The teacher-in-the-loop: collaboration with the teaching community in the development of an iCALL platform for Irish

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Abstract

This paper explores the teacher functionality within An Scéalaí, an iCALL platform being developed for Irish. Aiming to foster Irish language learning, the design and development of An Scéalaí has from the outset employed a cooperative approach with educators to optimise its responsiveness to user needs. There is a particular emphasis on corrective feedback at this current stage of development as we posit that administering constructive corrective feedback to learners will be the cornerstone of its pedagogical effectiveness and user satisfaction. The efficacy of iCALL platforms in promoting endangered languages, such as Irish, is contingent upon the active involvement of the associated language community. This work presents the findings of a recent questionnaire conducted as part of the ongoing initiative to engage educators and developers in a collective effort towards language revitalisation. We sought to gain an overview of teachers' experiences teaching Irish and their impressions of the An Scéalaí platform, introducing new functionality they would not have previously encountered. The results give us insights into the current situation of technology use in classrooms (post-Covid). It reinforces the importance of having the teacher-in-the-loop at every stage of iCALL development to ensure useful applications are built for the wider teacher community.

Keywords: iCALL, corrective feedback, teacher-in-the-loop, Irish language.

1. Introduction

The effectiveness of iCALL platforms, as well as the extent to which they are adopted, in the teaching and learning of endangered languages hinges on how much the respective language community participates in its evolution. From the foundation of the Republic of Ireland, education has been recognised as a critical factor in preserving and maintaining the Irish language. Speech and language technologies, when encapsulated within a pedagogically robust iCALL framework, have the potential to transform Irish language education, as they can facilitate interactive and personalised learning experiences that cater to the individual needs of the learners.

This paper describes *An Scéalaí[1]* (the Storyteller), an iCALL platform under development at Trinity College Dublin for the teaching/learning of Irish (Ní Chiaráin et al., 2022). It is being developed as part of a larger initiative, ABAIR[2], which develops core speech technologies, TTS and ASR, for the Irish language. The *An*

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[1] scealai.abair.ie

[2] www.abair.ie

Scéalaí platform is designed to facilitate the teaching of Irish at both secondary and tertiary levels, as well as to support autonomous learners in their language acquisition journey. The focus of this paper is the importance of collaborative engagement with educators in the design and development process of the platform, in particular the delivery of corrective feedback. The 'teacher-in-the-loop' concept is often used to define this human activity involved in the training and decision-making process of AI and digital systems. This participatory approach is critical to ensure that the platform is practical, effective, and responsive to the needs of end users. This paper presents insights gathered from a recent questionnaire designed to ascertain developmental priorities, contributing to an evolving understanding of the specific needs and preferences of our users.

For endangered languages, speech technology has an especially important role to play as it enables us to place the spoken language as the focal point of all language-learning activities. Most learners have very limited/no exposure to native speakers, and the ability to access native-speaker models of the language is a substantial advantage.

2. Background

2.1. The Irish language

The Irish language, classified as "definitely endangered" by UNESCO (Moseley, 2010), is a Q-Celtic language closely linked to Scottish Gaelic and the extinct Manx. It has distant ties to P-Celtic languages like Welsh, Breton, and Cornish (also extinct). The Celtic languages face significant challenges related to preservation and revitalisation. Irish, however, is Ireland's first national language and an official EU language since 2007. The 2022 census data indicates nearly 1.87 million individuals, or 40% of the population, self-reported that they could speak Irish (CSO, 2022). While it is mandatory to learn Irish at primary and secondary levels, the reality of everyday language use outside the education system, however, tells a contrasting story. In the Republic, fewer than 72,000 people (and within the Gaeltacht - predominantly Irish-speaking - regions, only 20,261 people) use Irish daily. There are three main dialects of Irish, which are quite distinct from one another.

2.2. Learning Irish at second level

Learning Irish in English-medium schools presents challenges, with learners often feeling disengaged due to a lack of native/fluent speakers and social interaction opportunities for language acquisition. Many teachers themselves are second language learners and may lack confidence in their language proficiency. The weight of responsibility for maintaining the language can often leave them feeling unsupported and isolated (Dunne, 2015).

There is a strong emphasis on State examinations in Irish language education at second level, which often shapes the curriculum and instruction methods. The syllabus combines literary and language elements, with increasing emphasis on formal grammar tests. It covers listening comprehension, written expression, and reading comprehension. At Leaving Certificate level, the oral exam constitutes 40% of the total. Literature and written expression are also emphasised, usually assessed through essays.

2.3. Corrective feedback in iCALL

iCALL, a subfield of CALL, "applies concepts, techniques, algorithms, and technologies from artificial intelligence to CALL" (Heift, 2021). An essential challenge in iCALL is integrating teacher-student Corrective Feedback (CF) loops. CF in iCALL is often given automatically, via automatic grammar checkers and text evaluators; however, this can also be combined with manual CF, such as written/audio feedback from a teacher. It is important to find a balance among the different ways of presenting and giving CF to enhance the learning experience. Auto-generated feedback, while faster and less labour-intensive, lacks reliability (Lavolette et al., 2015), particularly in under-resourced languages; therefore, teachers need to be aware of its limitations. Various iCALL platforms have been developed to explore effective feedback methods. Ai (2017) found that using

graduated feedback by increasing specificity was the most effective method for students to self-identify and self-correct. Another iCALL platform developed by Heift (2004) concluded a combination of error highlighting and meta-linguistic information was the most effective CF process, measured by students' improvements and satisfaction. These platforms emphasize the importance of responsive feedback systems.

These platforms, among others, show that it is important for iCALL platforms to implement a feedback system that learners respond well to. *An Scéalaí* incorporates proven automatic and manual feedback features while addressing the Irish teaching community needs. The questionnaire in the Methodology section gathers teacher CF experiences, which is vital for *An Scéalaí's* future development to meet the needs of the end-user.

3. An Scéalaí

An Scéalaí is an open-source intelligent-Computer-Assisted Language Learning (iCALL) platform, which: (i) acts as a digital hub for students and teachers, integrating the latest speech technology developments; (ii) serves as a tool for researchers to collect and analyse learner language data; and (iii) informs development priorities for core TTS and ASR development for Irish. Given that Irish is an endangered language, this data is invaluable for the future development of Irish language technologies.

The *An Scéalaí* platform utilises speech and NLP tools to provide students with different resources to aid their acquisition of writing, listening, reading, and speaking. One of the core features of the platform is for students to practise their composition skills, and teachers can monitor and give CF on their written work. Students compose their 'stories', via typing or speaking (ASR), and use different tools, such as grammar checkers (*An Gramadóir*[3] and a selection of in-house checkers), TTS synthesisers[2], and dictionaries[4], to enhance their composition and self-correction. Teachers have oversight of their students' stories and can provide CF by leaving textual and/or audio comments on their student's stories or by highlighting any errors.

Once a teacher has left feedback on a student's story, the student can open their story and view the changes. The feedback and comments are displayed next to the story so the students can refer to them while correcting any errors (Fig. 1).
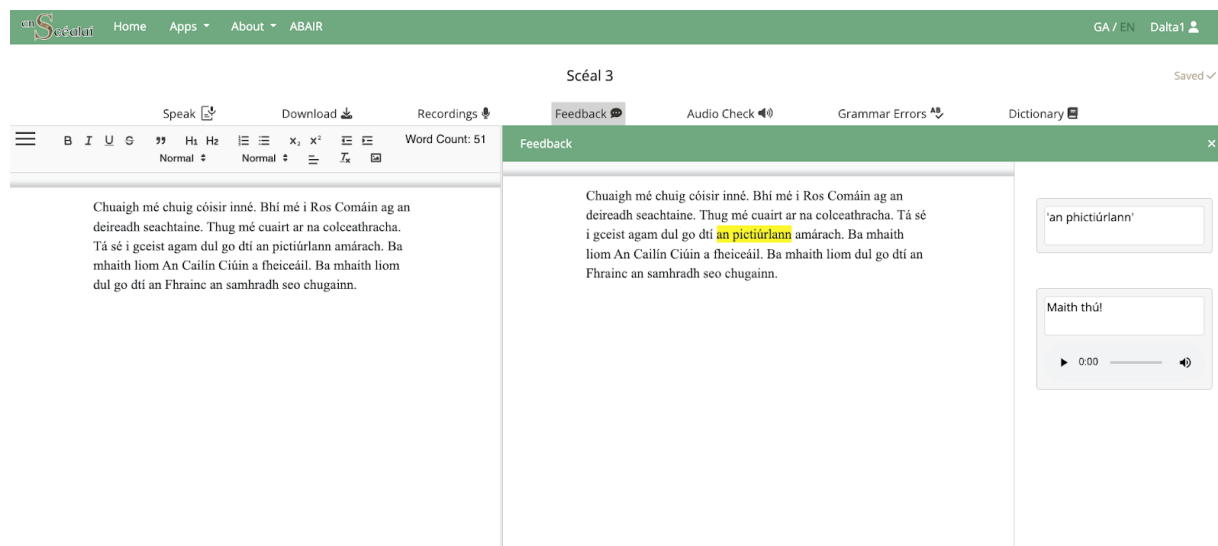

Figure 1. Students can view audio/textual feedback on their written work left by their teacher.

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[3] https://cadhan.com/gramadoir/index-en.html

[4] https://www.teanglann.ie; https://www.focloir.ie; http://www.potafocal.com

In addition to viewing their students' stories, teachers can also view a statistics dashboard that shows different metrics on their performance (Fig 2). The dashboard includes graphs displaying the vocabulary variety, average story word counts, dictionary word lookups, and errors that the grammar checkers have automatically detected. These tools give teachers an overview of error trends in both individual students' performance as well as at the classroom level.
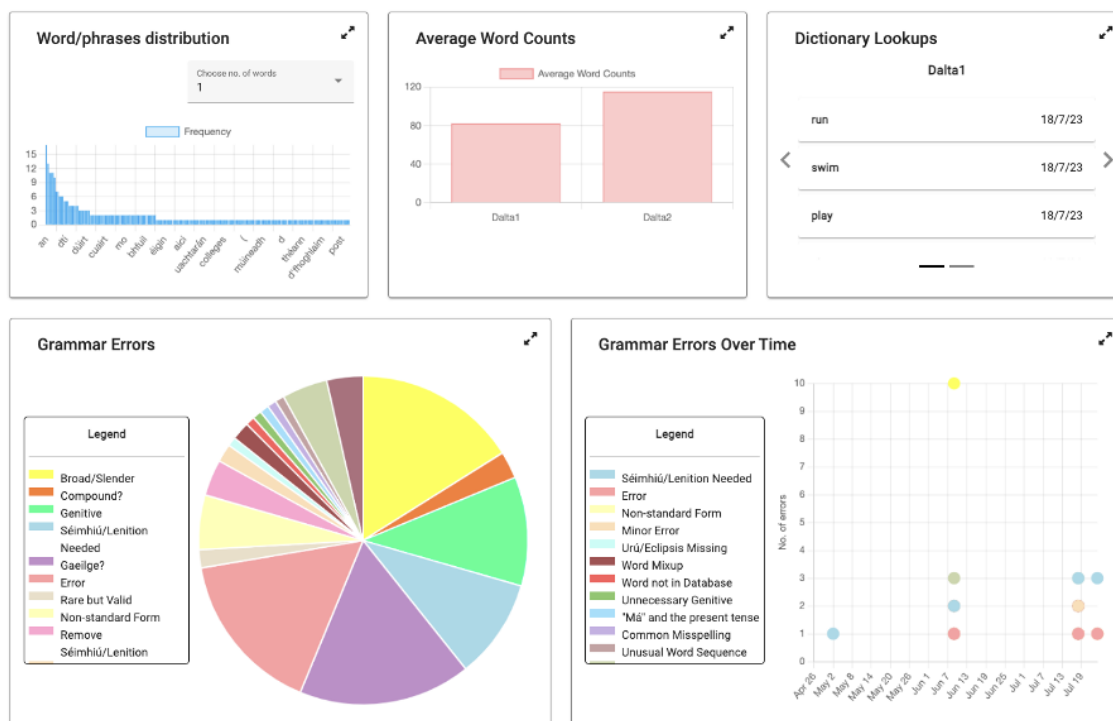

Figure 2. The teacher statistics dashboard. Available at: scealai.abair.ie

4. Methodology

A two-part (18 question) questionnaire[5] was designed and created within Google Forms and presented in a bilingual format. The questionnaire was aimed at eliciting detailed responses from second-level Irish language teachers. The first section sought general feedback on their experiences in teaching Irish, and the second section was more specifically focused on *An Scéalaí*. In this latter section, teachers were asked to watch a four-minute demo video that presented *An Scéalaí* from a teacher's perspective, and they were then asked to share their views on various features of the platform, particularly the newest addition, the statistics dashboard. The questionnaire was disseminated through a private Facebook group titled 'Múinteoirí na Gaeilge' (Teachers of Irish), which has over 8,000 members. This group of second-level teachers was chosen as it includes many active members.

5. Results and discussion

Thirty-two open-ended responses were gathered from second-level teachers of Irish (teaching Junior and Leaving certificate syllabi). Included here are some of the most notable questions and responses from the survey that can be used to direct further technical developments of *An Scéalaí*.

The questionnaire reveals teachers' strong inclination toward technology use in Irish classrooms; all but one in the sample group stated they use technology (Fig. 3). (While we believe teachers are incorporating technology into their lessons more extensively post-Covid, it is worth noting this data may have a bias towards technologically engaged teachers due to recruitment through social media during a school holiday period.)

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[5] Teacher Questionnaire: https://forms.gle/h7H1ajKwspC8zmyS9

Teachers reported using numerous Irish language resources, many of which are not specifically designed for educational or language learning purposes (e.g. Irish language media).
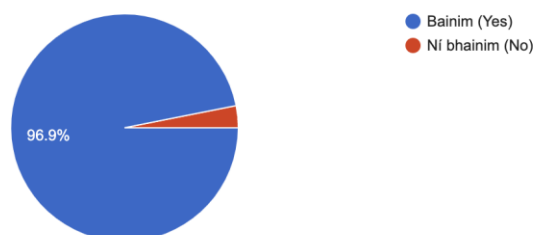

Figure 3. Teachers' (N=32) responses to: *Do you make use of any technologies when teaching Irish?*

Teachers also use numerous language-independent resources, such as Kahoot, Quizlet, and Blooket. While these resources can be useful, they require significant individual effort to tailor them for Irish. Therefore, teachers expressed strong desire for a unified platform that would supply Irish-specific materials and combine existing relevant resources in a pedagogically sound way, consolidating existing resources and reducing workload.

It is clear from the questionnaire results that teachers' approaches to platform design and development is influenced by the structure of examinations. Many respondents noted a significant disadvantage of an online platform is the necessity for students to physically write for their exams, making an extensive online engagement potentially counterproductive.

Another key area is teacher training to effectively address technological needs. Two teachers mentioned a disadvantage to the platform is the need for technological training, which mirrors that mentioned in Hubbard (2023). We can address this by creating short demonstration/instructional videos to show various features and to explain their relevance in terms of the teaching/learning of Irish.

Several teachers recognised the value of oral/aural feedback. When asked about current CF practices, over half of the teachers reported marking learner copybooks with highlights and notes and leaving audio messages for digital assignments. Six teachers mentioned using OneNote to leave CF in the form of voice messages. This is encouraging, as it aligns with what is already implemented in *An Scéalaí* (see Figure 1) and the core principle of placing the spoken language centre stage. For automatic feedback, teachers emphasised the importance of tools that are as accurate as possible, so students are not provided with misleading information.

A third of the teachers reported positive encouragement is an important part of the CF process. Currently *An Scéalaí* is dependent on manual/teacher-generated CF to provide this positive feedback for learners. In the future we would like to incorporate more positive reinforcement into our automatic feedback systems.

6. Conclusions

This paper focuses on the experiences of second-level teachers in (i) using technology for teaching the Irish language and (ii) reacting to the *An Scéalaí* platform with a view to corroborating the development trajectory of the platform.

The teacher-questionnaire feedback emphasises the importance of continually augmenting the resources available on *An Scéalaí* to meet a variety of needs. It highlights a significant demand for the development of a more diverse and engaging collection of aural and written language content as a top priority. Additionally, there is evidence that our developments align with the needs of teachers in terms of CF, namely composing individualised oral and written notes.

The engagement and buy-in of the wider teaching community are fundamental for the success of the platform. The teacher community must be 'in-the-loop' in the development of the core platform, providing input that directs development pathways, prioritising necessary applications, and actively participating in the creation and provision of these resources.

In contrast to major world languages, endangered languages require a distinctive approach. Intensive community engagement and participation become vitally important in the pursuit of preserving and revitalising languages that are under-resourced. This need becomes even more apparent when the learner's attitudes and motivation towards acquiring the language are either negative or minimal. Such a situation necessitates creating an encouraging and supportive learning environment, something that active community involvement can greatly assist in achieving.

Acknowledgements

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