ICT TO MEET THE ADDITIONAL EDUCATIONAL NEEDS OF STUDENTS IN IRISH IMMERSION AND GAELTACHT EDUCATION

The benefits of using information and communication technology (ICT) for the inclusion of students with additional educational needs (AEN) have been widely publicised internationally. The use of ICT allows students to access curriculum content and demonstrate their learning in a variety of ways. The limited data available suggests that there are benefits in relation to the use of ICT for bilingual students. Immersion education schools and teachers often have difficulty accessing appropriate ICT resources in the language of instruction of the school. This is particularly the case if it is a minority language. Using mixed methods research, this study investigated the challenges that teachers face when accessing ICT through the medium of Irish and the resources that they require in this area. The findings suggest that there has been some improvement in the availability of ICT through the medium of Irish, however some teachers are still unaware of the products available. More developments need to be made in this area to enable teachers to overcome the challenges that they face.

Keywords: information and communication technology (ICT), additional educational needs (AEN), bilingual, immersion education, Irish.

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INTRODUCTION

The use of information and communication technology (ICT) has been recommended for students with additional educational needs (AEN) to enable them to access and respond to the curriculum (Florian & Hegarty, 2004; Istenic Starcic & Bagon, 2014). The availability of bilingual or minority language ICT resources for students with AEN can vary depending on the context and resources available in each region or educational institution (Howard, 2023). For example, resources may depend on factors such as educational policies, funding, collaboration and partnerships, and customization or language adaptation possibilities (Al-Muwil et al., 2019; Turner-Cmuchal & Aitken, 2016). Collaboration between educational institutions, technology developers, and language experts is often necessary for the creation and availability of bilingual or minority language ICT resources. Unfortunately, these resources are not always available. In some cases, teachers or educational professionals may need to adapt existing ICT resources to meet the specific needs of bilingual/minority language students with AEN. This can involve modifying the language, interface, or content to ensure accessibility and usability for these students (Maldonado-Manso et al., 2018). Internationally, immersion and bilingual education teachers have spoken about the challenges that they face when accessing ICT in the language of instruction of the school (Durán-Martínez & Beltrán-Llavador, 2020; Wojtowic et al., 2011). Furthermore, teachers have discussed how they need more training on how to make ICT resources adaptable for their bilingual/minority language context (Gómez-Parra, 2022; Pérez Cañado, 2016).

This study focused on the use of ICT for the inclusion of all students in Irish immersion (IM) and Gaeltacht schools in the Republic of Ireland. In these schools the day-to-day language of communication and instruction is Irish (Ó Ceallaigh & Ní Dhonnabháin, 2015). Students undertake a period of immersion in the Irish language in IM primary schools to help build their Irish language skills in a positive environment (Department of Education and Skills, 2016). There are IM schools located in Gaeltacht areas, where traditionally the language of the community has been Irish (Údarás na Gaeltachta, 2023). However, over the last few decades, this area has experienced much cultural and linguistic diversity and data suggests that fewer families living in the Gaeltacht have Irish as their home language (Ó Giollagáin & Charlton, 2015). Also, there are IM schools outside of the Gaeltacht areas, where the majority language of the community is English. In these schools, most students enrolled come from homes where they do not speak Irish as their first language, therefore most students start school with limited Irish language proficiency (McAdory & Janmaat, 2015). As outlined in Table 1 below, there are less primary and post-primary IM schools located in Gaeltacht areas than in areas outside of the Gaeltacht. This study included primary and post-primary schools from both regions.

Table 1: The number of schools and students being educated in Irish-medium schools (Gaeloideachas, 2024)

	Primary students	Primary schools	Post-primary students	Post-primary schools
Outside of the Gaeltacht	37,500	153	11,951	3,832
In the Gaeltacht	7,360	105	47	29

Digital plan for the Irish language

Digital plan for the Irish language The Digital Plan for the Irish Language is focused on leveraging digital technologies to support and promote literacy in the Irish language (Government of Ireland, 2022). The goal of the plan is to enhance the learning, teaching and everyday use of the Irish language through the innovative use of digital technologies (Government of Ireland, 2022). The goal of the plan is to enhance the learning, teaching, and everyday use of the Irish language through the innovative use of digital technologies (Government of Ireland, 2022). It also aims to develop and disseminate high-quality digital resources in the Irish language, such as e-books, educational apps/websites, online courses, and multimedia content, with the aim of making learning Irish more accessible and engaging. The focus is on providing teachers with digital tools and resources to effectively teach Irish, along with providing them with professional development programs that focus on integrating digital technologies into Irish language education. Another aim of the policy is community and cultural engagement with the Irish language through using Irish in digital communications and social media to promote its use in everyday life, e.g., campaigns, online communities and digital content that celebrate and use the Irish language. Partnerships and collaboration between educational institutions, tech companies and cultural organisations is central to the implementation of the plan, further promoting the development of digital initiatives that support Irish literacy. Accessibility and inclusion is promoted through ensuring that digital resources for Irish literacy are accessible to all, including those in rural areas and individuals with disabilities, so that everyone has the opportunity to learn and use the Irish language. The plan emphasizes the need to develop a robust digital infrastructure, through investments in high-speed broadband and 5G networks, to ensure connectivity in urban and rural areas.

METHODS

The Research Ethics Committee of Dublin City University gave permission for the research and the guidelines were followed strictly. A sequential mixed methods approach was adopted for this research. In the first stage, all IM and Gaeltacht primary and post-primary schools were invited by email to participate in the study. These schools were sent an email with a plain language statement explaining the study and an online link to the questionnaire. Teachers from 56 IM schools completed an anonymous online questionnaire on the resources available through Irish and the resources that they required through Irish to meet the AEN of their students. The quantitative data collected were analysed descriptively using the Statistical Package for Social Sciences (SPSS) due to the small sample size. The questionnaire consisted of 19 questions comprising of multiple choice and open-ended questions (see Table 2). The questionnaire was piloted and based on the feedback received, several terminology amendments were made.

Table 2. Questionnaire design

Background Information	Designed by author
Challenges related to accessing teaching and assessment resources	Andrews, 2020; Ní Chinnéide, 2009.
Education professionals	Andrews, 2020; Ní Chinnéide, 2009
Creating resources through the medium of Irish	Created by author
Assessment	Andrews, 2020; Pert & Letts, 2001; Ní Chinnéide, 2009; O'Toole & Hickey, 2013
Resources	An Chomhairle um Oideachas Gaeltachta agus Gaelscolaíochta, 2010; National Council for Curriculum and Assessment, 2007; Ní Chinnéide, 2009.

In the second stage of the research, semi-structured interviews were undertaken with teachers from all school types. These interviews gathered in-depth information on the topics covered in the questionnaire (see Table 2). Interviews were conducted for a maximum of 30 minutes with teachers and principals. These interviews were conducted online

due to the COVID-19 pandemic restrictions and the dispersed geographical location of participants. Interviews enabled researchers to gain a deeper understanding of the data collected from the first stage. The qualitative data collected through the interview process were analysed using thematic analysis (Braun & Clarke, 2017). This process enabled the researcher to identify patterns and themes within the qualitative data and to address the research issues (Braun & Clarke, 2017).

Recruitment and profile of interview participants

Interviews were conducted with a total of 32 teachers from IM and Gaeltacht primary and post-primary schools (see Table 3). The main participants were special education teachers, but teachers with other roles were also interviewed. Special education teachers provide additional teaching to children with AEN (NCSE, 2024). A particular effort was made to ensure that the voice and views of each Gaeltacht area were considered. Participants for this stage of the research were recruited through a plain language statement and informed consent form being sent to all primary and post-primary IM and Gaeltacht schools throughout the country.

Table 3: Number of interview participants from each school type and their role within their school.

	Administrative Principal	Teaching Principal	Mainstream Teacher (Primary)	Subject Teacher (Post-primary)	Special Education Teacher	Special Class Teacher
IM primary schools outside the Gaeltacht (N=13)	2	2	2	N/A	7	0
IM post-primary schools outside the Gaeltacht (N=6)	0	0	0	3	3	0
Primary Gaeltacht Schools (N=7)	1	2	1	N/A	3	0
Gaeltacht Post Primary Schools (N=6)	1	0	0	0	3	2

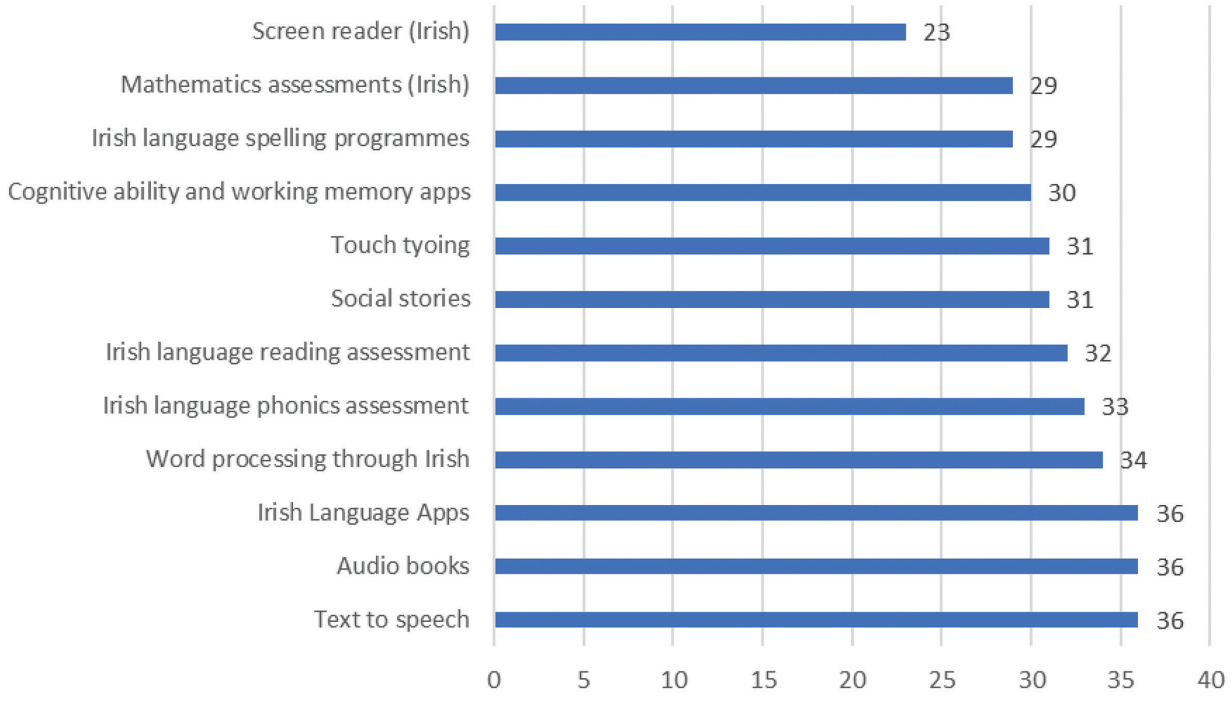
RESULTS

In the questionnaire, participants (n=56) were asked what types of ICT were required through the medium of Irish using a multiple-choice question. Text to speech (n=36), audiobooks (n=36) and Irish language applications (n=36) were identified as the most needed resources (see Figure 1 below). Word processing technology in Irish was listed next (n=34). Applications to assess students' Irish language phonics were listed in fifth place (n=33), followed by Irish literacy assessment applications (n=32). The other ICT resources required through Irish were social stories (n=31), touch-typing programmes (n=31), applications to develop student cognitive abilities and working memory through Irish (n=30), spelling programmes (n=29), mathematical assessments through Irish (n=29) and an Irish language screen reader (n=23).

In the interviews, teachers said that the most challenging aspect of including students in IM education was not having access to resources in Irish. This is a challenge experienced by bilingual and immersion education teachers internationally (Durán-Martínez & Beltrán-Llavador, 2020; Wojtowic et al., 2011). Many teachers indicated that they felt they had no choice but to use ICT resources in English to meet the needs of their students. In some cases, this may be because they were unaware of the Irish language resources available. One teacher spoke about how she adapted an English language mathematics resource by making voice-overs for the English language instructions. Four primary Gaeltacht teachers said that more applications were needed through Irish, and two teachers wanted more interactive websites through Irish. Three teachers reported that there is a need for more mathematics applications and games through Irish.

> *More applications are needed, I think. For example, the Cód na Gaeilge, it's excellent, but it doesn't start in Junior Infants. (Interview 1)*

Figure 1. The types of ICT required through Irish.



From the Gaeltacht post-primary cohort, one teacher said they that while they use a computer in the classroom, they try to avoid ICT as there are no applications or websites available to them through Irish. Similarly, another teacher spoke about how they try to avoid any English-based website or online resource. Instead, this teacher used online worksheets with no text and a lot of pictures. Regarding ICT use in IM post-primary schools outside the Gaeltacht, the Irish-language, history, and music teacher would like more interactive websites available in Irish. The lack of websites available through Irish can create problems in terms of students accessing and acquiring subject specific Irish language terminology. The teachers in the study described how their students enjoyed using technology and the immediate feedback was an exciting factor for their learning. It also helped students engage with new curricular concepts and reinforce previous learning.

> *They really liked the technology — anything related to the computer, and they were able to get immediate and positive feedback, this really helped them. (Interview 6)*

DISCUSSION

The data presented above suggests that more ICT software through Irish needs to be developed to assist students with AEN. However, the data also identified that many teachers are unaware of the Irish language ICT resources available. The ICT available through Irish is discussed in further detail below. It was identified, that in the area of literacy difficulties, for example, speech to text (Bruce, Edmonson & Coleman, 2003; Chiu, Liou, Yeh, 2007; Gardner, 2008; Higgins & Raskind, 2000, 2004; MacArthur, 2009), text to speech (Parr, 2013; Wood, Moxley, Tighe, & Wagner, 2017), predictive text software (Evmenova, Graff, Jerome, & Behrmann, 2010), and interactive books (Huriyah, 2018) through Irish would be beneficial for teachers and students, however, some of these resources are already available through Irish, for example, text to speech and speech to text (e.g., Microsoft Word, ABAIR.ie). The teachers also spoke about how they felt a touch-typing course in Irish would be beneficial to assist students with reading or motor skill difficulties (Koorland, Edwards, and Doak, 1996; Tenney and Osguthorpe 1990). The limited research available suggests that mathematics ICT programmes help bilingual students develop their mathematics skills, however, teachers in IM schools face a significant challenge accessing these resources through Irish. It is therefore suggested that the further development of mathematics and ICT applications would be beneficial through Irish for both primary and post-primary students (Outhwaite et al., 2018; Outhwaite, Gulliford, & Pitchford, 2020). For example, virtual mathematics games have been shown to promote the learning and motivation of students with AEN (Lämsä et al., 2018). The data also suggests that more ICT applications and resources are needed through Irish to assist with the personal, social,

and emotional development of IM and Gaeltacht students (Boucenna et al., 2014; Mitchel, Parsons, Leonard, 2007). This is particularly important as there is a widening body of research available on the benefits of ICT for autistic students and those with difficulties in these areas (Cabanillas-Tello & Cabanillas-Carbonell, 2020; Scarella et al., 2023).

There have been many developments in ICT Irish language resources over the last decade, with much funded work being undertaken in the Republic of Ireland. As mentioned previously, it would appear from the findings of this study that perhaps some teachers are not aware of the technology available to them through Irish. Microsoft Word now offers many functions through the medium of Irish, such as spell check, dictation, text to speech, and transcription. There are other spelling and grammar checking resources such as GaelSpell and Gaelgram. Language Tool is a free AI online and Google Chrome extension for spelling, style, and grammar checking across more than 30 languages including Irish. Abair.ie (Ní Chasaide et al., 2023a) contains state-of-the-art speech and language technologies in Irish. The site includes access to speech synthesis and recognition resources, a speech chat system for practicing irregular verbs, an Scéalaí (Ní Chiaráin, 2022) which is an intelligent computer assisted language learning platform, Mól an Óige (Ní Chasaide et al., 2023b) which is an Irish pronunciation and pre-literacy app for young people, and a free screen reader that is suitable for Windows operating systems. Geabaire which is an Irish Augmentative and Alternative Communication (AAC) device for people without speech is also available (Barnes et al., 2023), a C-Pen which scans texts and read aloud through Irish is also being developed (more information on Abair.ie). Other resources are also available such as LARA –Learning and Reading Assistant (Akhlaghi et al., 2022), this is a platform that creates multimedia annotated texts to support the development of reading skills.

CONCLUSION

It is clear from the findings of the study that perhaps some teachers in IM and Gaeltacht schools are unaware of the improvements that have been made in the development of Irish language ICT resources over the last decade. It is therefore important that teachers are provided with accessible information in relation to the resources that are available. First and foremost, it is essential that all schools have access to a high-quality digital infrastructure, such as Wi-Fi and modern computers, along with training opportunities for teachers in the area of ICT. These elements set an essential foundation for effectively incorporating technology into teaching, learning, and assessment.

Nevertheless, there is a need for further funding and development in this area in order for students in IM education to have the same access to ICT resources as those enrolled in English-medium schools. However, addressing the challenges outlined in this study is not an easy feat. It requires collaboration among educators, curriculum developers, technology providers, and policymakers to ensure that bilingual/minority language students with AEN have equal opportunities to access and benefit from ICT tools in their educational journey. It would also be worthwhile to ensure that the technology Irish language users, particularly in the context of disability and access, are included in the design and development processes in the future. This would ensure that their needs are directly addressed, rather than determined in a top-down approach by developers or educators.

Internationally, there is a need for more developments in this area, as ICT can provide bilingual children with AEN access to diverse learning opportunities, personalized support, and interactive tools that can foster their language development, cognitive skills and social skills. It can further empower them to engage actively in their education, overcome challenges, and reach their full potential.

REFERENCES

Al-Muwil, A., Weerakkody, V., El-Haddadeh, R., & Dwivedi, Y. (2019). Balancing digital- by-default with inclusion: A study of the factors influencing E-inclusion in the UK. *Information Systems Frontiers*, *21*, 635-659.

Andrews, S. (2020). *The additional supports required by pupils with special educational needs in Irish-medium schools.* https://www.cogg.ie/wp-content/uploads/Additional-supports...-2.pdf

Barnes, E., Cummins, J., Errity, R., Morrin, O., Berthelsen, H., Wendler, C., ... & Chasaide, A. N. (2023). Geabaire, the first Irish AAC system: voice as a vehicle for change. In *Proceedings of SIGUL 2023 Workshop at INTERSPEECH 2023*.

Cabanillas-Tello, A., & Cabanillas-Carbonell, M. (2020, October). Application software analysis for children with autism spectrum disorder: a review of the scientific literature from 2005-2020. In *2020 International Conference on e-Health and Bioengineering (EHB)* (pp. 1-4). IEEE.

Department of Education and Skills. (2016). Policy on Gaeltacht Education 2017 – 2022. https://assets.gov.ie/24606/a526faa89eb64675ab685c074f93b0af.pdf

Durán-Martínez, R., & Beltrán-Llavador, F. (2020). Key issues in teachers' assessment of primary education bilingual programs in Spain. *International Journal of Bilingual Education and Bilingualism*, *23*(2), 170-183.

Florian, L., & Hegarty, J. (2004). *ICT and Special Educational Needs: a tool for inclusion*. McGraw-Hill Education (UK).

Gaeloideachas. (2024). *Statistics*. https://gaeloideachas.ie/i-am-a-researcher/statistics/

Gómez-Parra, M. E. (2022). ICT Training of Pre-service Bilingual Teachers: Present, Past, and Future Needs. In *English Language Teaching: Policy and Practice across the European Union* (pp. 295-315). Singapore: Springer Nature Singapore.

Government of Ireland. (2022). *Digital Plan for the Irish Language*. https://assets.gov.ie/241755/e82c256a-6f47-4ddb-8ce6-ff81df208bb1.pdf

Howard, K.B., 2023. Supporting learners with special educational needs and disabilities in the foreign languages classroom. *Support for Learning*, *38*(3), 154-161.

Istenic Starcic, A., & Bagon, S. (2014). ICT-supported learning for inclusion of people with special needs: Review of seven educational technology journals, 1970–2011. *British Journal of Educational Technology*, *45*(2), 202-230.

Jalali-Moghadam, N., & Hedman, C. E. (2016). Special education teachers' narratives on literacy support for bilingual students with dyslexia in Swedish compulsory schools. *Nordic Journal of Literacy Research*, *2*.

McAdory, S. E., & Janmaat, J. G. (2015). Trends in Irish-medium education in the Republic of Ireland and Northern Ireland since 1920: Shifting agents and explanations. *Journal of Multilingual and Multicultural Development*, *36*(5), 528-543.

Maldonado-Manso, P., Ruiz-Palmero, J., Gómez-García, M., & Soto-Varela, R. (2018, June). Analysis of the Use of ICT in Compulsory Bilingual Secondary Education in Andalusia Public Schools. Case Study. In *International Symposium on Ambient Intelligence* (pp. 373-380). Cham: Springer International Publishing.

National Council for Special Education. (2024). *Special Education Teachers*. https://ncse.ie/special-education-teachers

Ní Chasaide, A., Ní Chiaráin, N., Berthelsen, H., Murphy, A., Lonergan, L., Sloan, J., Wendler, C., McCabe, C., Barnes, E. and Gobl, C. (2023a). The ABAIR suite of Irish Speech technology and applications: an overview, *UK Speech Conference 2023*, *Sheffield, UK*, 2023, 122 – 122.

Ní Chasaide, A., Chiaráin, N. N., Errity, R., Mroz, O., Ní hAonghusa, O., Chasaide, S. N., ... & Barnes, E. (2023b). Mol an Óige: a phonological awareness and early literacy platform for Irish. In *Proceedings of SIGUL 2023 Workshop at INTERSPEECH 2023*.

Ní Chiaráin, N. (2022). An Scéalaí: Foghlaim (Ríomhchuidithe) na Gaeilge, *Irish in Outlook: A Hundred Years of Irish Education*, *Trinity College, Dublin*, *12-13 May 2022*, Oral Presentation.

Ó Ceallaigh, T., & Ní Dhonnabhain, Á. (2015). Reawakening the Irish language through the Irish education system: Challenges and priorities. *International Electronic Journal of Elementary Education*, *8*(2), 179-198.

Ó Giollagáin, C. agus Charlton, M. (2015). Nuashonrú ar an staidéar cuimsitheach teangeolaíoch ar úsáid na Gaeilge sa Ghaeltacht: 2006–2011. *Co. Galway: Udaras na Gaeltachta (Gaeltacht Development Authority)*.

Pérez Cañado, M. L. (2016). Teacher training needs for bilingual education: In-service teacher perceptions. *International Journal of Bilingual Education and Bilingualism*, *19*(3), 266-295.

Scarcella, I., Marino, F., Failla, C., Doria, G., Chilà, P., Minutoli, R., ... & Pioggia, G. (2023). Information and communication technologies-based interventions for children with autism spectrum conditions: a systematic review of randomized control trials from a positive technology perspective. *Frontiers in Psychiatry*, *14*, 1212522.

Turner-Cmuchal, M., & Aitken, S. (2016). ICT as a tool for supporting inclusive learning opportunities. In *Implementing inclusive education: Issues in bridging the policy-practice Gap* (Vol. 8, pp. 159-180). Emerald Group Publishing Limited.

Wojtowicz, L., Stansfield, M., Connolly, T., & Hainey, T. (2011). The impact of ICT and games-based learning on content and language integrated learning. In *Proceedings of the 4th International Conference: "ICT for Language Learning* (Vol. 9).