# POWERED AUGMENTATIVE AND ALTERNATIVE COMMUNICATION IN IRISH SPECIAL EDUCATION: CONTEXTUAL FACTORS FOR EQUITABLE IMPLEMENTATION

This paper reports on the implementation of powered augmentative and alternative communication (AAC) in special education in Ireland. An online, cross-sectional survey was used to gather teachers' perspectives on the barriers to the successful adoption, implementation, and sustainability of powered AAC in schools. The Consolidated Framework for Implementation Research (CFIR) conceptually guided both the survey design and data analysis. Findings from 297 completed surveys revealed that the implementation of powered AAC in Irish special education is fragmented, inconsistent, and unsupported. Key issues include a lack of quality training and ongoing support, insufficient planning for and evaluation of powered AAC in schools, and inadequate collaborative processes. The research highlights systemic fragmentation surrounding powered AAC implementation and calls for greater support for its effective and sustained adoption in special education in Ireland.

***Keywords:*** powered AAC, implementation in schools, Consolidated Framework for Implementation Research, special education classroom

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## POWERED AUGMENTATIVE AND ALTERNATIVE COMMUNICATION IN IRISH SPECIAL EDUCATION: CONTEXTUAL FACTORS FOR EQUITABLE IMPLEMENTATION

In the ten years from 2013 to 2023, there has been over a 600% increase in special classes in Ireland, with 89% (2466 classes) of these being autism-specific special classes (Travers, 2023). It is estimated that up to 30% of autistic learners globally may not use speech as their primary method of communication (Lorah et al., 2022). These figures highlight how a large percentage of autistic learners, globally and in Ireland, likely use an augmentative and/or alternative method of communication (AAC), and this may include powered AAC[1]. AAC refers to a range of tools and strategies used to either enhance a person's speech or provide an alternative to it. 'Augmentative' means to add to a person's speech, while 'alternative' means to use a method of communication instead of speech (Kazmierczak-Murray, O'Mahony & Carey, 2024). AAC can involve any form of communication used with or instead of oral speech that is separate to one's body, including an external, battery-operated device (i.e., powered AAC), which is the focus of this research. Technology use in education has grown significantly in recent years (Fernández-Batanero et al., 2022), including in Ireland (O'Sullivan et al., 2021), however, there is still a dearth of research about the state of implementation of powered AAC in special education in Ireland. To advance this research, we explore if and how powered AAC is being used in Irish schools. Our exploration is guided by the Consolidated Framework for Implementation Research (CFIR) (Damschroder et al., 2022), an interdisciplinary theoretical framework widely used in implementation research.

## THE CONCEPTUAL FRAMEWORK FOR IMPLEMENTATION RESEARCH (CFIR)

The CFIR consists of five domains influencing implementation: innovation characteristics, inner setting, outer setting, characteristics of individuals, and process of implementation. Innovation characteristics are the features of an innovation which may influence implementation, for example, the cost or 'ease of use' of an innovation. Inner setting includes features of an organisation within which an innovation is implemented, for example, available funding or support systems for individuals who are adopting an innovation. Outer setting refers to features of the external, wider environment which might influence implementation and could refer to policy and legislation in place in the educational context. In this research, the domain referring to the characteristics of individuals will refer to

[1] The term powered AAC is used in this paper after Judge et al. (2017) and is largely synonymous with previously used 'high-tech' AAC.

participants' knowledge of powered AAC, received training, and participants' attitudes towards powered AAC. Finally, the implementation process refers to strategies or targets which may influence the success of implementation, for example, engaging in appropriate needs assessment, reflecting and evaluating.

While CFIR has not been previously applied to powered AAC, the use of this and other Implementation Science frameworks in Irish educational research has grown in recent years (Kazmierczak-Murray, Lehane & Hannify, 2025; Kazmierczak-Murray, O'Mahony & Carey, 2025; Prendeville et al., 2023). The CFIR framework guided the review of the literature, data collection, and the analysis of the findings in this study, providing a robust conceptual alignment to the study. Below we present the current literature on the implementation of powered AAC under the CFIR constructs.

### Characteristics of the individuals involved

Research tells us that practitioners' knowledge, skills and attitude to an innovation is known to impact all aspects of its implementation, including initial adoption, implementation quality and whether or not the innovation will be sustained (Fixen et al., 2005). Teacher attitude has been consistently highlighted as a key determinant in whether children access technology (Fernández-Batanero et al., 2022; Lamond & Cunningham, 2019). Research has also shown that teachers lack knowledge and skills to use assistive technology (Da Fonte et al., 2022; Flanagan et al., 2013). In line with this, teacher professional development is consistently named as one of the most influencing factors in AAC implementation in schools (Andzik et al., 2019; Flanagan et al., 2013; Judge et al., 2022; Young et al., 2023).

### Inner and outer setting

In addition to appropriate resourcing and developing the skills and attitudes of 'implementers' (who in our research are teachers), for effective adoption, implementation and sustainability of an innovation, we also need supportive policy and organisational context (Damschroder et al., 2022). The importance of systems thinking in relation to technology implementation in schools has been highlighted by many researchers (Baxter et al., 2012; Ley et al., 2021; O'Sullivan et al., 2021). For example, Baxter et al. (2012) found that a *team working* can positively influence functional use of AAC devices. More recently, Norrie et al. (2021) argued for the establishment of effective operational, interactional, and pedagogical context supporting the implementation of powered communication devices in schools. At a classroom level, the importance of systems thinking in AAC implementation has been highlighted also by Lorah et al. (2022), who stress that simply introducing technology is insufficient, rather, evidence-based instructional practices are needed to enhance communication outcomes. Alzrayer (2024) argues that simply giving a child with complex communication needs a powered AAC device and not providing learning opportunities throughout the day will not make them a competent communicator.

Beyond the quality of classroom instruction, school policies, at both local and national levels, should support coordinated and consistent AAC implementation yet previous research showed that two-thirds of Irish primary schools lack clear policies for AT use (O'Sullivan et al., 2021). Furthermore, a school's financial position and availability of funding can be considered an element of the enabling context, and as noted by many researchers, the availability of funding has a significant impact on the adoption of AAC in schools (Norrie et al., 2021; O'Sullivan et al., 2021). While this research refers to AT more broadly, it is likely that AAC, including powered AAC, is similarly unsupported at a policy level.

### The process of implementation

Research in both the US and UK highlight that although AT is an important component of the academic success of students with learning disabilities, it is often abandoned or inconsistently implemented (Judge et al., 2017; Lamond & Cunningham, 2019; Zhou et al., 2012). In fact, some UK researchers estimate 30% abandonment of technology devices (Lamond & Cunningham, 2019). To prevent this abandonment or inconsistent implementation, an assessment of the *effectiveness* of a chosen device should be an ongoing process (Andzik et al., 2019). Such an assessment is part of both initial and ongoing planning, monitoring and evaluation activity. AT, and powered AAC within it, should not be considered separate to this preparation and planning, rather it should be central to it, especially for children who do not use speech as their main method of communication.

### Innovation characteristics

Beyond training gaps, policy shortcomings, and lack of evaluation frameworks, AT remains largely inaccessible due to high costs. Teachers and parents often lack confidence in sourcing equipment (O'Sullivan et al., 2021). These issues persist in both Irish (Inclusion Ireland, 2022; O'Sullivan et al., 2021) and international contexts (Fernández-Batanero et al., 2022; Lamond & Cunningham, 2019; Lorah et al., 2022).

In Ireland, there is no national funding for AT use in schools, including powered AAC. The charity AsIAm leads a funding programme for powered AAC that provides devices and support for autistic children who need AAC (AsIAm, 2025). This programme, funded by the Health Service Executive (HSE), is welcome, however, its limited scale is unlikely to address powered AAC funding issues and associated implementation issues in schools. The Irish Department of

Education and Youth also provides a grant scheme to contribute to the cost of powered AAC in schools. The criteria each individual must meet is outlined in Circular 0010/2013 (Department of Education and Skills, 2013). It is specified that to meet the requirements an individual must have a degree of physical or communicative disability to the extent they require specialised equipment to access the school curriculum, along with an application from the school and a medical recommendation. The application process is a staged approach with applying for the grant being the final of five stages a school must navigate. Each school must apply for this grant on a case-by-case basis and any additional costs not covered by the grant are absorbed by the school itself or parental contributions.

Given this potentially inequitable implementation of AT in schools and the absence of research on powered AAC in Ireland in general, this study was guided by two key questions:

1. What is the current use of powered AAC in special classes and special schools in Ireland?
2. What structures and processes support the implementation of powered AAC in these settings?

## METHOD

### Participants

We surveyed teachers in special classes in mainstream schools and special schools in Ireland. At the time of this research, a publicly available list from the National Council for Special Education (NCSE) identified 121 special schools and 2,916 special classes. All schools were invited to participate via an initial email to principals, who were requested to forward the survey to relevant teachers. As per the university's Research Ethics Committee advice, no follow-up reminders were sent.

A total of 327 teachers engaged with the survey, with 297 fully completing it. Partially completed surveys were excluded from analysis. It is not possible to calculate at what level this sample represents all teachers in special schools and classes in Ireland and given a large number of special classes and schools in Ireland, the response rate was limited. Additionally, the role of principals as gatekeepers in the recruitment process could have potentially influenced the inclusivity and transparency of participation. Nevertheless, the total number of completed surveys in this exploratory study is sufficient to make some initial conclusions on the use of powered AAC in Ireland. The survey was administered using Qualtrics (institutionally licensed version).

### Research Design

The study employed a cross-sectional quantitative survey design (Cohen et al., 2017) to provide a broad overview of powered AAC use in Irish special education. Given the absence of prior Irish research in this area, gathering insights from as many teachers as possible was essential. The research has received all required approvals from the appropriate ethics committee of the authors' institution.

### Measures

Self-report surveys are commonly used to quantify teacher beliefs and instructional practices (Hoffman & Seidel, 2015). Given their efficiency in gathering large-scale data (Wilson, 2013), and in order to reach a large and geographically dispersed sample, an online survey was designed to address the research questions. The survey was structured with mostly multiple-choice and numerical questions, alongside six open-ended questions to allow for qualitative insights (Denscombe, 2021). Survey questions were developed after a) reviewing existing literature on the topic and b) with consideration of the key domains and subdomains influencing implementation as codified in the Consolidated Framework for Implementation Research (CFIR) (Damschroder et al., 2022) which guided this study conceptually, and included questions on practitioner skills, training, contextual supports, funding, collaboration, and evaluation processes. These implementation domains and subdomains corresponded to questions about practitioner skills and attitudes, provision of ongoing training and support, as well as contextual processes and structures supporting implementation, such as financing and provision of resources, collaborative planning and ongoing assessment, monitoring and evaluation.

In total, the survey consisted of 34 questions in six sections, as follows: a) consent section, b) demographic information (4 questions), c) adoption of powered AAC (9 questions), d) use of powered AAC (7 questions), e) training and supports (10 questions), and f) planning and evaluation (4 questions). Respondents were introduced to the purpose of each section in the survey to focus them on each area of their experience. The importance of this specificity in survey sections was emphasised by Denscombe (2021).

### Procedures

To enhance reliability and validity, the survey was piloted with five special education teachers. Feedback confirmed that multiple-choice questions covered relevant response options and that the survey was user-friendly. Based on pilot responses, "I do not use powered AAC" was added as an option to the yes/no questions to accommodate non-users.

Following the pilot, data collection occurred over four weeks. Responses were transferred to the Statistical Package for Social Sciences (SPSS) for descriptive statistical analysis. As this was an exploratory study focused on gathering initial data on the state of implementation of powered AAC in Irish special education in order to consider further research areas and implications for the sector, no further statistical calculations were conducted.

The analysis of the qualitative data from six open-ended questions included in the survey followed an inductive process of thematic analysis (Braun & Clarke, 2021), which was based on carefully reading the open-ended responses and creating categories that represented the emergent themes. Most responses to the open-ended questions were provided as list-style content. The findings arising from both quantitative and qualitative data were then mapped onto the domains of the Consolidated Framework for Implementation Research (Damschroder et al., 2022). The potential of this framework to guide the implementation of AT has been recently noted by Aldawood et al. (2024). To our knowledge, our study is the first internationally which illustrates how this framework can be practically applied in such research and how it can be applied specifically to powered AAC.

### Validity

The validity of survey findings relies on participant honesty (Denscombe, 2021), which is more likely in anonymous, online formats where no identifiable data is collected (Cohen et al., 2017). We acknowledge that the survey was reliant on principals forwarding it to staff and participation was voluntary, therefore, the results may represent more informed perspectives. However, given the lack of prior research on powered AAC in Irish special education, the 297 completed surveys provide a strong foundation for initial insights.

The reported findings relate to all survey respondents (n = 297). The responses to the broader attitudinal questions might have included the respondents who did not teach a learner who requires support via an AAC device. This is noted clearly on each graph and was considered in the interpretation of data.

## FINDINGS

Responses from teachers working in special classes in mainstream primary schools composed the majority of the data (64%), followed by responses from teachers working in special schools (27%), and teachers teaching in special classes in post-primary schools (9%). This is an accurate reflection of the distribution of the current educational landscape in special education in Ireland. The presentation of the findings is structured under themes which are mapped onto the domains of the Consolidated Framework for Implementation Research (CFIR) in Table 1.

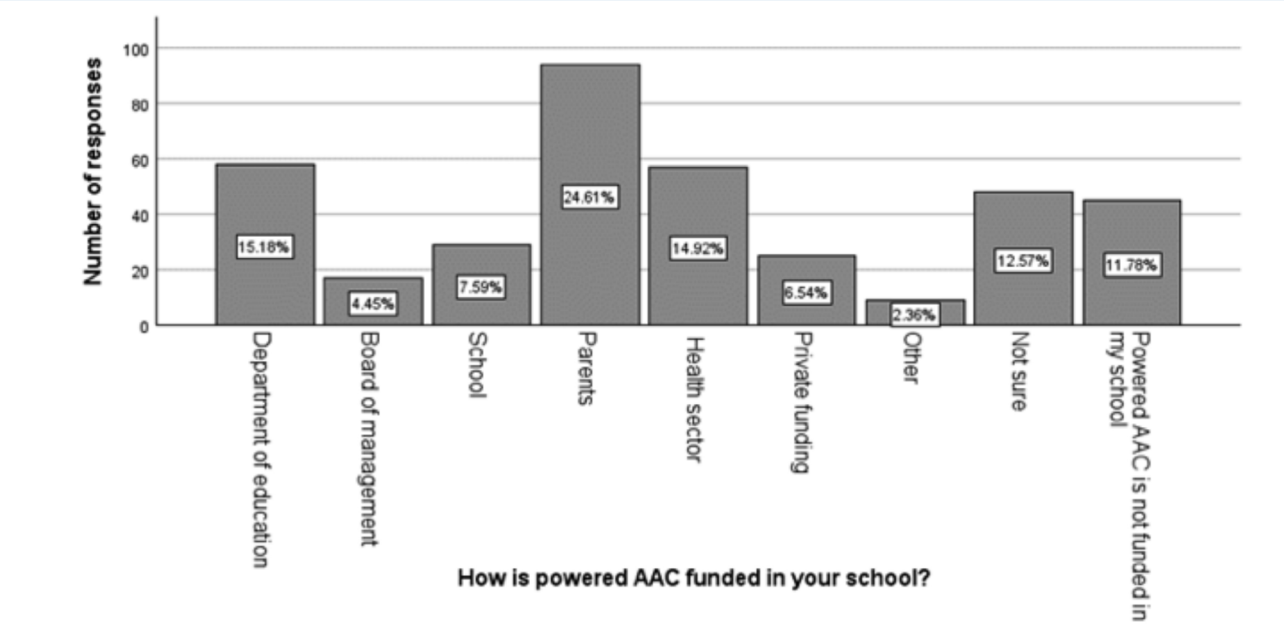
### Availability of Powered AAC

Powered AAC is not consistently available to all teachers who wish to use it. While 77% of teachers have used powered AAC in their classroom, only 52% reported it being readily available when needed. This suggests inconsistencies in access. Notably, 91% of teachers stated that they would use powered AAC if it were more accessible, demonstrating a strong willingness to integrate it into their teaching.

### Funding of Powered AAC

Responses to the survey suggested that funding is inconsistent and often falls on parents.

**Figure 1:** Survey question: How is powered AAC funded?




While 88% of teachers report some level of funding, the reliance on local sources like parents, private donors, and school boards indicates that funding may be discretionary and unevenly distributed.

### Teachers' Attitudes Towards Powered AAC

On the whole, teacher attitudes towards powered AAC were positive, for example, 91% of respondents stated that they would use additional powered AAC if available and 77% considered it 'useful'. The research design did not allow us to make definitive conclusions as to the reasons why nearly a fifth of respondents did not consider powered AAC 'useful', however, in their responses to an open-ended question about implementation barriers, one respondent cited "*tech fear* "while another added "*They are very difficult for adults to use so it's too difficult for children with learning disabilities to use them".*

Teachers' years of experience can also be considered a factor in whether they perceive powered AAC to be 'useful' or not. Teachers with more years in the profession are less likely to find powered AAC 'useful' and report low confidence in using it (Figures 2 & 3). These findings suggest the need for targeted support, particularly for experienced teachers who may not be familiar with emerging AAC technologies.

**Figure 2:** Survey question: Do you think powered AAC is useful for children in your class? With respondents' mean years of experience indicated on the graph

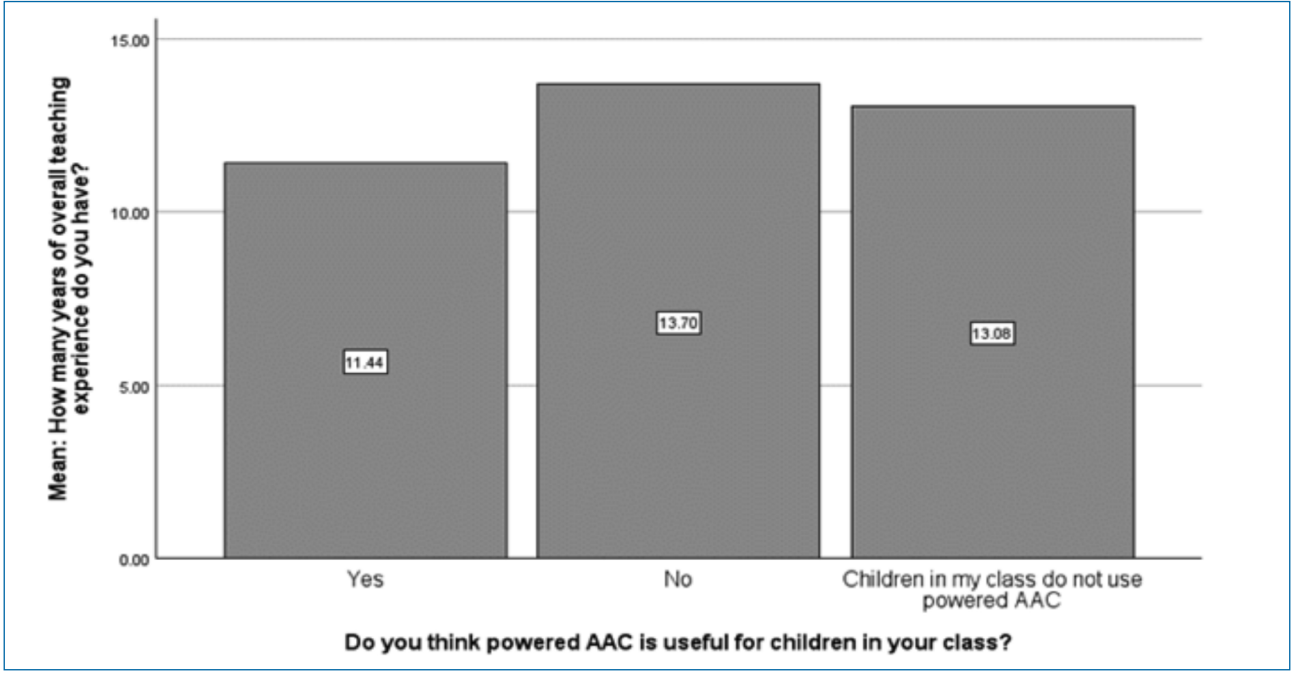
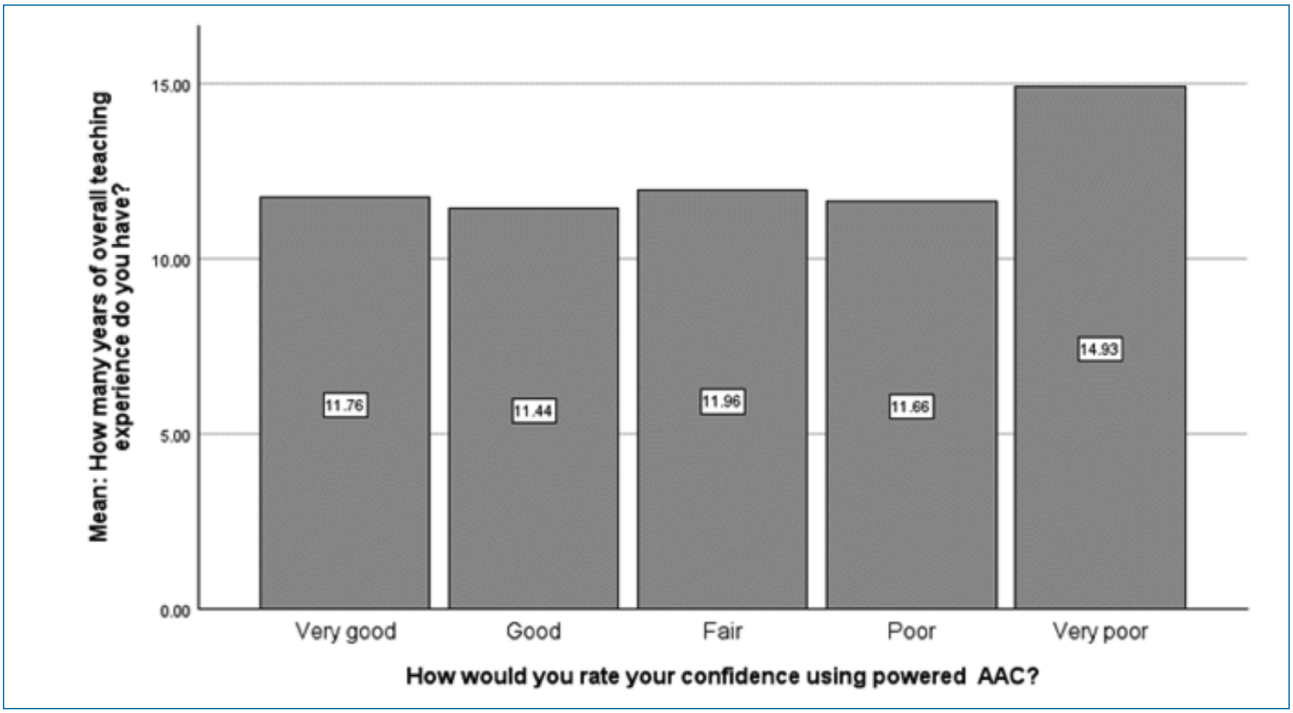


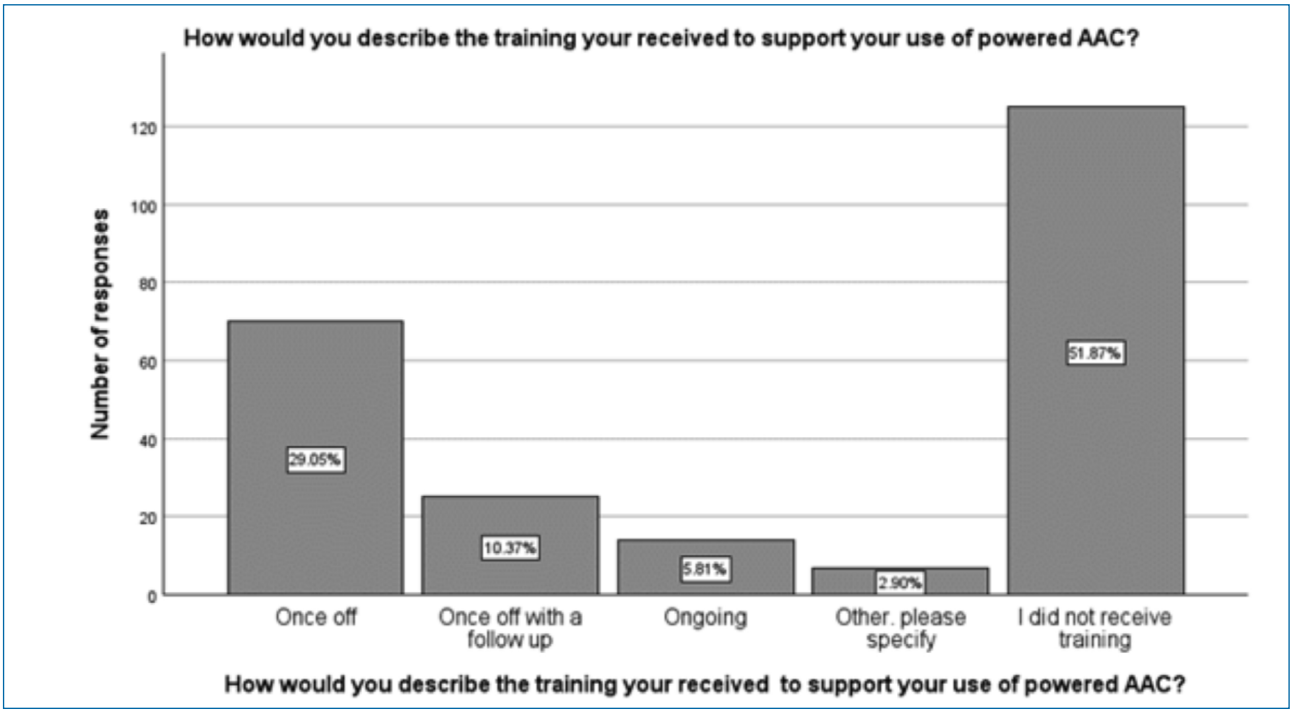
**Figure 3:** Survey question: How would you rate your confidence using powered AAC? With respondents' mean years of experience indicated on the graph.




## Availability and Quality of Training

Our results indicate that training in powered AAC is inconsistent. A slightly higher number of teachers reported never receiving training (52%) compared to those who had (48%), meaning that some teachers may be using AAC without formal preparation. Among those who received training, many rated it as "fair" and 29% described it as "once-off". Only 6% of respondents reported receiving ongoing training (Figure 4).

**Figure 4:** Survey question: How would you describe the training you received to support your use of powered AAC?

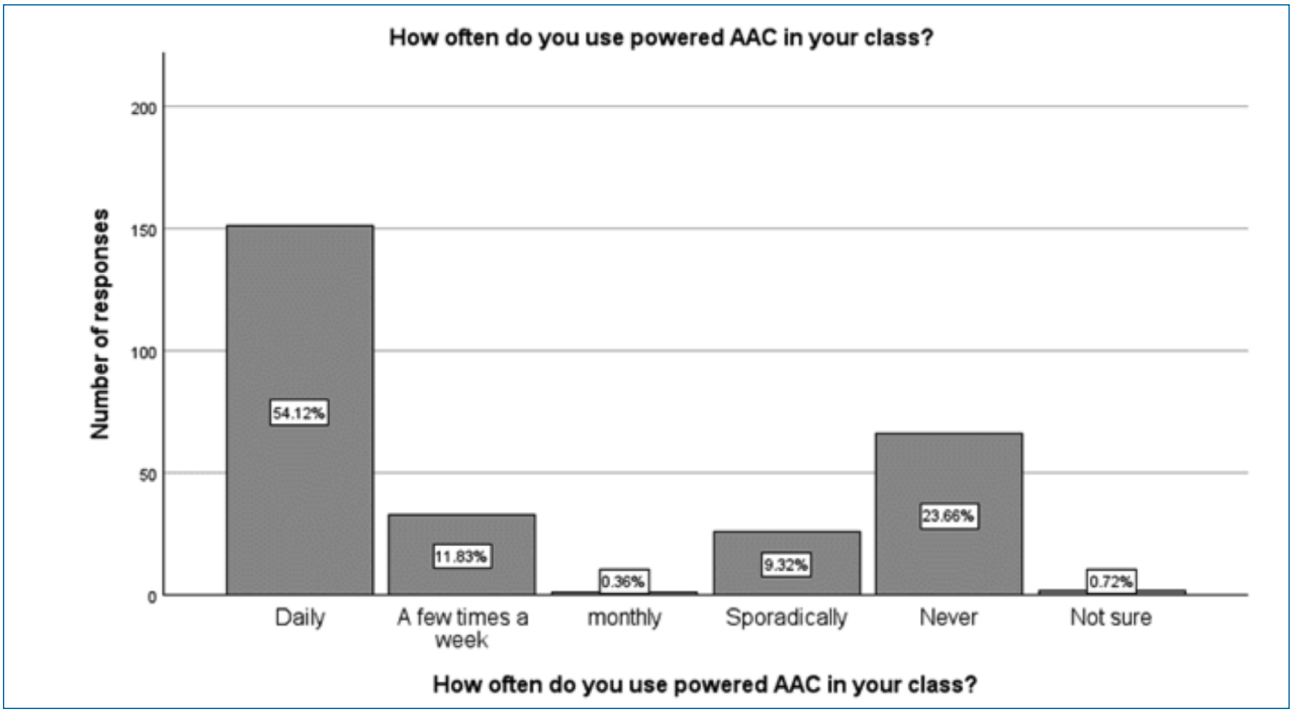



The demand for training is high - 93% of teachers expressed interest in additional AAC training. These findings suggest an urgent need for ongoing professional development to ensure effective implementation of powered AAC.

### Use in the Classroom

Only 50% of teachers indicated that they use AAC daily, and 24% stated that they never use it at all.

**Figure 5:** Survey question: How often do you use powered AAC in your class?




These figures indicate possible underutilization or abandonment of AAC in schools.

### Planning for Powered AAC

Only 32% of teachers incorporate powered AAC into their short-term planning (Figure 12), while 36% do not include powered AAC in their planning at all. Furthermore, just 6% of teachers reported that AAC is included in whole-school policy. This means teachers have autonomy over AAC use which may mean that their individual perceptions may influence the use of powered AAC. For example, in qualitative responses, one respondent commented that powered AAC devices are "*far beyond our children*", indicating attitudinal barriers.

### In-School Support

In-school support for powered AAC is lacking. 59% of teachers have never received any support in implementing AAC. Of those who have, only some received assistance from visiting speech and language therapists (24%). Only 17% indicated that they received support from principals (5%) or colleagues (12%) in relation to powered AAC. Collectively, these figures highlight that only 17% of teachers have support within their schools when using powered AAC if they need it throughout the day (from either the principal or colleagues). This highlights that 83% of teachers either have no access to support at all or only receive support from visiting speech and language therapists which would not be readily available when needed.

Collaboration among teachers is also low - only 20% indicated that they plan AAC use with colleagues, while 37% stated that they do not collaborate with colleagues in relation to powered AAC at all. This highlights the need for collegial support structures which are known to support consistent implementation.

### Assessment and Evaluation

Only 54% of teachers use the powered AAC devices available to them on a daily basis and only 5% noted that powered AAC is included in whole school policy. Concerningly, a large number of teachers also reported that the use of powered AAC was not assessed within their schools with as many as 89% saying it is not assessed or evaluated.

### Qualitative Data on the Barriers in Using AAC in Classrooms

When asked about barriers, 85% of teachers identified challenges in using AAC. Teachers were then given the opportunity to elaborate on their answers using a text box. The responses were analysed and coded thematically

and reduced to the themes which were then mapped onto the domains of CFIR (Table 1). Qualitative data reflects responses from 212 participants. Participants who did not respond to this question either felt that there were no barriers or chose not to answer this question. Key identified barriers included:

### *Lack of training, knowledge, and support*

Many teachers felt unprepared to use powered AAC, with one describing the lack of training as "*a disservice to the children*." Teachers also cited a lack of knowledge and motivation as a reason for limited AAC adoption.

### *Lack of resources*

Teachers reported insufficient technology, equipment, and staffing to support AAC use. Issues included poor internet, broken or inadequate devices, limited chargers and battery life, and a lack of Special Needs Assistants (SNAs) to provide one-on-one support. One teacher noted that "*staff need to be beside the student to hear the response*," highlighting the need for additional classroom support.

### *Lack of time*

Many teachers cited time constraints as a barrier, finding it difficult to integrate AAC into a busy classroom. Some referred to the devices "*time-consuming*," while others struggled to allocate time for modelling and familiarization.

### *Lack of funding*

Several respondents highlighted the high cost of AAC devices, with concerns that investment may be wasted if students "*do not take to it*" or if teachers lack adequate support to implement it properly.

### *Engagement with parents and home*

Some teachers reported limited engagement from parents, including "*unwillingness*" to charge devices, limited modelling at home, or fears that AAC use might hinder verbal communication. In some cases, both parents and schools appeared reluctant to take responsibility, with one teacher stating, "*It is not the school's responsibility*." These findings suggest a need for both parental and teacher education, as well as better collaboration between parents and teachers to ensure effective AAC use both at home and in school.

### *Needs assessment*

Most concerningly, some respondents perceived children themselves as 'barriers', citing lack of interest, cognitive ability, or self-regulation challenges. Others reported that AAC use "*upsets other children*" or "*creates arguments*" in the classroom. These perspectives may reflect attitudinal barriers within schools and a lack of appropriate needs assessment, and they call for an urgent need for additional training and support for teachers in this area.

In the Consolidated Framework for Implementation Research (CFIR) which conceptually guided this research, implementation barriers related to the 'innovation recipients' (children) and 'teaming' and 'engagement' (with parents) are categorised under the 'Implementation process' domain. This means that poor implementation of AAC may be influenced not just by a lack of available resources and support within the schools, but also by a lack of effective structures and processes such as collaboration, appropriate needs assessment, and evaluation. These overall contextual factors influencing implementation of powered AAC as found in this research are mapped onto the domains of CFIR in Table 1.

**Table 1:** Overall research themes mapped onto the domains of the Consolidated Framework of Implementation Research (CFIR).

| Quantitative data | Qualitative data | CFIR Domain |
|---|---|---|
| *Availability*<br>*Funding (inconsistent, discretionary)* | *Lack of funding* | 'Financing' (**Outer Setting**)<br>'Available resources' (**Inner Setting**) |
| | *Lack of resources including devices and personnel* | 'Financing' (**Outer Setting**)<br>'Available resources' (**Inner Setting**) |
| *Teachers' attitudes ('perceived usefulness, reported confidence)* | | 'Motivation' (**Individuals**)<br>'Capability' (**Individuals**) |
| *Training (unavailable or once off, inconsistent quality)* | *Lack of training and knowledge* | 'Access to knowledge and information' (**Inner Setting**) |

**Table 1:** Overall research themes mapped onto the domains of the Consolidated Framework of Implementation Research (CFIR). *(Continued)*

| Quantitative data | Qualitative data | CFIR Domain |
|---|---|---|
| *In school support (limited support from principal and colleagues, inconsistent support from SLT)* | *Lack of supports* | 'Relational connections' (**Inner Setting**) & 'Communications' (**Inner Setting**) |
| | *Lack of time* | 'Available resources' (**Inner Setting**) 'Structural characteristics' (**Inner Setting**) |
| *Assessment (not ongoing)* | *Children; self-regulation in class, cognitive ability, lack of interest* | 'Assessing needs' (**Implementation Process**) |
| | *Cooperation with parents and home* | 'Teaming and Engagement' (**Implementation Process**) 'Partnerships and Connections' (**Outer Setting**) |
| *Evaluation (not ongoing)* | | 'Reflecting and evaluating' (**Implementation Process**) |
| *Planning (inconsistent)* | | 'Planning' (**Implementation Process**) |

## DISCUSSION

Our study highlights persistent barriers to the effective use of powered AAC in Irish special education, including inconsistent availability, insufficient funding, and inadequate training, issues that align with international findings (Alzrayer, 2024; Andzik et al., 2019; Da Fonte et al., 2022; Norrie et al., 2021). While previous international research have emphasised the need for increased AAC training (Da Fonte et al., 2022; Fernández-Batanero et al., 2022; Judge et al., 2017; Lamond & Cunningham, 2019; Young et al., 2023), our findings stress the importance of establishing school-wide supports, beyond individual training, that will offer ongoing collaborative and structured implementation support for powered AAC implementation in Irish schools. Our research thus adds to the international literature that recognises *contextual* support for implementation of powered AAC in schools (e.g., Norrie et al., 2021).

These findings need to be interpreted with caution given potential nonresponse bias. The survey was reliant on principals forwarding it to staff and was also voluntary, therefore the teachers who responded might have been more engaged with AAC. In practice, this means that the barriers to the implementation of powered AAC may be even greater than reported in our findings. On the other hand, our findings may include responses from teachers who did not teach learners using powered AAC in some responses. Despite these limitations, overall, the findings show a broad picture of the current state of the implementation of powered AAC in Irish special education contexts on which we previously lacked evidence. Applying the CFIR framework has provided insight into the broader contextual factors shaping AAC adoption in schools, reinforcing the need for a systemic and contextual approach to training, funding and support. By drawing our attention to implementation influencing processes, such as collaboration, planning, needs assessment, and evaluation, the CFIR framework can help guide targeted interventions that lead to greater and more effective use of powered AAC in Irish classrooms.

## CONCLUSION

The findings show inconsistent availability of powered AAC, insufficient and fragmented funding, inadequate training and implementation support, and, importantly, poor implementation processes, all of which impede equitable and effective use of powered AAC in classrooms. These challenges resonate with international findings, highlighting persisting and unresolved issues in the equitable implementation of AAC. To address these issues, our research emphasises the necessity of a planned, systematic, collaborative, and supported approach to powered AAC implementation in Irish schools. This includes adequate funding, ongoing professional development, collaborative planning, and robust evaluation processes. While the decision on the *adoption* of AAC may not depend on individual teachers and/or factors at the school level, as in practice this decision is made in collaboration with parents and/or guardians, and often with a professional recommendation, *how* the AAC is implemented in schools

makes a key difference to its effectiveness. The application of Implementation Science tools, for example the Consolidated Framework of Implementation Research (CFIR), as utilised by us in relation to powered AAC for the first time internationally, has a potential to offer a structured method to assess the multifaceted challenges of AAC implementation and subsequently guide our tailored and contextualised responses. This study thus goes beyond documenting the extent of the inequity in relation to access to powered AAC by directing us towards some concrete solutions which Implementation Science and the thinking with 'implementation' in mind can offer.

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