	Uses computer to type a message to a peer(s).
Partner responses	Initiation of interaction by a peer or peers	1	Irrespective of mode a peer initiates an interaction with the primary participant. Initiation contains a discernible message.
	Peer partner responds appropriately	2	Any response that is an appropriate response to the message or initiation of an interchange by the primary participant
	Partner ignores adolescent who uses AAC	3	Partner ignores interactional behaviour of the adolescent who uses AAC
	Discourse maintainer	4	A peer partner or partners respond to a previous message of the adolescent who uses AAC or continues his/her turn with a new message. The message may introduce a new topic or serve any other communicative function.
	Partner clarifies message of the adolescent who uses AAC	5	Peer clarifies a message of the adolescent who uses AAC irrespective of the strategy used e.g. by repeating the message, or asking a question to clarify the message.
	Partner does not understand the adolescent who uses AAC	6	Partner clearly does not understand the message. May indicate he/she has not understood by asking e.g. "what?"

Further analysis included:

i. The number of occurrences for each of the codes within the category of discourse function were totaled for the main participant. These were converted and expressed as the number of occurrences per hour within each context for each phase of the research process. This was to allow for comparison of the frequency of each discourse structure across the phases of research. The formula used was:

$$\frac{\text{Number of Occurrences X } 60}{\text{Sample Time in Minutes}}$$

ii. This process was repeated for each of the codes within the categories of communication function and modes of communication used by the primary participant.

iii. Similarly, the number of occurrences for each code of partner response was totaled and formulated in the same way for evaluative comparison. .

4.5.8.2 The analysis of the multidimensional self concept scale

Scoring procedures were followed as directed by the manual. Differential scoring of positive and negative items was necessary (Bracken, 1992). Standard scores were determined for the total score and the six scales. The level of confidence of 90% was selected for reporting the respective confidence level intervals for the standard score for each of the six scales and the total score. The score classification, a descriptive classification of the extent of positive or negative self concept indicated on each of the six scales and the total scale, was determined. Percentile rank determinations completed the norm-referenced analysis of the MSCS. In addition, the ipsative analysis was completed to reflect personal weaknesses and strengths of the primary participant using his overall level of adjustment as the point of reference. The ipsative analysis gave an improved indication of the pattern of adjustment of the primary participant (Bracken, 1992). This was completed by determining the discrepancy level at the .05 alpha level and recording in the descriptive classification column whether each sub-scale was ipsatively a strength, weakness or average.

4.5.8.3 The analysis of the self description questionnaire II

Raw scores were converted to percentiles and *T* scores as per the instructions in the test manual. Percentile and *T*-score equivalents for the individual scale scores and the total self concept scores were recorded.

4.5.8.4 The analysis of the PACT scales

The PACT rating scales were used to determine patterns of attitudes and perceptions of attitudes between the adolescent who uses AAC and his peers relating to his use of speech and his DeltaTalker™. Comparisons of attitudes reported pre and post training were used to determine if there was any qualitative change following the peer training. The pre- and post- intervention rating scales of the primary participant were also compared to identify any qualitative changes in his attitudes or in his perceptions of his peers' attitudes toward his speech and use of his VOCA.
The attitudes of his parents and teachers to communicating with the primary participant and their perceptions of his communication with his peers were also compared to his attitudes and perceptions. Qualitative changes as reflected in the responses of his parents and teachers before and after the intervention phase were noted.

4.5.8.5 The analysis of the peer nominations

The number of nominations per learner in the class were simply tallied and then compared as the greater the number of nominations, the more popular the learner i.e. the higher the social status of the learner (Gresham & Little, 1993). Pre and post intervention results were also compared to note if there was any major difference in socio-metric status of the main participant.

4.5.8.6 The analysis of the audiotape transcriptions of interviews

After the interviews had been transcribed verbatim the researcher delineated themes and made tentative conclusions. The transcripts were then handed to an inter-rater, a doctoral graduate and researcher in language and AAC, who was asked to independently develop themes and make deductions. Having separately defined themes, the researcher and inter-rater met and reviewed the theme analysis. In the same way tentative conclusions were discussed, cross checked and then verified with constant reference to the original transcripts. Only when there was agreement between both the researcher and the inter-rater were conclusions about changes in pre and post training interviews tabulated. This

process was followed to minimise misinterpretation of interview data and to improve the validity of the findings.

4.5.9 Data Presentation

Overall main effects are presented diagrammatically.

4.5.9.1 Presentation of data from the videotapes

To allow for an overview and comparison across the different phases of the research the results of the above procedures were presented in a composite table for each specific context. To allow closer scrutiny coloured bar graphs were prepared for each category within each context. In these graphs the y-axis represents the number of occurrences per hour and the x-axis represents the different codes within each category across the different phases of the research. In addition line graphs were prepared comparing the occurrences of each code of each category at the various stages of research. In these graphs the y-axis represented the number of occurrences per hour and the x-axis represented the different phases of research.

4.5.9.2 Presentation of the data of the self concept scales

The results of the main participant on the MSCS including the norm-referenced standard scores, classification and percentile rank for each scale, and the total and average scale score are presented in table format as were the ipsative results. Pre and post intervention results are presented in separate tables but for comparative purposes the norm-referenced profile of the main participant on the MSCS both at pre and post intervention phases was presented graphically.

The results pre and post intervention of the primary participant on the SDQ II were presented in a single table reflecting percentiles and *T* scores for each scale and the total self concept score. The *T*-score results were represented graphically for easier comparison of pre and post intervention findings.

4.5.9.3 Presentation of the PACT rating scale data

To compare the primary participant's responses a table showing his pre and post intervention scores was prepared. Pertinent changes were discussed. Pre intervention and post intervention summary sheets were prepared tabulating the results of the primary participant and the peers. Similar tables were prepared for the PACT partner results of the teachers and the parents. Tables reflecting the peer partner scores and the user scores are presented in the results. .

4.5.9.4 Data presentation of the socio-metric measures

The peer nomination results were presented in a table reflecting the total scores of the nominations for each Grade 8 learner.

4.5.9.5 Data presentation of the interview data

Tables delineating the theme, pre and post intervention comments and the resultant conclusions were completed. Tables detailing the summarised findings of the teacher and parent interviews were then prepared. The analyses of the interviews with the primary participant and his parents were presented in the text.

4.6 SUMMARY

This chapter presented the methodology used in the study. The aims of the study were followed by a brief description of the research design. The main study was discussed with reference to the primary participant, the peer group, ethical issues, the equipment and materials utilised, data collection and analysis procedures.

CHAPTER 5
RESULTS AND DISCUSSION OF RESULTS

5.1 INTRODUCTION

The results of the study are presented and discussed in this chapter. The results will be described according to the following three sections:

i. Measures to ensure the reliability of the research findings.
ii. The analysis of the observational data obtained from the transcripts of the videotapes.
iii. The analysis of results pertaining to pre and post measures.

The results were obtained from primarily two sources (i) the analysis of the observational data and (ii) the analysis of data from pre and post measures. As discussed in the methodology the observational data were used to determine whether there was any increase in the number of messages (frequency of interactions) of the primary participant and whether there was any increase in the number of messages per interchange (extent of interactions). The observational data were also used to evaluate any changes in the interactions of the primary participant with respect to the discourse functions, the communicative functions and the modes he used.

The pre and post measures were selected to investigate any changes with respect to the evaluation and perception of his communication by the primary participant himself, his peers, parents and teachers. Pre and post measures were also selected to reflect other possible changes in the psychosocial background of the primary participant including the socio-metric status of the primary participant and his degree of self confidence as reflected in standardised self concept scales. In order provide a structure for the presentation of the results a schematic overview of the main sections and their parameters are presented in Figure 5.1.

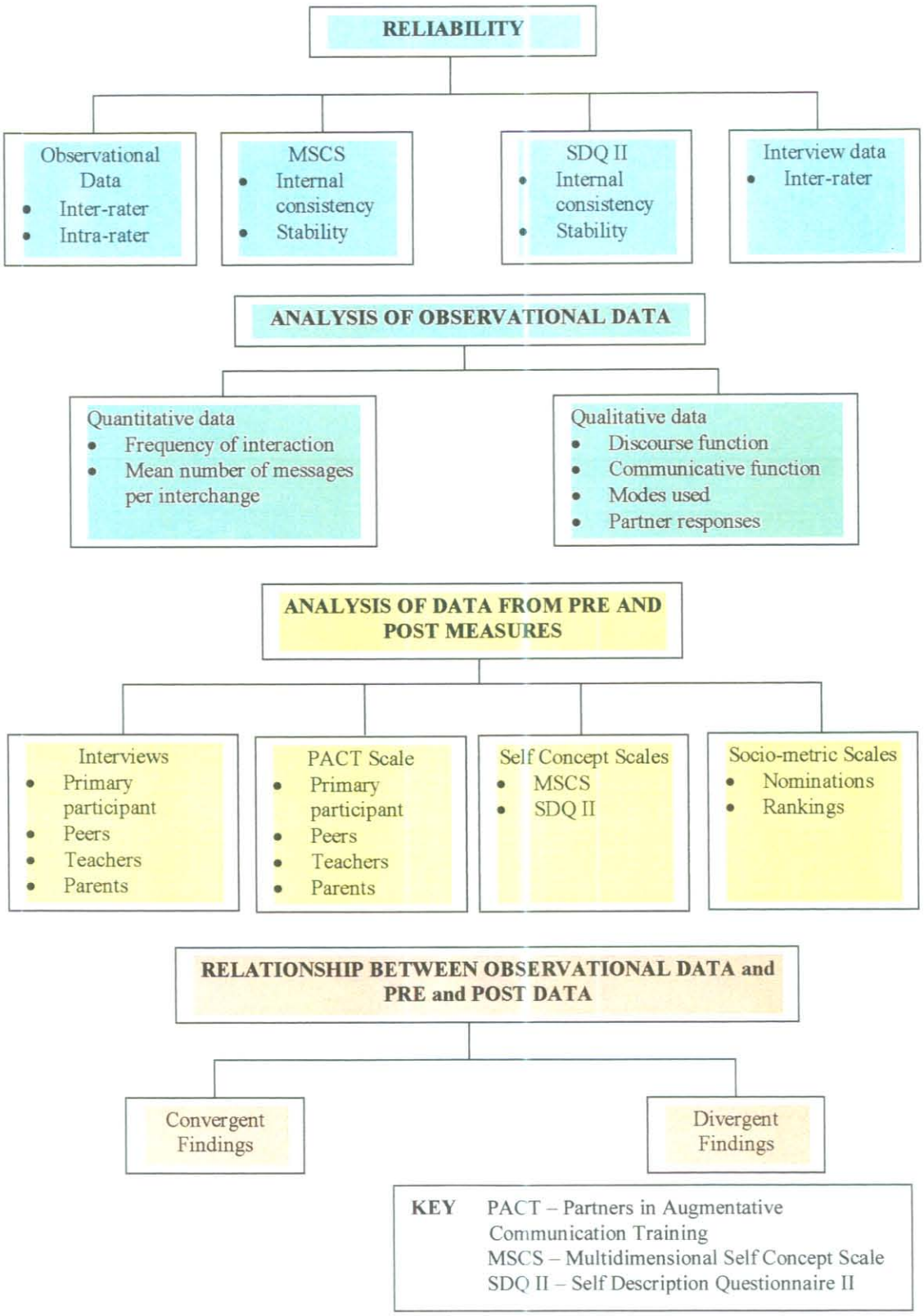


Figure 5.1 Areas of analysis of data

5.2 RELIABILITY

There are different types of reliability but they all refer to the consistency of method of measurement or the consistency of the measuring instrument (McMillan, & Schumacher, 2001). Repeatability is therefore the essence of reliability, namely will the method or instrument give the same results when subsequently administered. The consistency of observations, the type of reliability referred to as 'agreement' by McMillan and Schumacher (2001), was applicable to the observational data of the current study. The procedures used to measure this form of reliability are inter-rater and intra-rater reliability.

Two types of reliability are particularly relevant to tests and scales, namely internal consistency and stability. Internal consistency refers to the degree to which items in a test or scale correlate to the total score and is measured by means item analysis and by computing Alpha coefficients. Stability of tests over time is measured in terms of test/re-test reliability.

Reliability has also been defined as relative absence of errors of measurement (McMillan, & Schumacher, 2001). The standard error of measurement (SEM) is directly proportional to the reliability of a test so that as the SEM increases the reliability of the test decreases. Internal consistency, stability and SEM procedures were applicable to the standardised self concept scales used in the study. The measures of reliability applicable to the study are reflected in Table 5.1.

Table 5.1 Measures Used to Improve Reliability of the Research Results.

Data	Type of reliability
Videotape coding	Inter-rater reliability
	Intra-rater reliability
Multidimensional Self Concept Scale	Internal Consistency
	Stability (test/re-test reliability)
Reliability of Self Description Questionnaire II	Internal consistency
	Stability (over time)
Analysis of Audiotape recordings	Inter- rater reliability of theme identification

5.2.1 Reliability of the Coding of the Videotape Transcriptions

5.2.1.1 Intra-rater reliability

To determine how consistent rater 1, the researcher, was in the coding of the transcriptions, 22% of the videotapes were re-coded after a period of three months. The videotapes were selected to represent all phases of the research study and to include all the teachers and contexts. The rater watched the videotapes, re-coding all interactions that took place on the selected videotapes. The correlation between the ratings was 98%. The majority of the discrepancies were related to communication functions 5 and 6, namely 'offering information' and 'voicing an opinion or giving an instruction'. The intra-rater agreement on communication modes employed by the adolescent who uses AAC was 100%.

5.2.1.2 Inter-rater reliability

Two additional raters, raters 2 and 3, qualified Speech and Hearing Therapists, independently coded 22% of the videotapes. The videotapes were selected to represent all phases of the research study and to include all the teachers and contexts. The coding system was explained to raters 2 and 3 who were then trained using excerpts of two videotapes that were not included in the 22% sample. The raters (2 and 3) viewed the videotapes, coding all interactions on the selected tapes. Inter-rater agreement is reflected in Table 5.2 as a percentage of codes that were in agreement with rater 1, the researcher. The total number of messages coded for each category is reflected in the row labeled 'number of messages' in Table 5.2.

Table 5.2 Inter-rater Percentage of Agreements of Videotape Coding.

Key: R 2 = rater two, and R3 = rater three.

Videotape	Number of messages		Discourse function		Communication function		Modes used		Partner responses	
	R2	R3	R2	R3	R2	R3	R2	R3	R2	R3
Pre Intervention 3	91	100	91	100	100	91	100	96	83	92
Pre Intervention 4	100	100	94	94	88	94	100	100	100	92
Intervention 1	94	88	96	100	93	100	100	100	93	89
Intervention 8	85	90	97	100	94	88	100	100	83	94
Post intervention 5	100	100	100	98	95	88	100	100	100	95
Post withdrawal 1	100	92	97	100	89	93	99	99	98	98
Post withdrawal 2	91	91	97	97	83	97	100	100	92	96
Total % agreement	93	93	97	99	92	92	100	99	93	95
Number of messages	83/ 89	83/ 89	252/ 260	257/ 260	238/ 260	240/ 260	263/ 264	262/ 264	211/ 226	214/ 226

5.2.2 Reliability of the Self Concept Measures

Both the Multidimensional Self Concept Scale (MSCS) (Bracken, 1992) and the Self Description Questionnaire 11 (SDQ 11) (Marsh, 1990) were chosen as they were comprehensive multifaceted scales that had published psychometric characteristics. The internal consistency and stability of both tests were discussed in the methodology, 4.5.5.3 and 4.5.5.4 respectively.

Measurement error can result from undesirable environmental and other factors e.g. examinee characteristics (Bracken, 1992). In a test of this nature the independence and confidentiality experienced by the examinee would appear important. Both the MCSC and SDQ 11 were downloaded onto the home computer of the adolescent who uses AAC to allow for maximum independence and ease and to minimise potential error.

5.3 RESULTS OF THE ANALYSIS OF OBSERVATIONAL DATA

The primary aim of the research was to determine whether training the peers would influence the interactions of the adolescent who uses AAC. Both quantitative and qualitative changes needed to be recorded and analysed. The most direct method of doing so was through videotaping the adolescent who uses AAC interacting with his peers in the natural context of school throughout the phases of the research. The videotapes were then transcribed and the transcriptions coded and analysed (see Appendix E for sample transcript of videotape, post withdrawal 3). The parameters according to which the observational data were analysed are presented in Table 5.3.

Table 5.3 Schematic Overview of Observational Data Analysis

Phases of Research	Measuring Instruments	Parameters
Pre Intervention Phase	Discourse Analysis of the videotape recordings	Mean number of messages per minute (frequency of interactions)
Intervention Phase		Mean number of messages per interchange (extent of interactions)
Post Intervention phase		Discourse Functions
Post Withdrawal phase		Communication Functions
		Modes of communication used
		Partners' responses to participant

5.3.1 Frequency and Extent of Interactions

Of foremost interest were the following questions:

i. Was there any change in how frequently the adolescent who used AAC interacted with his peers?

ii. Was there any change in the number of messages per interchange (extent) in the interactions of the adolescent who uses AAC with his peers?

An *interchange* is defined as a coherent segment of interaction as discussed in chapter 3 (3.4.4.) Interchanges were divided into *messages*, which could be an initiation, a response or a follow-on and (see 3.4.4) constituted the basic unit of analysis.

5.3.1.1 Frequency of interactions expressed as the mean number of messages per hour

The frequency of interactions was determined by dividing the total number of messages for each context by the number of hours for that particular context to obtain the mean. Means were determined throughout all phases of the research study with the exception of the withdrawal phase. Standard deviations were also calculated. A summary of the results reflecting the mean number of messages within each context is presented in Table 5.4.

Table 5.4 Mean Number of Messages per Hour

Phase of Research	Context 1 - Teacher Directed Time		Context 2 – OBE Small Group Discussions		Context 3 – Informal Time	
	Mean number of messages per hour	Standard Deviation	Mean number of messages per hour	Standard Deviation	Mean number of messages per hour	Standard Deviation
Pre Intervention	22	0.19	84	0.77	55	0.42
Intervention	25	0.29	172	1.22	174	1.09
Post Intervention	58	0.93	215	2.08	284	3.01
Post Withdrawal	105	1.45	301	2.56	307	2.32

Table 5.4 reflects an increased frequency of messages across all phases of research within all three contexts. The increase in the frequency of the messages between the adolescent who uses AAC and his peer(s) is graphically represented in Figure 5.2 where context 1 refers to teacher directed time, context 2 refers to OBE small group time and context 3 refers to informal times within the classroom.

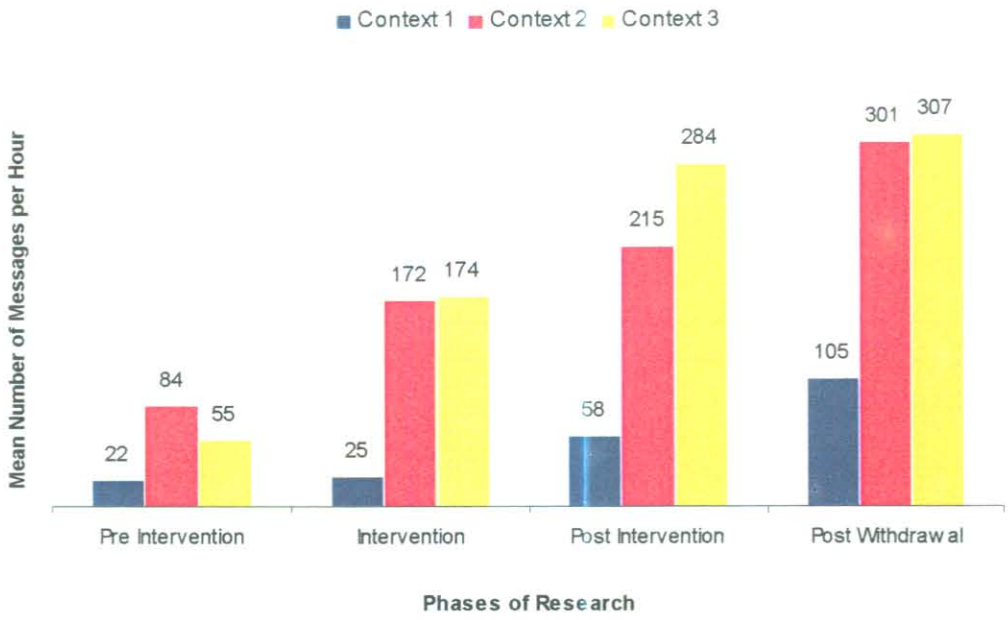


Figure 5.2 Mean number of messages per hour

The increase in messages was not uniform across contexts. Comparing the increase across contexts the following results were obtained:

i. The greatest increase was during context 3 (informal times) with a difference between pre intervention and post withdrawal phases of 252 messages per hour.

ii. The next largest increase was in context 2 (OBE small groups) where the difference between pre intervention and post withdrawal phases was 217 messages per hour.

iii. The smallest difference was during context 1(teacher directed time) which reflected an increase of 84 messages per hour from pre intervention to post withdrawal.

That the lowest number of messages per hour and smallest rate of change was evidenced in the context of teacher directed (context1) time is not unexpected. The principal increase in the informal time (context 3) context was significant as it is during this context that peers can choose with whom, to whom and for how long they wish to communicate and this would appear to indicate a definite increase in the social interactions of the adolescent who uses AAC with his peers as measured in messages per hour. It is interesting to note that the number of messages per hour is virtually the same at post

withdrawal during both the OBE small group time (context 2) and the informal (context 3) times. This is a positive finding as these contexts do offer different opportunities for interactions and the results could have been disparate. In OBE small groups (context 2) all the participants in a group were expected to offer opinions and to contribute to the group whereas in informal times (context 3) the adolescents were free to choose whether or not they wished to communicate with peers.

The increase in the number of messages per hour (frequency of interactions) with peers following peer training is consistent with the findings of other research studies during which peer training was implemented (Calculator, & Luchko, 1983; Carter, & Maxwell, 1998; Hunt et al., 1988; Hunt et al., 1992). The low number of messages per hour of the adolescent with peers at pre intervention is also consistent with findings that children who use AAC have few interactions with peers in school (Harris, 1982; Kraat, 1987; Light, 1988).

5.3.1.2 The mean number of messages per interchange (the extent of interchanges)

The mean number of messages per interchange between the adolescent who uses AAC and his peers was also of interest, the hypothesis being that should the peer training programme result in an improvement in the interactions between the adolescent who uses AAC and his peers this would be reflected not only in more messages per hour but also the interactions would increase in extent. The extent of interactions was not measured in time but rather as the mean number of messages per interchange. To determine the mean number of messages per interchange the total number of messages for each context within a research phase was calculated and then divided by the total number of communication interchanges for that context within that phase of research. This calculation was not applied to the withdrawal phase of research. The means and standard deviations of the number of messages per interchange are presented in Table 5.5.

Table 5.5 Mean Number of Messages per Interchange

Phase of Research	Context 1 - Teacher Directed Time		Context 2 - OBE small group discussions		Context 3 – Informal time	
	Mean number of messages per interchange	Standard Deviation	Mean number of messages per interchange	Standard Deviation	Mean number of messages per interchange	Standard Deviation
Pre Intervention	3.6	1.74	3.65	2.01	2.47	1.79
Intervention	3	1.87	5.56	5.56	5.38	4.36
Post Intervention	5.6	8.40	5.98	9.15	8.84	11.26
Post Withdrawal	6.56	6.29	10.2	8.46	7.53	4.97

These results are reflected graphically in Figure 5.3.

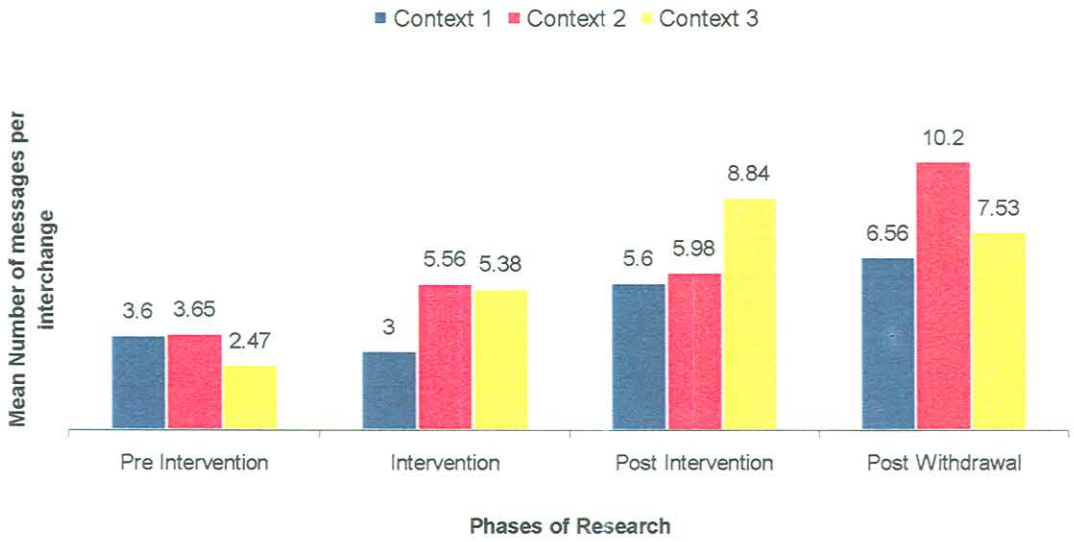


Figure 5.3 Mean number of messages per interchange

This graph does indicate an overall increase in the mean number of messages per interchange during each context from pre intervention measurements to those at post withdrawal. However, the mean number of messages per interchange during context 1 (teacher directed time) was less during the training phase than during the pre intervention phase falling from 3.6 to 3 messages per interchange. Similarly, the mean number of messages declined from 8.84 to 7.53 during context 3 (informal times) between the post intervention and post withdrawal phases of the research. Please note the standard

deviation for the post withdrawal phase, context 3, is high. However, this last result is of concern as it indicates that despite there being a higher number of messages per minute the number of messages per interchange was less in the post withdrawal as opposed to the post intervention phase. This could possibly be explained by the adolescent who uses AAC initiating more interactions with peers but that the peers did not sustain these interactions.

To investigate if this could account for this discrepancy the number of interchanges that were initiated by the adolescent who used AAC was compared to the number of interchanges initiated by a peer or peers. This comparison is reflected Table 5.6.

Table 5.6 Ratio of Initiation of Exchanges

Context	Pre Intervention		Intervention		Post Intervention		Post Withdrawal	
	User	Peer	User	Peer	User	Peer	User	Peer
Context 1	7	3	17	5	10	12	37	17
Context 2	31	21	34	49	19	33	15	15
Context 3	12	5	16	24	25	19	18	17

The above table clearly indicates that the proposition that the adolescent who uses AAC was initiating more interactions with peers but that peers did not sustain these interactions was not substantiated. However, initiations of exchanges was slightly less for both the adolescent who uses AAC and the peers during informal times (context 3) in the post withdrawal phase compared to during the post intervention phase. Although this is of concern the fact that the earlier imbalance between initiations of the adolescent who uses AAC and his peers during informal times (context 3) was remedied is positive. Initiations during post withdrawal were a virtually even ratio of 18/17 compared to the 12/5 ratio in the pre intervention phase. Of note is the actual increase in the initiations of the peers from 5 during the pre intervention phase to 24 during the intervention phase, 19 in the post intervention phase and 17 in the post withdrawal phase.

Increased interaction as evidenced in the preceding paragraphs is important, as interaction with peers is essential for adolescents to develop competent social and communicative skills (Cartledge, & Milburn, 1995; Light, 1988). Increased peer interaction was also necessary for the adolescent who uses AAC to develop the required socio linguistic abilities to develop his relationships and his position within the peer group (Bigelow, & La Gaipa, 1980; Romaine, 1884). Increased interaction was of major concern as the pre intervention observational data had shown low intensities of interaction by the primary participant, who had confirmed at the commencement of the study that several of his class peers had never interacted with him. Although this may have been due to the attitudes of his peers, the lack of interaction with his peers could result in the adolescent who uses AAC being considered to have insufficient interaction skills, which would exacerbate his being ignored or even result in rejection by peers (Whitmire, 2000). Previous research that showed that children who use AAC:

(i) Are seldom described as interacting with peers (Kraat, 1987)

(ii) Are dominated by the speaking partner and deprived of his/her turn in interactions (Light et al., 1985a)

(iii) Infrequently initiate topics or interactions (Light et al., 1985a)

(iv) Tend to be passive and merely respond with short answers to his/her speaking partners (Buzolich, & Lunger, 1995; Light, Collier, & Parnes, 1985b)

Considering the above, it was important that the interactions of the adolescent who uses AAC should increase (Light et al., 1992). For interactions to be rated as more successful this asymmetry needed to be lessened and the adolescent who uses AAC needed to take a more equitable part in interactions in order to achieve greater communicative competence and to meet the goal of social closeness (Light, 1989).

5.3.2 Qualitative Analysis of Observational Data

The videotaped exchanges were then further coded and analysed according to the following categories; (i) discourse functions, (ii) communication functions and (iii) communication modes employed by the adolescent who uses AAC as well as (iv) the responses of the peer partner or partners. The classification of each division within the categories was described in table 4.9 in the methodology. To evaluate the incidence of use of each of the four types of discourse function the number of times a function was used was converted into the number of occurrences per hour. This process was repeated for the nine communication functions that were coded, the six modes of communication used by the primary participant and as well as the six categories of partner response. This allowed for the incidence of each function or mode to be readily compared to the other functions or modes across the phases of research within each context. These results were prepared separately for each context and tabulated allowing for a comparison of the incidence of each function, mode or partner response in the different contexts. The analysis of the interactions between the adolescent who uses AAC and his peers during context 1, teacher directed time, across all phases of the research is presented in Table 5.7.

Table 5.7 Results of Analysis for Teacher Directed Time, Context 1

Category Description		Pre Intervention Phase	Intervention Phase	Post Intervention Phase	Post Withdrawal Phase
Discourse Functions of the Adolescent who uses AAC					
i	Initiation of interaction	5	7	5	13
ii	Re-initiation	3	1	0	4
iii	Response to peer	1	2	6	6
iv	Discourse Maintainer	5	6	31	42
Communication Functions of the Adolescent who uses AAC					
i	Social greeting/ norms	3	1	7	7
ii	Answers Yes/No question	0	1	3	8
iii	Answers contingent (open ended) question	0	0	0	1
iv	Requests or asks a questions	3	2	4	10
v	Offers information	1	3	4	5
vi	Voices opinion	2	2	18	9
vii	Expression of feelings/emotions	2	2	14	9
viii	Teases, pretends, humour or sarcasm	1	3	7	15
ix	Interrupts conversation of peer(s).	0	0	0	0
Modes of Communication of the Adolescent who uses AAC					
i	Voice: vocalisation or verbalization	8	11	37	54
ii	Facial expression	1	1	1	0
iii	Body movement	1	2	5	9
iv	DeltaTalker™	0	0	1	0
v	Eye gaze/eye pointing	1	0	1	0
vi	Computer	0	0	0	2
Partner Responses to the Adolescent who uses AAC					
i	Initiation by peer	2	2	6	6
ii	Partner responds appropriately	5	6	4	11
iii	Partner ignores adolescent who used AAC	1	1	1	4
iv	Discourse Maintainer	3	4	23	28
v	Partner clarifies message	0	1	0	2
vi	Partner does not understand user	1	2	1	6

This table clearly shows the following:

i. The greatest increase within the category of discourse functions was in the division of discourse maintainer supporting the result that the extent of the interchanges increased.

ii. At post withdrawal the primary participant initiated interactions more than twice as frequently as he did in the pre intervention phase.

iii. The primary participant answered far more yes/no questions at post withdrawal than during other phases of research

iv. The incidence of requesting/ asking questions and teasing/ pretending/ humour/ sarcasm showed considerable increases at the post withdrawal phase of the study.

v. The communication functions of voicing opinions as well as expressing emotions/feelings increased markedly at post intervention but decreased at post withdrawal. However, the incidence of these functions was still higher at post withdrawal than at the pre intervention or intervention phases of research.

vi. The primary participant did not interrupt his peers (communication function ix) at any time during this context, teacher directed time.

vii. The primary participant's use of his natural voice as his primary mode of communication is evident.

viii. The partners generally responded appropriately to the primary participant. The incidence of discourse maintainer increased markedly indicating that the increase in the number of messages per interchange was due to the contributions of messages by both the peers and the primary participant.

The analysis of the interactions between the adolescent who uses AAC and his peers during context 2, OBE small group discussion time, across all phases of the research in terms of the number of occurrences per hour is presented in Table 5.8.

Table 5.8 Results of Analysis for OBE Small Group Discussion Time, Context 2

Category Description		Pre Intervention Phase	Intervention Phase	Post Intervention Phase	Post Withdrawal Phase
Discourse Functions of the Adolescent who uses AAC					
i	Initiation of interaction	14	13	13	16
ii	Re-initiation	4	3	2	8
iii	Response to peer	9	17	22	13
iv	Discourse Maintainer	20	53	79	117
Communication Functions of the Adolescent who uses AAC					
i	Social greeting/ norms	2	5	3	12
ii	Answers Yes/No question	13	25	22	22
iii	Answers contingent (open ended) question	1	4	2	13
iv	Requests or asks a questions	3	8	13	24
v	Offers information	19	11	46	9
vi	Voices opinion	3	14	12	20
vii	Expression of feelings/emotions	2	8	14	18
viii	Teases, pretends, humour or sarcasm	4	12	5	36
ix	Interrupts conversation of peer(s).	0	0	0	0
Modes of Communication of the Adolescent who uses AAC					
i	Voice: Vocalisation or verbalization	23	59	94	135
ii	Facial expression	1	2	3	0
iii	Body movement	14	27	18	25
iv	DeltaTalker™	5	2	2	0
v	Eye gaze/eye pointing	4	0	1	0
vi	Computer	0	0	0	1
Partner Responses to the Adolescent who uses AAC					
i	Initiation by peer	10	19	23	16
ii	Partner responds appropriately	14	17	15	18
iii	Partner ignores Adolescent who used AAC	6	5	3	3
iv	Discourse Maintainer	13	45	57	118
v	Partner clarifies message	2	6	5	5
vi	Partner does not understand adolescent who used AAC	5	15	9	6

This table demonstrates:

i. A noticeable increase in the discourse function of discourse maintainer by the primary participant.

ii. Noticeable increases in the answering of contingent questions. Peers were made aware of the strategy and encouraged to ask the primary participant contingent questions during the peer training.

iii. Other communication functions to show noticeable increases included making requests/ asking questions, expressing of feelings/ emotions as well as teasing/ pretending/ humour/ sarcasm.

iv. The adolescent who uses AAC did not interrupt his peers at all during this context.

v. In this context the preferred use of his natural voice as his preferred mode of communication was most evident.

vi. The partner response in maintaining discourse showed the greatest increase in occurrence. A positive factor is the decrease in the occurrence of the partner ignoring the adolescent who uses AAC.

The analysis of the interactions between the adolescent who uses AAC and his peers during informal times, context 3, across all phases of the research is presented as the number of occurrences per hour in Table 5.9.

Table 5.9 Results of Analysis for Informal Times, Context 3

Code	Category Description	Pre Intervention Phase	Intervention Phase	Post Intervention Phase	Post Withdrawal Phase
Discourse Functions of Adolescent who uses AAC					
i	Initiation of interaction	14	14	18	22
ii	Re-initiation	8	6	9	7
iii	Response to peer	11	21	14	18
iv	Discourse Maintainer	11	52	111	111
Communication Functions of the Adolescent who uses AAC					
i	Social greeting/ norms	10	4	7	14
ii	Answers Yes/No question	2	21	13	25
iii	Answers contingent (open ended) question	0	6	1	6
iv	Requests or asks a questions	10	9	17	28
v	Offers information	1	9	42	7
vi	Voices opinion	6	15	41	13
vii	Expression of feelings/emotions	3	12	10	14
viii	Teases, pretends, humour or sarcasm	6	15	14	49
ix	Interrupts conversation of peer(s).	0	0	0	0
Modes of Communication of the Adolescent who uses AAC					
i	Vocalisation or verbalization	28	74	135	146
ii	Facial expression	0	1	1	0
iii	Body movement	11	19	16	13
iv	DeltaTalker™	0	0	0	0
v	Eye gaze/eye pointing	0	0	1	0
vi	Computer	0	0	0	0
Partner Responses to the Adolescent who uses AAC					
i	Initiation by peer	6	20	14	20
ii	Partner responds appropriately	8	14	15	17
iii	Partner ignores Adolescent who used AAC	18	10	12	7
iv	Discourse Maintainer	5	48	81	98
v	Partner clarifies message	0	1	9	2
vi	Partner does not understand Adolescent who used AAC	1	3	15	17

This table confirms similar findings to those of the previous contexts.

i. The function of discourse maintainer shows the most marked increase and is consistent at both post intervention and post withdrawal phases.

ii. The initiation of interactions also doubled when comparing the incidence at pre intervention with that at post withdrawal.

iii. Communication functions noted to increase markedly include the answering of yes/ no questions, requests/asking questions, expression of emotions/ feelings and teasing/ pretending/ humour/ sarcasm.

iv. Although reflecting a higher occurrence at post withdrawal than at pre intervention, offering information and voicing his opinion fluctuate markedly between the phases of research.

v. As for both of the other two contexts, at no time did the primary participant interrupt the conversations of his peer (communication function ix).

vi. Vocalisations and verbalizations are also reflected as the preferred mode of communication of the primary participant in this context.

vii. Partner responses of initiating interactions, responding appropriately and, especially maintaining discourse, indicate positive increases. Ignoring the primary participant shows a steady decrease in occurrence throughout the phases of research.

The previous three tables provided an overview of the results of the evaluative analysis of the observational data. The salient features of each of the different categories, discourse functions, communication functions, modes of communication and the responses of partners will now be briefly discussed.

5.3.2.1 Comparisons of discourse functions

Discourse functions were compared according to the following four options namely:

i. Initiation of interaction by adolescent who uses AAC.

ii. Re-initiation by adolescent who uses AAC.

iii. Response by adolescent who uses AAC to peer (mostly the first response to an initiation by a peer or peers).

iv. Discourse maintainer.

Overviews reflecting the incidence of each option across the pre intervention, intervention, post intervention and post withdrawal phases of the research for each context are presented as bar graphs (see Figures F1, F2 and F3 in Appendix F). Line graphs depicting the occurrences per hour of each discourse function within the three contexts across the phases of research are included (see Figures F4 – F7 in Appendix F).

The most noticeable increase was in the incidence of the discourse function 4, discourse maintainer, during all three contexts from pre intervention to post withdrawal phases as reflected graphically in Figure 5.4.

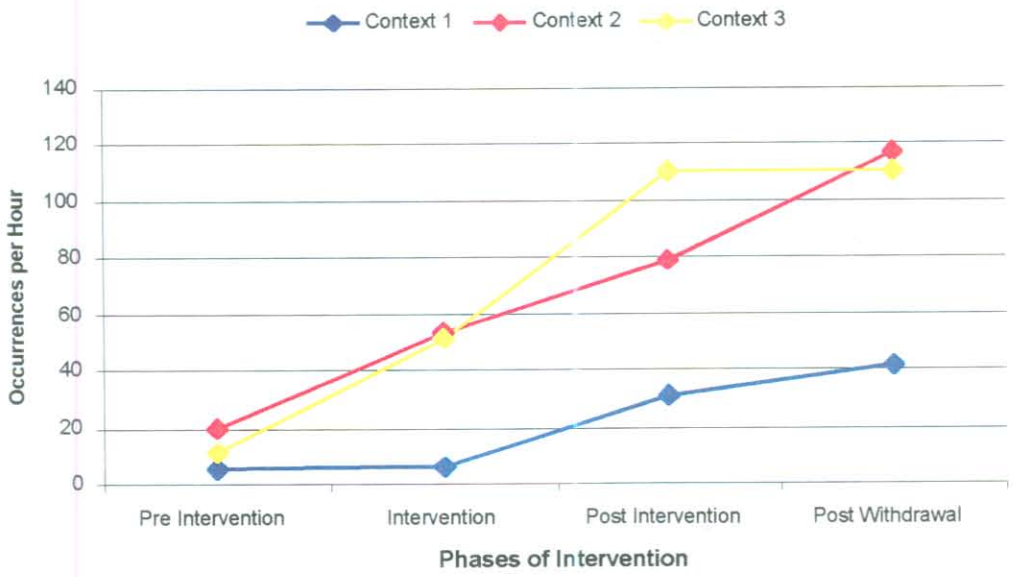


Figure 5.4 Comparison of incidence of discourse maintainer, discourse function 4, for the three contexts across the phases of research

This increase is noticeable across all phases of research in OBE groups (context 2). During teacher directed time (context 1), there was hardly any increase (5.2 to 5.7 occurrences per hour) between pre intervention and intervention phases but a marked increase was noted at post intervention (30.8 occurrences per hour) and at post withdrawal (a further increase to 41.5 occurrences per hour). During informal times, (context 3), there was a

striking increase from pre intervention to intervention to post intervention phases followed by a very slight decrease at post withdrawal. The increased levels of the use of discourse maintainer at post withdrawal when compared to pre intervention levels is a positive indication of increased interaction by the adolescent who uses AAC with his peers.

This finding correlates with the increase in "conversational turns" as a result of peer training in the study of Hunt et al. (1991). It was important that the interchanges of the adolescent who uses AAC be extended as the development of social and communicative competence both influences and is influenced by interactions with peer partners, (Butterfield et al., 1995). The ability to sustain interchanges and produce an extended sequence of contingent interactions is partly a developmental construct and early development is characterised by short sequences of interaction (McTear, 1985). However, the extent of a sequence will depend on external factors and in some cases shorter sequences can indicate a more mature interaction (McTear, 1985).

5.3.2.2 Comparisons of communication functions

Nine communication functions used by the adolescent who uses AAC were coded for comparison. They were:

i. Social greetings
ii. Answering yes/no questions
iii. Answering contingent or open ended questions
iv. Requesting or asking questions
v. Offering information
vi. Voicing opinion or giving instructions
vii. Expression of feelings or emotions
viii. Teasing, pretending, making humorous or sarcastic statements
ix. Interrupting conversation of peers.

A comparison of the occurrence of the communication functions coded is presented in bar graphs for each context (see Figures G1, G2 and G3 in Appendix G). Line graphs depicting the incidence of occurrence for each function during each context across the phases of research are also depicted (see Figures G4 –G12 in Appendix G).

During the training peers were encouraged to differentiate when it was appropriate to ask contingent questions as opposed to yes/no questions. Peers were encouraged to increase their use of contingent questions. However, use of the yes/no questions to increase the primary participant's rate of communication, establish immediate needs and wants, and to resolve misunderstandings was also encouraged. An increase in asking contingent questions was noted during the intervention and post withdrawal phases in the OBE small group context, context 2. Although this was a positive trend the incidence of answering "yes/no" questions remained higher than that of answering contingent questions.

Although there were generally increased occurrences of most of the communication functions monitored there was a noted fluctuation in the incidence of offering information, communication function 5. As this is an important pragmatic function for an adolescent involved in the OBE educational setting, the decrease from pre intervention to post withdrawal of this function within the OBE small group discussions is of concern and is reflected below in Figure 5.5.

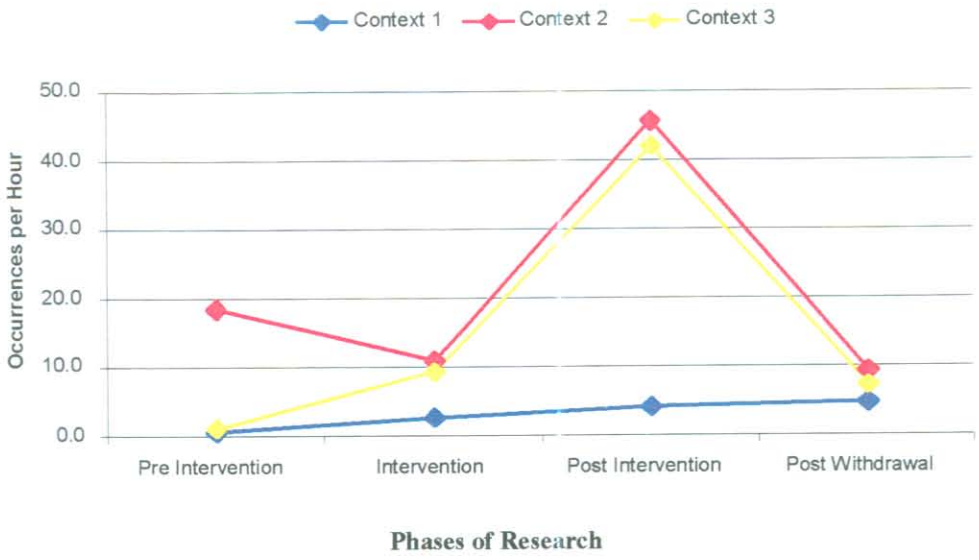


Figure 5.5 Comparison of the incidence of the communication function 5, offering information, across the phases of research

During the teacher directed context there is a slight but steady increase in the use of offering information by the primary participant. However, in both of the other contexts there is a wide fluctuation of the use of this communication function. It is also difficult to predict what the result would be due to the lack of consistency. The low incidence of the primary participant offering information during the OBE small group context, context 2, during the intervention and post withdrawal phases is of particular concern as it is in this context that learners would be expected to offer information or make suggestions. Possible contextual and partner related variables impacting on this function could be:

i. His world knowledge related to the specific topics discussed
ii. Different peers assigned to work together within the OBE groups.

It is during small group discussions involving set tasks that learners have greater opportunity to offer opinions/ information, initiate topics and to take part in *exploratory talk* (McTear, 1985). Exploratory talk reflects a collaborative interactive process in which the group shape and adjust their knowledge with experimentation of new ideas and implications (McTear, 1985). In these discussions adolescents usually surpass the contributions they would make in open class discussions and will e.g. provide an example, debate an assertion or qualify the contribution of a peer (McTear, 1985). According to

McTear (1985) the skills that adolescents have shown in small group discussions reflect more mature abilities akin to those of competent adults.

A zero level of occurrence throughout all phases of research in all three contexts for interrupting the conversation of peers (communication function 9) was recorded. In Western culture, the ability to interrupt is considered to be an important communication function and it is interesting that throughout the entire research project the adolescent who used AAC was not noted to achieve this successfully at all. Observation of the videotapes clearly demonstrated that the peers in the class frequently interrupted each other's conversations. The frequency of peers interrupting each other increases significantly from Grade 7 to Grade 12 (Nippold, 2000). At times interruptions are considered impolite but appropriate interruptions play a constructive role in promoting discussion amongst adolescents (Nippold, 2000). Being able to use the same interactive behaviours as peers, including interrupting, is an integral part of the socialisation process (Romaine, 1984).

The incidence of the primary participant asking questions or making requests increased markedly across all three settings from pre intervention to post withdrawal as indicated in Figure 5.6.

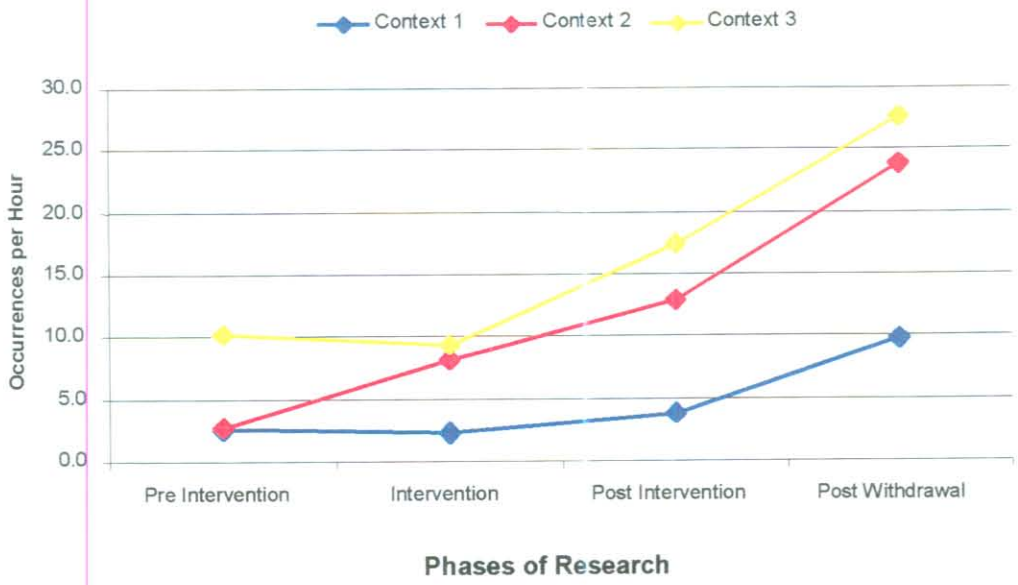


Figure 5.6 Comparison of incidence of communication function 4, asking questions/ making requests.

This marked increase and continued trend across the latter two phases of research is most positive as asking questions is an important communication function and a way to both initiate and sustain interaction with peers. Asking questions is a fairly complex linguistic function that is not easily learnt by young children who use AAC (Light et al., 1985b). In early adolescence the use and form of requests includes persuasion, asking for information and requesting opinions (McTear, 1985). Asking questions is thus an important conversational behaviour of adolescents that enhances interactions (Nippold, 2000). The adolescent in the study clearly had the required skills to ask questions but the increased use of this function within all three contexts may reflect improved self confidence or may have resulted from peer reinforcement of his attempts at communicating requests (Carter, & Maxwell, 1998).

A further positive result of the study was that the adolescent who uses AAC showed a marked increase between pre intervention and post withdrawal of communicating to express feelings and emotions as evidenced in Figure 5.7.

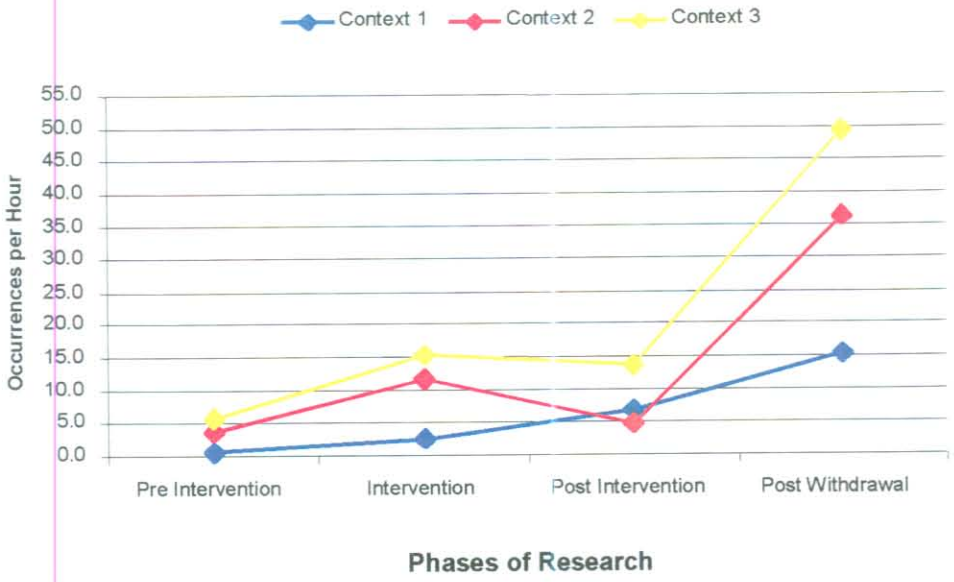


Figure 5.7 Comparison of incidence of communication function 7, expressing emotions or feelings.

The exceptionally low incidence of the primary participant's expressions of emotions was of concern when the pre-intervention phase data were examined. In viewing the videotapes of the pre intervention phase this was clearly in contrast to the behaviour of his peers in the classroom. The ability to express emotions including anger and frustration and to show feelings including affection for one another is an important communication skill for any adolescent (Nippold, 2000). These forms of social interaction are essential for the personal well being of adolescents (Nippold, 2000). The need to share feelings as well the ability to express emotions is important for an adolescent who uses AAC (Light, Beesley, & Collier, 1988). Increased interaction with peers has been previously discussed with regard to adolescence. The topics of interaction also differ with adolescents discussing personal issues and peer concerns with other adolescents (Nippold, 2000). Both male and female adolescents have also reported increased levels of affect when interacting with peers and the incidence of interacting by teasing and joking increases during adolescence (Nippold, 2000; Whitmire 2000). The incidence of the primary participant in teasing, pretending, joking, making humorous or sarcastic comments (communication

function 8) with his peers increased markedly when comparing occurrences during the pre intervention and post withdrawal phases of the research as evidenced in Figure 5.8.

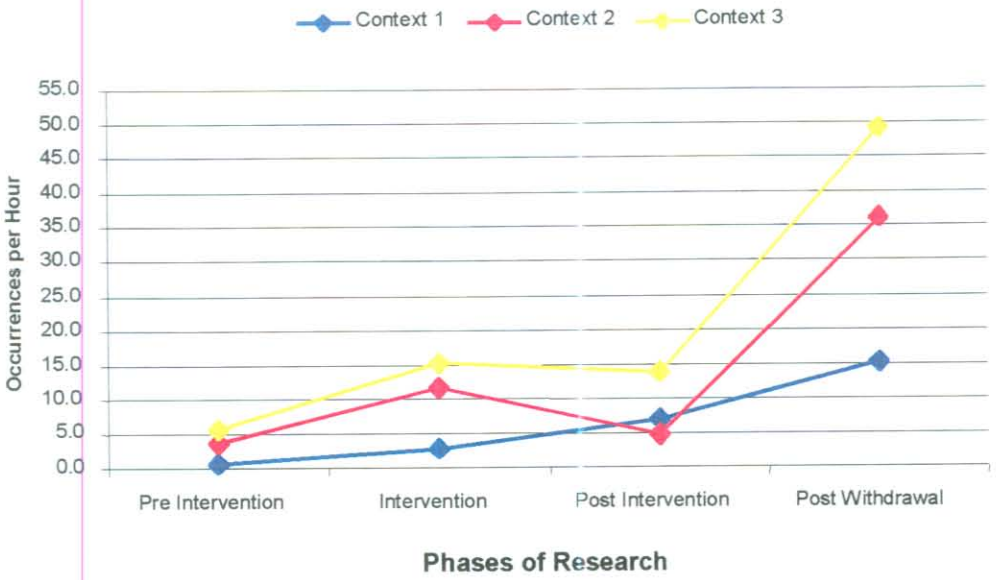


Figure 5.8 Comparison of incidence of teasing/ pretending/ humour/ sarcasm, communication function 8, across the phases of research.

The explicit increase in the primary participant's use of humour was positive as both his teachers and parents had mentioned his acute sense of humour as an important personality trait during the pre intervention interviews. It may also reflect an increase in his confidence in interacting freely with his peers. Self reports have indicated that adolescents are more spontaneous and relaxed when interacting with peers and often use humour to amuse peers (Nippold, 2000).

Both the appropriate expression of emotions and the use of humour are important pragmatic skills that are exhibited by competent communicators. Light (1988) tentatively suggests that the factors that determine the communicative competence of speakers may be the same that determine the communicative competence of persons who use AAC, but that the means and strategies of realising these same factors may differ. Using their sense of humour to put speaking partners at ease was one way that competent users of AAC demonstrated their level of social competence (Light, 1988). In addition in the process of

social closeness, one of the four main goals of communication as defined by Light (1988), it is essential that the adolescent who uses AAC should be able to freely express emotions.

5.3.2.3 Comparison of communication modes used by the primary participant

The primary participant used a variety of modes of communication. He often simultaneously employed more than one mode e.g. a verbalization accompanied by a facial expression or body movement. The modes that were coded included:

i. Natural voice i.e. Vocalisations and verbalizations
ii. Facial Expression
iii. Body Movement
iv. DeltaTalker™
v. Eye Gaze
vi. Computer

For the purposes of comparison only the primary or dominant mode of communication was coded. In certain instances two modes were used with equal intensity and both modes were coded. The incidence of occurrence per hour of each of the six modes of communication utilised by the primary participant as his primary mode of communication are presented in bar graphs (see Figures H1, H2 and H3 in Appendix H). Line graphs of each function within each context throughout the phases of research are also included (see Figures H4 – H9 in Appendix H).

The primary participant used his natural voice as his most preferred mode of communication. This was apparent throughout each context, teacher directed, working in small OBE discussion groups and informal time, and across all research phases. The increase in the incidence of him using his natural voice during interactions is reflected in Figure 5.9.

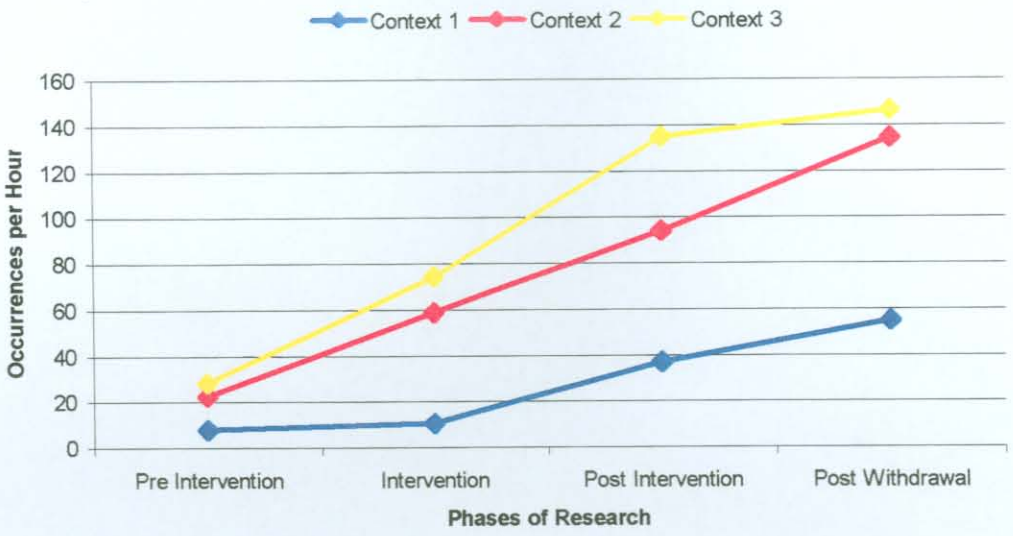


Figure 5.9 Comparison of incidence of using natural voice, mode 1, across the phases of research.

The second most important mode of communication used by the participant was mode 3, body movements. This was consistent in all three settings throughout all phases of the research project. The primary participant utilised the DeltaTalker ™, mode 4, to a very limited degree. The primary participant was consulted and agreed that the following were contributing factors:

i. Limited access - only one keyboard could be mounted on his laptray at any one time and as he needed frequent access to his computer for academic tasks the computer keyboard was most often in place.

ii. Lack of assistance to set up the DeltaTalker ™ on the mounting plate and to put on his headpointer if he was not wearing it.

iii. Self consciousness - he had recently become aware that using a VOCA made other people think that he was different.

iv. Slow rate and lack of intelligibility - he found it much quicker to use his natural voice and was also frustrated that his peers found the synthetic speech difficult to understand.

During adolescence peer pressure to conform to the manner, style and vocabulary of the peer group is a strong influence (Romaine 1984). The reluctance of the adolescent who uses AAC to use his VOCA may possibly have resulted in part from a desire not to be different as mentioned above. This view was supported by one of his parents. However, it must be remembered that using his voice was one of the easiest ways for him to communicate a message and this mode also conformed more closely to that of his peers.

5.3.2.4 Partner responses

A comparison of the occurrence of the six coded partner responses to the adolescent who uses AAC is presented for each context in bar graphs (see Figures I1, I2 and I3 in Appendix I). The peer interactions with the primary participant were coded according to the following six categories:

i. Initiation of interaction by the partner
ii. Partner responds appropriately to initiation of interaction by primary participant
iii. Partner ignores user
iv. Discourse maintainer
v. Partner clarifies message of the user e.g. by repeating it
vi. Partner does not understand user

In applying the codes it was evident that some of the messages of the partners met the definitions of two categories. When this occurred, the messages were given both codes, for example 4 and 6 in the situation when the partner did not understand the message and either asked him to repeat it or asked "what?" Line graphs depicting the incidence of occurrence for each of the coded partner responses were prepared (See Figures I4-I9 in Appendix I).

Partner response 4, discourse maintainer shows a marked increase in all contexts throughout the phases of research as indicated in Figure 5.10.

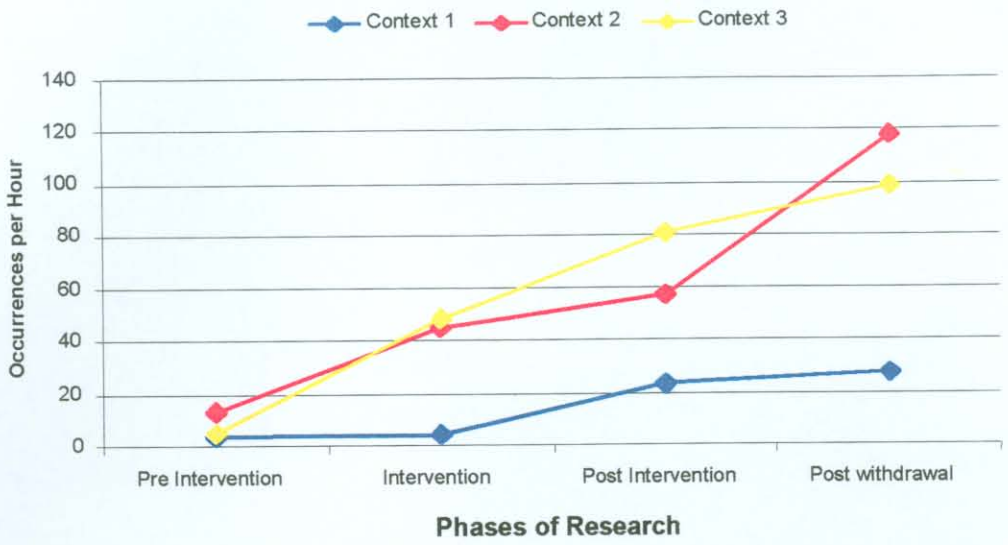


Figure 5.10 Comparison of incidence of partner response 4, discourse maintainer across phases of research.

This figure clearly shows the increased use of this response in all three contexts throughout the phases of research. This result confirms that the increase in the number of messages per interchange was due to the maintenance of the discourse by both the primary participant and the peers.

In their discussion of social relationships among adolescents with diverse abilities Meyer et al. (1998) discuss examples of what they refer to as the "invisible/ignore" code of behaviour in which peers ignore a classmate with severe disabilities. Research describing interactions of children who use AAC also describe a lack of response to the initiations of children with LNFS (Kraat, 1987; Light et al., 1992). This partner response was included in the category of partner responses for the pilot study and instances of the peers ignoring the adolescent who uses AAC were recorded at the pre intervention phase of the study. This response pattern of ignoring was coded as partner response 3 and the occurrence of ignoring by peers is reflected in Figure 5.11.

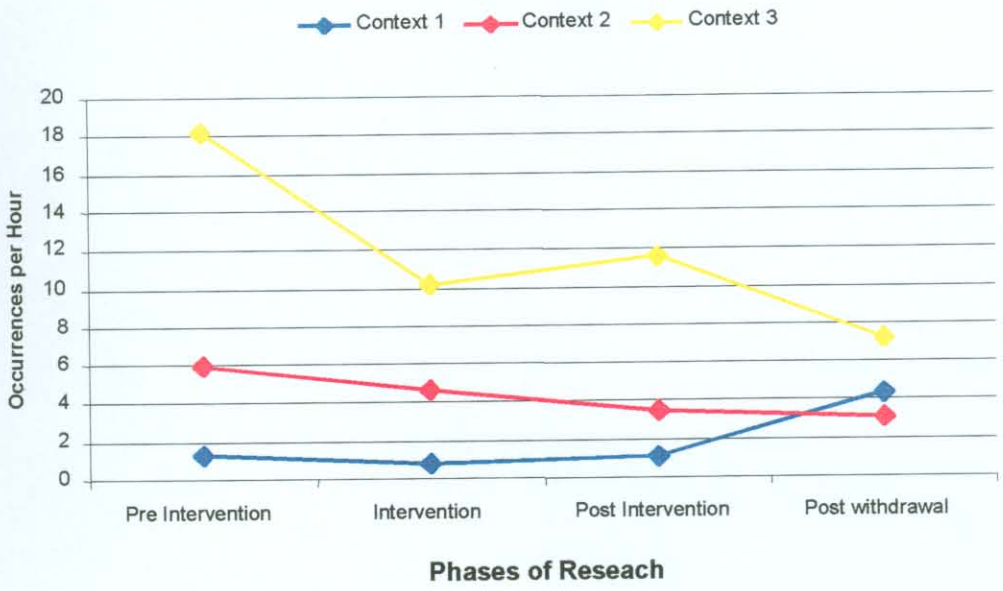


Figure 5.11 Comparison of incidence of partner response 3, partner ignores adolescent who uses AAC across phases of research.

A decline in the incidence of partners ignoring the adolescent who uses AAC is noted during contexts 2 and 3 (OBE groups and informal times respectively). This is considered a positive response to the peer training programme which encouraged peers to be more aware of the needs of the adolescent who uses AAC and included activities to enhance the peers awareness of how it felt to be ignored or misunderstood. The increase in the peers ignoring the adolescent who uses AAC during context 1 may well be appropriate to the context. In context 1, teacher directed time, learners were not expected to talk or interact. The increase in initiations and re-initiations of interactions by the adolescent during this context was clearly evident (see Figures E4 and E5 in Appendix E). The adolescent who uses AAC is not able to vocalize quietly and the peers would have needed to ignore him during this context in order to avoid being disciplined by the teachers.

5.3.3 Summary of Main Findings of Observational Data

There were noticeable increases in both the mean number of messages per hour and the mean number of messages per interchange indicating a greater amount of interaction

between the adolescent who uses AAC and his peers. This increase was confirmed by the increase of the discourse function of maintainer in all three contexts across all phases of research. This was evident both with respect to the adolescent who uses AAC and his peer partners. There were marked increases when comparing the pre intervention occurrences per hour with those of the post withdrawal with respect to the communication functions of asking questions/ making requests and the use of humour. The primary participant showed a noticeable preference to use his natural voice as his primary mode of communication with his peers. The peers showed an increase in initiations of interactions with the user and they also responded more appropriately to him as the research process progressed with a positive decline in the tendency to ignore the primary participant.

The analysis of the observational data was complemented by data obtained from additional measures that were used in the pre and post intervention phases of research. These measures included strategies for the self evaluation of the adolescent who uses AAC including his ability to communicate with his peers, strategies for evaluation by his peers, strategies for the evaluation of his social interaction with peers by the teachers as well as strategies for evaluation by his parents. The results of these additional measures are presented in the following section.

5.4 ANALYSIS OF DATA FROM THE PRE AND POST MEASURES

Four main categories of measures were used:

i. Self concept scales
ii. PACT Scales
iii. Socio-metric measures
iv. Interviews

An overview of the pre and post measures that were used and the parameters that were analysed by is presented in Table 5.10.

Table 5.10 Schematic Overview of the Data Analysis for Pre and Post Measures

Measuring Instruments	Parameters
Multidimensional Self Concept Scale	The self concept of the adolescent who uses AAC as reflected in social, competence, affect, academic, family, physical and total scales.
Self Description Questionnaire II	The self concept of the adolescent who uses AAC as reflected in physical abilities, physical appearance, opposite-sex relations, same-sex relations, parent relations honesty-trustworthiness, emotional stability, math, verbal, general school, general self and the total scales.
PACT Scales	Communication attitudes of the adolescent who uses AAC
▪ Adolescent who uses AAC	Partner communication attitudes
▪ Peers	Perception of partner attitudes by adolescent who uses AAC
▪ Teachers	Partners perceptions of the communication attitudes of the adolescent who uses AAC
▪ Parents	Communication attitudes of the adolescent who uses AAC
Peer nominations	Socio-metric status of the adolescent who uses AAC
Peer rankings	
Thematic & content analysis of interviews with the adolescent who used AAC	Perception of social interaction with peers of the adolescent who uses AAC
Thematic & content analysis of interviews with teachers	Teacher's perceptions of the social interaction of the Adolescent who uses AAC with his peers
Thematic & content analysis of interviews with parents	Parents' perceptions of the social interaction of the Adolescent who uses AAC

5.4.1 Multidimensional Self Concept Scale

This standardised self concept scale was discussed in the methodology (see 4.5.5.3). As the scale has both positive and negative items reverse scoring procedures apply in determining the raw scores achieved. Raw scores are converted to standard scores. Standard scores in the MSCS are based on an intelligence quotient metric with a mean of 100 and a standard deviation of 15 and were determined through percentile rank to standard score conversions (Bracken, 1992). Descriptive classifications of self concept for the range of standard scores are provided and the standard scores, percentile ranks and descriptive classifications are norm referenced. Norm referenced interpretation compares the performance of the individual with the performance of a sample of peers and it should be noted that the MSCS standardisation sample was USA based (Bracken, 1992). The MSCS has not been standardised with a South African sample. The MSCS also provides

for ipsative or intra-child interpretation that allows a comparison of the primary participant's performance on each individual scale with his overall performance, his average scale score. In this way areas of relative strength and weakness of self concept can be identified (Bracken, 1992).

The pre-intervention results of the MSCS are reflected in Table 5.11.

Table 5.11 Results of Adolescent who Uses AAC, Pre intervention, on the MSCS

	Norm-Referenced Interpretation			Ipsative Interpretation	
Scale	**Standard Score**	**Classification**	**%ile Rank**	**Difference Score**	**.05 Classification**
Social	73	Very negative	4	-10	Average
Competence	78	Moderate negative	7	-5	Average
Affect	80	Moderate negative	9	-3	Average
Academic	80	Moderate negative	9	-3	Average
Family	102	Average	56	+19	Strength
Physical	85	Moderate negative	16	+2	Average
Total Scale	80	Moderate negative	9		
Average Scale Score	83				

As can be seen from the above table the only result to fall within the average range was the "family" scale that was on the 56th percentile. The lowest standard score was on the social scale indicating a very negative self concept of his social abilities in relating to both boys and girls. Both the total scale score and the average scale score were more than 1 standard deviation (15 points) below the mean for the age of the primary participant, reflecting a rather poor (moderately negative) self concept. As expected on the intrachild evaluation the result on the family scale was a relative strength and the only other positive factor relating to his self concept was in terms of the physical scale. This is interesting in that the adolescent is regarded as having severe physical disabilities, has no independent mobility and is dependent for all activities of daily living. His weakest area of self concept relates to the social scale.

The above results can be compared to the post intevention results of the MSCS as reflected in Table 5.12.

Table 5.12 Results of Adolescent who Used AAC, Post Intervention, on the MSCS

	Norm-Referenced Interpretation			Ipsative Interpretation	
Scale	**Standard Score**	**Classification**	**%ile Rank**	**Difference Score**	**.05 Classification**
Social	77	Moderate negative	6	-16	Weakness
Competence	99	Average	48	+6	Average
Affect	92	Average	29	-1	Average
Academic	93	Average	33	0	Average
Family	99	Average	48	+6	Average
Physical	98	Average	44	+5	Average
Total Scale	92	Average	29		
Average Scale Score	93				

The higher scores obtained on the MSCS post intervention as opposed to those obtained pre intervention are evident in this table. The social scale, although improved, remains the lowest standard score obtained. Standard scores on the competence, affect and academic scales are all within one standard deviation of the mean as is the total scale score and the average scale score. For easier comparison of pre and post training scores they are presented graphically in Figure 5.12.

Figure 5.12 Comparison of pre and post training profiles of the adolescent who uses AAC on the MCSC.

The training programme would not have had any effect on the child's self concept related to family and it is interesting to note that this score remained virtually constant. However it is not possible to attribute the gain in self concept to the peer training programme as it is not possible to prove that the increased success of his peer interactions generalised to his self concept. According to the adolescent who uses AAC and his parents the peer training programme and the resultant increased success in his peer interactions were the only changes in his experiences and environment so may have been a contributing factor.

5.4.2 Self Description Questionnaire II

The SDQ II was the second standardised self concept scale to be completed by the primary participant and is discussed in section 4.5.5.4 of the methodology. Raw scores on the SDQ II were converted into percentile rank scores and *T* scores. Percentile rank scores indicate the percentage of children in the normative sample who scored at or below the self concept score of the primary participant (Marsh, 1990). *T* scores have a mean of 50 and a standard deviation of 10. The percentiles and *T* scores realised by the primary participant at pre intervention and post intervention are reflected in Table 5.13.

Table 5.13 Pre and post intervention results on the SDQ II

Scale Description	Percentiles		*T* Scores	
	Pre Intervention	Post Intervention	Pre intervention	Post Intervention
Math	30	44	44	49
Physical Appearance	28	64	45	55
General Self	11	41	37	50
Honesty – Trustworthiness	49	84	51	60
Physical Abilities	11	8	36	34
Verbal	39	36	47	46
Emotional Stability	14	16	39	40
Parent relations	31	49	47	52
General School	13	47	38	51
Same-sex Relations	4	3	31	30
Opposite-sex relations	6	5	32	30
Total Self Concept	8	24	36	43

Table 5.13 clearly indicates the improved scores post intervention as compared to those achieved on the SDQ II at the pre-intervention phase of research. Post intervention the total self concept score is within one standard deviation (10 points) of the mean. The largest improvements were noted on the general self and general school sub-scales. The lowest percentiles were on the same-sex relations and opposite-sex relations scales which correspond to the social scale on the MSCS. Pre and post intervention *T* scores are presented graphically to facilitate comparison in Figure 5.11.

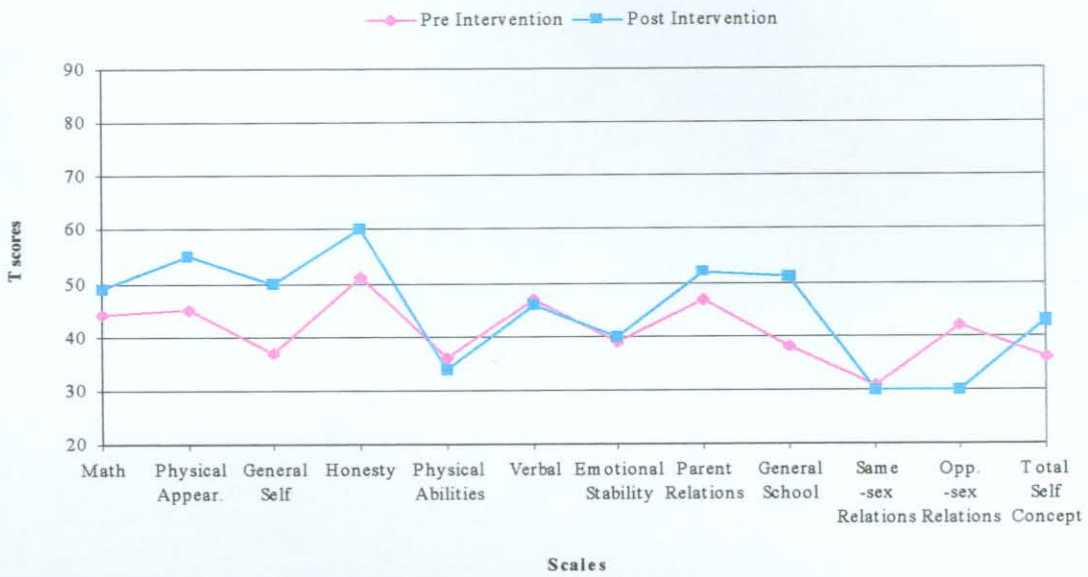


Figure 5.13 Comparison of pre and post training profiles of the adolescent who uses AAC on the SDQ II.

5.4.3 Discussion of Self Concept Scale Results

According to Bracken (1992) self concept is a learned behavioural response pattern and changes gradually as the person or his environment changes. Improvement in global self concept may result from differential success in one or more contexts and that success in one context may positively affect the person's self concept in other areas (Bracken, 1992). It may well be that the peer training programme was responsible for the improved self concept of the adolescent who uses AAC as reflected on the MSCS and SDQ 11 but this cannot be directly attributed to the programme.

In her discussion on the socio communicative considerations within AAC Warrick (1988) states that the modified community settings such as special schools include attitudes, philosophies and elements of the child/environment interface that influence the self concept of the learner who uses AAC either positively or negatively. Supporting the development of a positive self concept of the child using AAC relates to many aspects including characteristics of the AAC system and the development of relationships (Warrick 1988). Developing the child's communicative competency skills and supporting the development of positive relationships will enable the child or adolescent to experience positive self concept (Warrick 1988). Studies need to determine how communicative control influences self-concept as well as the influence of a person's positive self concept on communication skills (Warrick 1988). Natural speakers express their personalities and attempt to influence the perception of others by the style and content of their speech. And AAC interventionists should give meticulous attention to the social-communicative aspects of growth of children using AAC to enable them to project as positive a self concept as possible (Warrick 1988). The first factor listed by AAC clinicians as significant to identify a person using AAC as a competent communicator was a positive self image (Light 1988).

5.4.4 PACT Rating Scales

These rating scales assess communication attitudes (Culp, & Carlisle, 1988). The perceptions of the adolescent who uses AAC and partners can be identified as the scales were designed so that the same statements regarding attitudes could be presented to both the child and partner and or partners. This strategy allowed information to be documented within one or multiple dyads with respect to:

i. The child's (adolescent's) communication attitudes.
ii. The partners' communication attitudes.
iii. The child's (adolescent's) perception of partner communication attitudes
iv. The partners' perceptions of the child (adolescent) communication attitudes.

In evaluating the information from the PACT scales patterns of attitudes across a dyad may be identified as either consistent or inconsistent (Culp & Carlisle, 1988). An example

of a consistent pattern would be that both the person using AAC and the partner report positive (or negative) attitudes toward the communication of the person using AAC and their perceptions are consistent with the reported attitudes (Culp & Carlisle, 1988). Example of inconsistent patterns would be (a) if the person using AAC reported negative attitudes while the partner reported positive attitudes without perception of the negativity of the person using AAC or (b) the person using AAC reported positive attitudes and the partner reported negative attitudes but neither perceived the difference in attitudes toward the communication of the person using AAC (Culp & Carlisle, 1988). Each statement on the PACT scales are coded between 1-5 as follows:

1= Very wrong /Strongly disagree

2=A little wrong/Disagree

3=Not right or wrong/Neutral

4=A little right/Agree

5=Exactly right/Strongly agree (Culp & Carlisle, 1988).

5.4.4.1 PACT user rating scale

The attitudes of the adolescent who uses AAC with respect to his communication were explored by comparing his responses on the PACT user scale both pre and post intervention. The PACT scale allows for attitudes towards natural speech and an AAC mode to be evaluated.

5.4.4.1.1 Attitudes to use of speech and the VOCA

Both at pre and post intervention the primary participant strongly indicated that both when speaking and when using his DeltaTalker™ he felt he was able to express what he wanted to communicate. At pre and post intervention he indicated that he felt most people could not understand him when he spoke but that most people could understand him when he used his DeltaTalker™. At both pre and post intervention he also consistently indicated strong agreement with the statement that he liked to use his DeltaTalker™ but was unsure about whether he liked to speak. However, analysis of the observational data has revealed

that the primary participant made very limited use of the DeltaTalker™ and his preferred mode of communication with his peers was his natural voice, in contrast to his attitudes as reflected by the above responses on the PACT scale.

The full results of the PACT user scale were tabulated (see Appendix J). As expected his attitudes generally remained consistent from pre to post intervention apart from his responses to the following three statements:

i. I think I need to use my DeltaTalker ™ to do better in school
ii. My classmates understand how to use my DeltaTalker™
iii. My classmates like me to talk.

In the pre intervention scale he responded to the first statement with "strongly disagree" (1) and in the post intervention measure his attitude had changed to "strongly agree" (5). With respect to the second statement his perception altered from "strongly agree" (5) to "disagree" (2). His response to the third statement changed from "strongly disagree" (1) to "neutral" (3) from the pre to post intervention measures.

5.4.4.1.2 Discussion with respect to "I think I need to use my DeltaTalker ™ to do better in school"

In the classroom the adolescent who uses AAC experienced limited access to his DeltaTalker™ due to the fact that he could only access one keyboard at a time and his computer keyboard was most often mounted on his laptray. To access his DeltaTalker™ he needed to attract the attention of a peer and request that the computer keyboard be removed and the DeltaTalker™ be mounted in its place. In contrast the communication workshops were not held in the classroom and he attended these with his DeltaTalker™ ready mounted on his laptray. During the workshops he was expected to engage with all the peers in his grade at times including those who seldom and those who had never interacted with him. He had thus become aware of how the majority of the peers in his grade did not understand him when he spoke and of how often he needed to resort to using his DeltaTalker ™. Despite this realisation, there was little change in his use of the DeltaTalker ™ in class as accessibility remained poor.

5.4.4.1.3 Discussion with respect to "My classmates understand how to use my DeltaTalker™"

The peer training programme included procedures to increase awareness of the peers into the difficulties of using AAC strategies. These included some activities involving the use of the DeltaTalker™ and many of the peers had their first opportunity to 'operate' the DeltaTalker™. During these activities the adolescent who uses AAC became aware that most of his peers lacked understanding of how to use his DeltaTalker™. He had obviously been relatively unaware of this at the pre intervention phase and had assumed they knew how to operate the DeltaTalker™. The results of the PACT scales that were completed at pre intervention were not discussed with the primary participant until after the completion of the study.

5.4.4.1.4 Discussion with respect to "My classmates like me to talk"

The negative opinion of the adolescent who uses AAC in the pre intervention phase appears to relate to his feeling at that time that most of his peers generally did not wish to interact with him. As mentioned several of his class had never spoken to him. Although his response post intervention is neutral, this is a more positive response and may well reflect his general feeling of greater acceptance by his classmates as his interactions had increased during all contexts during class time.

5.4.4.2 PACT peer rating scale

The rating scale responses of each peer were compared to those of the user both prior to and following intervention. Thus the attitudes of the dyad of the adolescent who uses AAC and peer 1 were compared pre and post intervention, then the dyad of the AAC user and peer 2 etc. The pre and post intervention results for the user and peer PACT rating scales are presented in Table 5.14. The wording of the statements is shown as it appeared on the PACT peer rating scale.

Table 5.14 **PACT User and PACT Peer Partner Results**

Pre intervention **Post intervention**

No.	Topic	S.E		Peers																			
				1		2		3		4		5		6		7		8		9		10		11	
1	I enjoy chatting to S. E.	4	5	3	3	4	4	3	5	4	3	5	5	5	4	4	4	5	5	4	4	3	4	5	4
2	I really don't understand what S. E. tells me	3	3	2	3	4	3	2	4	3	4	4	3	4	3	3	3	3	3	3	3	3	3	4	5
3	S. E. can answer my questions	5	4	2	3	3	5	2	4	5	4	4	3	3	3	4	3	4	5	5	5	3	5	4	4
4	Most people understand S. E. very well	2	3	2	3	3	1	2	2	4	2	2	4	4	3	4	2	2	5	2	3	4	1	2	2
5	I don't understand S. E.'s jokes	2	2	4	3	4	2	4	5	5	2	4	5	4	3	4	3	2	5	1	3	3	1	4	4
6	S. E. likes to speak	3	3	3	3	5	5	3	5	3	3	4	4	3	4	4	4	5	5	5	4	4	4	4	4
7	I like S. E. to speak	1	3	3	3	5	5	3	5	3	1	3	5	4	4	5	3	5	4	3	5	4	4	4	4
8	Other people like S. E. to speak	4	3	3	3	4	3	3	3	3	3	4	3	4	4	5	3	5	3	5	4	3	4	2	2
9	S. E. likes to use his DeltaTalker	5	5	5	4	5	2	5	1	2	3	4	4	5	4	3	4	5	3	5	4	2	5	4	3
10	I like S. E. to use his DeltaTalker	3	3	4	4	5	3	4	2	3	5	2	3	5	5	5	4	5	3	5	3	5	5	4	4
11	Other people like S. E. to use his DeltaTalker	4	5	5	4	4	4	5	5	4	5	4	4	4	4	4	3	5	2	5	4	5	3		4
12	S. E. feels good about the way he speaks	3	3	3	3	1	1	3	1	2	3	4	3	4	3	3	2	1	2	3	3	2	3	4	4
13	I feel good about the way S. E. speaks	2	2	3	3	3	1	3	3	2	1	4	4	4	4	3	3	1	1	3	2	3	3	4	4
14	S. E. feels good about the way he uses the DeltaTalker	4	5	5	3	5	5	5	3	3	3	4	4	5	4	5	3	4	3	5	3	5	5	4	4
15	I feel good about the way S. E. uses his DeltaTalker	2	3	4	3	5	5	4	5	3	5	4	3	5	4	5	4	5	4	5	4	5	5	3	4
16	S. E. thinks it is important to use his DeltaTalker	5	5	4	4	3	5	4	3	3	3	4	4	4	3	4	4	4	3	5	3	5	3	5	4
17	I think it is important for S. E. to use his DeltaTalker	2	3	5	4	5	5	5	3	2	5	4	3	5	4	5	4	4	2	5	3	5	5	3	4
18	S. E. understands how to use his DeltaTalker	4	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5	4	4
19	I understand how to use S. E. DeltaTalker	5	2	1	3	1	4	1	1	5	1	4	4	1	2	2	2	2	5	1	1	1	1	2	4
20	S. E. thinks he needs to use his DeltaTalker to do better in school	1	5	4	3	1	2	4	3	4	3	4	3	3	3	1	2	5	4	3	3	4	3	3	4
21	I think S. E. needs to use his DeltaTalker to do better in school	2	3	4	2	1	4	4	2	4	4	4	3	2	2	1	2	5	4	3	3	4	3	4	4
22	When speaking S. E. can say most things he wants to say	5	5	3	4	1	4	3	1	3	2	4	3	4	3	4	3	3	5	2	3	4	3	3	4
23	When using his DeltaTalker S. E. can say most things he wants to say	5	5	4	4	5	5	4	5	5	5	4	5	5	4	5	4	2	5	5	4	4	4	4	4
24	When S. E. speaks most people can understand him	2	2	2	3	1	2	2	2	5	5	2	2	3	3	1	3	2	4	2	3	3	3	3	2
25	When S. E. uses the DeltaTalker most people can understand him	4	4	5	5	4	5	5	3	5	5	4	5	4	4	4	4	5	5	5	4	5	4	4	4

As can be seen from the table 5.16 the responses of peers varied considerably from each other. However, all but one peer showed perceptions conflicting with those of the adolescent who uses AAC on the statement "I understand how to use S.E.'s DeltaTalker™" in the pre intervention phase. The peers had responded with "strongly disagree" (1) and "disagree" (2) to this statement whereas the adolescent who uses AAC had responded "strongly agree" (5) to the statement "My classmates understand how to use my DeltaTalker™". Post intervention the adolescent who uses AAC indicated that he disagreed (2) with the latter statement. This was in consensus with the perception of the majority of his peers although many rated their ability to understand how to use VOCA slightly more positively than prior to the training programme.

In comparing individual peer responses pre and post intervention several of the peers did not show marked changes in their attitudes. However, there was a noticeable trend to indicate that post intervention peers perceived that S.E. preferred to communicate using his own voice but they remained unsure (neutral) about the ability of most people to understand S.E. when he spoke. Four peers had changed their perceptions of the communication ability of S.E. substantially. They rated him more positively on most aspects. Examples of their changes in perception of 2 or more points are shown in table 5.15 below:

Table 5.15 Examples of Items Showing More Positive Ratings of the Adolescent who Uses AAC

PACT Statement	Pre	Post	Peer(s)
S.E. can answer my questions	3	5	2, 10
When speaking S.E. can say most things he wants to say	1 3	4 5	2 8
Most people understand S. E. very well	2 2	4 5	5 8
I like S.E. to speak	3	5	3, 9
I enjoy chatting to S.E.	3	5	3
When using his DeltaTalker™ S.E. can say most things he wants to say	2	5	8
S.E. likes to speak	3	5	3

5.4.4.3 PACT teacher rating scale

The results of the pre and post PACT teacher rating scale are reflected in table 5.16

Table 5.16 Pre and Post intervention results of the PACT teacher rating scale

No.	Topic	Pre Intervention		Post Intervention	
		S.E.	Teacher	S.E.	Teacher
1	His peers enjoy chatting to S. E.	4	4	5	3
2	His peers really don't understand what S. E. tells them	3	3	3	2
3	S. E. can answer his peers' questions	5	3	4	4
4	Most people understand S. E. very well	2	1	3	1
5	His peers don't understand S. E. 's jokes	2	4	2	2
6	S. E. likes to speak	3	4	3	4
7	I like S. E. to speak	1	5	3	5
8	His peers like S. E. to speak	4	2	3	2
9	S. E. likes to use his DeltaTalker	5	4	5	2
10	I like S. E. to use his DeltaTalker	3	5	3	5
11	His peers like S. E. to use his DeltaTalker	4	4	5	3
12	S. E. feels good about the way he speaks	3	3	3	2
13	I feel good about the way S. E. speaks	2	2	2	5
14	S. E. feels good about the way he uses the DeltaTalker	4	3	5	3
15	I feel good about the way S. E. uses his DeltaTalker	2	4	3	1
16	S. E. thinks it is important to use his DeltaTalker	5	3	5	4
17	I think it is important for S. E. to use his DeltaTalker	2	5	3	5
18	S. E. understands how to use his DeltaTalker	4	5	5	5
19	I understand how to use S. E. DeltaTalker	5	1	2	1
20	S. E. thinks he needs to use his DeltaTalker to do better in school	1	3	5	3
21	I think S. E. needs to use his DeltaTalker to do better in school	2	4	3	5
22	When speaking S. E. can say most things he wants to say	5	4	5	2
23	When using his DeltaTalker S. E. can say most things he wants to say	5	2	5	4
24	When S. E. speaks most people can understand him	2	1	2	1
25	When S. E. uses the DeltaTalker most people can understand him	4	4	4	4

The responses of the teacher were compared to those of the adolescent who uses AAC at both pre and post intervention phases, and the key results are reported including discrepancies between the attitudes and perception of the teacher compared to the adolescent who used AAC. Pertinent discrepancies are reported as well as changes in the perception of the teacher from pre to post intervention.

i. The adolescent who uses AAC felt he could definitely answer peers' questions (5) whereas the teacher was unsure of this and rated the statement "S.E. can answer his peers' questions" as neutral (3). However, post intervention both rated this statement as "agree" (4).
ii. S.E. agreed (4) that "other people like me to speak" whereas his teacher disagreed (2) with the statement "other people like S. E. to speak".
iii. In contrast to S.E. his teacher felt he needed to use his DeltaTalker™ to do better in school.
iv. At the pre-intervention phase his teacher disagreed (2) that S.E. was able to say most things with his VOCA. This was in contrast to S.E. who strongly agreed (5) that he could say most things with his DeltaTalker™. Post intervention his teacher agreed (4) with this statement.
v. Changes in the teacher's perception pre and post intervention included that the teacher felt far better about S.E.'s use of speech but was far less happy with his use of the VOCA for communication at the post intervention phase.
vi. The teacher had become aware of the fact that S.E. was reluctant to use his VOCA as this was discussed in the focus interview with her. Her increased awareness of this issue was reflected in her disagreeing with the statement that he liked to use his DeltaTalker™ at post intervention whereas at the pre intervention phase she was in agreement with this statement.

5.4.4.4 PACT parent rating scale

The responses of both parents at pre and post intervention phases are presented in Table 5.17.

Table 5.17 Pre and Post Intervention Results of the PACT Parent Rating Scales

Key: P1 = Parent 1 and P2 = Parent 2

No.	Topic	Pre Intervention			Post Intervention		
		S.E.	P1	P2	S.E.	P1	P2
1	His peers enjoy chatting to S. E.	4	4	3	5	4	4
2	His peers really don't understand what S. E. tells them	3	1	1	3	4	2
3	S. E. can answer his peers' questions	5	4	2	4	4	4
4	Most people understand S. E. very well	2	2	1	3	4	3
5	His peers don't understand S. E.'s jokes	2	2	4	2	4	2
6	S. E. likes to speak	3	4	4	3	4	4
7	I like S. E. to speak	1	4	5	3	4	4
8	His peers like S. E. to speak	4	3	2	3	4	3
9	S. E. likes to use his DeltaTalker	5	4	4	5	4	3
10	I like S. E. to use his DeltaTalker	3	4	5	3	5	5
11	His peers like S. E. to use his DeltaTalker	4	3	3	5	5	4
12	S. E. feels good about the way he speaks	3	2	2	3	2	2
13	I feel good about the way S. E. speaks	2	3	3	2	3	3
14	S. E. feels good about the way he uses the DeltaTalker	4	5	2	5	5	2
15	I feel good about the way S. E. uses his DeltaTalker	2	5	1	3	4	2
16	S. E. thinks it is important to use his DeltaTalker	5	4	4	5	4	2
17	I think it is important for S. E. to use his DeltaTalker	2	4	5	3	4	5
18	S. E. understands how to use his DeltaTalker	4	5	5	5	5	5
19	I understand how to use S. E. 's DeltaTalker	5	4	4	2	3	4
20	S. E. thinks he needs to use his DeltaTalker to do better in school	1	4	3	5	4	2
21	I think S. E. needs to use his DeltaTalker to do better in school	2	5	4	3	4	5
22	When speaking S. E. can say most things he wants to say	5	4	2	5	4	3
23	When using his DeltaTalker S. E. can say most things he wants to say	5	5	5	5	4	5
24	When S. E. speaks most people can understand him	2	2	2	2	2	2
25	When S. E. uses the DeltaTalker most people can understand him	4	5	5	4	5	5

Table 5.17 indicates that the attitudes of the parents were generally in agreement with those of S.E. apart from their attitude to his use of the DeltaTalker™ and their perception of how he felt about using the DeltaTalker™. An example is the statement "S.E. thinks he needs to use his DeltaTalker™ to do better at school". S.E. strongly disagreed with this

statement at pre intervention whereas both his parents perceived him to agree to this statement. One of the parents also felt that S.E. did not feel good about the way he used his DeltaTalker™ whereas the other parent's perception was in agreement with the positive attitude expressed by S.E. The pre and post intervention ratings by the parents were generally consistent apart from a more positive perception of how other people understand S.E. when he speaks.

Perceptions influence attitudes and attitudes in turn influence behaviour (Feldman,1993). The PACT scales provided important insights into the peers' perceptions and attitudes to the primary participant and his communication. However, people are often not fully conscious of their attitudes and attitudes are often more easily detected in behaviour (Aitken, 1996). Part of the peer training programme involved increasing the peers' awareness of the difficulties and nature of AAC. This increased awareness could have resulted in a change in their perception of the adolescent who uses AAC. In turn this could have contributed to the changes noted in their behaviour towards the adolescent who uses AAC. The programme also ensured that all the peers interacted with the adolescent who uses AAC and this could have had a positive influence as contact has to be interactive to be effective in changing attitudes (Armstrong et al., 1987).

5.4.5 Socio-metric Status

The peer nomination procedure was discussed in the methodology in section 4.5.5.6. Scores were reflected as the sum of the nominations received and are presented for the primary participant and his peers in table 5.18 below.

Table 5.18 Results of Socio-metric Nominations

		Peers												
Grade 8 Learners	**S.E.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Pre Intervention	30	15	16	19	19	16	40	12	19	28	11	2	19	17
Post Intervention	30	19	15	28	9	21	34	7	7	19	32	0	10	31

As can be seen from Table 5.18, at both pre and post intervention the primary participant received a total of 30 nominations. At pre intervention this was the second highest score and at post intervention the fourth highest score indicating that the primary participant was one of the more popular members of the class. Research into correlates of the socio metric status of children has shown that popular children are generally described as being skilled at peer relationships, are viewed as sociable and friendly by teachers and peers, are unlikely to be attention seeking, do not disrupt peer activities and demonstrate communicative competence (Rubin, Bukowski, & Parker, 1998). The results are interesting in that the primary participant, his teachers and parents were all concerned about his lack of peer relationships. However, he was described as friendly and as having a good sense of humour. During one of the communication workshops his peers had disclosed that they felt he was a reliable person who could be trusted with secrets. In addition he did not disrupt peer activities and was not attention seeking.

5.4.6 Interviews

As discussed in the methodology, 4.5.7.5, all the interviews were transcribed verbatim. The analysis of themes and conclusions about changes in pre and post interviews were cross-checked and verified with an inter-rater before being tabulated. A summary of the pertinent results is presented.

5.4.6.1 Analysis of interviews with the adolescent who uses AAC

In analyzing the potential impact of the peer training programme the comments of the primary participant at pre and post intervention interviews were compared according to themes related to the topic of his interaction with peers. The following aspects were noted to show definite change:

- Certain classmates had increased their interactions with him. This was most apparent with two of the male learners in his class.

- Two additional peers were considered to be friends. These were the two male learners referred to above.
- Interactions with his peers had improved and increased during OBE groups.
- More of his peers were willing to assist him. He cited four peers in this regard.

A detailed table of the analysis of the interviews with the primary participant is presented (see Appendix K).

5.4.6.2 Analysis of the interviews with teachers

The following variables as presented in Table 5.19 influenced both the provision of opportunities for peer interactions and the significance of the teacher's observations reported during the interviews.

Table 5.19 Variables influencing the provision of peer interactions during classes and teacher observations as reported in the interviews.

Variables affecting provision of opportunities for peer interaction	**Influence**
Teaching style	If the preferred teaching style was teacher directed teaching, fewer opportunities resulted. Conversely outcomes based educational practice in small groups encouraged peer interactions. "Batting" allowed for large periods of informal peer interaction.
Subject taught	More peer interactions were possible during certain subjects e.g. during Drama as opposed to English, both of which were taught by the same teacher.
Topic of lesson	Some topics allowed for increased peer interaction e.g. practical group experimental sessions allowed for more peer interaction than the review of test papers during Natural Sciences (NS).
Level of discipline	When a teacher was more strict the amount of peer interaction was reduced as well as the extent and loudness of interactions
Variables affecting the significance of teacher observations	**Influence**
Number of teaching hours per fortnight	A larger number of teaching hours of the class resulted in increased teacher confidence in reporting on the participant's peer interaction and changes thereto.
Familiarity with the participant	The NS replacement teacher had acted as the participant's facilitator and therefore had a wider range of interactions with him in different contexts. Teachers who taught the participant during the previous years were more familiar with him.

5.4.6.2.1 The validity of the results of the interviews

Validity refers to the degree to which inferences drawn from the interview data would be appropriate. Certain factors were determined as important to consider with respect to the validity of the observations made by the teachers and these factors are presented in table 5.20.

Table 5.20 Positive Factors and Limitations Influencing Validity of Teacher Observations

Teacher	Positive factors	Limiting factors
Teacher A	High number of contact hours with class: 13 periods (11 hours 55 minutes) per fortnight. Multiple subject contexts (English, Drama and Guidance). Interactive teaching style during drama classes.	English language classes by nature largely teacher directed Familiarity over time as she had only taught the class from beginning of 2001
Teacher B	Familiarity over time as Teacher B had been the class teacher for this group for the year 2000	Limited number of teaching hours: 4 periods (3 hours 40 minutes) per fortnight Only one subject context, Human and Social Sciences (HSS) Limited opportunities for peer interaction as "the class does not lend itself to this type of teaching for HSS".
Teacher C	High number of contact hours with class: 6 periods (5 hours 50 minutes) per fortnight with entire class and 6 periods (5 hours 50 minutes) with half of the class. Two subject contexts: Natural Science (NS) and Technology. Class interacting in small groups during most lessons Familiarity over time as she had taught the class during the previous two years in addition to 2001.	Not present for entire research project. Only pre-intervention interview possible.
Teacher D	High number of contact hours with class: 6 periods (5 hours 50 minutes) per fortnight with entire class and 6 periods (5 hours 50 minutes) with half of the class. Two subject contexts: Natural Science (NS) and Technology. Class interacting in small groups during many of the lessons Familiarity with the participant as she had been his facilitator and interacted with him in different contexts	Only post –intervention interview possible.

The potential impact of the peer training programme is reflected in the summarised findings of the teacher interviews in Table 5.22. (See Appendix L for a detailed table of the analysis of the interviews with the teachers).

Table 5.21 Summarised Findings of Teacher Interviews

Theme	Findings		Possible Impact
Primary participant's interaction in peer group	Teacher A	Definite improvement -- peers more responsive	Definite change noted
	Teacher B	No change noted – lacks spontaneity	Inconsistent across teachers
	Teachers C/D	Definite change – interacting more and with a greater number of peers in group	
Friendship	Teacher A	Definite improvement noted. Two peers became friends in addition to one former friend	Definite change noted by two teachers.
	Teacher B	No significant changes. Only one friend.	No change noted by teacher B.
	Teachers C/D	Limited change- 2 peers named by C as friends then 5 peers named by D but attributed in part to computer games on participant's computer	
Participation in class	Teacher A	Definite improvement - good participation and more interaction with the boys in the class	Limited change
	Teacher B	No change noted – participation poor	Inconsistent across teachers
	Teachers C/D	No change noted – participates actively	
Peers' understanding of participant	Teacher A	Definite improvement – peers listening more and taking time to understand participant	Limited change
	Teacher B	No change noted	Inconsistent across teachers
	Teacher C/D	Some improvement – mention of four peers who understand him better	
Peers response to participant's way of communicating	Teacher A	Limited improvement	Very limited change
	Teacher B	Slight change in use of VOCA during lessons	
	Teachers C/D	No change – but increased use of VOCA to aid peers' understanding noted	
Loneliness at recess	Teacher A	No change	No impact
	Teacher B	No change	
	Teachers C/D	Very limited change – some recess time spent with a girl peer	

From the above table it is clear that the teachers varied in their opinions as to the impact of the peer training programme. Teacher B did not feel that the programme had had any impact on the interactions of the adolescent who uses AAC with his peers. The only change noted by her was a slight increase in the use of his VOCA during lessons. Teacher A, however, had noted definite positive changes and was able to provide examples of

these including an incident she had videotaped of a group of peers taking time to understand the contribution of the primary participant during a practical drama examination. Teacher A described his peers as being more responsive and the primary participant as being more involved and interactive. Teacher A had also noted that two additional peers had recently befriended the primary participant. Teacher D had also noted some positive changes but all of the teachers agreed that there had been no or very limited improvement in the primary participant's interaction with peers at recess.

5.4.6.3 Analysis of the interviews with parents

Both parents were involved with their son and expressed concern on a range of issues during both the pre and post intervention interviews including his lack of peer friendships. The negative effect this was having on their son at that time was a major concern. Both parents expressed fears about the effect poor peer relationships would have on his social development and later adult relationships and were aware of his need to interact more with peers. (See Appendix M for a detailed table of the analysis of the interviews with the parents). The potential impact of the intervention as defined by the parents is summarised in Table 5.22.

Table 5.22 Summarised Findings of the Interviews with Parents

Theme	Findings		Possible Impact
Level of interactions with peers	Parent 1	Not aware of any change.	Limited impact.
	Parent 2	Limited improvement as participant has reflected peers interact more during OBE groups	No consensus between parents
Friends	Parent 1	Limited improvement – aware of two new friends. Had invited a friend to visit and emailed some peers from school	
	Parent 2	Limited improvement -- aware of more boys who have become friendly but no contact out of classroom.	Limited impact
Loneliness	Parent 1	No improvement	No impact
	Parent 2	No improvement	
Peers' understanding of his speech	Parent 1	No change noted – very few peers understand him	No impact
	Parent 2	No change noted – only a few peers understand him	

Both parents were aware of limited positive changes with respect to friends and one parent had noted that the primary participant had spoken of increased interaction during discussion in class groups. There was consensus by the parents that loneliness remained a problem for the primary participant and that he had little opportunity for socialisation with peers apart from at school.

5.4.7 Consensus of Interview Conclusions

The primary participant, teachers A and D and one parent had noted an increase in his interactions with his peers in the classroom. In relation to the formation of friendships, the primary participant, teachers A and D and both parents were aware of two of the male peers who appeared to have become friends of the primary participant in addition to one peer who had previously been regarded as a friend. The primary participant also mentioned two other peers who were more willing to assist him. Teachers A and D felt that there was some improvement in the way peers understood the primary participant. There was general consensus that no benefit had resulted outside of the classroom.

5.4 CORRELATION BETWEEN OBSERVATIONAL DATA AND PRE AND POST MEASURES

The results and potential results of both the observational data and the data arising from pre and post measures were examined for the presence of convergent and divergent findings that would either substantiate or contradict each other. In addition some data derived from different measures used at pre and post intervention was contradictory. The format for the evaluation of converging and diverging findings is depicted in Table 5.21.

Table 5.23 Evaluation of Relationships between Findings

Results with Respect to:	Measuring Instruments	Parameters
Relationship between observational data and data from pre and post measures	Evaluation of the related factors that suggest 1. General trends 2. Specific issues that corroborate or challenge suggested results	Convergent findings that substantiate
Relationship between data from different pre and post measures		Divergent findings that contradict

5.5.1 Convergent Findings

5.5.1.1 Increase in frequency of interactions (number of messages per hour)

The increase in frequency of interactions was clearly evidenced in the analysis of the observational data. An awareness of this increase was confirmed by the primary participant in the post intervention interview as well as in the post intervention interviews with teachers A and D and one parent.

5.5.1.2 Apparent change in affect

The evaluative analysis of the observational data clearly showed that the primary participant was expressing his feelings and emotions more fully and that there was an increase in his use of humour during the intervention, post intervention and post withdrawal phases of research. On the MSCS scale of affect there was an increase in standard scores from 80 at pre intervention to 92 at post intervention.

5.5.1.3 Primary participant's use of voice

Analysis of the data from the videotapes clearly shows that using his natural voice was the preferred mode of communication by the primary participant. The responses of peers to the PACT partner scale showed that post intervention many of the peers had changed their perception to stating that natural voice was the preferred mode of the user.

5.5.1.4 The primary participant's ability to answer peers' questions

The communicative function of answering both yes/no and open ended questions increased in frequency during the research process as indicated in the evaluation of the observational data. The perception of the teacher changed at post intervention changed to reflect this perception in her response on the PACT scale.

5.5.1.5 The attitude of the primary participant to using his DeltaTalker™

It was explicit from the observational data that the adolescent who uses AAC seldom used his VOCA. The change in awareness of this fact was reflected in the teacher's response on the PACT scale at post intervention when compared with pre intervention

5.5.1.6 Influence of family on self concept

The highest score on the family scale of the MSCS and second highest T score on the SDQ II were confirmed in the observations of teacher C that the positive self concept of the primary participant was largely determined by his relationships with his family members.

5.5.2 Divergent Findings

5.5.2.1 Use of Deltatalker™ to improve school performance

Response on the PACT user scale indicated that the primary participant felt he had to use his Deltatalker™ to do better in school. However, analysis of the observational data showed minimal use of this VOCA and no occurrences were noted of his using it at the post withdrawal phase during any of the contexts.

5.5.2.2 Social relationships with peers

The socio-metric rating of the peers in his class indicated that the primary participant was rated as one of the popular members of the class whereas on the social scale of the MSCS and the same-sex relations and opposite-sex relations on the SDQ 11 he rated himself very poorly. Evidence on the videotapes also indicated that most members of his class interacted well with him in the classroom context.

5.6 OVERVIEW OF RESULTS

The following results were obtained:

5.6.1 Reliability

Reliability was high for the coding of the observational data. Intra-rater reliability was 97.5% and inter rater reliability was above 90% for both raters 2 & 3. The inter-rater reliability of theme identification of the audiotapes was 100% as total consensus was reached.

5.6.2 Interaction Patterns of the Adolescent who Uses AAC with his Peers

Analysis of observational data at the pre-intervention phase of the study established that the adolescent who uses AAC interacted with his peers:

i. By exchanging on average 22 (*SD* = 0.19) messages per hour during teacher directed time, 84 (*SD* = 0.77) messages per hour during OBE small group time and 55 (*SD* = 0.42) messages per hour during informal times.

ii. In interchanges that consisted of a mean of 3.6 (*SD* = 1.7) messages during teacher directed time, 3.7 (*SD* = 2.01) messages during OBE small group times and 2.5 (*SD* = 0.1.79) messages during informal times.

iii. Primarily by initiating interchanges as opposed to responding to the initiations of peers irrespective of the context. He needed to reinitiate interactions more frequently during informal contexts than during teacher directed or OBE small group contexts. The incidence of him maintaining a discourse was most prevalent during OBE small group discussions.

iv. Mostly to achieve the communication functions of meeting social norms and asking questions.

v. Primarily by using his natural voice in preference to other modes of communication throughout contexts.

In addition, his peers were more likely to respond appropriately to him and to maintain discourse with him than to ignore him or clarify his message during the contexts of teacher directed time and OBE small group discussions. However, during the context of informal times he was most likely to be ignored.

5.6.3 Possible Effects of Peer Training on the Social Interactions of the Adolescent who Uses AAC

Analysis of the observational data at post intervention and post withdrawal indicated the possibility of the following effects of the peer training:

i. Substantial increases in the mean number of messages per hour during all contexts with the highest frequencies recorded at the post withdrawal phase of research.

ii. Considerable increases in the mean number of messages per interchange indicating that interactions were maintained to a greater extent than at pre intervention.

iii. The most significant increase in the discourse functions monitored was in discourse maintainer supporting the evidence of an increase in the extent of interchanges. This was evident in all three contexts.

iv. Within the context of teacher directed time the most obvious increases were related to the communication functions of requesting/asking questions and teasing/pretending/use of humour/sarcasm. During the OBE small group context the most obvious increases were to achieve the communication functions of answering contingent questions, requesting, expression of feelings/emotions and teasing. During informal times he showed the largest increases in the use of answering yes/no questions, requesting, as well as teasing and the expressions of feelings.

v. At no time during the study did the primary participant successfully interrupt the conversation of his peers.

vi. The use of his natural voice remained the most preferred mode of communication by the primary participant with body movements also increasing particularly in the context of OBE small group discussions.

vii. The most obvious increase in the nature of the peers' response to the primary participant was in discourse maintainer indicating that the increase in the mean number of messages per interchange was a reflection of increased messages from and directed to the primary participant. A second positive factor was the decrease in the occurrence of the peers responding by ignoring the adolescent who uses AAC.

5.6.4 Results of Self Concept Scales at Pre and Post Intervention Phases of Research

i. There was a marked improvement of an average of 10 scale points in his self concept as measured by the MSCS. However, this cannot be directly attributed to the training programme as other variables may have influenced his self concept.

ii. An improvement in his self concept during the research period was also reflected in his scores on the SDQ II.

5.6.5 Changes in the Self Evaluation of the Primary Participant

i. The attitudes and perceptions of the primary participant towards his communication generally remained consistent. However, post intervention he was more confident that his classmates liked him to talk.

ii. A marked change was apparent in his attitude to using his DeltaTalker™ to do better at school. He strongly disagreed that he needed to use his DeltaTalker™

to do better at school at pre intervention but strongly agreed with this statement at post intervention.

iii. He also became more aware that his peers did not know how to operate his DeltaTalker™ and he perceived his peers as being more willing to talk to and assist him at post intervention as opposed to pre intervention.

5.6.5.1 Results with respect to the attitudes, perceptions and behaviours of peers and the socio-metric status of the primary participant

i. Peer nomination procedures showed that the primary participant was one of the more popular members of the class and this did not change during the research period.

ii. Four of his peers changed their perception of the ability of the primary participant to communicate substantially, rating him far more positively on the PACT partner scale at post intervention than they had at pre intervention.

iii. Certain of the male class peers became far more friendly and interacted far more readily with the primary participant after the intervention. This fact was noted in interviews by the primary participant, two of his teachers and his parents.

iv. No change was noted in the social interaction of the primary participant out of the classroom context.

5.7 SUMMARY

In this chapter the results of the research were described and briefly discussed. Measures to ensure the reliability of the results were initially described. The results of the questions posed by the primary and sub aims were presented. Changes in the interaction of the adolescent who uses AAC with his peers within the classroom context were discussed. The extent of the recordings on which the observational data were based provided a sound basis and allowed the results to be presented with confidence.

Changes in the self concept of the primary participant that were potentially due to the peer training programme were described. As self concept is a relatively stable concept the changes noted in the performance of the primary participant on both of the self concept scales administered were unexpected. Findings of the other pre and post measures were briefly discussed as well as convergent and divergent findings. A summary of the pertinent results as they related to the sub-aims of the study concluded the chapter.

CHAPTER 6
CONCLUSIONS, EVALUATION AND RECOMMENDATIONS

6.1 INTRODUCTION

The purpose of the study was to develop a peer training programme and to evaluate the effects of the peer training programme on the interactions of an adolescent who uses AAC with his peers. An analytic approach to the description of (a) the psychosocial background of the interactions of the adolescent who uses AAC with peers and (b) the description of the actual interactions needed to be developed to meet the specific purposes of the study. This chapter commences with a synopsis of the basis for the development of the peer training programme and how the effect of the training could be evaluated. The results obtained are then integrated with related research findings.

The goal of research in AAC is to improve the service delivery to clients by (a) increasing our understanding of the processes involved, (b) developing new hypotheses to test or (c) suggesting new techniques for clinicians to try. By defining the clinical implications of AAC research we provide a means towards the development of best practice. In discussing the clinical implications of the current study aspects of peer partner training are discussed. The limitations and the strengths of the present study are discussed in the evaluation of the research and suggestions for further research are then proposed.

6.2 CONCLUSIONS

6.2.1 The Value of Peer Training to Facilitate the Social Interaction of Adolescents who use AAC

The peer training programme proved to be effective in increasing the number of messages per hour (frequency) and the number of messages per interchange (extent) of the interactions of the adolescent who uses AAC with peers within the classroom setting. Changes were also noted in the nature of the interactions, for example there was an

increase in the use of certain communication functions such as showing emotions and feelings. The peer training focused on social communicative skills and peer training has proved an effective means of developing social communicative skills for adolescents with social, emotional or behavioural deficits as well as for typically developing adolescents facing family, interpersonal or academic difficulties (Cartledge & Milburn, 1995; Hess, 1993; Rose, 1988). Research into the social interaction of children using AAC has indicated that most children who use AAC have deficits in terms of their social and communicative interaction with peers (Buzolich & Lunger, 1995; Harris, 1982; Kraat, 1987; Light, 1988). Studies involving the perspectives of individuals who use AAC have confirmed the inability of AAC implementation to meet socio-communicative needs effectively (McCall et al., 1997). Effective partner training is an important issue that has been widely identified in the AAC literature as requiring additional investigation (McEwen & Karlan, 1990). Training of communication partners has been identified as an essential component if persons using AAC are to become socially competent (Light, 1997). Furthermore, as Sack and Mclean (1997) explain the daily communication partners of persons using AAC are not likely to be communication professionals but rather, family members, primary caregivers, peers, friends or support staff. Adolescents spend progressively more time with peers and considerably more time interacting with peers than with parents and other adults (Rubin et al., 1998). Thus, peer training for partners of adolescents who use AAC would appear to be an essential component of AAC intervention if adolescents who use AAC are to develop the social competence required for adulthood. The need for the implementation of similar programmes with both children and adolescents who use AAC is supported by this study.

6.2.2 Consideration of Pertinent Communication Functions.

Analysis of the observational data showed changes in the use of various communication functions throughout the phases of research within the different contexts. There was for example an increase in the use of requests by the adolescent who uses AAC. Following the pilot study certain categories of communication functions were eliminated and only nine were coded in the analysis of the observational data of the main study. Pertinent communication functions will differ according to the developmental level of the children

or adolescents being studied. Light et al. (1985b) used different categories of communication functions in their study of eight boys who were under the age of six years, had physical disabilities and had LNFS.

6.2.3 The Importance of the Multimodality of AAC- Including Aided and Unaided Modes

In the present study the adolescent who uses AAC often used several unaided modes simultaneously, for example a vocalization accompanied by a facial expression and body movement. Only the dominant mode or modes was coded. He also had access to aided modes including a VOCA, the DeltaTalker™ and his computer. As in the study of eight boys, aged between 4 and 6-years of age, by Light et al. (1985c), the adolescent in the present study preferred to use his natural voice as his dominant mode of communication. This was despite the fact that the results of the PACT user and partner scales indicated that he was aware that many of his peers could not understand his speech. A follow up to the study has included measures to increase his access to the VOCA for purposes of clarification when his speech has not been understood by peers. Many clinicians and researchers in AAC have discussed the importance of teaching the person using AAC to vary modes of communication to facilitate greater success in different contexts or with different partners. However, this study suggests that not only should the person using AAC be taught strategies to improve his/her communicative competence in this way but that the familiar partners, including peers, should be taught to suggest a change in mode when the need for clarification exists.

6.2.4 The Possible Effect on Self Concept

Given the design of the study it was not possible to determine whether the noted improvement in self esteem of the adolescent who uses AAC was as a result of the implementation of the peer training programme and the resultant increased interaction of the adolescent. It seems reasonable to suggest that, as one's social competence is an important factor of one's global self concept, the improvement in the primary participant's interactions within the classroom may have been associated with the

improvement as noted on the MSCS and the SDQ 11. Evaluation of psychosocial factors such as self concept may well be important considerations in future AAC research.

6.2.5 The Lack of Peer Training Programmes for use with Children and Adolescents who use AAC

One of the foremost barriers of implementing peer training for the partners of children, adolescents or adults who use AAC is the lack of validated training materials or procedures (Sack & Mclean, 1997). Materials and programmes that would be appropriate for some communication partners would not be appropriate for other groups of communication partners (Sack & Mclean, 1997). This would imply that partner training programmes need to consider not only the person who uses AAC but also the partners. The development of the peer training programme in the current study was an attempt to design a programme that would be effective in increasing the social interaction of the specific participant. However, principles and strategies utilised could be adapted by other researchers and clinicians. For example the process of defining the goals in terms of the desirable behaviours of peers by consulting the primary participant to establish the difficulties he was experiencing with his class mates, or the use of co-operative games could easily be applied and adapted by other clinicians.

6.2.6 The Viability of Peer Training

The persistence of the intervention effects post withdrawal following what was a relatively short period of intervention suggest that peer training is a viable option to include in the intervention of children and adolescents who use AAC. This is substantiated by the maintenance for two to three weeks of interaction gains noted by Light et al. (1992) after intervention of four 1-hour sessions with facilitators. Similarly, the respondents in the final field trail of the partner training programme, Developing Communicative Interactions, indicated that partner training had a positive ongoing impact on the interactions of persons who used AAC and who had severe developmental disabilities (Sack & McLean, 1997).

6.3 CLINICAL IMPLICATIONS

6.3.1 Peer Training Promotes Social Competence for Adolescents who use AAC

The main implication of the study is that peer training should be considered an integral part of the AAC intervention for adolescents who use AAC in order to facilitate socio-communicative competence. This implication is supported by the results of studies involving partner training for adolescents and children who used AAC and had severe cognitive disabilities. Conversation training with three adolescents with severe cognitive disabilities that included interactions with typical students resulted in positive gains in abilities of initiation and turn taking and a concurrent reduction in inappropriate behaviours (Hunt et.al.1988). A later study by Hunt et al.(1991) with younger students with severe disabilities showed that generalisation of conversation skills only occurred when training of peers was implemented. The authors concluded that peer training was essential to generalise the gains made by the participants (Hunt et al., 1991).
In the current study the increase in the social interaction of the peers and the adolescent who uses AAC were not generalised to the playground at recess. Peer training needs to be structured to facilitate generalisation across partners, and settings.

6.3.2 Socio-communicative Competence and Self Concept

Although the improved self concept of the adolescent who uses AAC cannot be directly linked to the implementation of the peer training programme it is regarded as a potential effect of the programme. Socio-communicative competence has been linked to the self concept of speaking adolescents (Romaine, 1984; Whitmire, 2000). In the current study the programme was aimed at improving not only the social interaction of the adolescent but also the socio-communicative skills of the peers.

6.3.3 Need for Additional Training Materials

The need for clinicians and researchers to develop appropriate materials and training programmes is evident. This implication is supported by other authors such as Carter and Maxwell (1998) and Sack and McLean (1997). Where there are existing programmes to teach socio-communicative skills to adolescents it may be possible to adapt the programme to also facilitate interaction with a peer who uses AAC.

6.3.4 Need to Train Peers of Children who use AAC

This study has highlighted the importance for adolescents to interact socially with their peers. Typically, adolescents have already learned a range of socio-communicative skills in childhood to the extent necessary for social interaction with their peers. But is widely accepted that children who use AAC are at risk of having inadequate socio-communicative skills as a result of reduced opportunities, and therefore in adolescence their peer interaction is hampered and their social integration may suffer adversely. The implementation of peer training programmes with children will support the successful inclusion in educational and training establishments of children who have disabilities and require AAC, by facilitating his/her social integration. Within the South African context peer training programmes should form part of the inclusion package provided by the support services of the education department for children who have LNFS and who are being integrated into the inclusive education and training system.

6.4 EVALUATION OF THE RESEARCH STUDY

6.4.1 Positive Aspects of the Research

i. The extensive nature of the different methods of recording data relating to the actual interactions and the psychosocial background of the interaction of the adolescent who uses AAC and his peers added depth to the study. The multiple sources of evidence allowed for a process of triangulation of data increasing the construct validity of the study.

ii. The robust nature of the observational data collection was a strong point of the study. Extended videotaping was completed for each phase of treatment and each videotape was transcribed, coded and analysed in full. This increased the internal validity of the study.

iii. The effects of the peer training were not only documented in terms of the frequency and extent of interactions but also in terms of the peer partners' responsiveness as well as the discourse and communication functions and the modes used by the adolescent who uses AAC. As Buzolich and Lunger (1995) stated analyses of interactions between persons who use AAC and speaking partners are essential to promote our understanding of the processes involved, and to build on both the research and clinical foundations of AAC.

iv. The analytical model used in the description of the interactions of the adolescent who uses AAC with his peers could well serve as a framework to be adapted by other researchers. Adaptations could include a different range of communication functions pertinent to the particular age range or purpose of the research. Additional categories in the framework could include contextual factors and AAC system factors. Also, the category of partner responses may well need to be expanded.

v. Three different contexts were identified as occurring naturally within daily classroom routines. These were teacher directed time, OBE small group discussions and informal times. The opportunities for peer interaction with the adolescent who uses AAC varied in degree from one context to another, and therefore it is with greater confidence that the results of analyses in each context could be compared.

6.4.2 Limitations of the research

The limitations of the research included:

i. Lack of replication of the study is a major limitation. There was no other adolescent subject available. This is a difficulty encountered in the field of AAC research and was exacerbated by previous education policies in South Africa that resulted in children with LNFS being unable to meet admission

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criteria for admission into special schools. Replication of the study with other adolescents who use AAC and their peers would enable one to verify that the intervention was responsible for the changes in the social interaction of the adolescent who uses AAC and did not arise by chance or due to other variables. A result of the lack of replication is that it is not possible to generalise the findings. However, the procedures and the process are carefully described and should allow for the study to be readily repeated or adapted.

ii. The peer training programme integrated many components including raising the awareness of peers, teaching specific strategies and the familiarisation of the peers with encoding strategies, and the study gives limited insight into the significance of each component.

iii. A further limitation is that the analysis of interactions in terms of discourse and communication functions and the modes used did not fully analyse the complex nature of the interactions. The coding of partner responses could have been more detailed; additional psychosocial information on the background of the peers could have been included and more information detailed regarding contextual information with respect to each interchange.

iv. The analytical model used for the description of the psycho social background of the interactions of the adolescent who used AAC with his peers was comprised of various components such at the PACT partner rating scales. Other assessment tools such as the *Social networks: Augmented Communicators and their Communication partners* presently being developed by Blackstone, Berg, Soto, and Liboiron (2002) may well prove more effective for this purpose.

v. Finally, the results showed greater and more frequent interactions of the adolescent who uses AAC with his peers but were not analysed in terms of how many or with which specific peers interactions took place. The impact of peer variables was not addressed.

6.5 RECOMMENDATIONS FOR FURTHER RESEARCH

The following research options were suggested by the current study:

i. Further research is required to determine whether extending the intervention to include additional natural settings, for example the playground, would result in greater generalisation of the social interaction gains of the child or adolescent who uses AAC.

ii. Further research is also required to identify instructional and motivational factors that are essential for the success of peer training programmes and how these factors would differ in importance according to the age of participants.

iii. Additional research is needed to clearly define which variables are relevant to the peer training process and the impact of each on the interaction skills of the child or adolescent who uses AAC.

iv. Further studies may identify how the child or adolescent who uses AAC can facilitate the competence of peers in interactions. Speaking persons differ in the way they interact with persons who use AAC and we need to identify and define which strategies used by speaking partners improve interactions.

v. Additional research to determine the effectiveness of different techniques in peer training would assist in determining which techniques are most effective. For example, a comparison of peer training programmes would be instructive, where one programme included activities in which peers have to communicate using AAC in simulated interactions, and another programme does not include this kind of activity.

vi. In practice it would be impossible to make extended videotapes in natural settings of the interactions of each child or adolescent who used AAC. Further research to develop viable clinical procedures, that are both valid and reliable, to describe the interactions of children and adolescents who use AAC in natural settings is required.

vii. The evaluation of the peer training programme when included as part of an inclusion programme for an adolescent who uses AAC, would usefully explore and compare the experiences and perceptions of the child, peers, teachers and

parents. Of additional interest would be the impact of peer training on the interaction of siblings with the child or adolescent who uses AAC.

6.6 CONCLUDING STATEMENT

Communication is essential for participation in daily life situations. Studies have shown that the implementation of a multimodal AAC system for children with LNFS has resulted in an increase in their interactions with adults, developed their language abilities and had positive effects on literacy development. However, the provision of an AAC system cannot guarantee increased social interaction, the main goal of AAC.

Implementation of peer training programmes in addition to training the child or adolescent who uses AAC in social skills and strategies may result in increased social interaction with peers. There have been few studies describing the effects of peer training on the interaction of persons who use AAC. Specifically, no studies were found pertaining to the training of peers of adolescents who used AAC and who did not have cognitive impairments. Given the widespread acceptance that including learners with disabilities in inclusive educational settings will offer opportunities for developing complex socio-communicative and other skills, the lack of research is disappointing.

Social interaction is fundamental to success in inclusion (Carter & Maxwell 1998). The ability to communicate socially is essential to the goal of participatory inclusion. The White Paper 6 of the Department of Education states that it is committed to establishing an inclusive education system for the 21st century in which all learners, with or without disabilities, must be supported to achieve their learning potential to the fullest (Department of Education, 2001). The White Paper 6 is committed to implementing the values of the Constitution (Act 108 of 1996) including the value of human dignity and the human right of communication (Department of Education, 2001). To facilitate social integration and thus positive inclusion of children who require AAC a peer training programme should be implemented as soon as a child who uses AAC is accepted into a classroom. In implementing effective AAC intervention we must provide the means to a richer quality of life for our learners who have little or no functional speech.

6.7 SUMMARY

This final chapter begins with a synopsis of the multiple descriptive means by which the peer interactions and the psycho-social background of the interactions of the adolescent who used AAC were determined. The integration of the results was then discussed followed by the clinical implications suggested by the study. A discussion of the limitations and positive aspects of the research preceded recommendations for further research. The concluding paragraph highlighted how essential communication is for participation in everyday contexts and the need for peer training if we are to meet our educational goal of including all learners in an inclusive educational system in South Africa.

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