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**‘AAC don Ghaeilge’: A needs analysis survey for the development of
Irish language augmentative communication devices for people
with speech difficulties.**

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A thesis submitted in fulfilment of the M.Phil Speech and Language Processing
degree

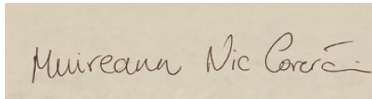
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September 2021

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Date: 29ú Meán Fómhair, 2021

Abstract

Augmentative and alternative communication (AAC) systems, device development and research continues to emerge and develop, while all the time broadening to be more inclusive for those who utilise these systems to communicate effectively. With the focus on bilingual AAC and minority languages AAC development growing, the possibility of developing and optimising AAC technology for the Irish language continues to come to the forefront of developing inclusive and accessible ways to communicate in Ireland's first national language. A needs analysis survey was conducted to gain insight into what key features would be necessary for Irish AAC (bilingual, layout, high-tech or low-tech) and why such technology is in demand by those who wish to communicate in Irish, as an L2 learner or as members of the Irish-speaking community. Results indicate an interest into the development of Irish language based AAC technology. Key recommendations include integrating Irish text-to-speech synthesis into the AAC system, along with significant interest in a keyboard with Irish diacritics and the opportunity for users to model their own phrases. Other recommendations include working with Speech and Language Therapists to help address the lack of AAC assessment available through the medium of Irish. Future research into developing Irish AAC and trialling it in various demographics in society will shape and mould the research in the near future.

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List of Terminology

- AAC – Augmentative and Alternative Communication
- PECS – Picture Exchange Communication System
- SLT – Speech & Language Therapy/Speech & Language Therapist
- AT – Assistive Technology
- CCN – Complex Communication Needs
- SEN – Special Educational Needs
- DEIS - Delivering Equality of Opportunity Schools
- IASLT – Irish Association of Speech and Language Therapists
- ID – Intellectual Disability
- ASD – Autism Spectrum Disorder

Chapter 1: Introduction: Aims and Objectives

1.0 Introduction

There has been substantial and significant research and development of augmentative and alternative communication (AAC) systems and devices in recent years. The use of AAC technology to assist those with complex communication needs (CCN) can “encompass various modalities that can replace or augment a person’s speech and other existing communication skills” (Iacono et al., 2016, p. 2349). Ranging from unaided AAC systems (e.g. sign language, facial expressions) to aided based systems (e.g. symbol boards, speech-generating devices) the use of such technology is included in the assessment and intervention process conducted by Speech and Language Therapists (SLT) and support teams.

Arising from the substantial growth and optimisation in this technology and as it becomes more readily available via applications for smartphones and tablets, the potential to support AAC users who wish to communicate in minority languages and languages other than English is very encouraging. Despite the fact that there has been a significant growth in Irish-medium education recently with over 53,000 students currently enrolled in Irish-medium schools (Gaeloideachas, 2021), there is no aided AAC device or system that enables those who wish to communicate in Irish to accurately portray complex grammatical structures or novel culturally related phrases in Irish.

Irish is the first national language of the state of the Republic of Ireland, as noted in the Constitution in Article 8 of the Irish constitution (Ireland, 1937). Provision within the Official Languages Act enacted in 2003 ("Official Languages Act ", 2003), affords the language official standing in State legislature and policy. Notwithstanding this however, on a practical level it remains complicated and challenging to enact this policy effectively within society. The Irish language has three main dialects, as noted above, Munster (Cúige Mumhan), Ulster (Cúige Uladh) and Connacht/Conamara (Cúige Chonnacht), with Irish-speaking communities known as Gaeltacht areas located within each of the three provinces and a smaller Gaeltacht community located in Co. Meath (Ráth Chairn). However, there has been a decrease of 11.6% of those who live in this area and speak Irish on a daily basis outside of the education system (now standing at 32% as of 2016 Census results). Outside of these

areas, there are a substantial number of people who speak Irish on a daily basis or on a very frequent basis, with 39.8% of the population in 2016 stating that they spoke Irish, with 73,803 people speaking it daily outside of the education system and 53,217 people living outside of Gaeltacht areas speaking Irish outside of the education system (Census, 2016). The majority of students who attend mainstream primary and post-primary schools in Ireland must learn Irish as one of the three compulsory subjects, (with the exception of those with a language exemption) alongside English and Mathematics, with many choosing to avail of their education through the medium of Irish, both at primary (Gaelscoileanna, 49,367 pupils) and post-primary/second level (Gaelcholáistí, 16,350)(Gaeloideachas, 2019-20 statistics via Gaeloideachas website, 2021). Previous research indicates that 9.4% of those attending Irish-medium education have Special Educational Needs (SEN) or Additional educational Needs (AEN) (Nic Aindriú et al, 2020). Organisations such as Gaeloideachas have developed resources to support students with diagnoses of dyslexia and Autism Spectrum Disorder (ASD) in Irish-medium education, but more work is needed to ensure meaningful inclusivity and equity for those who wish to be educated in the Irish language and engage and participate in society in general through the medium of Irish.

From an equity perspective and in order to be inclusive of all members of society who use Irish, those who have difficulties with communication should be offered the opportunity to engage and participate through a differentiated manner or with additional support, such as that provided by AAC intervention.

The aim of this research was to design, circulate and analyse a needs analysis survey to assess what provision currently exists in terms of AAC technology in Ireland, and what (potential) users would like to see within a potential Irish language aided AAC system.

1.1 Rationale

A parent of two children who both have a diagnosis of Autism Spectrum Disorder (ASD) and who are currently non-verbal, with the eldest child showing capability to speak through intermittent speech, approached the ABAIR team based in the Phonetics and Speech Laboratory in Trinity College Dublin enquiring about assistance for her children. The father of the children is from a predominantly Irish speaking family in the Gaeltacht (predominantly Irish-speaking area) and his family use the Irish language as their first and

everyday language. The eldest child attends Irish-medium education primary school, (known as a Gaelscoil) in the Dublin area and as part of her communication intervention has been using an augmentative and alternative communication (AAC) system to communicate in English. Unfortunately she has very limited means of communicating effectively through the medium of Irish. If an Irish word was entered into an English speech-generating device (SGD), it would not generate the correct pronunciation.

This thesis will utilise a needs analysis survey which will provide a critical insight into the barriers to communication through Irish for those who utilise AAC systems to communicate, as well as key components of AAC technology that can be considered for future development of Irish language AAC systems. Based upon the results and findings from this survey, recommendations for how a device could be designed for communication through Irish will be proposed. Recommendations will be made in the final chapter, having been derived from a review and synthesis of the results of the survey and a critical analysis and discussion undertaken to highlight the more prominent findings that arise. It is hoped that responses to the survey questions will afford the researcher an understanding as to the demands for Irish language AAC systems and for what purposes it could be used for. It is also important for the researcher to understand the key features that stakeholders would like to see included in such a device/system. It could also be expected that for those who are familiar with high tech AAC systems and devices, that suggestions and recommendations related to key features for an Irish AAC device would be derived from their current experience with AAC systems and the gaps in which the technology could be integrate more into the everyday 'real world' scenarios.

Further stages of this research will also examine the challenges associated with introducing Irish into an AAC application, device or system. These challenges are not insignificant, given that Irish semantic and syntactic structures differ greatly from those of English. Ultimately, it is envisioned that the ABAIR text-to-speech systems developed for Irish at the Phonetics and Speech Lab, Trinity College Dublin, will allow for the full adaptation of AAC systems for Irish.

1.2 Research Questions

The thesis is guided and scaffolded by two research questions which the thesis aims to address, namely;

Research Question 1: What are the grounds for which people are requesting Irish language AAC systems/speech-generating devices?

Research Question 2: What key features of AAC systems/speech-generating devices that are currently available would be useful to consider in designing a new Irish language AAC system/speech-generating device?

1.3 Thesis Outline

The thesis is presented in seven chapters, including this introductory chapter. Chapter 2 provides a literature review on the AAC research both in Ireland and in international spheres to gain an understanding about the challenges and barriers that face future development of AAC devices and systems, along with the challenges associated with the Irish language.

Following this, the research methodology including the design of the needs analysis survey, participant recruitment and procedures will be presented in chapter 3.

The survey results will then be examined and explored in chapters 4 and 5 and key findings will be highlighted. Further insight into these results will be provided in the discussion in Chapter 6. Chapter 7 concludes with key recommendations, which will inform future development of Irish AAC aided systems. The thesis is supported by five appendices.

Chapter 2: Literature Review

2.0 Introduction

To understand the challenges that face those who engage with augmentative and alternative communication (AAC) assessments and technologies, a comprehensive literature review was undertaken to gain a more thorough understanding of the growth and development of the technology over recent years. The researcher also explored where AAC technology and assessment is found within speech and language therapy contexts in Ireland, along with an examination of how bilingualism could possibly be supported or achieved with the support from AAC technology. Examining case studies from international scholars follows, offering a key understanding of how this has been applied in other contexts globally, where minority languages are a feature. Using the knowledge gathered from this literature review and taking inspiration from the research methods applied in the published research, plans to conduct a needs analysis survey for developing Irish AAC technology will be discussed in more detail.

2.1: What is AAC?

Augmentative and alternative communication (AAC) is defined by the American Speech-Language-Hearing Association (ASHA) as clinical practice intervention method to assist those with complex communication needs (CCN) “characterized by impairments in speech-language production and/or comprehension, including spoken and written modes of communication. (ASHA, 2021, p. 258). Figure 2.1 illustrates how this technology can be classified into three categories: no-tech, low/light tech and high-tech, which is matched accordingly to AAC users by SLTs and AAC intervention teams who can help to determine “the fit between a device or system and the communicative abilities and needs” (Ogletree et al., 2018, p. 116) of those who would be engaging with this method to increase communicative abilities.

Forms of AAC		
Unaided	Aided	
No-tech	Low-/Light-Tech	High-Tech
• Gestures • Manual signs • Facial expressions • Vocalizations • Verbalizations • Body language	• Pictures • Objects • Photographs • Writing • Communication boards/books	• Speech generating devices (SGD)* • Single-message devices and recordable/digitized devices • AAC software that enables dynamic symbol/language representation and that is used with some form of technology hardware (e.g., computer, tablet, smartphone)

Figure 2.1 Table listing forms of AAC, ranging from no-tech to high-tech (ASHA, 2021)

Regarding the AAC intervention process, this is not solely focused on the AAC user itself, but focuses on how the effects of intervention should follow a ‘person-centred’ approach, which places the AAC user at the centre of “all phases of the AAC assessment and intervention process” (McNaughton et al., 2019, p. 57). Literature and more recent research supports the consideration of “the AAC user, family perspectives, educational outcomes, vocational outcomes” (Ronski & Sevcik, 2018, p. 258), while also teaching a variety of skills that they may take with them into real-world situations to communicate more effectively. AAC intervention is not usually seen as a stand-alone intervention method, but rather part of the overall assessment that may see more than one mode of AAC in usage (e.g a mix of aided and unaided), which in general terms can prove “moderately effective in addressing challenging behaviours and social interaction skills”. It can often be seen integrated in a behavioural package to “support comprehension and learning within structured activities” (Iacono et al., 2016, p. 2357) that can be translated into real-world environments with support from communication partners, building upon gaining valuable comprehension and learning skills. By using AAC technology, there is an indication that AAC users can gain increased independence and autonomy, have a deeper social role and solidify strong friendships, along with improving physical and mental health (AssistiveWare, 2021).

Positive associations can be found between both aided and unaided AAC systems, showing a positive impact on vocabulary acquisition and symbol comprehension (Dada et al., 2020, p. 1). Ganz (2015) also notes that such interventions not only can help treat communication deficits, but can support treatment for co-occurring diagnoses and challenging behaviours in certain cases where the AAC user would also have a diagnosis for autism/ASD. While this

may be considered by Ganz, Iacono et al (2016) do note that AAC has at times been neglected as an intervention tool for those with autism, citing a “lack of evidence for the role of AAC within comprehensive intervention program”(Iacono et al., 2016, p. 2349). However, this presents an opportunity to build upon growing research on the potential benefits AAC for children with autism, intellectual disabilities (ID) and other CCN.

An interesting point that has been identified in AAC research is the focus on early childhood intervention and a gap in focusing on the progressive development of AAC usage in adolescents with developmental disabilities (Dada et al., 2020, p. 8). This may include adults being introduced to AAC systems at a later stage in life, or seeing changes in AAC devices and systems over the lifetime of an AAC user, with the exception of a few independent studies such as Holyfield et al (2019) and King et al (2020). This indicates a need to conduct research with older generations learning how to use AAC systems for the first time. Possible strands of research could include the change in usage over a long period of time, alongside comparing and contrasting different AAC systems in use by people in older age brackets, with an intersectional approach on the differing CCN they may have. In order to ensure that various AAC systems can be used to assist different generations, the importance of continuous research and development on making such systems as accessible as possible is crucial to ensuring success.

The concept of modelling communication boards, as seen in Figure 2.2 and Figure 2.3, is often seen at the beginning of the familiarisation process for new AAC users, where key words, or pictures, are used to help familiarise the AAC user with this technology (AssistiveWare, 2021).



Figure 2.2 Website homepage of LAMP- Words for Life, a high-tech AAC device with example communication board (LAMP, 2021).



Figure 2.3 Keyboard example used in CoughDrop AAC Devices, available to test on CoughDrop website (CoughDrop, 2021).

It can also be used to help AAC users gain independence and confidence in engaging with this technology. With the emphasis more on the main concepts being communicated over grammatical accuracy, this is crucial to allow AAC users to develop their skills, while also allowing for their communication partners to understand what core words are needed to help with their language development (AssistiveWare, 2021). There are various views in the literature examined with regard to using modelling on AAC devices, with the main concerns stemming around the communication partner having significant influence on the modelling instead of collaborating with the AAC user to ensure that the core vocabulary is accessible to them. This means that a 'person-centred approach' where the AAC intervention, which

includes learning how to successfully model on a device, is focused on the communication needs of the individual (McNaughton et. al, 2019).

Part of the modelling process and AAC intervention can also see the inclusion of core vocabulary lists, that can be included in sample model boards, PECs booklets and more. The role of the core vocabulary list is to offer lexical and symbolic representations of the language in question, generally seen in grid format (see Figure 2.2) and are often the most common symbols associated with that language. Generally, this can comprise of an initial 50-word lexicon, which allows the user to experiment and become familiar with the concept of symbolic communication (Laubscher & Light, 2020, p.43). However, an issue that has emerged in discussions relates to the use of core vocabulary lists in AAC intervention and the generalisation applied to the symbols in question. Ogletree et al (2018) makes a valid point that there is an assumption that both adult and child AAC users interpret the symbols in the same way, but there is new evidence suggesting that “symbol identification and use can be enhanced by the addition of animation and sound within dynamic grids” (Ogletree et al, 2018, p. 119). This is much more visually appealing to children and sees them more willing to engage with the technology and gain an understanding of the relationships between the objects in the display grid (Harmon et al, 2014). There is a challenge to ensure that the core vocabulary is functionally and developmentally appropriate for the user in question. This may often mean working with the Speech and Language Therapist (SLT) and the main communication partners to help model the communication boards from this core vocabulary list to ensure that it will be appropriately accessible for the user in question.

The key factor to the successful usage of AAC technology, be it low-tech or high-tech, is that the intervention is a coordinated effort between the AAC user, their main communication partners and the professionals, namely the SLT who utilises AAC technology in their speech and language intervention approaches. Ensuring that the intervention strategies benefit and support the AAC users and their families first and foremost is of the utmost importance, which lays the foundation for all new technological methods and practices. Considering that the focus of this thesis is the implementation of Irish language based AAC in the future, including cultural practices and home life experiences at the centre of the initial intervention implementation stage is crucial to ensure that the user can continuously

develop and grow in independence as their familiarity with AAC technology grows over time (Soto & Yu, 2014, pg. 90).

2.2 Bilingualism and AAC

Cognisant of the previous points, the question must be asked as to whether or not AAC systems are suited to support bilingualism, be it simultaneous bilingualism (developing two languages simultaneously from birth or within the first three years of their life) or sequential bilingualism (developing two languages outside of the first three years), with both cases needing “regular exposure to develop them successfully” (La Morgia, 2018; Unsworth, 2016). The biggest barrier that arises when the discussion of bilingualism and AAC, or communication disabilities, may manifest as a concern articulated by professionals and parents that bilingualism would be too taxing, or would be too challenging for children, in particular (Soto & Yu, 2014). As a result, it is not unusual to see people with communication disorders and their communication partners engage with disability services in the more well-resourced language. La Morgia’s article also refers to the difficulty that can arise when attempting to diagnose simultaneous and sequential bilinguals for developmental language disorders (DLD), which can have an impact on relevant intervention assessments being applied to these cases. Parallels can be drawn between typical language learning difficulties for sequential bilinguals with people who have a diagnosis of DLD, such as errors in morphemes, difficulty constructing narratives and limited expressive vocabulary (La Morgia, 2018 p. 82).

Fortunately, this argument has been challenged more in recent years and there is a lot more support for affording children the opportunity to engage in bilingualism, as the limited comparative research indicates that the “performance of bilingual children with communication disabilities is comparable with monolingual peer.” There is also no concrete evidence to show that the home language impairs the learning of a second language or that bilingualism as a concept is too taxing for children with communication disorders (Soto & Yu, 2014, pg. 85). Instead, the argument for a sociocultural approach to bilingualism and AAC intervention is proposed, showing the benefits of engaging in interventions that acknowledge the home language and culture of the AAC user. By targeting the cognitive processing and mediated skills that can underly one or more languages in question (Stewart, 2017), it allows for those engaging with a second language through the utilisation of AAC

technology to affirm their cultural and linguistic identity and grow cognitive language skills (Collin Stone, 2019). In short, if there is willingness on the part of the professionals and the family to engage in AAC intervention to the best of their ability in another language other than English, it can “constitute an effective and culturally and linguistically appropriate intervention” (Stewart, 2017, p. iii) should it be successful.

Research examined within the area of bilingual AAC intervention and assessment places a strong focus on the role of the family being prominent in the intervention stage, noting the concern of some family members of utilising the technology if it is not in a language they themselves are comfortable with (Stewart, 2017, p.6). The need for respect and acknowledgement for the home language and culture of the prominent communication partners of AAC users, which in general terms includes close family members, sees the need for the concept of “family-centred practice” to be included in AAC intervention assessments (Collin Stone, 2019, p. 53). However, for this to be successful in offering the opportunity for AAC users to engage in bilingual AAC, the communication partners all need to be on an equal footing with the professionals (SLTs, O.Ts) in the decision-making process. The challenge then arises where professionals attempt to design communication systems that take the values and home language of the main communication partners into account. Attempting to model the use of AAC in “communicative contexts that are culturally appropriate and increase the child’s affiliation with the family and community” (Soto & Yu, 2014, pg. 88) should be the primary aim.

The emphasis on ensuring that the AAC user can use the technology and intervention methods provided to them ensuring they can have an active role in society and their community, along with the recognition that this continues to be a developing process within minority languages in particular is crucial in understanding how much further the research and advocacy for AAC intervention and technology needs to go. Collin Stone’s research, which focuses on the Aotearoa New Zealand context, emphasises the need to understand that it is not a simple translation of communication boards or core wordlists that will solve the issue. Rather, the examination of “metalinguistic and cultural elements that express different worldviews” (Collin Stone, 2019, p. 48) is of importance. The need to compare the languages in question in terms of their different modalities, vocabulary layouts and grammar, as well as offering the use the ability to codeswitch (switching from one language

to the other) is crucial to see successful bilingual AAC intervention come to fruition (Soto & Yu, 2014, p.89). Within the colonised context, which can be placed in parallel with the colonial context within Ireland as well, understanding that the linguistic suppression of elements of the language and the place it has in society can also have an impact in developing AAC assessment methods and technologies in minority languages.

Even with the evidence provided by both Soto & Yu (2014) and Collin Stone (2019), putting this research into practice proves challenging when there is a deficit of support from professionals, who lack the experience in providing support and intervention in languages other than English. Supporting teachers, communication partners and the AAC users themselves is crucial to ensure that they can engage with such important support and be comfortable developing their skillset in independent settings as well as in intervention sessions with an SLT. It will also be beneficial to support the argument that those with learning difficulties or with a diagnosis of a DLD based disorder or ASD does not necessarily mean that the AAC users are unable to engage via other languages, which will be discussed in more detail later on in this chapter.

2.3 AAC in the Irish context & the status of the Irish language

Constitutionally the Irish language is prioritised as the first national language of Ireland in Article 8 of the Irish constitution (Ireland, 1937). The Official Languages Act enacted in 2003 ("Official Languages Act ", 2003) and an incoming amendment Bill to further support the usage of Irish in Ireland sets the language on a strong footing constitutionally and from a policy development perspective. Thus it would be reasonable to assume that there is also prioritisation for the provision of resources and tools supporting a practical and an inclusive approach to promoting and accommodating all those who wish to speak Irish and live in Irish speaking communities, such as the Gaeltacht areas. While the legislation clearly provides a basis for this, the practicalities are not as straightforward and it can be challenging to engage in society and live through the medium of the Irish language, especially for minority groups including Irish speakers.

A recent report conducted by Nic Aindriú et al (2020) aimed to provide insight into the main learning disabilities cited within Irish-medium education in the Republic of Ireland via a

survey conducted in the 2017-2018 academic year. Compared to an earlier study conducted by Nic Gabhann (2008), which reported an overall prevalence of 7.9% of pupils in Irish-medium education presenting with a learning disability, Nic Aindriú et al's study proved to be very insightful into the change that came about within the past ten years. Nic Aindriú et al reported a 9.4% overall prevalence rate of children presenting with learning disabilities and/or were on the spectrum etc. It was noted that it can be challenging when attempting to assess the possibility of a child having dyslexia within the Irish-medium context (Nic Aindriú et al, 2020, pg. 9). Of those who presented with learning disabilities in Junior Infants, 21% had a diagnosis of ASD, with 1.7% of pupils presenting with multiple disabilities (Nic Aindriú et al, 2020, pg.12). This indicates a change that has seen children being diagnosed earlier and that there is a slight increase in the number of children in Irish-medium education at primary level who also require additional support in school. However, the point made regarding the low percentage of prevalence in DEIS (Delivering Equality of Opportunity Schools) schools of children with learning difficulties (between 5.8% and 6.8%) along with the low prevalence rate in general would indicate low numbers of children with special educational needs (SEN) availing of Irish-medium education. With growing support from organisations to provide additional support to those who require Irish-medium education at primary level, it would be desirable to see this number grow in years to come. Adequate support for those who wish to engage in Irish-medium education coming from Irish language organisations and the Department of Education is needed to make this a reality.

Recent changes in the Department of Education policy regarding the exemption of students from studying Irish reveal a significant growth at post-primary/second-level for students with a learning disability noted in 2015 (Darmody & Smyth, 2016). Tynan (2018) raises concern regarding the lack of differentiated approaches to ensure inclusivity in the classroom and offering all students the opportunity to engage with an important part of Irish culture (Tynan 2018). Hence, organisations such as COGG (An Chomhairle um Oideachas Gaeltachta agus Gaelscolaíochta) and Gaeloideachas attempt to fill the gap where there is a lack of accessible resources and tools to support a more inclusive approach to teaching Irish, research supporting bilingualism and the provision of SEN through the

medium of Irish and campaigning to ensure that Irish language rights of those with complex communication needs are advocated for.

AAC users in Ireland experience similar intervention and assessments as their international counterparts. A recent position paper published by the Irish Association for Speech and Language Therapists (IASLT) note the benefits of including AAC intervention in assessments for those with CCN, acknowledging the “growing body of evidence to support the use of AAC” (IASLT, 2019, p. 19) has seen the use of AAC incorporated into individual interventions and assisted in reducing barriers to communication. However, this position paper also notes the “lack of ongoing support for AAC users”(IASLT, 2019, p. 19) as adults, indicating that support and resources for this cohort is quite limited. The importance of positive communication environments is highlighted, with support for dedicated training for communication partners (IASLT, 2019, p. 20). The position paper does focus on the adult population in Ireland with Intellectual Disability (ID), one of the few published pieces that focuses solely on this cohort, with much of the research and case studies focusing on early intervention with children who have CCN. However, even with the comprehensive recommendations on how best to address some of these issues, without dedicated funding of these services that this progress could be very slow, possibly stagnant if continuous and consistent efforts are not made to see the recommendations come to fruition.

One important aspect of the AAC intervention assessment model in Ireland of note is that this is mainly conducted through the medium of English, with many AAC systems both low-tech and high-tech being readily available through English, echoed in other societies where services “are often delivered only in the majority or socially dominant language” (Soto & Yu, 2014, pg. 84). Organizations including Gaeloideachas and COGG have been engaging in exceptional work in developing resources, in particular those classified as having special educational needs (SEN), such as a student with autism spectrum disorder (ASD) or dyslexia. It is often the case that in minority languages, it can fall upon the communication partners or SLTs who have fluent communication skills to translate, rearrange and edit existing tools (Stone, 2019) to support language and cultural participation. Guidelines published by IASLT in 2016 under the title ‘Working with Linguistically Diverse Service Users’ do acknowledge the increasingly diverse clientele they would be engaging with and that they should be assessed in each of their languages.

However, La Morgia highlights that the employment of interpreters to assist the SLT may help them understand competence, but “cannot substitute a trained healthcare professional”(La Morgia, 2018). She cites the lack of tools and resources to carry out bilingual intervention is limited to the availability of interpreters or others taking it upon themselves to make the relevant AAC materials available in another language, such as Irish. As a result, children who experience fluent Irish in their home, community and education settings often access their assessment and treatment through the medium of English (La Morgia, 2018). The Census data from 2016 (*Census 2016 Summary Results*, 2016) notes over 22,221 pre-school children and 76,301 children with languages other than English or Irish at home, along with 50,000 pupils engaging in Irish-medium education. Such numbers suggest the investment in Irish-based assistive technology, such as AAC, would prove beneficial to many across the country. The results of a survey conducted by Nic Aindriú et al (2020) report that the overall prevalence rate of primary school children in Irish-medium education with SEN stood at 9.4% during the academic year of 2017-2018. One of the most prominent recommendations in the report looked towards developing “standardised educational psychology assessments through the medium of Irish” (Nic Aindriú et al, 2020, p. 14). This would greatly benefit a more inclusive cultural mindset when offering supports for SEN units in Irish-medium schools.

With technology such as the Irish language synthesiser developed for ABAIR.ie by the Phonetics and Speech Laboratory in Trinity College Dublin being incorporated into various projects to increase accessibility to those wanting to engage with the language, such developments in technology should begin to expand into broader areas of accessibility. Efforts should be made to connect with SLTs and SEN teachers to assist in breaking down communication barriers. With this project falling under the ABAIR project, it is well placed to conduct research and develop resources of this find due to the (i) text-to-speech systems developed (ii) linguistic data and expertise and (iii) contacts and collaboration within the fields of speech and language therapy and accessibility.

2.4 International AAC Studies

Taking studies conducted by international researchers in bilingual AAC intervention and minority language AAC development into consideration, an initial examination of these

papers indicate that the demand and interest in alternative AAC systems other than through the medium of English seems to be widespread. Work by researchers in South Africa, New Zealand, the United States of America (USA) and other countries focusing on languages such as Zulu, te reo Māori, Spanish and Arabic have seen interest pique from other nations, such as Ireland, who are looking to take inspiration from this work and apply it to their own context. The key point being made across the literature is that this is still a niche area of research, with recommendations looking at how the implication of bilingualism can be integrated into system design. Alongside this, ensuring that scaffolding language development preserves key cultural values and increasing adequately trained professionals to deliver such services (Soto & Yu, 2014).

Discussions have arisen in recent years regarding the importance of bilingual intervention for AAC users, particularly in the early intervention stage, with similar issues and barriers arising in different countries in providing these services. A case study undertaken by Stewart (2017) as part of their doctoral studies, where the participant who had Downs Syndrome came from a background where Spanish was the dominant home language and had therapy provided in Spanish was reported to “constitute an effective and culturally and linguistically appropriate intervention for this participant”(Stewart, 2017). With consideration for the Language Independence Hypothesis considering the transfer of language skills from L1 into L2, utilising core words that were “functional and culturally valued” (Stewart, 2017, p. 8) and facilitating codeswitching along with communication partners implementing indirect intervention in the target language. This indicates that a strong case can be made for bilingual AAC assessment and interventions. The combination of these efforts would be better supported with a bilingual device that can facilitate codeswitching, differing grammatical structures, modalities and motor planning, which is echoed in work by Soto & Yu (2014) and in an exploratory study by Tönsing et al (2019).

In support of a sociocultural approach to serving AAC users in bilingual communities to preserve “cultural and linguistic heritage, the promotion of positive regard of minority languages and linguistic diversity and emerging benefits of bilingual interventions” (Soto & Yu, 2014, p. 89), an exploratory study conducted in South Africa regarding the availability of AAC systems and intervention in participants’ home languages, was undertaken in 2019. With the most prominent findings indicating a desire to increased access to appropriate AAC

systems in their home language (85.4% of participants), 70% of participants expressed interest in accessing such technology due to their chosen language being the language of their community. 68% also recognising it as an essential part of their identity (Tönsing et al., 2019, pp. 8-9), tying into the local culture that surrounds them on a daily basis and promoting minority languages regardless of their language status. The recommendation of developing appropriate multilingual AAC systems ties into the importance of ensuring that there is an ability to allow for customization of systems to incorporate more than one prominent language. This suggests that the AAC user can continue language development and erasing limitations to “express themselves in multiple languages using AAC” (Tönsing et al., 2019, p. 13). Similar sentiments can be seen in the research conducted regarding te reo Māori, with an emphasis on members of the Māori community who have disabilities having the opportunity to “participate and contribute in language revitalisation” (Stone, 2019, p. 123). This in turn supports culturally located AAC. Links were made with links to TalkLink, a service actively working to provide such resources to ensure that aided AAC technology, no matter how high tech, would be “made by, with, and for Māori, need to speak with Māori voices”(Stone, 2019, p. 127).

Core vocabulary lists consisting of high-frequency words are often used in AAC interventions. This can support the AAC interventions (Soto & Cooper, 2021), for the AAC user and communication partners who are being introduced to AAC technology for the first time, offering great support to learn words and to experiment with combinations and understand “how concepts relate to each other”(Laubscher & Light, 2020, p. 50). While it is noted that core word lists cannot be the sole foundation for AAC development, relevant content and social words including “relevant content and function words” hold high importance in early expressive language (Laubscher & Light, 2020, p. 51). This is recognised by others who are working to improve the development of AAC, using core word lists to integrate the likes of Zulu and Spanish into more high-tech AAC systems. Soto & Cooper (2021) recognised this with their study on developing core vocabulary lists for Spanish to assist “families, professionals and AAC software developers in the selection of Spanish vocabulary”(Soto & Cooper, 2021, p. 3). They noted variations in grammatical structure and lexical items should be key components in such lists due to differing typologies and order in languages (Soto & Cooper, 2021, p. 2).

Mngomezulu et al (2019) focused on the development of a core vocabulary list for Zulu, a morpheme-rich language with a differing orthographic structure to English. With this study establishing a core vocabulary list for preschool children in Zulu, it gives the opportunity to be “supplemented by personalized fringe vocabulary”, which refers to a set of low-frequency words which are tailored to an individual or an activity (Mngomezulu et al., 2019, p. 282). There is also a suggestion around appropriating concepts and functions according to the development of the AAC user (Laubscher & Light, 2020). As well as this, the Zulu study supports the point articulated by Laubscher & Light (2020), who indicate that the majority of frequently occurring words in most languages may not necessarily be typically produced by young children or early symbolic communicators using AAC technology for the first time (Laubscher & Light, 2020, p. 47). Hence, the importance of appropriate core vocabulary that can be personalized and developed through different stages of life.

2.5 Chapter Summary and Conclusion

This literature review afforded the researcher the opportunity to delve into current and previous AAC intervention assessment methods and research, along with scoping of literature and research on AAC in other language contexts. This proves useful when contrasting characteristics between languages and measuring it against the Irish language. Recognising that even though AAC intervention in minority languages is still in early development, positive steps have been taken to introduce this intervention tool into other languages offers increased accessibility for AAC users to engage with languages used in the home and the local community. Within the Irish context, the importance of AAC devices in assessment and intervention was recently acknowledged by the IASLT (2019). This is an important factor as to where future research can lead to build upon the work already being done internationally and finding the common thread to link it all together.

One of the key points that is important to consistently emphasise is the understanding that this type of technology has seen positive effects on AAC users from a wide-ranging demographic internationally, showing that there is benefit in investing in such technology and in educating people about the benefits that can come about through including this in everyday life. To gain a better understanding as to how we may begin to address this issue within the Irish language context, the needs analysis survey that is detailed in the following

chapters will hopefully suggest how we may begin to have conversations about furthering the development of assistive technology in general for the Irish language.

Chapter 3: Survey Design and Methodology

3.0 Introduction

Before delving into the methodology and outlining the design of the survey used for the purpose of conducting this needs analysis, this chapter first considers the potential impact research of this nature can have on the area of AAC intervention and development. Taking into account what has already been achieved in the area of bilingual AAC system development, along with AAC development in other minority languages, the reasoning behind choosing a survey to conduct the analysis will then be discussed, as well as the possible recommendations that may arise from the results generated in this study.

3.1: Current Contribution derived from Literature Review

It is intended that this needs analysis survey in this research will also contribute to a bigger project in the future. It is hoped that following on from the publication of the survey results, the design process of an Irish AAC device can begin under the direction of the ABAIR.ie team based in the Phonetics and Speech Laboratory in Trinity College Dublin. While this needs analysis is very much the first step in this process, the use of the Irish language synthesiser developed by the ABAIR team which is available in the three main dialects of Irish (Ulster, Munster and Connacht) is of a significant advantage. Such a tool unlocks the potential to design a speech-generating device (SGD), or to work alongside current AAC applications and systems available in Ireland and incorporate this speech processing technology alongside them. It must be noted that this survey will not be the primary source of information regarding the design of such a device, but that it is a scoping exercise that will be further developed outside of this particular thesis. Due to the restrictive nature of the Covid-19 pandemic, the decision was made not to conduct any in-person consultation sessions due to the public health guidelines and restrictions that were put in place to protect everyone from the coronavirus. It is intended to conduct in-person consultation sessions with the various stakeholders in the project (e.g AAC users, SLTs, parents/guardians, educators familiar with AAC in educational environments, family members) in the future. This would ensure that the development of any Irish AAC system, be it high tech or low-tech, gets a consistent flow of feedback from those directly involved in the intervention and assessment processes.

Furthermore, with the hope that such a device may be developed in the near future, pilot sessions of using the device will have to be conducted to ensure that it is accessible, inclusive of a variety of CCN, portable and can be modified to reflect the users' needs.

3.2 Rationale for Survey Selection and Design

Due to the constraints of this research being conducted during the Covid-19 pandemic, the survey was hosted via an online survey software platform, Qualtrics, with every effort made to ensure that the software was made as accessible as possible. Different options were explored to find the best survey platform that would be easy to manage for a variability of users. Ensuring that the survey was accessible was the main priority in selecting the survey modality, based on discussions with the core advisory group, Qualtrics was chosen for this reason. This core advisory group includes an adult AAC user, a parent of two children who use high-tech AAC systems in the form of an application on an iPad and members of the SLT profession. The researcher utilised the expertise of the core advisory group to ensure that the survey was accessible and appropriate for all stakeholders involved, while also availing of their assistance in the recruitment of participants for the survey.

The researcher was responsible for the design, distribution and analysis of the survey. Drawing on the literature reviewed, the main focus of the survey was to ensure that the survey would be designed to be as accessible as possible. Key considerations included making sure that the font of the online survey was accessible to those who may have visual impairments, and that there an audio version of the Participant Information Leaflet, as well as a plain-text version. This was made available for those who needed the additional support, alongside researching which survey software could assist in further accessibility concerns that would arise during the design process.

The researcher was cognisant of the approach used by Tönsing et al. (2019) who used a similar approach, which saw their survey circulated in quite a strategic and purposive manner and engaged with the groups of stakeholders they wished to target. It is important to recognise that a primary difference in Tönsing et al's approach and the approach in this survey was that Tönsing et al (2019) had the opportunity to conduct the survey in both

online and face-to-face settings. Face to face settings were not available as an option for the primary researcher working on this survey regarding Irish AAC.

While the Tönsing et al (2019) survey offers an example and a template of how to conduct needs analysis for the development of bilingual/multilingual AAC technology, simply attempting to 'copy and paste' the structure into the Irish context was not viable for a number of reasons. With only two official national languages in Ireland (Irish & English), this is different to considering over 11 official languages in South Africa. Some of the questions included in the South African based survey were also deemed not suitable in an Irish context. The researcher considered restructuring and rephrasing some of the questions to retain the sentiment, but not necessarily the questions themselves. Along with a restructuring of the survey with regard to the sections and content of each section, questions that suited the Irish context, such as the discussion of Irish-medium education and Irish-speaking communities (Gaeltacht) areas were included in a new section. The importance of linking in culture was cited numerous times across the literature examined (Iacono et al., 2016; Mngomezulu et al., 2019; Soto & Cooper, 2021; Stewart, 2017; Tynan, 2018), which is why a section regarding Irish culture could be included. This replaced any questions from the South African study which were related to South African culture and the culture attached to all of the official languages.

The importance of including questions that would help to identify key features of AAC technology that works well for current AAC users was essential. These questions were aligned to the second research question addressed in this thesis and considered the design of an Irish language AAC device, be it a dedicated device, application or incorporated into current AAC technology. To ensure that the questions were not leading questions, the importance of consulting with the core advisory group was imperative to gain an understanding into what type of language should be used within the survey. Importance was also placed on the phrasing of the questions to make sure that they originated from a neutral standpoint and did not try to sway opinions.

3.3 Research Design

In order to gain an understanding and to begin compiling recommendations for future research into the development of Irish AAC devices, the researcher focused in particular on collecting feedback and data from those who would be directly impacted by this research. A

self-directed survey that utilised both quantitative and qualitative questions offered significant scope to conduct a thorough mixed methods analysis that would offer a broad insight into the needs and demands of those hoping to use Irish AAC in the future.

Taking inspiration from Tönsing et al (2019), to effectively conduct a needs analysis on the demands of accessing appropriate AAC systems in multiple languages, the decision was made to design a quantitative descriptive survey through the format of a survey. This type of survey supports a sequential mixed methods research approach, where the social concepts can undergo both statistical and textual analysis, with the findings of the survey explored in more detail (Hall, 2020). Another important factor in selecting a survey to generate data for this type of research is that the findings will hopefully provide “the foundation from which to build the social change outcomes”(Hennink et al., 2020, p. 51) and extend knowledge in this area. It offered the opportunity to gain an insight into the attitudes, opinions, and knowledge of those who opted to complete it. This survey could also be defined as cross-sectional survey as it is collecting data within a specific timeframe comparing variability between different demographics (Hall, 2020, p. 66).

As noted previously, the decision to use the Qualtrics survey platform was made due to the constraints imposed by the Covid-19 pandemic, which restricted the ability to meet participants face to face or conduct various empirical data collection practices, such as focus groups and interviews. The use of the survey accessibility checker tool allowed the researcher to design the survey in a way which was accessible to a broad variety of participants. Qualtrics also offers a detailed report for all the participants’ responses, breaking it down into percentages and offering some graphic images to illustrate the responses clearly, which is a helpful aid when beginning the analysis of the questions.

Many of the questions are closed-ended questions, which allows for easy conversion onto a numerical scale (Hall, 2020, p. 115), with some open-ended questions included to allow participants the opportunity to elaborate on certain topics further. It was important to ensure that there was a balance between the closed questions being positive and negative, with an effort to phrase them in a neutral tone. Recognising the need to try and keep the survey as short as possible to limit the poor response rate that might befall the survey, a key

component of the survey design was to examine how to keep the survey as concise and succinct as possible. The aim was for participants to be able to complete within approximately 15 minutes, to gain key insight into the barriers to engaging with Irish AAC and how best to address those issues. Using the Design Logic tool in Qualtrics, the questions that were not relevant to the participant (e.g the participant did not have a diagnosis of ASD/Cerebral Palsy), were omitted from their survey and hence helped to tailor the survey to cater to their needs and perspectives more efficiently.

With the survey aiming to focus on a very broad demographic of AAC users, it was important to consider what exactly this research would attempt to examine and explore without having too many questions which may not be relevant to some participants and to figure out how to group the questions together. The decision was made to divide the survey into different sections to ensure that the main topics could be addressed in a systematic order. The survey begins with the relevant information about the survey, along with a link to the Linktree (Appendix B). This Linktree contains a link to a protected Google Drive folder (participants can only view the content and cannot edit the content of the folder), containing alternative accessible formats of the Participant Information via audio file, plain text and a plain Google Doc document. The consent section follows, where participants simply ticked the box as to whether or not they consented to participating in the survey.

The main sections in the survey were categorised under the following headings: Background Information, Experience using AAC systems, Irish language AAC needs analysis. The first section focuses on gaining an understanding of the demographic of those who have participated in the survey. This is further developed in the following section where an attempt to understand some of the main challenges to various conditions and disabilities can be elaborated upon. There was also the opportunity to gain insight into the different types of devices used by AAC users and their communication partners and the types of scenarios and settings they would use these devices for. The final section focused specifically on the Irish language and developing Irish AAC technology. Questions in this section focus on the types of features that would be expected for Irish AAC, the barriers people currently face when trying to engage with Irish in everyday life and why such

technology would help them to engage more affectively. These questions align with the research questions set out at the beginning of this thesis:

1. Research Question 1: What are the grounds for which people are requesting Irish language AAC systems/speech-generating devices?
2. Research Question 2: What key features of AAC systems/speech-generating devices that are currently available would be useful to consider in designing a new Irish language AAC system/speech-generating device?

3.4 Ethical Considerations & Reliability

Ethical approval for this research was obtained from the Research Ethics Committee in the School of Linguistics, Speech and Communication Studies in Trinity College Dublin. A modified copy of the research ethics application form is available in Appendix E.

Participants were informed that their participation was entirely voluntary and that they could withdraw their consent at any point in time if they so wished. For the online based survey, informed consent was elicited at the beginning of the survey, by participants checking a box to indicate their consent and willingness to participate in the survey. For those who were completing the survey on behalf of a family member/client, a follow up question followed the initial consent, to enquire whether the person was completing the survey independently or on behalf of another person. This follow-up question gave several options for the participant to indicate their relationship to the AAC user (parent, caregiver, guardian, sibling, speech and language therapist, occupational therapist etc.). Having these options for participants before they answered any question on the survey gave participants the assurance that they have the ability to self-determine whether or not partaking in the survey is worth it for them. The survey was confidential and did not ask for any identifying information from participants,. All the information regarding data collection and confidentiality was outlined in the Participant Information section to ensure that this was made very clear to everyone interested in the research.

3.5 Participant Recruitment

Following the finalisation of the survey, the recruitment process began. Each member of the core advisory group received an email which included a link to the survey, a letter explaining

the research and the link to the Qualtrics survey, which they were encouraged to circulate to people they knew who may be interested in participating in the survey. Along with utilising this core advisory group, participants were recruited via dedicated AAC Facebook groups (e.g. AAC Users and Allies Ireland) which allowed people who were interested but had no connection to the research up until this point to participate of their own accord. The advertisement placed on the Facebook group can be viewed in Appendix C. Parents and Guardians were encouraged to participate on behalf of family members who were under the age of 18 or were not capable of completing the survey independently. The survey was live for a period of two weeks, after which the results exported into Excel for analysis.

3.6: Participants:

Participants included those who are users of AAC devices, people who are family members of users of AAC devices, caregivers and/or therapists who have AAC users to whom the survey would be of interest. All participants had to be over the age of 18 years old to complete the survey. Efforts were made, as stated previously, to ensure that the survey would be as accessible as possible to ensure that participants had a high level of autonomy in expressing their thoughts and opinions.

3.7: Analysis

As stated previously, one benefit of the Qualtrics software is that it can generate a detailed Default Report, giving percentage breakdowns for all of the closed questions asked in the survey and listing all the open-end responses without identifying the participants. Due to time constraints and the fact that this thesis was merely the starting point of a larger project, the decision was made to use the percentages breakdown from the Qualtrics Default Report and input them into Excel. Through utilising Excel, a variety of graphs and figures could be constructed to give a visual representation of the data being analysed.

Open-ended questions were analysed under discourse analysis guidelines (Hall, 2020), meaning that the responses recorded by participants were relevant to the overarching theme of Irish AAC intervention and the question at hand.

Assistance with working through the data was acquired from the project supervisor and research assistants in the Speech and Phonetics Laboratory. This proved very useful in the initial stages of the data interpretation when labelling the data and ensuring that the charts and figures were as accurate as they could be.

3.8 Summary and Conclusion

This chapter described the design of the survey, the methods used to recruit participants and ethical considerations. The survey questions investigated the key features that would be needed for high-tech Irish AAC, as well as the challenges that are currently facing those who wish to engage with Irish via AAC. The survey results are presented in two separate chapters, with the closed-ended survey results provided in Chapter 4, while results to the open-ended survey questions are provided in Chapter 5.

Chapter 4: Results and Analysis of Survey: Closed Questions

4.1 Introduction

The results of the survey are presented aligned with the two main research questions:

Research Question 1: What are the grounds for which people are requesting Irish language AAC systems/speech-generating devices?

Research Question 2: What key features of AAC systems/speech-generating devices that are currently available would be useful to consider in designing a new Irish language AAC system/speech-generating device?

The results from the closed questions are presented in this chapter and the results for the open questions are presented in Chapter 5. Following the presentation of all results, Chapter 6 presents a discussion of the key interesting outputs from the survey. A summary of findings and recommendations are summarised in the Conclusions section of Chapter 6, where there is also discussion of future research focussing on developing Irish AAC systems and technologies.

4.2 Participation Results

The survey was published live to the public on the 20th of July and remained open until the 10th of August. On the 12th of August, survey data indicated that a total of 130 people participated in the survey. Of the 130 responses, 35 participants completed the survey or progressed over three-quarters of the way through the survey. This equates to 27% of those who participated in the survey completing two sections or more.

4.3 Closed-question Results

The total number of responses for each of the closed questions are presented in visual representations via a bar chart or a pie chart. It should be noted that due to the Design Logic tool utilised via the Qualtrics survey software and the option for participants to not be obliged to answer all the questions, the sample size of responses for each question may differ at different stages. Therefore, the numbers of responses obtained for each question is indicated throughout, in brackets ($N = X$).

4.3.1 Background Information on Participants

A) Those Filling out survey: AAC user vs others (N=12) (Q2 - What is your relation to the person you are filling out this form on behalf of?)

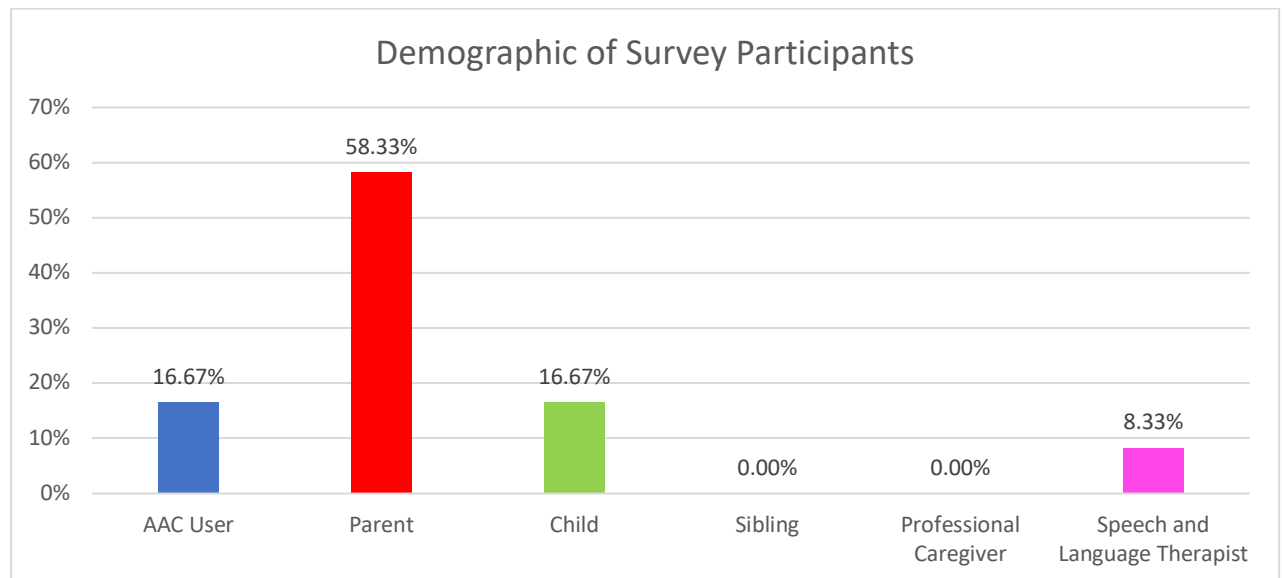


Figure 4.3.1 A: Societal demographic of participants of the survey.

The results from this question indicate a high percentage of parents filling out the survey on behalf of their children (58.33%), who may not have been able to complete the survey independently for a variety of reasons. One of these reasons may have been due to the fact that their children were under the age of 18 years old and thus required a parent or guardian to complete the questionnaire for them.

B) Age Demographic of Participants (N = 53) (Q4 - What age are you/the AAC user?)

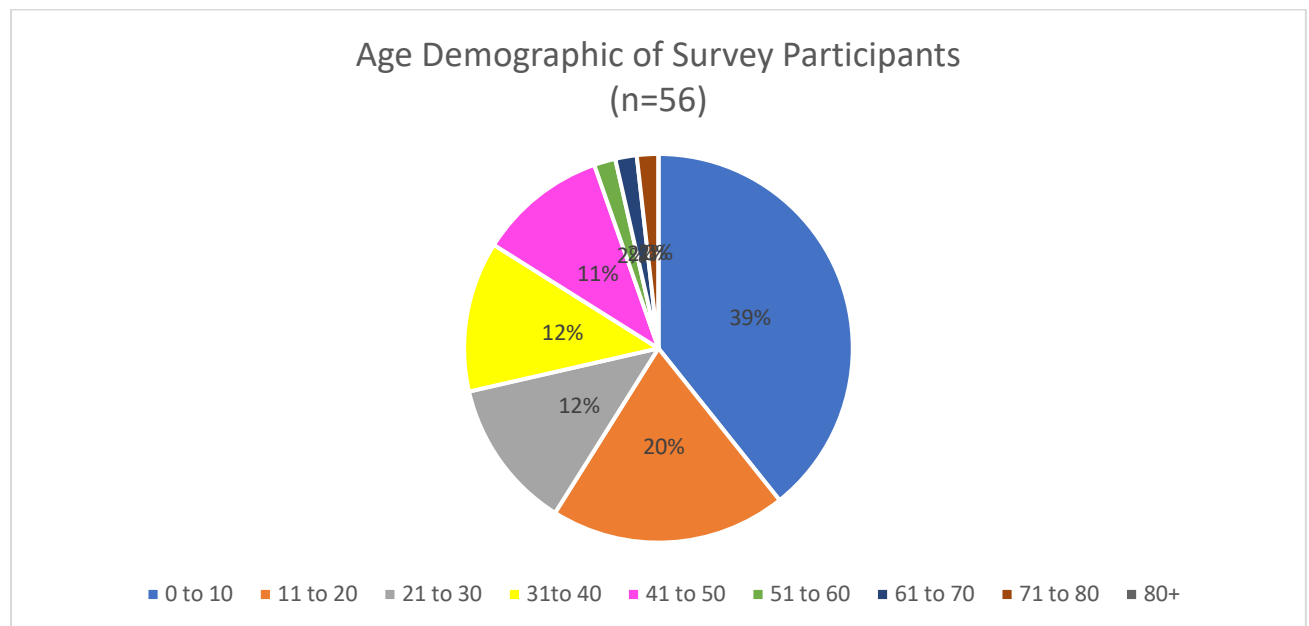


Figure 4.3.1 B: Age demographic of survey participants

The demographic results as shown above illustrate that AAC systems and devices are utilised by a wide range of users and across age demographics. The data indicates a high concentration of users under the age of 10 (39%), with the second highest between the ages of 11 to 20 years of age. It should be noted that not all participants of the survey answered this question. With 56 participants of the 130 answering this question, (43%), this is helpful to establish an understanding of the demographic.

C) Medical diagnoses of AAC users in question (N = 121) (Q3 - What condition do you/does the AAC user have?)

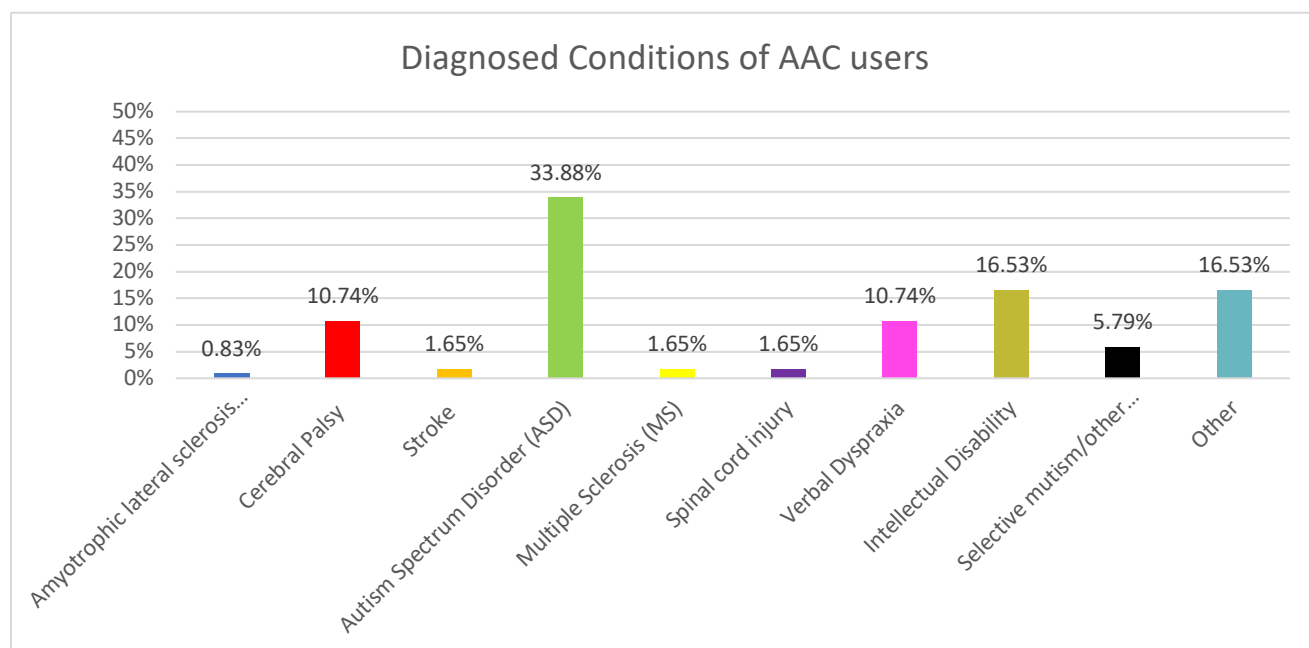


Figure 4.3.1 C Diagnosed conditions of AAC users (self-declared or declared by communication partner)

D) 'Other' conditions listed by participants

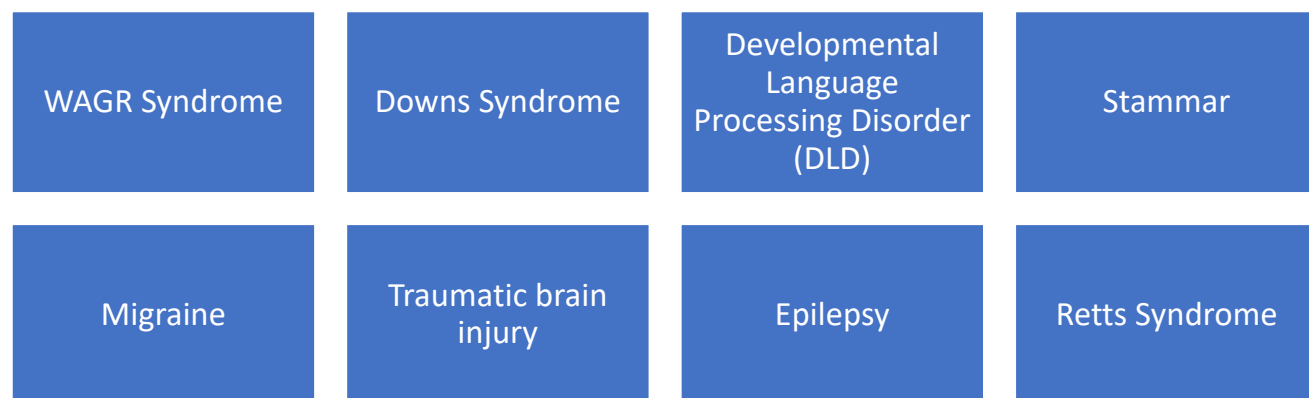


Figure 4.3.1 D: Additional conditions listed by participants

Understanding the different diagnoses of the AAC users gives the researcher an understanding that it is not simply people with one particular diagnosis or another utilising the technology but is in fact more complex than this. Interestingly, a very high percentage of AAC users engaged in the survey have a diagnosis of Autism Spectrum Disorder (ASD) (33.88%), suggesting that AAC intervention is now being more widely used with people with a diagnosis of ASD. People with a diagnosis of Intellectual Disabilities (ID) followed as the

second highest diagnosis (16.53%), followed by Verbal Dyspraxia (10.74%). It should be noted that some of these diagnoses are co-occurring with other conditions not listed above.

E) Current speech and motor abilities (N = 42) (Q10 - Do your/the AAC user's speech and/or motor abilities change with time?)

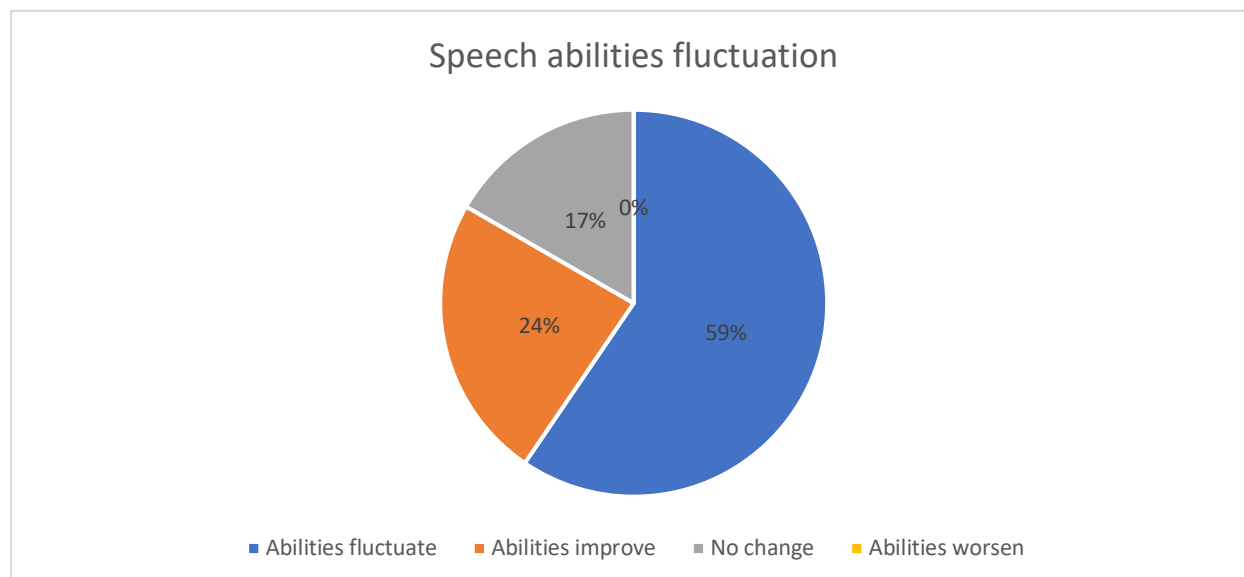


Figure 4.3.1 E: Speech ability fluctuation of AAC users (self-declared or by communication partner)

Q11 - How frequently do you notice changes in your/the AAC user's speech and/or motor abilities?

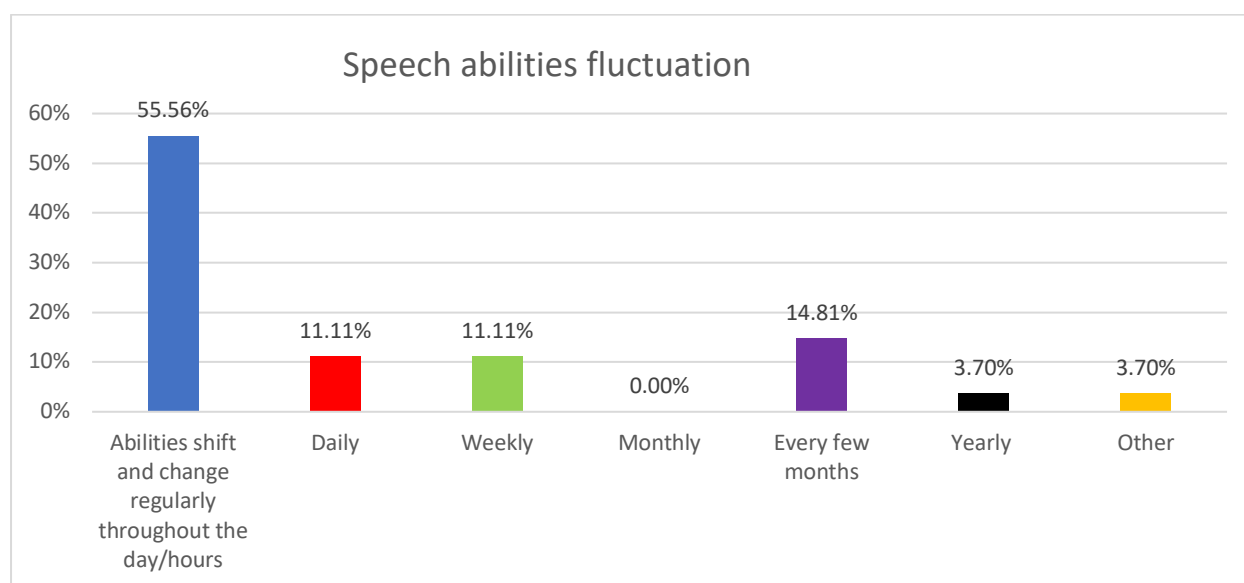


Figure 4.3.1 F: Additional information of speech fluctuation abilities of AAC users

The speech abilities of AAC users is widely varied, with Figure 4.3.1 E showing that 59% of participants who answered that question noted fluctuation in their speech abilities. Figure 4.3.1 F provides more insight into the different ways that an AAC users' speech could fluctuate, with 55.56% responding that their abilities/the abilities of the AAC user they were filling the survey out on behalf of, shifted quite regularly throughout the day/hours. Other participants indicated that there was a fluctuation in their speech abilities and motor skills on a daily (11.11%) and weekly (11.11%) basis or every few months (14.81%). This highlights the importance of tailored AAC assessment for users to ensure their specific needs are being catered for.

4.3.2 Current AAC Device usage

Communication Methods Used (including AAC) (N= 102) (Q15 - Which of the following applies to your/the AAC user's communication practices? Please select all that apply.)

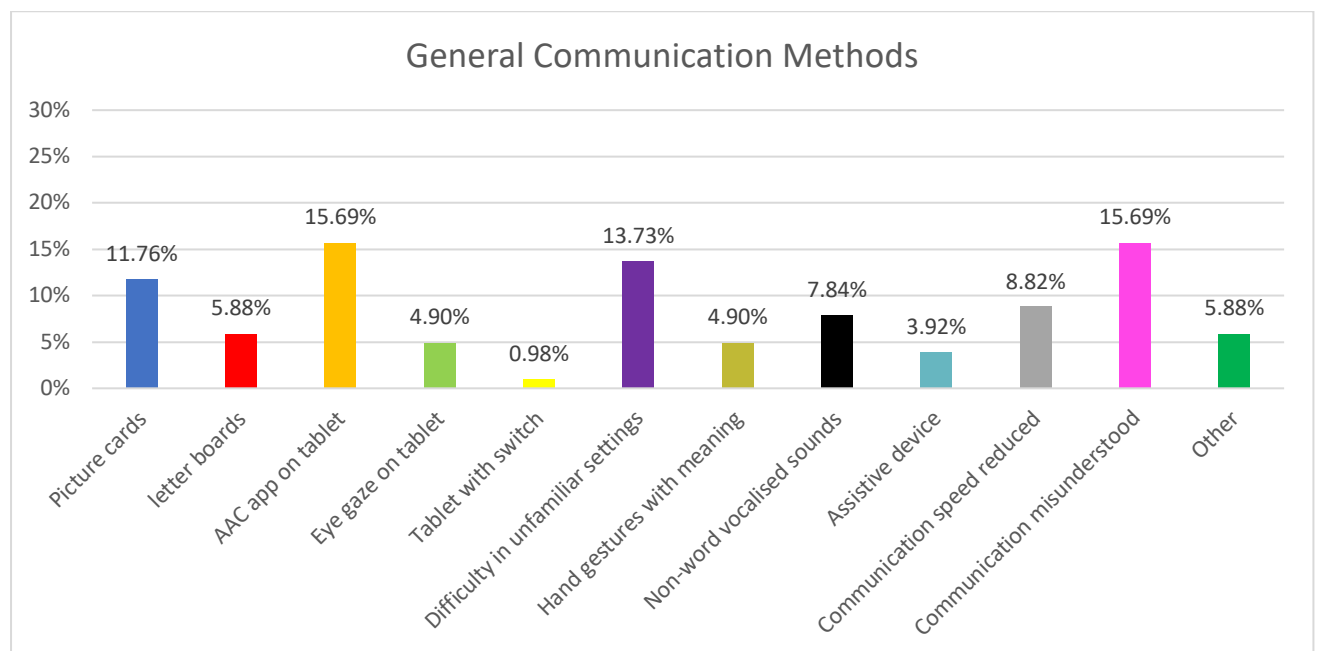


Figure 4.3.2 A: Communication practices of AAC users (self-declared or by communication partner)

Figure 4.3.2 A: gives insight into AAC usage, alongside other more common communication methods. Among those who use an actual device, some of the most common communication methods seems to be utilising picture cards (11.76%), derived from Picture

Exchange Communication (PECs), non-vocalised sounds (7.84%) and letter boards (5.88%). It is noteworthy that there were a low number of participants who responded that they used AAC devices (15.69%), compared to what would have been predicted by the main researcher. The graph also shows alternative modes of communication such as hand gestures and non-word vocalisations. Hand gestures are as commonly used as the use of an AAC app on tablet. Note however that AAC users may also be using hand gestures.

Other communication issues signalled in these responses included that the users are often misunderstood, they experience difficulties when trying to communicate in an unfamiliar setting, and in the case of those who have some speech, the speed of communication is reduced. It is interesting to note the percentage of people whose communication has been misunderstood (15.69%). This could potentially be linked in with those who noted difficulty communicating their needs in unfamiliar settings, which is a common barrier to communication for many who have speech-based diagnoses.

This question encompassed a variety of themes. In future iterations, it would be worth dealing separately with (i) the devices/forms of communications used and (ii) the difficulties that might arise with each one of these.

B) Different AAC devices used (N= 41) Q17 - What, if any, devices/systems do you/does the AAC user use to help with communication? If you use a specific product, please list the product name. Please tick all that apply.

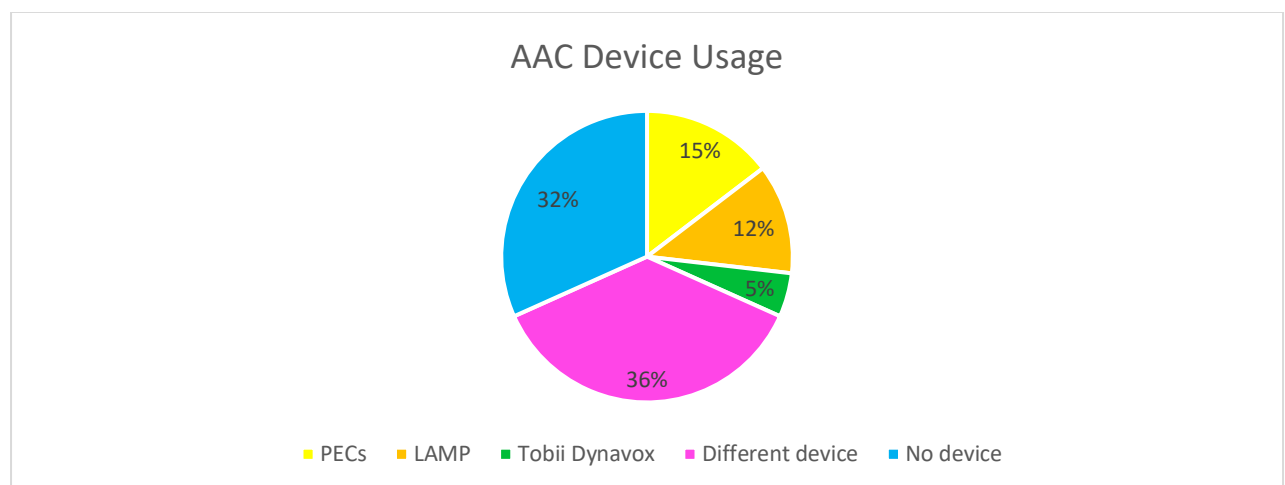


Figure 4.3.2 B: Common AAC devices used by participants

C) Other (different devices) in use (N = 11)

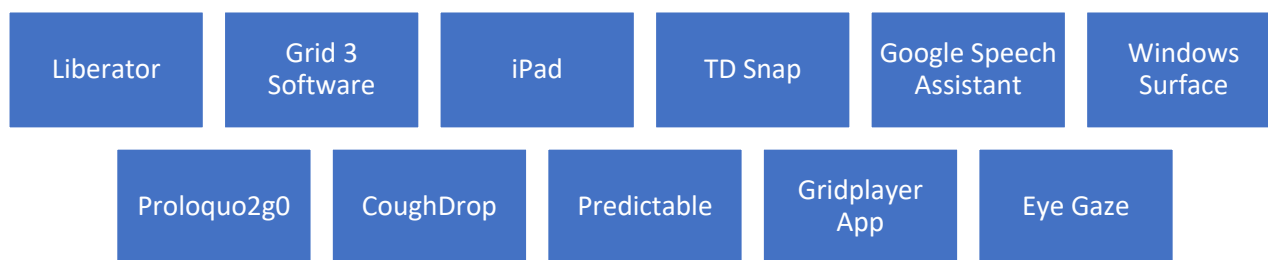


Figure 4.3.2 C: Additional AAC devices used by participants, included in 'Other' option for Q17 in survey, building upon information shown in Figure 4.3.2 B

The question posed above gives a really good insight into the wide variety of AAC devices that are in use here in Ireland. Seeing so many different devices and systems quoted shows that there is a very strong market in Ireland that caters for a variety of AAC users, regardless of if they have one medical condition or multiple conditions. There is a sense of strong usage of PECs (Picture Exchange Communication), with 15% of participants who responded to this question indicating they use PECs on a regular basis. This shows the importance of using low-tech AAC as well as high-tech AAC. Another interesting result from this question is that 32% of participants who responded to the survey do not use AAC, a response which would presumably be in terms of using high-tech AAC devices. While there are a wide variety of products available on the market, as seen in Figures 4.3.2 B and 4.3.2 C, it would be fair to state that more opportunities are needed to engage with AAC technology as part of intervention processes.

D) Settings where AAC technology used (N = 36) Q21 - In what settings do you/does the AAC user use your/their device the most?

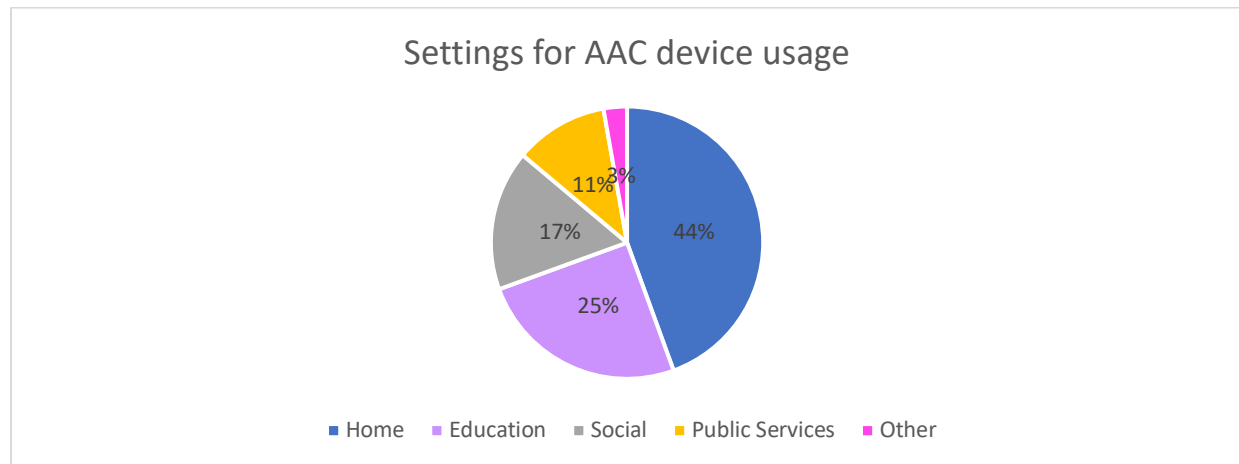


Figure 4.3.2 D: Common social settings where AAC devices were used by participants

To get a sense of where AAC users are most likely to use AAC devices, or to engage with AAC systems in general, is very helpful to get insight into what social settings cater for AAC systems. There is a high percentage of AAC users who utilise the technology in the home (44%), with educational settings following this at 25% of participants who responded to this question. These results are relevant to the settings where a high majority of AAC users receive strong support from family members and other communication partners. However, the low response of using AAC in public settings (11%) gives a sense of a lack of accommodation for AAC users in public settings, indicating a need for public places and services to be given the opportunity to become more educated on the importance of AAC systems and providing for AAC users.

4.3.3 Irish AAC device needs

A) Key features to include on Irish AAC device (N = 103) Q23 - Would you/the AAC user be interested in using a device with the following outputs? Please select all that apply.

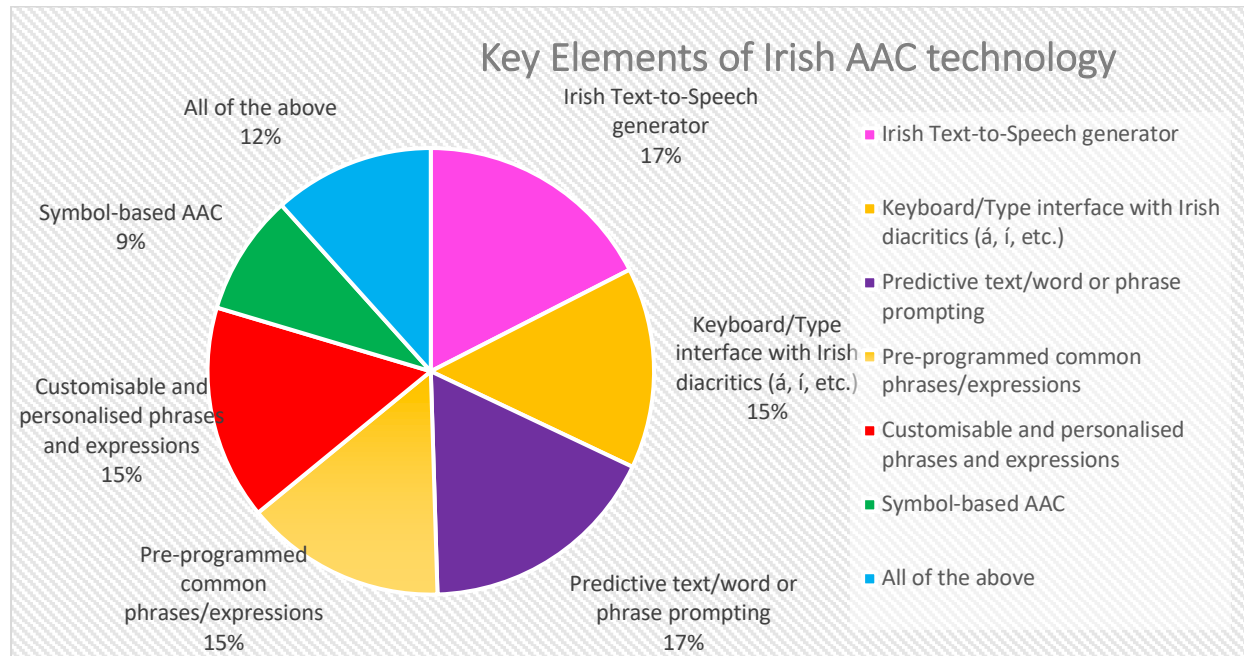


Figure 4.3.3 A: Key elements of Irish AAC technology desired by AAC users and communication partners

This was probably one of the most important questions in the survey, it is very interesting to analyse these results regarding what elements of AAC technology participants would like to see in Irish language-based AAC. The inclusion of an Irish Text-to-Speech Synthesiser and Predictive text/word or phrase prompting polled the highest at 17% as the most important elements to include in an Irish AAC device. The desire for pre-programmed phrases in Irish (15%), for the keyboard to include Irish diacritics (15%) and having the opportunity model their own phrases and store them in a dedicated folder within the AAC device/application (15%) followed as other key elements to include in the device. Interestingly, 12% of participants who responded to this question noted that they would be interested in all of the elements mentioned in Figure 4.3.3 A, which seems to be lower than predicted from the Methodology Chapter.

B) Languages in household (N = 30) Q24 - What languages are used in your/the AAC user's household?

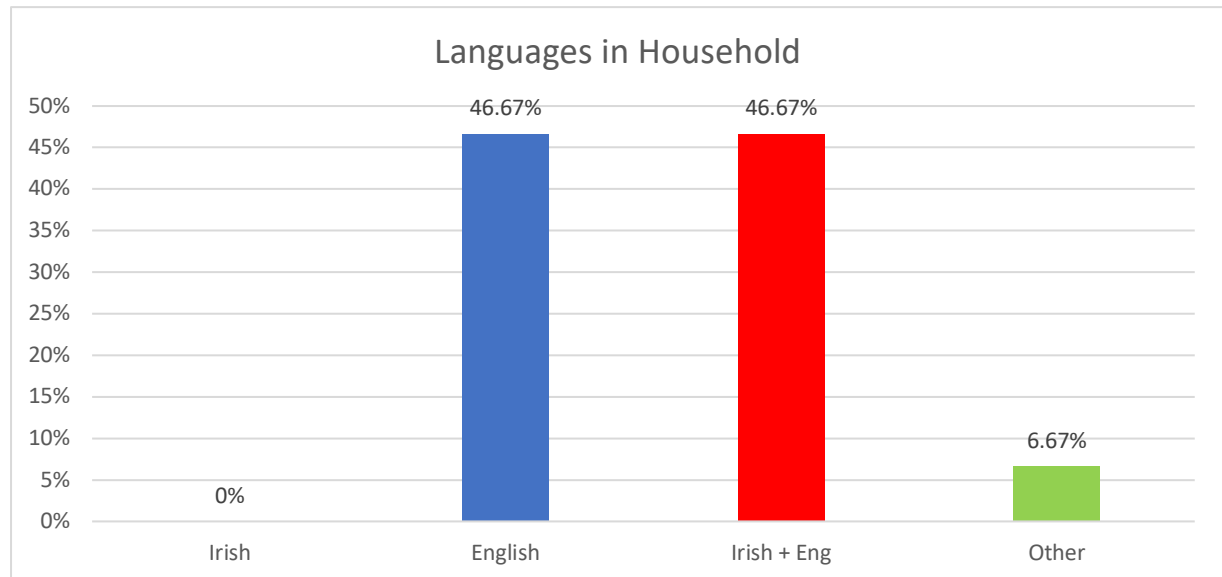


Figure 4.3.3 B: Languages spoken in households of participants

The most striking response from this question was that no participant who responded chose the option where they only spoke Irish. Instead, there is a nice balance between participants who chose English only and those who spoke both English and Irish (46.67%). The percentage of participants who chose another language is quite low, indicating that the majority of participants had both English and Irish as household languages.

C) Access to Speech & Language Therapy through Irish (N = 26) Q28 - If you have Irish as a home language, did you or the AAC user have access to Speech and Language Therapy through Irish?

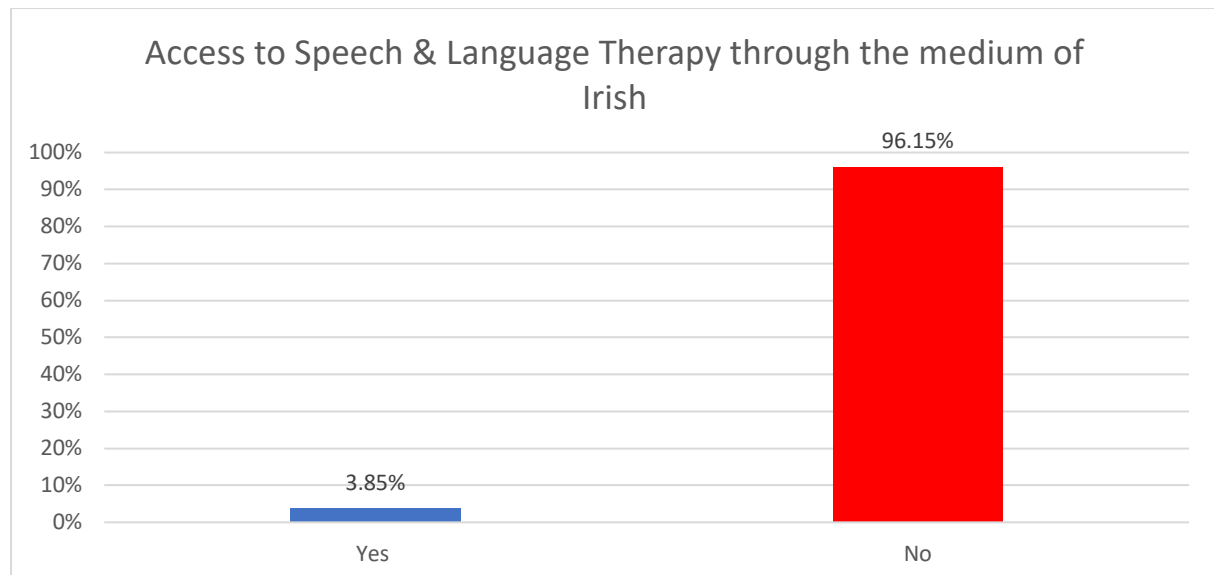


Figure 4.3.3 C: Access to Speech & Language Therapy through the medium of Irish for AAC users

This is one of the most striking responses, which is developed further in Chapter 5 in terms of gaining an understanding the reasons as to why people would be interested in accessing Speech and Language Therapy through the medium of Irish. The image above in Figure 4.3.3 C is so striking, where 96.15% of participants who responded noted that they did not have access to speech therapy through the medium of Irish. This response raises the question of whether the participants would have liked the opportunity to engage in Speech and Language Therapy in Irish, or whether they had requested it and been refused. Again, this issue is developed further in Chapter 5.

D) Interest in Irish AAC device (on current device & standalone device)(N = 29) Q31 - Which of the following options would you be interested in, regarding Irish language AAC? (all that apply)

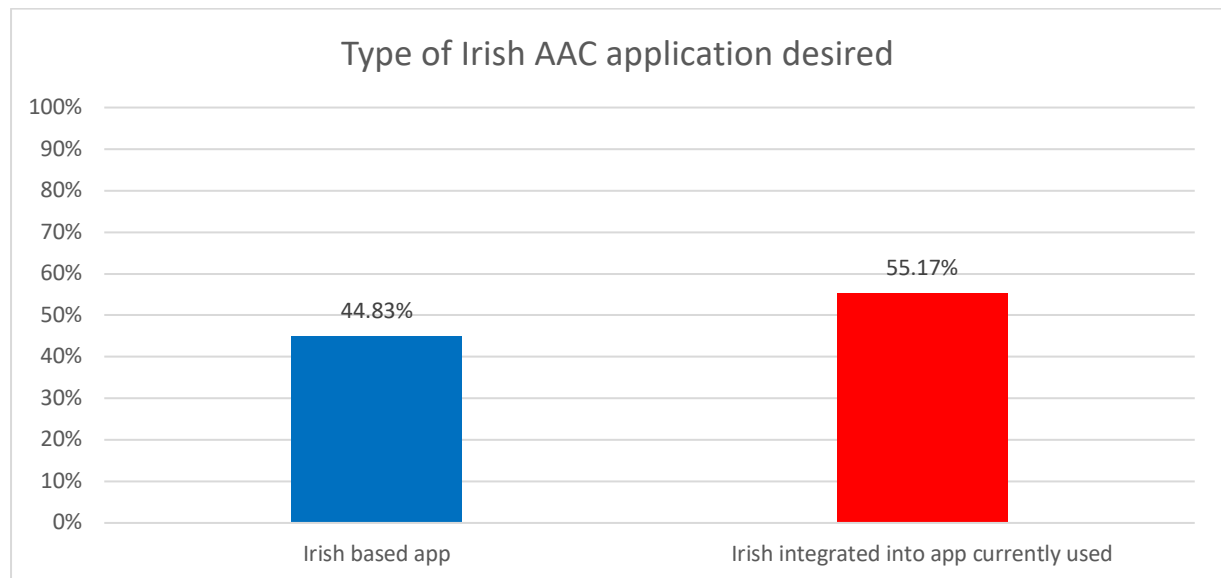


Figure 4.3.3 D: Type of Irish AAC based application desired by AAC users and communication partners

For participants who responded to the question noted above, there is a demand for both an Irish-based app (standalone Irish application) and to have Irish integrated into AAC users current devices. The option of having Irish integrated into existing AAC devices to be adapted for bilingual use (as opposed to having to learn how to use a new application) polls slightly higher at 55.17%, compared to 44.83% for a standalone Irish based application.

E) Reasons for Interest in Irish AAC (N = 25) Q32 - What are your reasons for being interested in an Irish AAC device? Please select all that apply.



Figure 4.3.3 E: Reasons for interest in Irish AAC access for AAC users and communication partners

F) Additional Reasons Given for Interest in Irish AAC (N =8) ('Other' option in Q32).



Figure 4.3.3 F: Additional reasons for opportunity to access Irish AAC

Delving into the main reasons as to why many participants were interested in Irish AAC systems being made available gives great insight into the cultural aspect of having Irish made more accessible in society, as well as tying in with participants' identity. 8% of participants who responded cited wanting Irish AAC because it's the home language of other family members, with 20% citing how the language is an integral part of who they are. For these participants, having access to Irish was crucial as it is a part of their identity. One response from a participant in Figure 4.3.3 F noted how they wanted to ensure they could pass the language on to the next generation ties into the cultural pride and importance of identity as cited above. Additional reasons such as having the ability to access the school curriculum and promoting the use of Irish for all members of society is noteworthy. This would indicate that much more work needs to be done to increase accessibility of the language for those with additional needs in educational settings.

4.4 Summary & Conclusion

These results give a broad insight into the lives of AAC users and their families and communication partners in Ireland in the present day. Some of the results were as expected, whereas others ran contrary to expectations and predictions set out in the previous chapter. Some interesting points include the fact that the majority of people who completed the survey had a diagnosis of ASD; that a high percentage of AAC users did not have access to a dedicated AAC device; that a significant majority did not have access to Speech and Language Therapy through Irish. Regarding the development of Irish AAC, the interest in integrated Irish Text-to-Speech and other elements of dedicated Irish AAC elements into users' existing devices seems to be the more popular option. Having access to technology like this would make engaging with their family and community easier, as well as being able to access school curriculums and being given the opportunity to learn the language with the support of Irish AAC.

Chapter 5: Results and Analysis of Survey: Open-ended Questions

5.1 Open-ended Questions

As structured in Chapter 4 when analysing the closed questions, the open-ended question results of the survey are presented to align with the two main research questions below;

Research Question 1: What are the grounds for which people are requesting Irish language AAC systems/speech-generating devices?

Research Question 2: What key features of AAC systems/speech-generating devices that are currently available would be useful to consider in designing a new Irish language AAC system/speech-generating device?

5.2 Reasoning behind selection of open-ended questions

When analysing the open-ended questions, the decision was made to focus on the most striking responses from the survey, given the scope of this thesis. The most prominent themes are dealt with here, building upon the closed-ended questions that surround them. The following themes give further insight into reasons why people have an interest in Irish AAC and the key factors that would need to be considered in the development of this technology.

5.3 : Barriers to communicating in Irish

A) Current experience with Irish as an AAC user (Q 34):is there anything else you would like to share about your experience with Irish as an AAC user?)

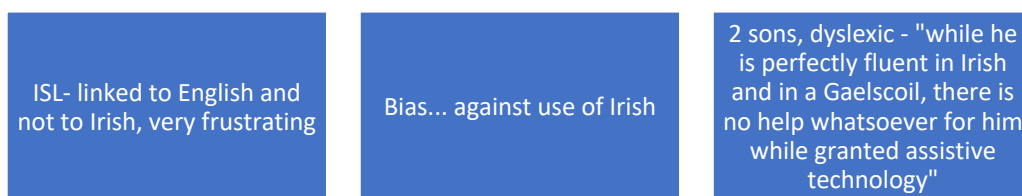


Figure 5.3 A: Barriers to communicating in Irish

B) Further barriers & insight into current experience with Irish as an AAC user (Q 33): what barriers have you faced when communicating through Irish (e.g. device doesn't 'speak' their language, no text prediction, no prestored words on AAC systems, can't spell well in this language, etc.) (comment box)

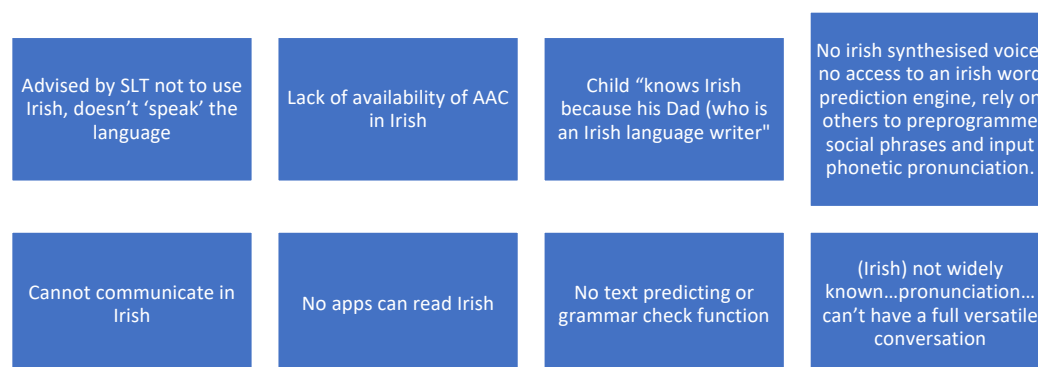


Figure 5.3 B: Additional barriers to communicating through Irish for AAC users

Figures 5.3 A & 5.3 B illustrate explicit examples of how AAC users and their families have faced barriers trying to engage with the Irish language and to communicate through Irish. It is disappointing to see that one participant's experience with a Speech and Language Therapist (SLT) saw them advised not to use Irish. This response is somewhat difficult to understand as further information is not given - whether it was a lack of adequate Irish language skills on the part of the SLT, or whether they the SLT did not deem the capabilities of their client to be sufficient to engage with Irish. Regardless it was an unexpected finding.

The lack of AAC in Irish is highlighted on a number of occasions as one of the main barriers for AAC users to communicate in Irish. One participant responded that there is "no Irish synthesised voice, no access to an Irish word-prediction engine" with the current AAC technology that is available to AAC users in Ireland. It could be the case that they are unaware of the work that ABAIR research group are conducting with the Text-to-Speech synthesiser (TTS), or that they are arguing more on the side of not being able to utilise ABAIR to its full extent without it being coupled to an AAC device. (The ABAIR research initiative at Trinity College Dublin has pioneered text-to-speech systems for the main Irish dialects, and these can be used on its website www.abair.ie)

C) Barriers to accessing Speech & Language Therapy through Irish (an “If no” extension to Q.30 on whether they had access to SLT through Irish): would you have liked to have had this opportunity? Why/why not? (SLT as Gaeilge)



Figure 5.3 C: Barriers to accessing Speech & Language Therapy support through the medium of Irish

Building upon the point made above about an SLT advising a participant not to use Irish, there is a response to this question by one participant to say that there is no Irish speaking SLT as it is not requested enough. This signifies a huge barrier of accessibility to the language. This could be likened to being a chicken-and-egg problem: it does not seem to be available, so people don’t request it, and hence the need for it becomes invisible.

One very striking view expressed by one participant was that it is more logical to focus on AAC in English as it will be “better to communicate with a much greater number of people”, citing the fact that not many people speak Irish even after having learned it in school. With this survey being anonymous there is no definite way to determine in what capacity this participant was responding to this survey, but it would be fair to speculate it was coming from the point of view from a parent. The assumption appears to be (for this participant) that Irish AAC would be useful in Gaeltacht areas but not in mainstream society. Note

however that this response was from a single participant and contrasts with the opinions of others who responded signalling very clearly that they wished to have access to Irish AAC.

Another (single) participant stated that it was difficult enough for them to gain access to SLT in English, and so can be assumed that after fighting so hard for access SLT in the dominant language of society that they would deem it a futile effort to try access it in a minority language. However, reading through the responses from others showed a determination for equal opportunity to access the language for the AAC user as for their siblings.

5.4 Key AAC Device Features & Considerations for Users

A) Existing features in AAC devices they would like to see in an Irish AAC based device (Q 19 for AAC users): what do you/does the AAC user like about the device/system you/they use?)

consistent layout, switch scanning, historically used semantic compaction system and moved to eco2	consistency of message	Ease of access, flexible to add new vocabulary, combination of text and prestored messages	Affordable, portable, mainstream platform
It makes everything easier	Ease of editing, ability to switch between devices and share pages, multiple support people	Ease of programming and updating everywhere	communicate more efficiently
[children's] device gives them a voice and a platform to express their wants and needs.	Fast and easy	fun voices to try out	voice output, keyboard access, folders of preferred characters and activities

Figure 5.4 A Elements of AAC device/systems that AAC users like

Ease of editing and access to prominent features were highly requested by survey participants for AAC users, offering opportunity for independent modelling. Examples of independent modelling includes having folders of preferred characters and activities and a “combination of text and prestored messages”. This helps to personalise the setup in the device to suit the individual user. Ensuring that Irish AAC technology is accessible is also considered important by participants as is ensuring that it is affordable for users and that it

is portable, so that it can be used in all social settings (e.g home, education, public service).

The fundamental importance of AAC technology is highlighted by one participant, where the child's device "gives them a voice and a platform to express their wants and needs."

Having speech output raises specific issues for Irish AAC provision. As a high proportion of users are children, there is a need for children's synthetic voices. Furthermore, a matter that is not directly mentioned, but which would be of importance would be the range of dialects that might be made available on an Irish AAC device: it would be important to allow for flexibility in choice of dialect. The inclusion of 'fun voices' as well would be important to include in AAC development, letting the user have a variety of voices to choose from and play around with. These questions stem from the need for the synthetic voice to be adapted to the AAC users, and are ones that would need to be borne in mind in current and future Irish text-to-speech systems by the ABAIR research group mentioned above.

B) Problematic aspects of current AAC device usage (Q 18 for AAC users: what difficulties do you/does the AAC user have with your/their device?)



Figure 5.4 B: Elements of AAC device/systems that AAC users do not like

Figure 5.4 B illustrates some of the elements considered by participants as important to address to ensure that Irish AAC works for users. The data indicates that multilingual AAC supports are not currently supported efficiently enough. According to one participant's experience, "needing different things with different languages" points to a realisation that

provision of a multilingual (or here, bilingual) facility is a complex matter. The critical need for Irish provision in AAC devices for those attending Irish-medium schooling (Gaelscoil) is highlighted along with the need for Irish language synthetic speech output. The need to personalise the speech patterns would encompass points raised above, such as having the possibility to store one's own stock of prepared phrases as well as the means of ensuring that the speaking (synthetic) voice is suited to the individual user (dialect, child voice etc.)

5.5 Summary & Conclusion

Separating the closed-ended questions and the open-ended questions for analysis allows for a more in-depth and elaborated insight into elements of AAC design and an explication of the reasons why participants had an interest in Irish AAC in particular. Further insight into the reasons why AAC users and their families did not have the opportunity to engage with Irish language-based Speech and Language Therapy was interesting to delve into, as well as understanding the barriers that are present in accessing support for Irish for AAC users in Ireland. It was also important to get further insight into the aspects of AAC technology that participants were in favour of and were not in favour of to take into account for the development of Irish AAC. These responses will be important to highlight the importance of having access to Irish AAC and to address many of the barriers currently faced by AAC users who want to engage with Irish. The following chapter will discuss both the quantitative and qualitative results relative to the research questions and with a view to proposing recommendations for future work.

Chapter 6: Discussion of Results

6.0 Introduction

This chapter presents an overall synthesis and discussion of the results and findings presented in chapters 4 and 5. The research questions below that were introduced in the Introduction chapter, which will help to guide this discussion;

Research Question 1: What are the grounds for which people are requesting Irish language AAC systems/speech-generating devices?

Research Question 2: What key features of AAC systems/speech-generating devices that are currently available would be useful to consider in designing a new Irish language AAC system/speech-generating device?

6.1 Participation Analysis

While it was heartening to discover that 130 people had engaged with the survey in some shape or form, it was disappointing to see that many of the participants did not complete the key section about developing AAC for the Irish language. This could be due to a number of factors; some may have engaged with the initial aspects of the survey but felt that they could not contribute to the section on Irish AAC, or, as is often the case, some may simply have been fatigued or busy, and simply given up. It could also be the case that those who were completing the survey in a professional capacity, such as a Speech and Language Therapist, felt that the space was not there for them to give a professional perspective on using AAC. The questions in the survey focused a lot on the individual using AAC and their communications partners, more than on the SLT assisting them and on getting a therapist's viewpoint on developing Irish AAC technology.

The survey results above indicated a high percentage of parents completing the survey on behalf of children (58.33%), with children under the age of 10 constituting a significant proportion of those who engage with AAC technology (39%). This gives an impression that a significant amount of AAC intervention and assessment is being conducted with younger members of society, connecting with early intervention approaches that are very popular in this area (Dada et al, 2020, Iacono et al, 2016, King et al, 2020). However, the balance of

other age groups engaging with this technology does affirm that AAC interventions are being utilised across the board, which is helpful when showing that all age groups could potentially benefit from Irish AAC technology. It was striking that 33.88% of participants cited Autism Spectrum Disorder (ASD) as the condition relevant to them or to the person on whose behalf they were filling out the survey. Clearly, AAC users with ASD can benefit from using AAC to support communication difficulties and to break down some barriers.

6.2 AAC Usage Analysis

This section of the discussion relates to the following research question:

Research Question 2: What key features of AAC systems/speech-generating devices that are currently available would be useful to consider in designing a new Irish language AAC system/speech-generating device?

For those who engaged with the question regarding the use of AAC devices, a substantial number of AAC users engaged with an AAC based application on a tablet (15.67%). However, the striking figure of the 32% of AAC users not using an AAC device raises questions about the current accessibility of AAC technology to people who engage with SLT assessment and interventions. One must wonder about the availability of devices offered to those who have a diagnosis, in keeping with the assessment of their condition. Research conducted by the NDA gives insight into the provision of such services in Ireland, noting that higher-tech Assistive Technology (AT) is mainly provided by specialist Non-Government Organisations (NGOs). However, referrals for such services come from therapy services and primary care and hospital services, such as Occupational Therapy (OT) and paediatrics (Cullen et.al, 2012). After the referral, the assessment carried out determines which application goes forward depending on its priority of need and urgency. Clarity about the provision of such services and assessment applications at a local level is currently unclear. This is further frustrated by additional ambiguity about the availability of funding and long waiting lists (Cullen et al, 2012). This indicates that for many waiting on an AAC assessment, they may qualify to use this technology, but due to external factors find themselves waiting a long period for confirmation on whether or not they qualify.

For those who were fortunate to have access to an AAC device, a wide variety of devices and applications were listed, showing that there is great choice available on the market that

can cater to different users' needs. This is where the role of the SLT and intervention team play a crucial role in the intervention process when selecting the most suitable device for their client, and where the importance of trying to cater to different users' needs can potentially prove to be challenging when developing Irish-based AAC technology. Ogletree's research supports this statement, where "the fit between a device or system and the communicative abilities and needs" (Ogletree et al., 2018) is supported by SLTs, Occupational Therapists (OT) and others involved in the assessment application process to determine where the client lies in terms of priority. It also can support Soto and Yu's work (2014) and McNaughton et al (2019)'s perspectives on placing the needs of the AAC user at the fore of the assessment process.

The results regarding the social situations in which AAC devices are most commonly used were as predicted, with the majority of users utilising the technology in the home (44.44%) and in education settings (25%). These settings are also potentially where the primary communication partners are based and where the AAC user can get additional support should they encounter communication difficulties or become overstimulated by their environment. This aligns with Iacono et al (2016) and Ronski and Sevcik (2018)'s findings on supporting the AAC user and their main communication partners around them, so that everyone has knowledge on how best to support the AAC user. The societal challenge therefore lies in ensuring that AAC device usage would be made more acceptable in other aspects of society, tying in the results from Figure 4.3.2 D that indicate more usage of AAC systems in the home (44%) and in educational settings (25%) than in public settings. This will hopefully include Irish AAC in the future, which can be addressed by working to educate the wider public on what is involved with AAC and how they can give general support to AAC users.

6.3 Irish AAC Needs Analysis

This section of the discussion addresses the following research question;

Research Question 1: What are the grounds for which people are requesting Irish language AAC systems/speech-generating devices?

The analysis conducted above gives a general insight into the lives of people using or engaging with AAC technology on a daily basis, which gives a good indication as to what would also be expected of an Irish-based AAC system. In terms of key elements that participants thought to be important to include were an Irish Text-to Speech synthesiser and Predictive text/word or phrase, with both at 17%. With the other elements also showing high interest (see Figure 4.4.3 A), 12% indicated that they would be in favour of all of the suggestions listed from the get go. This may seem like a small figure in the overall scheme of things, but this is still a substantial proportion of participants, showing that this should be explored in the future development. The interest in a standalone Irish AAC application is slightly lower (44.83%) compared to Irish AAC elements being integrated into the current devices being used by participants (55.17%). This indicates that these AAC users are comfortable with the technology they currently use and simply want the additional element of being able to access core vocabulary and phrase folders that they can model Irish as easily as they do English. Additionally, the interest in ensuring that the device is fast and accessible, which would include the device or application in question being affordable and portable so that it can be used in a multitude of settings is important to note for future research and development.

The open-ended questions offered additional insight into the reasons why such technology would be useful in the context of the Irish language and in the overall provision of support for those wanting to communicate through the medium of Irish. The biggest overall theme that emerged was that such technology could offer a way to break down barriers to being able to engage with the language, where younger members of an Irish-speaking community can have an “equal opportunity” to engage with the language as siblings, friends and family members. The recent research undertaken by Stewart (2017) and Collin Stone (2019) offers support to developing Irish language AAC, which can offer the opportunity for AAC users to engage with Irish as a first language or a second language, through the means of AAC technology. The phrase “equal opportunity” is incredibly striking, indicating that the barriers for AAC users to engage with Irish are stacked against them, where the likes of AAC technology could offer them the same opportunity to engage with cultural links within the community and affirm their cultural and linguistic identity (Collin Stone, 2019).

6.4 Speech and Language Therapy in Irish

This section addresses Research Question 1, building upon the points made in section 6.3. The interest in accessing Speech and Language Therapy through the medium of Irish was highlighted, especially with the stark figure that saw over 96.15% of participants note that they did not have access to SLT through the medium of Irish. The IASLT position paper released in 2019 cited the difficulty in acquiring SLTs with the additional language skills that would allow them to conduct effective Speech and Language Therapy through the medium of Irish due to a lack of resources being available (IASLT, 2019), including having access to an interpreter that could help assist with making bilingual intervention prominent in Ireland (La Morgia, 2018). However, connected with the difficulty in acquiring SLTs with sufficient language skills, the ability to acquire interpreters that fully comprehend the AAC assessment process is impeded due to a lack of funding, showing that the investment in AAC intervention needs to be significantly boosted to address such issues.

Interestingly, where other participants appeared hopeful of Irish-based SLT being made available in the future, one participant stated that they did not see the use of engaging in Irish SLT and would concentrate on English-based SLT as it would prove “better to communicate with a much greater number of people.” This would suggest that they did not see the benefit of having Irish-based SLT when they did not come from an Irish speaking background or see it being beneficial to the AAC user in their lifetime. Another participant noted that it was difficult enough to gain access to SLT in English, it can be assumed that after fighting so hard for access in the dominant language of society that it would be deemed a futile effort to try access it in a minority language. Cognisant of the points made regarding the provision of AAC technology in Ireland being influenced by external factors (Cullen et al, 2012), it seems to also be the case that getting the initial referral for SLT in English is challenging, let alone trying to access it in another language. These issues surrounding the provision of appropriate SLT through the medium of Irish need to be addressed in the future so that Irish AAC technology can be properly integrated into the assessment and intervention processes conducted by SLTs in Ireland.

Finally, to build upon some of the participants’ reasons and interest in accessing Irish AAC, 8% of participants cited the reason being that it was the home language of other family

members, whereas 20% of participants indicated that it was an essential part of who they were, highlighting the strong identity links to the language (Collin Stone, 2019), which is similar to what was expected by the researcher. Additionally, statements made about the importance of having the language in the home to help with “passing on the language, despite not having grown up with the language” reemphasises the strong links to identity and local communities. It was cited on multiple occasions that having access to Assistive Technology (AT), such as Irish AAC, would make the ability to access the school curriculum easier and increase accessibility in the classroom (Tynan, 2018). This highlights the opportunity that is available through using AAC technology to have the opportunity to engage in Irish.

6.5 Summary and Conclusion

With a wide ranging demographic using AAC technology and a variety of devices being utilised across the spectrum of AAC intervention, it is imperative that the future development of Irish AAC takes the opinions and views of the AAC users into account to ensure that they have all of the key elements included in the new technology. Noting the key reasons as to why AAC users and their communication partners are interested in Irish-based AAC technology, the importance of respecting ones’ cultural ties to the language and it being a central part of a persons’ identity is important to ensure that the technology can cater to their involvement in family and local community life. However, this is only a glimpse into the AAC Users and allies community in Ireland, with more work needed to understand how each branch of the community, SLTs, communication partners and AAC users to name but a few, can contribute further to ensure that the development of this technology can be a success. The next chapter will identify key recommendations for future research and possible research pathways.

Chapter 7: Conclusion

7.0 Introduction

The previous chapter presented a discussion of the synthesised and most relevant findings with respect to the research questions set out in the introductory chapter.

Research Question 1: What are the grounds for which people are requesting Irish language AAC systems/speech-generating devices?

Research Question 2: What key features of AAC systems/speech-generating devices that are currently available would be useful to consider in designing a new Irish language AAC system/speech-generating device?

This concluding chapter will note some of the most striking findings from the survey, taking the limitations of the survey into account. Future research and possible research pathways will then be discussed, concluding with the final main thoughts on the feasibility of developing Irish AAC technology in the near future.

7.1 Striking Findings

- 20% of participants who responded indicated that they wanted access to Irish AAC because it is the home language of other family members, while 20% indicated that the language is an integral part of their identity.
- The interest in a standalone Irish AAC application is slightly lower (44.83%) compared to Irish AAC elements being integrated into the current devices being used by participants (55.17%).
- The inclusion of an Irish Text-to-Speech Synthesiser and Predictive text/word or phrase prompting polled the highest at 17% as the most important elements to include in an Irish AAC device.
- Ensuring that any development of Irish AAC technology is easily accessible, affordable and portable hold high priority for AAC users and their communication partners.
- There is a high percentage of AAC users who utilise the technology in the home (44%), with educational settings following this at 25% of participants who responded to this question.

7.2 Limitations attached to the analysis

Due to the fact that the survey was only provided in English, this could be interpreted as being biased in favour of “those with English skills, literacy skills ... have a level of professional support” (Tönsing et al., 2019). Since this is aimed at understanding the demand for Irish AAC, it could also be interpreted as biased in favour of those who may come from Irish-speaking backgrounds with a high level of English skills. With the time limit to complete this research, offering the survey in both English and Irish was not feasible at the time. However, this can be incorporated into future research plans to ensure there is a more equitable bilingual approach.

The time constraints attached to the survey meant that only the most prominent information could then be interpreted in the results section. It also meant that the ability to have a hard copy of the survey available or to have the ability to supervise those doing the survey in person alongside face-to-face interviews was not possible, as this research was conducted during the height of the Covid-19 pandemic. However, even with such a limitation, good data was extracted from the dataset at hand, which one would hope would be amplified had the opportunity been available to conduct this research with a face-to-face element.

Another number of limitations were raised by some participants of the survey that will be noted for future survey work and future consultation with AAC users, allies and SLTs when progressing this research in the future. There was an issue where the published survey had questions where choosing multiple options was listed in the questions but the survey software itself only allowed for once choice to be made, which may have had an impact on some of the results. This feedback will prove useful for compiling more dedicated survey work for particular people, such as SLT-based survey work.

7.3 Future Work

This survey is only the beginning in establishing future research and development for Irish language Assistive Technology and AAC technology in the future. Following steps will include further consultation with the different stakeholders in the area of AAC intervention and assessment, with each consultation having a more refined focus than the general aims

initially acquired via this survey. Such consultations will be useful to develop the initial data uncovered via the survey, and can be conducted at different intervals of the development of an Irish AAC system.

Attempting to integrate the TTS synthesis work developed by the Abair.ie team will most likely be the most tedious part of the project, seeing a lot of trial and error. Examining the intricacies of these systems and attempting to understand whether or not certain elements, such as the independent modelling boards, can actually transfer easily into another language with another grammatical and contextual structure. The other element of experimentation is to see if it is possible to merge the synthesiser into the existing technology. While the technological aspects do indeed take a huge role in the future development of Irish AAC systems, the important links to culture and language will need to be taken into account, similar to the research conducted by Collin Stone (2019) on the re Maori in New Zealand.

The opportunity to test prototypes with subjects from the various stakeholder groups could potentially be the best way to ensure that the AAC development is applicable to different demographics and can be applicable to various diagnoses as well.

7.4 Conclusion

This initial needs analysis survey paves the way for further important research in the Irish context and shows an explicit interest in making the Irish language more accessible and inclusive. The data indicates that there is a significant interest within AAC user and allies' circles to access such a resource so that every opportunity is provided for those who need this technology to fulfil their potential in society.

Having this information allows us to plan and pave multiple pathways for users, which is an incredibly exciting concept. The research in some ways raises even more questions. Will it be a simple case of mapping over communication boards for Irish, can we just incorporate the abair.ie TTS synthesiser directly into the likes of LAMP or Coughdrop? Will there be buy-in from key stakeholders, such as SLTs, parents, teachers, sports coaches?

The importance of recognising the cultural and community links to the language will hopefully shape future research and will break down barriers in terms of the accessibility of Irish for those learning the language, such as those who have the language in their home but have not had equal opportunity to engage in the language. It also offers the opportunity to contribute to international research in AAC technology and minority languages using such methods to see their language grow and continue as a living language.

This research is a first step to addressing one of the most prominent barriers in any language-communication. By offering alternative and accessible ways for people with speech difficulties and challenges to communicate, this broadens the diversity of communities and offers great insight into how research and government policies can be conducted and implemented to ensure that those possibly seen as outliers in Irish language communities will be afforded the same opportunity to immerse themselves in the Irish language in their daily lives.

Word Count: 16,770

References

- AHEAD. (2017). Universal Design for Learning. AHEAD Ireland. Retrieved 30 July from <https://www.ahead.ie/udl>
- Aronin, L., & Ó Laoire, M. (2013). The material culture of multilingualism: Moving beyond the linguistic landscape. *International Journal of Multilingualism*, 10(3), 225-235.
- ASHA. (2021). Augmentative and Alternative Communication (Practice Portal). Retrieved 18 May from https://www.asha.org/practice-portal/professional-issues/augmentative-and-alternative-communication/#collapse_4
- AssistiveWare. (2021). An introduction to Augmentative and Alternative Communication (AAC). What is AAC and who is it for? What are the different types of AAC? What are the benefits of AAC? Retrieved 20 May 2021 from <https://www.assistiveware.com/learn-aac/what-is-aac>
- Breathnach, T. , (2021, July 29), Caomhán Mac Con Iomaire, Tuismitheoir, agus Muireann Nic Corcráin, Mac Léinn Máistreacht – cumarsáid bhreisitheach nó malartach (AAC). RTÉ Raidió na Gaeltachta, <https://www.rte.ie/radio/rnag/clips/21987811/>
- Byrne, Á., Pyne, J., & Sheehan, V. (2019). Use of key word signing for children and adults with intellectual disability in an Irish context. *Tizard Learning Disability Review*, 24(3), 113-120. <https://doi.org/10.1108/tldr-07-2018-0023>
- Census 2016 Summary Results (2016). Central Statistics Office
- Collin Stone, B. (2019) *Ko tōku reo tōku ohooho : towards culturally located te reo Māori augmentative and alternative communication*. Master's Thesis, Speech and Language Sciences, University of Canterbury. Available at <https://ir.canterbury.ac.nz/handle/10092/16961>
- [Article 8, Constitution of Ireland \(last amended June 2004\) \[Ireland\], 1 July 1937, available at: https://www.refworld.org/docid/47a70815d.html \[accessed 29 September 2021\]](https://www.refworld.org/docid/47a70815d.html)
- Constitution of the Republic of South Africa (1996), 1996 Rule Number: Act 108, Section 6[1]
- *CoughDrop*. Retrieved 12 July 2021 from <https://www.mycoughdrop.com/example/keyboard>
- Cullen, K., McAnaney, D., Dolphin, C., Delaney, S., Stapleton, P. (2012) 'Research on the Provision of Assistive Technology in Ireland and other countries to support independent living across the life cycle
- Dada, S., Flores, C., Bastable, K., & Schlosser, R. W. (2020). The effects of augmentative and alternative communication interventions on the receptive language skills of children with developmental disabilities: A scoping review. *International journal of speech-language pathology*, 1-11. <https://doi.org/https://doi.org/10.1080/17549507.2020.1797165>
- Darmody, M., & Smyth, E. (2016). Profile of second-level students exempt from studying Irish. <https://www.econstor.eu/bitstream/10419/174260/1/WP527.pdf>
- Doherty, A., Bracken, M., & Gormley, L. (2018). Teaching children with autism to initiate and respond to peer mands using picture exchange communication system (PECS). *Behavior analysis in practice*, 11(4), 279-288. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6269386/pdf/40617_2018_Article_311.pdf
- DOLLY, A., & NOBLE, E. (2018). 'Lámh Signs Combined'-Investigating a Whole School Approach to Augmentative and Alternative Communication (AAC) Intervention Through Research in Practice. *Reach*, 31(1).

- Faldt, A., Fabian, H., Thunberg, G., & Lucas, S. (2020). "All of a sudden we noticed a difference at home too": parents' perception of a parent-focused early communication and AAC intervention for toddlers. *Augment Altern Commun*, 36(3), 143-154. <https://doi.org/10.1080/07434618.2020.1811757>
- Gaeloideachais, 2021. Retrieved 20 August, 2021 from <https://gaeloideachas.ie/i-am-a-researcher/statistics/>
- Ganz, J. B. (2015). AAC Interventions for Individuals with Autism Spectrum Disorders: State of the Science and Future Research Directions. *Augment Altern Commun*, 31(3), 203-214. <https://doi.org/10.3109/07434618.2015.1047532>
- Ganz, J. B., Morin, K. L., Foster, M. J., Vannest, K. J., Genc Tosun, D., Gregori, E. V., & Gerow, S. L. (2017). High-technology augmentative and alternative communication for individuals with intellectual and developmental disabilities and complex communication needs: a meta-analysis. *Augment Altern Commun*, 33(4), 224-238. <https://doi.org/10.1080/07434618.2017.1373855>
- Gillespie-Smith, K., & Fletcher-Watson, S. (2014). Designing AAC systems for children with autism: evidence from eye tracking research. *Augment Altern Commun*, 30(2), 160-171. <https://doi.org/10.3109/07434618.2014.905635>
- The Constitution of the Republic of South Africa (1996), 1996 Rule Number: Act 108, Section 6[1]
- Hall, R. (2020). *Mixing Methods in Social Research: Qualitative, Quantitative and Combined Methods*. Sage.
- Harmon, A.C., Schlosser, R.W. , Gygi, B., Shane, H.C. ,Kong,Y., Book, L., Macduff, K., & Hearn, E., (2014) Effects of Environmental Sounds on the Guessability of Animated Graphic Symbols, *Augmentative and Alternative Communication*, 30:4, 298-313, DOI: [10.3109/07434618.2014.966206](https://doi.org/10.3109/07434618.2014.966206)
- Hennink, M., Hutter, I., & Bailey, A. (2020). *Qualitative research methods*. Sage.
- Holyfield, C., Light, J., Mcnaughton, D., Caron, J., Drager, K., & Pope, L. (2020). Effect of AAC technology with dynamic text on the single-word recognition of adults with intellectual and developmental disabilities. *International journal of speech-language pathology*, 22(2), 129-140. <https://doi.org/https://doi.org/10.1080/17549507.2019.1619836>
- Iacono, T., Trembath, D., & Erickson, S. (2016). The role of augmentative and alternative communication for children with autism: current status and future trends. *Neuropsychiatr Dis Treat*, 12, 2349-2361. <https://doi.org/10.2147/NDT.S95967>
- Irish Association of Speech and Language Therapists (IASLT)(2016), *Guidelines for Speech and Language Therapists Working with Linguistically Diverse Service Users*, Dublin: IASLT.
- Irish Association of Speech and Language Therapists (IASLT) IASLT. (2019). *Speech and language therapy service provision for adults with an intellectual disability and communication needs: Definition, Service Provision and Recommendations for Change*.
- Ireland, C. O. (1945). *Bunreacht na hÉireann: Constitution of Ireland*. Government publications sale Office.
- Ivy, S., Robbins, A., & Kerr, M. G. (2020). Adapted Picture Exchange Communication System using tangible symbols for young learners with significant multiple disabilities. *Augment Altern Commun*, 36(3), 166-178. <https://doi.org/10.1080/07434618.2020.1826051>
- King, M., Ronski, M., & Sevcik, R. A. (2020). Growing up with AAC in the digital age: a longitudinal profile of communication across contexts from toddler to teen. *Augmentative and Alternative Communication*, 36(2), 128-141. <https://www.tandfonline.com/doi/full/10.1080/07434618.2020.1782988>

- LA MORGIA, F. (2018). Towards a Better Understanding of Bilingualism: Considerations for Teachers of Children with Speech, Language and Communication Needs. *Reach*, 31(1).
- *LAMP Words For Life*. Retrieved 12 July 2021 from <https://lampwflapp.com/>
- Laubscher, E., & Light, J. (2020). Core vocabulary lists for young children and considerations for early language development: a narrative review. *Augment Altern Commun*, 36(1), 43-53. <https://doi.org/10.1080/07434618.2020.1737964>
- Lynch, Y., Murray, J., Moulam, L., Meredith, S., Goldbart, J., Smith, M., Batorowicz, B., Randall, N., & Judge, S. (2019). Decision-making in communication aid recommendations in the UK: cultural and contextual influencers. *Augment Altern Commun*, 35(3), 180-192. <https://doi.org/10.1080/07434618.2019.1599066>
- McNamara, E. (2018). Bilingualism, augmentative and alternative communication, and equity: Making a case for people with complex communication needs. *Perspectives of the ASHA Special Interest Groups*, 3(12), 138-145.
- McNaughton, D., Light, J., Beukelman, D. R., Klein, C., Nieder, D., & Nazareth, G. (2019). Building capacity in AAC: A person-centred approach to supporting participation by people with complex communication needs. *Augmentative and Alternative Communication*, 35(1), 56-68. <https://www.tandfonline.com/doi/full/10.1080/07434618.2018.1556731>
- Mngomezulu, J., Tonsing, K. M., Dada, S., & Bokaba, N. B. (2019). Determining a Zulu core vocabulary for children who use augmentative and alternative communication. *Augment Altern Commun*, 35(4), 274-284. <https://doi.org/10.1080/07434618.2019.1692902>
- Muharib, R., Alzrayer, N. M., Wood, C. L., & Voggt, A. P. (2019). Backward chaining and speech-output technologies to enhance functional communication skills of children with autism spectrum disorder and developmental disabilities. *Augment Altern Commun*, 35(4), 251-262. <https://doi.org/10.1080/07434618.2019.1704433>
- Nic Aindriú, S., Ó Duibhir, P., & Travers, J., (2020): The prevalence and types of special educational needs in Irish immersion primary schools in the Republic of Ireland, *European Journal of Special Needs Education*, DOI: 10.1080/08856257.2020.1732109
- Nic Gabhann, D. 2008. "Survey of Special Education Needs in Gaelscoileanna, 2006–7". In Barrett, M. (2016). *Exploring Special Educational Needs Provision and Practices across Gaelscoileanna and Gaeltacht Primary Schools in the Republic of Ireland*. <http://www.cogg.ie/wp-content/uploads/doras-feas-fiafrai.pdf>
- Official Languages Act (2003). <http://www.irishstatutebook.ie/eli/2003/act/32/enacted/en/pdf>
- Ó Laoire, M. (2013). Tuarascáil ar an Díonlúine i leith na Gaeilge mar Ábhar Iar-bhunscoile.
- O'Neill, S. J., Smyth, S., Smeaton, A., & O'Connor, N. E. (2020). Assistive technology: Understanding the needs and experiences of individuals with autism spectrum disorder and/or intellectual disability in Ireland and the UK. *Assist Technol*, 32(5), 251-259. <https://doi.org/10.1080/10400435.2018.1535526>
- O'Toole, C., Ní Shíthigh, D., Molamphy, A., & Walsh, E. (2020). Findings from the first phase of developing a receptive vocabulary test for the Irish language. *International Journal of Bilingualism*, 24(4), 572-587.
- O'Toole, C., Ní Shíthigh, D., Molamphy, A., & Walsh, E. (2020). Findings from the first phase of developing a receptive vocabulary test for the Irish language. *International Journal of Bilingualism*, 24(4), 572-587.
- Ogletree, B. T., McMurry, S., Schmidt, M., & Evans, K. (2018). The Changing World of Augmentative and Alternative Communication (AAC): Examining Three Realities Faced by

Today's AAC Provider. Perspectives of the ASHA Special Interest Groups, 3(12), 113-122.
<https://doi.org/10.1044/persp3.SIG12.113>

- Ronski, M., & Sevcik, R. A. (2018). The complexities of AAC intervention research: emerging trends to consider. *Augmentative and Alternative Communication*, 34(4), 258-264.
<https://www.tandfonline.com/doi/full/10.1080/07434618.2018.1526319>
- Part 8: Service Delivery and Outcome Research. (2019). *Technology and Disability*, 31(s1), 165-176. <https://doi.org/10.3233/tad-190011>
- Soto, G., & Cooper, B. (2021). An early Spanish vocabulary for children who use AAC: developmental and linguistic considerations. *Augment Altern Commun*, 1-21.
<https://doi.org/10.1080/07434618.2021.1881822>
- Soto, G., & Yu, B. (2014). Considerations for the provision of services to bilingual children who use augmentative and alternative communication. *Augmentative and Alternative Communication*, 30(1), 83-92.
<https://www.tandfonline.com/doi/pdf/10.3109/07434618.2013.878751?needAccess=true>
- Stewart, C. A. (2017). BILINGUAL AAC INTERVENTION University of Colorado].
- Stone, B. C. (2019). Ko tōku reo tōku ohooho: towards culturally located te reo Māori augmentative and alternative communication.
- Tager-Flusberg, H., Rogers, S., Cooper, J., Landa, R., Lord, C., Paul, R., Rice, M., Stoel-Gammon, C., Wetherby, A., & Yoder, P. (2009). Defining Spoken Language Benchmarks and Selecting Measures of Expressive Language Development for Young Children With Autism Spectrum Disorders. *Journal of Speech, Language, and Hearing Research*, 52(3), 643-652.
[https://doi.org/10.1044/1092-4388\(2009/08-0136\)](https://doi.org/10.1044/1092-4388(2009/08-0136))
- Tonsing, K. M., & Soto, G. (2020). Multilingualism and augmentative and alternative communication: examining language ideology and resulting practices. *Augment Altern Commun*, 36(3), 190-201. <https://doi.org/10.1080/07434618.2020.1811761>
- Tönsing, K. M., Van Niekerk, K., Wilken, I., & Schlünz, G. (2019). Multilingualism and augmentative and alternative communication in South Africa—Exploring the views of persons with complex communication needs. *African journal of disability*, 8(1), 1-13.
- TYNAN, F. (2018). Exemptions from Irish: An Inclusion Dilemma. *Reach*, 31(1).
- Unsworth, S. (2016). Early child L2 acquisition: Age or input effects? Neither, or both? *Journal of child language*, 43(3), 608-634.
- Valencia, S., Pavel, A., Santa Maria, J., Yu, S., Bigham, J. P., & Admoni, H. (2020). Conversational Agency in Augmentative and Alternative Communication Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems.

Appendices

Appendix A: Letter to Core Advisory Group (Proxy Gatekeepers in some cases)

‘AAC don Ghaeilge’: A need analysis survey for the development of Irish language augmentative communication devices for people with speech difficulties

I would like to invite you to assist me in conducting a research survey into the needs for an Irish language augmentative communication device. The survey is available at:

https://tcdecon.qualtrics.com/jfe/form/SV_d3TaXkpl4HMrqGG

Before you decide, you will need an explanation as to why the research is being done and what it would involve for you and for the participants. Please take time to read the following information carefully. Please do not hesitate to get in touch with any questions you may have if anything you read is not clear or if you would like more information.

WHAT THIS STUDY IS ABOUT

Information about this survey and its motivation are contained in plain text and audio version at <https://linktr.ee/MuireannNicC>. The aim of this survey is to conduct an initial needs analysis on the demand of an augmentative and alternative communication (AAC) device that will allow the user to communicate through the medium of Irish. There are quite a wide variety of AAC devices in use in Ireland for various purposes and by people with various conditions (e.g ASD, Cerebral Palsy, stroke) that allows the user to communicate, or to aid their speech. From the research that has been done to date, there is no dedicated AAC device, or bilingual AAC device that caters to Irish speakers.

This anonymised needs analysis survey will form the basis of the principal investigators’ dissertation project to fulfil the coursework requirement for the M.Phil in Speech and Language Processing. The principal investigator for this study is Muireann Nic Corcráin, who is undertaking an M.Phil in Speech and Language Processing in Trinity College Dublin under the supervision of Prof. Ailbhe Ní Chasaide.

WHAT I NEED YOUR ASSISTANCE WITH

There are a few ways in which you could help in carrying out this survey.

(i) We would be grateful if you would be willing to distribute this needs analysis survey (https://tcdecon.qualtrics.com/jfe/form/SV_d3TaXkpl4HMrqGG) as well as the information regarding it in accessible formats (<https://linktr.ee/MuireannNicC> provides in both a plain-text format and an audio version) to any potential participant or to anyone who might be interested in carrying out this survey on behalf of an AAC user.

(ii) In the case where you are an AAC user, we would be grateful if you would carry out the survey.

(iii) In the case that you are a parent/relative/carer/therapist who is connected to an AAC user over 18 years of age, we would be grateful if you could ask them to complete the survey/assist them in completing the survey.

(iv) In the case that you are a parent/relative/carer/therapist who is connected to an AAC user under 18 years of age, we would be grateful if you could complete the survey on their behalf.

If anyone would like to contact the principal investigator, they should email Muireann Nic Corcráin at niccorcm@tcd.ie directly with any further queries.

We hope to have at least 100-130 participants, which will include those contacted by the core advisory group, as well as those who respond to invitations in AAC User Facebook groups (private groups), and/or parents/family/guardians/ Speech and Language Therapists who participate on behalf of AAC users.

Inclusion criteria: Users of AAC devices, people who are parents/family/guardians/ Speech and Language Therapists who may respond on behalf of users of AAC devices (including users under the age of 18).

Exclusion criteria: Children under the age of 18.

WHAT TAKING PART IN THE SURVEY WILL INVOLVE?

Participants will be asked to take part in an anonymous survey about their experience of AAC devices and technology, either as an AAC user or on behalf of someone who uses AAC technology. The survey will take approximately 15 minutes to complete. The survey is split into three parts: (i) initial background information, (ii) current AAC usage and reasons for engaging with this type of technology and (iii) their interest in dedicated Irish language AAC technology.

Participation in the survey is voluntary and participants are free to withdraw at any time. This research is crucial to identifying the features that would be deemed essential by AAC users in an Irish language (or bilingual Irish-English) AAC facility. The aim is to enable AAC users to communicate in their native language and assist those in Irish-medium education to be able to engage with the language and continue with their language acquisition and educational development.

WHO WILL HAVE ACCESS TO DATA FROM RESEARCH?

The survey data will be confidential and anonymous. This survey returns will only be viewed by the principal investigator and the researchers mentioned on page 2. Secure zipped data files, SPSS datasets and graphs will be collected in a Zipped folder with a password and stored by the Principal Investigator. For questions or concerns about data processing, please contact dataprotection@tcd.ie.

WHAT WILL HAPPEN TO THE RESULTS OF THE STUDY?

The survey will be live until 5pm on August 1st 2021, with the data to be collated and reported in the dissertation of the principal investigator by September 2021. This report will hopefully help form the basis of further research into the development of Irish language based AAC devices in the Speech and Phonetics Laboratory in Trinity College Dublin.

WHO SHOULD YOU CONTACT FOR FURTHER INFORMATION?

Principal Investigator:

Muireann Nic Corcráin (M.Phil Speech & Language Processing, Trinity College Dublin)

0871622448 & niccorcm@tcd.ie

Academic Supervisor:

Prof. Ailbhe Ní Chasaide (Professor in Phonetics, Trinity College Dublin)

anichsid@tcd.ie

Go raibh míle maith agaibh! Thank you very much!

Appendix B: Social Media Message

Social Media Platforms Message:

Hi everyone, my name is Muireann Nic Corcráin and I'm currently undertaking a research project as part of my Masters in Speech and Language Processing in Trinity College Dublin. For my research project I am conducting a needs analysis on the demand of augmentative and alternative communication (AAC) devices and systems that will allow the user to communicate through the medium of Irish. An AAC device/system gives someone the ability to communicate by using pictures to form sentences which are then spoken out by a text-to-speech synthesis system. Currently widely used systems for English are Coughdrop or LAMP. AAC devices help a person with significant communication challenges communicate more effectively. However, there is currently no version that supports Irish language speech generation for those who want to communicate in Irish.

Survey link https://tcdecon.qualtrics.com/jfe/form/SV_d3TaXkpl4HMrqGG

Note that the survey begins with information about the research for the participant, and requests that the participant consents to carrying out the survey.

Participant Information in accessible formats: <https://linktr.ee/MuireannNicC>

If you have any questions about the survey or the background information as to why this survey is being conducted, you can contact myself at niccorcm@tcd.ie or my supervisor, Prof. Ailbhe Ní Chasaide at anichsid@tcd.ie.

Appendix C: Survey Questions which incorporate Participant Information and Consent

Introduction

- Thank you for your interest in our research. The aim of this study is to gather information that will help in the development of an Irish language Augmentative and Alternative Communication (AAC) system. The system will allow users to communicate in Irish using an Irish language Text-to-Speech (TTS) synthesiser that has been developed by the ABAIR team in the Phonetics and Speech Lab in the School of Linguistic, Speech and Communication Studies, Trinity College Dublin. This survey will take approximately 15 minutes to complete. The information you provide in this survey will not be presented in a way that can be identified to you. If you would like to stay in contact and hear about this project as it develops, or if you have any questions, please contact Muireann Nic Corcráin at niccorcm@tcd.ie or Dr. Ailbhe Ní Chasaide at ANICHSID@tcd.ie.

- A Plain Text version of this Participant Information Leaflet and an audio recording of the Participant Information Leaflet are available at this link: <https://linktr.ee/MuireannNicC>

Part 1 - The Study

Why is this study being done?

We are doing this study to inform the work of developing an Irish language augmentative communication systems, commonly known as 'AAC' systems. Augmentative (in addition to) and Alternative (instead of) Communication (AAC) is any method (device, system, or technique) that helps a person with significant communication challenges communicate more effectively. Examples would include a student using his or her communication system to answer a question in class (PECs, LAMP etc.), someone pointing to a picture of food on the menu at a restaurant, or at home, an adult using an AAC device to call his or her doctor. This project is being carried out as part of an M.Phil Speech and Language Processing Dissertation Project.

Why have I been invited to take part in this study?

You have been invited to take part because you are a Speech and Language Therapist who may have an interest in the development of an Irish language AAC device, a parent/guardian

of a school-going child who uses an AAC device, an independent AAC user. We aim to have approximately 130 participants in this study.

Do I have to take part in this? Can I withdraw from this study?

You don't have to take part in this study. It is up to you to decide whether or not to take part. If you decide not to take part it won't affect your current or future opportunities to be involved in studies in the future.

What happens if I change my mind?

You can change your mind at any time by contacting Muireann Nic Corcráin at niccorcm@tcd.ie.

If you choose not to continue to take part, this will not affect your opportunity to participate in research in this area in the future.

What will happen if I decide to take part? What do I have to do?

If you decide to take part you will be invited to do a 15-minute online survey which will ask you to provide your opinion on developing an Irish language augmentative communication system interface. The survey has been run through an accessibility checker to ensure that the survey interface and questions are made as accessible as possible for those who wish to participate.

Are there benefits for me to take part in this study?

Taking part in this study will not directly benefit you. However, research using your data and information may help us to better understand the current market for AAC devices in Ireland.

Are there any risks to me taking part in this study?

No risk will come to the individual. All information from participants will be anonymised, so that no opportunity to identify an individual may occur.

Part 2 - Data Protection

How will my data be used in this study?

Data from this research project may be published in future in scientific/medical/linguistic/educational journals. Note that the survey is anonymous and that no personal data is elicited.

Part 3 - Costs, Funding and Approval

Has this study been approved by a Research Ethics Committee?

Yes, this study has been approved by the Research Ethics Committee of the School of Linguistic, Speech & Communication Sciences.

Who is organising and funding this study?

This study is being undertaken as part of the course requirements for the M.Phil Speech and Language Processing Course as part of the Dissertation Project module.

Is there any payment for taking part in this study?

No, we will not be paying participants for this study.

Part 4 - Future Research

Due to the nature of this research it is very likely that other researchers may find the data collected to be useful in answering future research questions about AAC system development. Future research will only take place if it has research ethics approval.

Part 5 - Future Information

Who should I contact for information or complaints?

Principal Investigator: Muireann Nic Corcráin, niccorcm@tcd.ie

Will I be contacted then?

If you would like to take part in this study, you will need to indicate your consent on the next page. Other than arrangements for the study described, we do not contact you.

Consent (second item in survey)

- I confirm I have read and understood the Participant Information for the above study. The information has been fully explained to me.

- I understand that this study is entirely voluntary, and if I decide that I do not want to take part, I can stop taking part in this study at any time without giving a reason. I understand that deciding not to take part will not affect my current or future opportunities to be involved in studies such as this.

- I understand that I will not be paid for taking part in this study.

- I agree to take part in this research study having been fully informed of the risks, benefits and

alternatives which are set out in full in the information leaflet which I have been provided with.

- I understand that there are no direct benefits to me from participating in this study.

- I consent to participate in this survey on Irish language AAC. (check box)

- I confirm that I am over 18 years of age (check box)

Survey Questions (3rd part of survey)

Background information:

1. Are you filling out this survey on behalf of someone else?

☐ Yes

☐ No

☐ I am filling out this survey with assistance

NOTE: If “No” is answered in Q1, then Q2 will not be shown. Depending on the answer given in Q1, the rest of the questions will be displayed with the text “you” or “AAC user” (e.g., for Q3: “What condition do you/does the AAC user have?”). This system is used multiple times during the survey.

2. What is your relation to the person you are filling out this form on behalf of?

☐ Parent

☐ Child

- ☐ Sibling
- ☐ Professional caregiver
- ☐ Speech and Language Therapist
- ☐ Other (please specify)

3. What condition do you/does the AAC user have?

- ☐ Amyotrophic lateral sclerosis (ALS)
- ☐ Cerebral Palsy
- ☐ Stroke
- ☐ Autism spectrum disorder (ASD)/Autism Spectrum Condition
- ☐ Multiple sclerosis (MS)
- ☐ Spinal cord injury
- ☐ Verbal Dyspraxia
- ☐ Intellectual Disability (ID)
- ☐ Other (please specify) (comment box)

4. What age are you/is the AAC user?

Experience using AAC systems

5. [If: What condition does the AAC user have? = Autism spectrum disorder (ASD)/Autism Spectrum Condition]

What activities do you/does the AAC user find most challenging as an autistic person/ a person

living with ASD/Autism Spectrum Condition?

6. [If: What condition does the AAC user have? = Amyotrophic lateral sclerosis (ALS)] When were you/was the AAC user diagnosed with ALS?

7. [If: What condition does the AAC user have? = Multiple sclerosis (MS)]

When were you/was the AAC user diagnosed with MS?

8. [If: What condition does the AAC user have? = Stroke]

When did you/the AAC user have a stroke?

9. [If: What condition does the AAC user have? = Autism spectrum disorder (ASD)]

Is there any other information about your condition/the AAC user's condition you would like to

share? (e.g. subcondition type, what activities are affected most by the condition)

10. Do your/the AAC user's speech and/or motor abilities change with time?

☐ Abilities improve

☐ No change

☐ Abilities worsen

11. [If: Does the AAC user's speech and/or motor abilities change with time? = improve/worsen]

How frequently do you notice changes in your/the AAC user's speech and/or motor abilities?

☐ Daily

☐ Weekly

☐ Monthly

☐ Every few months

☐ Yearly

☐ Other

12. [If: Does the AAC user's speech and/or motor abilities change with time? = improve/worsen] What types of changes in speech/motor abilities do you notice? Does the AAC user use intermittent speech? (Comment Box)

13. Which of the following better describes your/the AAC user's speech abilities?

- ☐ Used to be able to speak, but lost speech ability
- ☐ Have never been able to speak
- ☐ Intermittent speech

14. Which of the following applies to your/the AAC user's verbal speech? You can select multiple options.

- ☐ No auditory speech
- ☐ Can speak in short phrases, not complete sentences (e.g. "milk: instead of "I want some milk")
- ☐ Can speak in sentences with full clarity
- ☐ Can speak in sentences, with reduced clarity (still understandable by most people)
- ☐ Can speak in sentences, with reduced clarity (only understandable by close friends and family)
- ☐ Other

15. Which of the following applies to your/the AAC user's communication practices? You can select multiple options.

- ☐ Have/Has more difficulty communicating in unfamiliar settings
- ☐ Hand gestures have consistent meanings when communicating
- ☐ Non-word vocalized sounds have consistent meanings when communicating
- ☐ Assistive device used to aid communication
- ☐ Communication speed is significantly reduced
- ☐ Communication is often misunderstood
- ☐ Other

16. What communication related tasks do you/does the AAC user find most difficult or frustrating?

(Comment Box)

17. What, if any, devices/systems do you/does the AAC user use to help with communication? If you use a specific product, please list the product name. Please tick all that apply.

☐ PECS

☐ LAMP

☐ Tobii Dynavox

☐ (comment box)

☐ I do not currently use an AAC device

18. [If: uses a device] What difficulties do you/does the AAC user have with your/their device?

19. [If: uses a device/system] What do you/does the AAC user like about the device/system you/they use?

20. [If: uses a device/system] Do you use an AAC app on an iPad/Android tablet, or a dedicated AAC device?

21. [If: uses a device] In what settings do you/does the AAC user use your/their device/systems the most? Home/Education/Social/Public Services

22. Use this space to provide any other information you would like to share about the assistive

devices/systems you/the AAC user use/s or would like to use (optional comment box).

Irish language AAC needs analysis:

23. Would you/the AAC user be interested in using a device/system with the following outputs? Please select all that apply:

☐ Irish Text-to-Speech generator

- ☐ Keyboard/Type interface with Irish diacritics (á, í, etc.)
- ☐ Predictive text/word or phrase prompting
- ☐ Pre-programmed common phrases/expressions
- ☐ Customisable and personalised phrases and expressions
- ☐ Individual words

24. What languages are used in your/the AAC user's household?

- ☐ English
- ☐ Irish
- ☐ Other

25. Are you based in a Gaeltacht area?

- ☐ Yes
- ☐ No

26. What language-medium school do you/did you/does/did the AAC user attend?

- ☐ Irish
- ☐ English
- ☐ Other

27. Is the school based in the Gaeltacht or is it a Gaelscoil/Gaelcholáiste outside of the Gaeltacht?

28. If you have Irish as a home language, did you or the AAC user have access to Speech and Language Therapy through Irish?

29. [If: yes Q.30] Did you pursue it? Why/why not?

30. [If: no Q.30] Would you have liked to have had this opportunity? Why/why not?

31. Which of the following options would you be interested in, regarding Irish language AAC? (all that apply)

- o Irish AAC app on the device I already have
- o Irish speech generation in the AAC app/device I already use

32. What are your reasons for being interested in an Irish AAC device/system?

- o Home language of other family members
- o Language of their community
- o Part of who I am
- o Feel 'part of the group'
- o Get practice in Irish
- o Access to school curriculum
- o Other

33. What barriers have you faced when communicating through Irish (eg. device doesn't 'speak' their language, no text prediction, no prestored words on AAC systems, can't spell well in this language, etc.) (comment box)

34. Is there anything else you would like to share about your experience with Irish as an AAC user?

(comment box)

Thank you for participating in this survey. Go raibh míle maith agat!

Appendix D: Initial Data Reports

'AAC don Ghaeilge': a needs analysis survey for the development of Irish language augmentative communication devices for people with speech difficulties.



Coláiste na Tríonóide, Baile Átha Cliath
Trinity College Dublin
Ollscoil Átha Cliath | The University of Dublin

Thank you for your interest in our research. The aim of this study is to gather information that will help in the development of an Irish language Augmentative and Alternative Communication (AAC) system. The system will allow users to communicate in Irish using an Irish language Text-to-Speech (TTS) synthesiser that has been developed by the ABAIR team in the Phonetics and Speech Lab in the School of Linguistic, Speech and Communication Studies, Trinity College Dublin. This survey will take approximately 15 minutes to complete. The information you provide in this survey will not be presented in a way that can be identified to you. If you would like to stay in contact and hear about this project as it develops, or if you have any questions, please contact Muireann Nic Corcráin at niccorcm@tcd.ie or Dr. Ailbhe Ni Chasaide at ANICHSID@tcd.ie.

A Plain Text version of this Participant Information Leaflet and an audio recording of the Participant Information Leaflet are available at this link: <https://linktr.ee/MuireannNicC>

Figure A: Introduction for survey on Qualtrics survey platform.

What communication related tasks do you/does the AAC user find most difficult or frustrating?

What, if any, devices/systems do you/does the AAC user use to help with communication? If you use a specific product, please list the product name. Please tick all that apply.

PECS	☐
LAMP	☐
Tobii Dynavox	☐
Device name	
☐ I do not currently use an AAC device	

Figure B: Sample of questions asked in survey relating to current experience of AAC by user/participant filling out survey on behalf of an AAC user.

Would you/the AAC user be interested in using a device with the following outputs? Please select all that apply

☐	Irish Text-to-Speech generator
☐	Keyboard/Type interface with Irish diacritics (á, í, etc.)
☐	Predictive text/word or phrase prompting
☐	Pre-programmed common phrases/expressions
☐	Customisable and personalised phrases and expressions
☐	Symbol-based AAC
☐	All of the above

What languages are used in your/the AAC user's household?

☐	Irish
☐	English

Figure C: Sample of questions related to developing Irish AAC systems.

Appendix E Research Ethics Application Form



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

SCHOOL OF LINGUISTIC, SPEECH AND COMMUNICATION SCIENCES
TRINITY COLLEGE DUBLIN

RESEARCH ETHICS APPLICATION FORM

PLEASE NOTE THE FOLLOWING:

- **Incomplete applications cannot be processed** and will be returned for completion.
- Forms **without** the applicant(s) and research supervisor(s) (for student applications) confirmation of declaration/s section/s completed cannot be processed.
- Forms **without a completed checklist** (Section 1) cannot be processed.
- Applications must be **typed** and not hand-written and submitted as a single document (application & all appendices)

Please complete the application form and return two hard copies (one copy to include original signatures) to: Chair, Research Ethics Committee School of Linguistic, Speech and Communication Sciences Room 4091, Arts Building Trinity College Dublin Please also email your application in full to: slscs@tcd.ie	Office use only: REF No: _____ Meeting date: _____ Decision: _____ Remarks: _____
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APPLICANT NAME: Muireann Nic Corraí APPLICANT EMAIL: niccorra@tcd.ie Please provide your slscs@tcd.ie email address: _____	SILCS STAFF MEMBER? Yes ☐ No ☒ Job title: _____ STUDENT NUMBER 16327765 SILCS STUDENT? UG ☐ MSc ☐ MPhil ☒ MLitt ☐ PhD ☐ CLCS ☐ CSLC ☐ CDS ☐ SUPERVISOR NAME: Prof. Ailbhe Ní Chasaíde SHORT TITLE: 'AAC don Ohaeilge' Needs analysis survey for Irish language AAC Devices DATE OF SUBMISSION TO REC: Full resubmission of a previous application? Yes ☒ No ☐
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1

SPECIFY YOUR ROLE IN PROJECT

Single Researcher ☐ Principle Investigator ☒ Co-Investigator ☐

Please provide the name, qualification and position of each person associated with this research project (add further rows as required). All other researchers involved must be detailed below.

Name & Qualification	Position & primary employer	Role in research project	Email Address
Muireann Nic Corraí (BA) TSM Modern Irish & History, Trinity College Dublin, 2020	M.Phil Speech and Language Processing student	Principle Investigator	niccorra@tcd.ie
Prof. Ailbhe Ní Chasaíde	Professor in Phonetics, Phonetics and Speech Laboratory, TCD	Dissertation Supervisor	anichs@tcd.ie
Claire O'Neill	Research Assistant, Phonetics and Speech Lab, TCD	Research Support	oneic54@tcd.ie
Emily Barnes	Research Assistant, Phonetics and Speech Lab, TCD	Research Support	ebarnes@tcd.ie

RESEARCH APPLICATION CHECKLIST

Please answer all question yes, no or not applicable as appropriate to the following questions. If you answer no to any question, please explain why and the relevant question number in the comment box at the end of the form.

Question	YES	NO	N/A
1. Are you undertaking the proposed research study in your capacity as a staff member of the School of Linguistic Speech and Communication Sciences?	☐	☒	☐
2. Are you undertaking the proposed research study in your capacity as a student of the School of Linguistic Speech and Communication Sciences?	☒	☐	☐
3. If you are a student, has your supervisor read, approved and signed the completed form?	☒	☐	☐
4. Have you signed the application form?	☒	☐	☐
5. Have you checked that your application meets the criteria for this research ethics committee?	☒	☐	☐
6. Are you recruiting participants for this study?	☒	☐	☐
7. Are the participants purposefully recruited from a vulnerable group?	☒	☐	☐
8. Is this a health research study?	☐	☒	☐
9. Does the study include a health intervention?	☐	☒	☐
10. Are you collecting personal or sensitive data?	☐	☒	☐
11. Have you completed and included a risk assessment (for data) for this study?	☐	☒	☐
12. Do you require a Data Protection impact assessment?	☐	☒	☐
13. If applicable (yes to Q8), have you completed a Data Protection impact assessment?	☐	☐	☒
14. If accessing personal or sensitive data have you successfully completed Trinity GDPR online course?	☒	☐	☐
15. If accessing collecting personal or sensitive data, and if you are an undergraduate or master's student, has your supervisor successfully completed Trinity GDPR online course?	☒	☐	☐
16. If accessing collecting personal or sensitive data, have all Trinity members of the research team listed, successfully completed Trinity GDPR online course?	☐	☐	☒
17. Have you included a copy of the questionnaires, interview template, data extraction list?	☒	☐	☐

2
3

18. Are you collecting samples, no matter how small, that could be used for genetic testing?	☐	☒	☐
19. If applicable, have you included the consent form and participation information leaflet?	☒	☐	☐
20. If applicable, have you included all relevant letters of permission /access from external agencies/organisations/schools/ industry / clinical site hosting the study, from the appropriate responsible people agreeing access included including access to databases?	☐	☐	☒
21. If applicable, have you included the letter to the participants?	☒	☐	☐
22. If applicable, have you included any posters/other material used to advertise the study?	☒	☐	☐
23. If collecting personal or sensitive data, have you included detailed information on how you will implement security measures to protect the personal data in all its forms and all types e.g. device encryption?	☐	☐	☒
24. Have you included any other documents that are needed for your study i.e. Garda clearance, debrief documentation?	☐	☐	☒
25. If collecting personal or sensitive data do you agree to only use the minimum data necessary to carry out the research?	☐	☐	☒
26. Have you put in all the necessary security arrangements required to collect, process store and destroy any personal or sensitive data required for this study?	☐	☐	☒
27. Are there any contractual arrangements required in order to carry out this study?	☐	☒	☐
28. Have you read and will abide by the requirements regarding research reporting, data storage and reporting of adverse events	☒	☐	☐

If you have answered **NO** to any of the above questions (except 1,2,6) please explain:

Where no was answered, the question was not relevant to this study.

SECTION 7 – CONFIRMATION OF APPLICANT AND SUPERVISOR DECLARATIONS

APPLICANT DECLARATION: I confirm that the information provided in this form is correct, that I am not aware of any other ethical issues not addressed within this form. I understand the obligations to and the rights of participants (particularly concerning their safety and welfare, the obligation to provide information sufficient to give informed consent and the obligation to respect confidentiality).

APPLICANT CONFIRMATION OF DECLARATION: Muireann Nic Corcráin



APPLICANT NAME: Muireann Nic Corcráin

DATE: 21/05/2021

RESEARCH SUPERVISOR CONFIRMATION OF DECLARATION :

Student applicants are required to have their Research Supervisor complete this section. Research Supervisors are also required to send an email to the Research Ethics Committee confirming that they have reviewed the ethics application and that the proposed research project conforms to the School's Research Ethics Guidelines.

SUPERVISOR DECLARATION: As the student's supervisor, I have read this document, and to the best of my knowledge, this project conforms to the School's Research Ethics Guidelines.

SUPERVISOR CONFIRMATION OF DECLARATION: Prof. Ailbhe Ní Chasaide



SUPERVISOR NAME: Prof. Ailbhe Ní Chasaide

Ailbhe Ní Chasaide

DATE: 21/05/2021