'Lámh Signs Combined' – Investigating a Whole School Approach to Augmentative and Alternative Communication (AAC) Intervention Through Research in Practice

This study aims to investigate the effectiveness of a whole school AAC intervention approach, focusing on the development of knowledge of Lámh signs among communication partners (CPs) in a special school setting. Acquisition and use of single signs as well as ability to combine signs for spontaneous novel utterance generation (SNUG) was evaluated. Intervention took place in a school for children with physical and multiple disabilities, aged 0 – 18. Participants included all staff i.e. communication partners (CP) across each of the nine classrooms within the school. Over the course of a school year, five signs were modelled on a fortnightly basis to each of the classroom groups, at a time when both CPs and students were present. In week one, signs were modelled singularly. In week two, signs were modelled in different combinations. Results show an average increase of 39% in acquisition and ability to use single signs and 61% in acquisition and ability to use sign combinations taught. Additionally participants demonstrated a 400% increase in number of spontaneously signed words, moving from one signed word per utterance to four signed words per utterance on average. Results indicate that a whole school AAC intervention approach, as described above, is effective in enhancing knowledge and use of Lámh among CPs.

Keywords: Augmentative and Alternative Communication, Intervention, Key Word Signing, Lámh, Special School, Communication Partners

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INTRODUCTION

Many children in special schools have speech, language and communication impairments that impact on their ability to access and interact with the curriculum.

For these children, augmentative and alternative communication (AAC) may be an important support in facilitating communication, language development and academic progress (Calculator and Jorgensen, 1991). AAC is a means by which an individual can supplement or replace spoken language (Williams, 2002). AAC encompasses a range of aided and unaided systems. Aided systems involve the use of external aids or equipment e.g. objects, photos, symbols and voice output communication aids. Unaided systems do not require the use of external aids or equipment. Instead, the person uses their body to communicate (Beukelman and Mirenda, 2005). Key word signing (KWS), which was the focus of this research, is a form of unaided AAC. The main advantage of unaided systems is that they are always available. Some disadvantages include the fact that that they require a trained communication partner to interpret the message and adequate fine motor skills to produce (Beukelman and Mirenda, 2005). Many different KWS systems exist internationally e.g. Makaton in the UK. Lámh is a form of KWS widely used with children and adults with communication difficulties in Ireland.

Children with special educational needs often miss much classroom time and academic opportunities attending therapies and appointments during school time. Furthermore direct speech and language therapy provided in a one to one setting often does not support school children to use those skills in every day settings (Irish Association of Speech and Language Therapists, 2016). Indirect interventions e.g. through provision of training to communication partners has the potential to support school children to develop their skills in natural settings, while reducing their time absent from the classroom.

Communication partners include those who interact with the individual who uses AAC on a regular basis. CPs often either (a) primarily have relationships of a social nature with individuals who use AAC such as parents, siblings, peers, friends, and colleagues; or (b) primarily have relationships of an educational or care nature with individuals who use AAC, such as teachers and health care professionals (Cumley and Beukelman, 1992). In early childhood, CPs spontaneously provide children with ongoing modelling of speech during language interactions, resulting in typically developing children rapidly acquiring and using spoken language (Light 1997; Paul 1997). However, it has been reported that in interactions with people who use AAC, CPs are more likely to use verbal modelling, irrespective of the mode of communication of the individual who uses AAC (Bradshaw 2001; Houghton, Bronicki and Guess, 1987; McConkey, Morris and Purcell, 1999). Furthermore, it has been demonstrated that children who use AAC have limited exposure to modelling of their own AAC system, and that CPs can have difficulty creating opportunities for use of the AAC system and expanding on the messages

produced by the individual using AAC (Sturm and Clendon, 2004). Smith (2015) reported that individuals who use AAC require both implicit (indirect) and explicit (direct) learning opportunities to be provided in their communication modality. In order for AAC systems to be successful they need to be available, accessible, accepted and supported (VonTetzchner and Stadskleiv, 2016). Therefore, CPs play a key role in the AAC user's acquisition and use of their communication system, leading to communication partner instruction/training becoming an important method of AAC intervention.

LITERATURE REVIEW

Input Based AAC Interventions

A number of research studies have demonstrated the effectiveness of input-based AAC interventions, also known as aided language stimulation (Goossens', 1989; Goossens', Crane and Elder, 1992), augmented input (Romski and Sevcik, 1996), natural aided language (Cafiero, 2001), aided language modelling (Drager, Postal, Carrolus, Castellano, Gagliano and Glynn, 2006) and aided AAC modelling (Binger and Light, 2007). Communication partner instruction has been found to be highly effective across different modes of AAC and intervention approaches (Kent-Walsh, Murza Malani and Binger, 2017). However, limited evidence which focuses on communication partner instruction in unaided AAC modalities exists. Meuris, Maes, and Zink (2015) identified that adults with intellectual disability (ID) often knew significantly more key word signing (KWS) than their support staff. They also suggested that improved training methods for support staff and more easily accessible KWS related support was required with benefits for a 'train the trainer' approach emerging. Rombouts, Maes and Zink, 2017a; 2017b) investigated staff experiences with key word signing in special schools and group residential homes. Staff suggested that adults with ID are more inclined to use KWS when their communication partner uses KWS and that appointing a staff member to supervise KWS maintenance could facilitate self-monitoring and generalising of signs into everyday contexts. Overall, the participants reported that they experienced KWS implementation as a learning process and aimed to turn the use of KWS into a routine habit (Rombouts et al., 2017a).

Collaboration Between SLT and School Staff

Considering that the school-age child spends at least 28 hours per week in school (Department of Education and Science, 2004) with CPs who primarily have relationships of an educational or care nature with them, it is essential that classroom staff are engaged in communication partner training. This is not an easy feat and often requires the availability of resources (Peck, Ricsharz, Peterson,

Hayden, Mineur and Wandschnieder, 1989), collaboration among professionals (Giangreco, Dennis, Cloniger, Edelmein and Schattman 1993; Peck et al., 1989) administrative support and recognition (Giangreco, et. al, 1993) and is often influenced by past experiences (Melograno and Loovis, 1991). Teachers' perceptions of their students' abilities to learn to communicate more effectively were the strongest positive influence on their intentions to use AAC systems in the classroom. However, teachers' perceptions of students' abilities appeared to be strongly affected by perceptions of their own skills and responsibilities to provide communication training in the classroom (Soto, 1997).

Communication Partner Training Methods
Various forms of communication partner training methods have been reported in the literature varying from once off training involving extracting CPs from their working environment e.g. organised communication intervention courses (Mendes and Rato, 1996), workshops with a practical focus (Loeding, Zangari, and Lloyd, 1990) to ongoing on-site training e.g. 'Signs of the Week' systems (Spragale and Micucci, 1990). It is widely known that training which takes place on a once off basis, outside of the environment in which the skill is required, fails to support the long-term use and development of communication systems (Todis, 1996). A commitment to ongoing on-site training of CPs is recommended and has also been shown to lessen the likelihood of abandonment of AAC systems (Holmes, Judge and Murray, 2010; Rombouts et al., 2017c). Chadwick and Jolliffe (2009) found that staff working with adults with intellectual disabilities who were trained using a once off formal training course did not generalise learning into everyday use of signs. Spragale and Micucci (1990) described a positive impact of an ongoing on-site approach to KWS training for direct care staff working with adults with intellectual disability. An improvement in knowledge and consistency of use of KWS among staff was reported.

However, little is known about the specific procedure which should be included in the establishment of this type of ongoing on-site training. Rombouts et al. (2017b) reported that introducing a balance of new signs and repetitions of learned signs through the communication partner helped to facilitate the client's production and maintenance of signs learned. The impact of modelling on the syntactic skills (i.e. the sequence with which words are put together to form sentences) of individuals who use aided AAC has been the focus of many studies (Sennott, Light, and McNaughton, 2016). However, little evidence exists in relation to the use of syntactic structures in modelling of unaided AAC systems. Furthermore, evidence regarding the inclusion of a syntactic component of communication partner training in key word signing is lacking.

METHODOLOGY

Rationale

On commencing a new role in a service for children with disabilities in a special school, two speech and language therapists (SLTs) identified a need for communication partner training in KWS. During summer planning, the SLTs reflected on their previous experiences of providing KWS training across a variety of settings and conducted a search of the literature in this area. Being a time of a natural staff turnover, both in the SLT department and the school (a new school principal had started), the SLTs identified a unique opportunity for implementation of an innovative approach. Prior to school starting back in September, the SLTs arranged a meeting with the SLT Manager and the school principal to seek feedback regarding previous methods of KWS training delivered. This was reported to have included once off training courses as well as ongoing on-site 'Sign of the Week' approaches. The principal then met with the school staff and sought their feedback on previous methods of KWS training. Once school commenced, there were natural opportunities for observation of KWS use in the school environment. The SLTs observed that KWS was being used by classroom staff primarily with students who used KWS expressively and was not observed to be used with the large proportion of students who were reported to benefit from KWS receptively. Furthermore, when KWS was used by classroom staff, a maximum of one word per utterance was signed and signs were used at structured times of the day only e.g. during oral language lessons. These observations as well as feedback received from classroom staff, led to the development of the 'Lámh Signs Combined' intervention approach. Ethical approval for the project was sought from the internal ethics board of the Central Remedial clinic and was approved.

Setting and Participants

The project took place in a special school for children with physical disabilities and complex needs including Cerebral Palsy, Autism Spectrum Disorder and Intellectual Disability, aged three to eighteen years. This school is part of a wider disability service where medical and therapy services are provided on- site. The school consists of nine classes; three preschool, three primary and three post primary classes. Participants were recruited through convenience sampling and following receipt of consent included all staff (i.e. CPs) working within the classrooms. Staff based outside of the classrooms or working across variety of classrooms e.g. music teacher, were excluded. There were 43 participants in total, including class teachers, Special Needs Assistants (SNA) and others e.g. Community Employment (CE) scheme workers. A record of any relevant training received by participants prior to the project was established and showed that: 26%

of participants had attended the Lámh family course, 5% had attended the Lámh Module 1 course and 2.5% had attended Irish Sign Language training.

Procedure

The initial stage of the project involved the development of resources e.g. a Lámh station for each classroom and a timetable of sign vocabulary. Vocabulary included was derived from the Lámh Module 1 course with consideration for words which were syntactically compatible i.e. could be combined, as well as thematic vocabulary relevant to the school environment/time of year. Revision of signs was incorporated midway through the school year following receipt of feedback from participants, resulting in adaptations to the vocabulary list. The intervention approach entitled 'Lámh Signs Combined,' was launched at a school assembly which was called by the school principal and attended by each of the nine classes, including the class students. Information regarding KWS was provided and Lámh stations were distributed. Class students were invited to volunteer as 'Lámh Leaders' to assist with Lámh sign demonstrations. Following the assembly, baseline evaluations took place within each class. Knowledge of a random selection of 8 single signs from the sign vocabulary list developed, were measured among participant groups. This involved visiting each classroom at a convenient time chosen by the class teachers and asking the classroom staff to demonstrate the sign corresponding to the 8 chosen words. Feedback regarding the planned approach was sought from participants via an anonymous feedback box in the school corridor following which an action plan was developed and distributed among participants.

Over the course of the school year, five signs per fortnight were demonstrated in each of the nine classrooms. A Lámh trained member of the SLT department e.g. SLT or SLT assistant, visited each of the nine classrooms along with a 'Lámh Leader,' each day at a time when classroom staff and class students were present in the classroom. In the first week of each fortnight, the five signs were demonstrated singularly, one sign each day. In the second week, the same signs were demonstrated in different combinations as outlined in the table below. Following feedback received from participants midway through the project, a competition was included which involved each class coming up with their own sentence once per fortnight and demonstrating it during the visit from the Lámh trained SLT department member. Each classroom was provided with a visual representation of each sign demonstrated which was placed on their Lámh station and ideas regarding potential activities/situations for using the sign were discussed. Classroom staff absent for sign demonstration, were encouraged to refer to the Lámh station and seek a demonstration of the sign from staff who were present.

Table 1: Sample of Signs Demonstrated per Fortnight

Week 1 – Single Signs

Monday	Tuesday	Wednesday	Thursday	Friday
I	computer	play	You	and

Monday	Tuesday	Wednesday	Thursday	Friday
You play	Play computer	I play computer	You play computer	Choose your own sentence! e.g. you and I play

Evaluation Procedure

Participants' knowledge of single signs was measured midway through and again at the end of the school year, as per the procedure used in obtaining baseline data. A measure of participants' ability to recall sign combinations demonstrated was included at the midway evaluation. Eight different combinations of signs were chosen at random from the original vocabulary list and staff were asked to demonstrate them. At the final evaluation stage, participants' ability to spontaneously combine signs was measured by calculating mean length of signed utterance (MLU) contained in entries received as part of the 'Choose Your Own' competition. The record of any additional Lámh/KWS training received by participants was maintained throughout the project. Anonymous feedback continued to be sought at each evaluation point following which adaptations to the approach were made and an action plan was developed and distributed to participants.

Over the course of the school year, situations occasionally arose where the Lámh trained member of the SLT department was unavailable to visit classrooms for sign demonstrations. In these instances, offers were received from participants to complete classroom visits, following an initial demonstration by the trained SLT department member. This led naturally to the appointing of five 'Lámh champions' among the participant groups who became involved in shadowing daily Lámh sign modelling. Following one month of shadowing, 'Lámh champions' agreed to independently complete classroom visits along with a student 'Lámh Leader,' following an initial demonstration by a trained SLT department member. Lámh champions were asked to complete a daily log of when they completed classroom visits, providing a reason if classroom visits were unable to be completed on a given day. A follow up evaluation of these logs measured the success of handover of responsibility for the intervention approach.

Table 2: Final Evaluation Form

LÁMH Signs Combined 2015/2016

Second Audit Form – June 2016

Class: _____

Record how many staff have attended LÁMH training since initial audit (Feb 2016):

Family Lámh Course   Lámh Module 1

Ask all staff "Can anybody show me how to sign _____?"

Sign	Known	Unknown	Comments
Play			
PE			
Come			
Toilet			
Yoghurt			

Sign	Known	Unknown	Comments
No School (2)			
Go Home Now (3)			
Excuse Me please (2)			
Finish drink (2)			
Sorry we hurt (3)			
Be careful on road (3)			

Create Your Own Activity

Sentence No	Sentence	Observations
1		
2		

RESULTS

Single Signs
Participants demonstrated a 26% increase in knowledge of single signs midway through the school year and a further 13% by the end of the school year, resulting in a 39% total increase in knowledge of single signs.

Figure 1: Knowledge of Single Signs
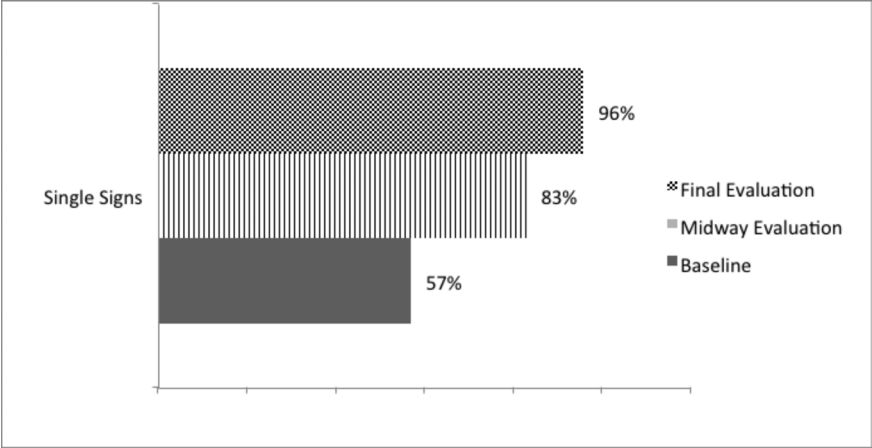
Combined Signs

Knowledge of sign combinations was evaluated midway through and at the end of the school year, resulting in a 61% average increase. Furthermore, a 400% increase in signs used in spontaneous utterances (an average of four signs per utterance) was observed at the end of the school year. Significant discrepancy between the ability of classes to use signs to form spontaneous utterances was observed, ranging from 2.5 signs per utterance to 10.5. A reason for this discrepancy was not evident in these results.
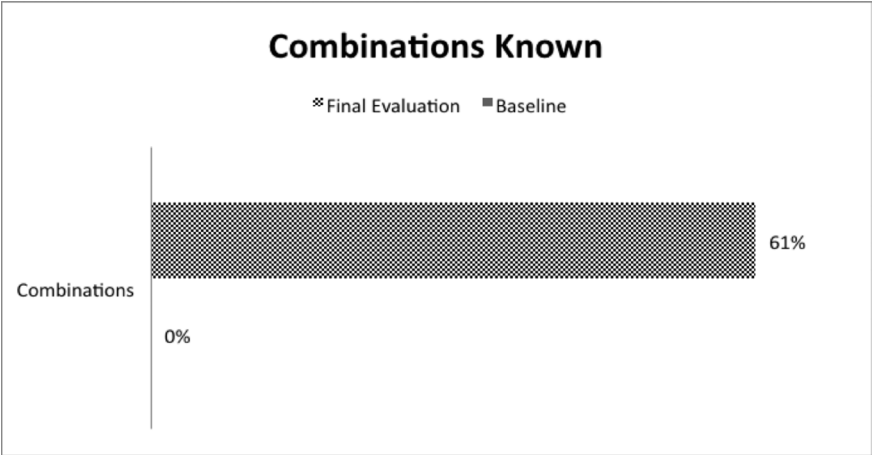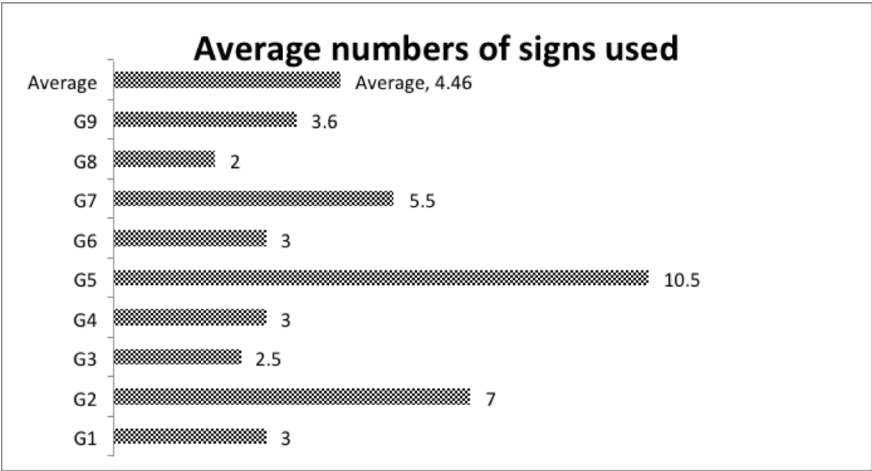
Figure 2: Knowledge of Sign Combinations.

Figure 3: Average Number of Signs Used in Spontaneous Utterances.

Shared Responsibility

Analysis of data logs completed by 'Lámh Champions' during the handover period indicated that classroom visits, including sign demonstration, were completed 74% of the expected time. Interestingly, barriers to completing classroom visits, as recorded by Lámh champions, were resoundingly similar to the barriers experienced by the Lámh trained members of the SLT department e.g. staff absences, other school commitments outside of the classroom e.g. sports day. Furthermore, no additional Lámh training was received by participants during the school year meaning that results obtained can be attributed to a direct result of the intervention.

DISCUSSION

Type of Communication Partner Training

The results of this project support existing evidence in relation to the positive impact of ongoing on-site training in enhancing knowledge of KWS among CPs. Furthermore, this project provides initial evidence that training CPs to model not only single signs but also sign combinations, results in an increase in the mean length of signed utterance modelled in the environment. Considering the overwhelming evidence supporting the benefits of communication partner modelling in rebalancing input/output asymmetry, it may be hypothesised that enhancing the mean length of modelled utterance may result in increased mean

length of utterance signed by individuals who use KWS. However, further studies focusing on the syntactic skills of individuals who use KWS are required in order to confirm or refute this hypothesis.

Specific Procedures

This study also outlines a number of specific considerations for establishing ongoing on-site training. Firstly, this study demonstrates the importance of the initiation and maintenance of effective collaborative team working. Meeting with the school principal during the initial stages of the project development was successful in achieving hierarchical openness and commitment to the project. Consulting with and providing ongoing feedback to participants further fostered the culture of team working and provided participants with an appreciation of the value of their input. Secondly, the establishment of the 'Choose your own' competition created the motivation required to retain commitment to the approach, particularly during times when there were competing demands placed on classroom staff e.g. preparing for end of year concert. This was also an important step towards handover of responsibility which, following a period of gradual fading of support offered, resulted in successful handover of responsibility for the approach to school staff for a three month period. This supports existing evidence regarding the benefits of a 'train the trainer' approach. A follow up study examining maintenance over an extended period would be useful in establishing the quantity of monitoring/ongoing support which would be required and whether achievement of full handover of the approach would be a realistic goal.

Additional Outcomes

A number of adventitious outcomes were achieved including an observable increase in KWS being used outside of the classroom environment by both classroom staff and students. This included the inclusion of KWS in the St. Patrick's Day parade, end of school concert and the Christmas play. Furthermore, multidisciplinary team (MDT) members who were not the focus of this research but were often present in the classes during Lámh demonstrations, were observed to independently use KWS in their interactions with the students. Reports received from classroom staff and MDT members indicated that enhanced modelling of KWS by CPs in the environment, may have resulted in enhanced use of KWS among students. However this requires further investigation.

Limitations

Being a research in practice project, the duty to provide a service to all students did not allow for the establishment of a control group with which results could be compared. Furthermore, the sample size of participants was relatively small and

reflective of a special school setting only. It is also difficult to ensure consistency in the quantity and/or quality of training received by participants due to difficulties accounting for the presence of all classroom staff during sign demonstrations and absent staff relying on second hand demonstrations.

CONCLUSION

This study provides initial evidence to support the benefits of an ongoing on-site training model of communication partner training in enhancing knowledge and use of key word signing among classroom staff in a special education school setting. Guidance regarding specific procedures for consideration in the establishment of this type of approach is offered. Furthermore, this study highlights the importance of collaborative team working to foster the potential for the approach to ultimately become school led.

Future Directions
The majority of the literature available relating to the impact of ongoing on-site KWS training has been conducted with direct support staff working in centres supporting adults with ID. Further investigation regarding the impact of this model of communication partner training on CPs working with a paediatric population across a range of environments and client groups is required in order to strengthen the research presented in this paper. While this study focused on KWS, the potential for this particular method of CP training to be applied to other forms of AAC modelling such as aided symbol vocabulary modelling, would benefit from investigation. Furthermore, the availability and close proximity of school staff and clinical therapists was demonstrated to be fundamental to achieving collaboration for successful AAC intervention. It is crucial that this is considered in service planning and development both locally and nationally, particularly in light of recent changes in clinical service provision for children with disabilities in Ireland.

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