

## Co-creating CALL content - does it work? Goldilocks compromise or Cruella chaos?

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### Abstract

*Developing Computer-Assisted Language Learning (CALL) resources is a complex task that requires a multidisciplinary team. Each team member brings their unique perspective – the teacher focuses on pedagogy, the developer on software, the Natural Language Processing (NLP) expert on NLP, the game developer on gaming, and the CALL expert strives to maintain a balance between all of these elements. To create effective CALL resources, collaboration and co-creation among team members is crucial. This paper delves into the intricacies of CALL resource development through the lens of a digital, game-based CALL resource for Irish, undertaken by a team comprising a teacher, a game developer, an NLP specialist, and a CALL researcher. It explores the challenges, opportunities, and the delicate balancing act required during development, to achieve a ‘Goldilocks compromise’ rather than ‘Cruella de Vil chaos’.*

**Keywords:** CALL, less commonly taught languages, educational games, co-creation.

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## 1. Introduction

Computer-Assisted Language Learning (CALL) development is a multidisciplinary endeavour and ideally involves a team with different skill sets (Ward, 2015a). However, even for the most commonly taught languages, this is often not the case, and for Less Commonly Taught Languages (LCTLs) it can be rare. Usually, CALL researchers for LCTLs have to use whatever resources are available and have to try to repurpose existing resources for their LCTL.

CALL resource development can also be frustrating for individual team members. Each member is usually most focussed on getting their part ‘right’, and having to make compromises with the other team members can sometimes require patience. The teacher wants to focus on pedagogy, the Natural Language Processing (NLP) specialist wants to focus on getting the NLP aspects right, the game-designer wants to make sure that the game element is kept to the fore, and the CALL researcher wants to ensure that learnings from CALL research underpin what is developed.

This paper looks at the development of CIPHER, a digital, game-based CALL resource for Irish (Ward et al., 2022). Current teaching is textbook-based and students have very limited access to digital resources. In order to strengthen the alignment of the CIPHER game with the classroom curriculum, the original team of a digital game developer, an

NLP researcher, and a CALL researcher was strengthened by the addition of a primary school teacher. The end goal for the team was the development of a game for learners of Irish that would be an attractive game, while at the same time being aligned with the school curriculum. The game texts are based on fairy stories and myths and the challenge is to weave the desired pedagogical components into the narrative in an unobtrusive manner, with emphasis on maintaining the game's ambiance. We wish to avoid a 'chocolate-covered broccoli' situation (Hopkins, 2015), whereby it becomes a gamified language learning resource which duplicates the curriculum, rather than a CALL resource which complements the curriculum and enhances the learning experience.

This paper reports on the co-creation process used to ensure better alignment with the school curriculum. It looks at whether a 'Goldilocks compromise' was reached or whether 'Cruella de Vil chaos' ensued, and provides suggestions for other CALL researchers considering adopting a similar approach.

## **2. Background**

### **2.1. Software development and CALL**

In the early days of computing, software development was very linear. The Waterfall model (e.g. Sommerville, 2004) was the dominant model. Needs were analysed, the system was designed, developed, tested, delivered to the end-user, and finally entered the maintenance phase. While this seems like a logical approach, there was a long time between the initial analysis phase and the final delivery of software to the client, often with little interaction between the development team and the final end-user. More recently, the agile approach has come to the fore where development occurs in iterative and incremental cycles, with frequent collaboration between teams and continuous feedback from end-users. Agile methodologies prioritise user satisfaction, teamwork, and the ability to respond effectively to evolving needs (Highsmith, 2002). This approach works well in situations where there are unknown elements or novel aspects for the development team. In the context of CALL, the development of resources is non-linear, particularly in the context of LCTLs. The development team may be ad-hoc, and the team members may have limited availability as they may have to share their time between several projects. It may be difficult to arrange team meetings with all of the required members present, and it might not be possible to carry out tasks in the preferred order. One benefit of the agile approach is that there is continual interaction between the developers and the client, so there is scope to clear up misunderstandings as the development progresses.

### **2.2. Co-creation**

Co-creation implies the creation of something between different parties. In education, particularly at higher/third level, it refers to co-creation between educators and students in a student partnership model (Bovill, 2020). In the field of CALL, there are two types of potential end-user - educators/teachers and learners. The teachers know what they want to teach but may not know how to develop it. The developers know how to develop a resource but may not be familiar with the pedagogical requirements. An NLP specialist may not be familiar with CALL. Learners may not have the experience or maturity to understand the language learning process. In a co-creation approach, it is accepted that no one person knows everything needed to develop the desired system, but together they contribute their expertise to enhance the development of CALL resources, emphasising learner needs and the deployment context (Ward, 2015b).

## **3. Method**

Cipher was developed for English and then adapted and modified for Irish, with a particular focus on primary school learners (Ward et al., 2022). The first version of Cipher (Xu et al., 2022a) was relatively successful and students were able to use it in their own classroom. However, there was a desire to make sure that the content was pedagogically focussed and aligned with the school curriculum, as previous research indicates that this is important for the uptake of CALL resources in the school context (Ward, 2007). The Cipher team consisted of a digital, game-based language learning developer interested in learning motivation and cultural heritage, an NLP and Irish language expert, a primary school teacher, and a CALL researcher with an interest in resources for LCTLs. The

game developer did not speak Irish and had not attended school in Ireland. The other team members had no game development expertise. The Irish language expert was not familiar with Irish pedagogy while the teacher was not familiar with CALL resources for Irish. However, all members of the team wanted to develop a useful and usable CALL resource for Irish by adapting and aligning Cipher with the Irish primary school curriculum.

There were four iterative steps in the development process. Firstly, the game developer worked closely with the NLP and language specialist and CALL researcher to develop the initial version of each of the stories to be used in the Cipher game. The texts were chosen with the target language learners, primary school children aged 8-12, in mind. Secondly, the teacher reviewed the texts and suggested vocabulary words that could be added to the story, so that it would align with what was being taught in the classroom. Thirdly, there were discussions between the team members to strike the right balance between curriculum alignment and maintaining the game ambiance. In step 4, the final texts were agreed and added to the Cipher game.

Figure 1 shows part of an initial version of the Hansel and Gretel story in the game. As the story deals with food, the teacher suggested that more food words could be added to the story. While the addition of some words make sense, not all the words were added as this would change the focus of Cipher from a game to a vocabulary learning task. It would distort the story and dilute the game aspect of the CALL resource. Figure 2 shows part of the amended story in the game with the addition of some of the suggested words.



Translation:

"..., said the witch.

We are very hungry, said the children.

Look, I have sweets, chocolate, jam, cakes, and apples in the house, said the witch.

The children went into the house.

They saw a lot of foods. Suddenly the witch grabbed Hansel and put him in a cage ..."

Figure 1. Initial version of the Hansel and Gretel story in the game along with translation



Translation:

"The witch came out.

Are you hungry? said the witch.

We are very hungry, said the children.

Look, I have sweets, chocolate, jam, cakes, crisps, and apples in the house, said the witch.

The children went into the house.

They saw a lot of foods - popcorn, pancakes ..."

Figure 2. Amended version of the Hansel and Gretel story in the game along with translation

#### 4. Results and discussion

The Cipher game was tested in three primary school classrooms in Ireland. Cipher was installed on tablets and each student could play the game individually. Although there were issues with Wi-Fi access in one of the classrooms, the students enjoyed the game and the teachers reported that it was good for their students. Following a two-month period of weekly engagement with the game, students were invited to participate in a survey. We considered responses rated as 4 or 5 on a 5-point Likert scale as indicative of a positive assessment, aligning with

the criteria set forth in Xu et al. (2022b). Analysis of the responses indicated that the students reported high satisfaction ratings, particularly when comparing learning Irish through the game compared to usual classroom teaching (66%). See Table 1 for details.

**Table 1:** Distribution of ratings provided by the participants.

Question	Satisfaction (n = 165) positive (percentage)
Did you like playing the game?	53%
Do you like the images in the story?	51%
What do you think about learning Irish through the game?	39%
How would you compare learning Irish through the game to normal classroom teaching?	66%
How do you feel about learning Irish after playing the game?	38%
Do you think you learned anything while playing the game?	34%
Would you recommend this game to your friends?	39%

We also collected verbal and written feedback from the teachers in the classrooms. Comments from teachers included, *“it is very motivating for the children,”* and they also had suggestions for improvement (*“I would need a few sample questions to get better before completing the game!”*).

The co-creation aspect of the development was interesting and challenging. The teacher was an expert in her classroom and was familiar with teaching Irish in an English-medium primary school. She knew the curriculum and the level of students’ knowledge of the language. The game developer stayed focussed on the game element, while being guided by the other team members in terms of Irish language content. The Irish language expert tended to overestimate the Irish language ability of the English-medium primary school students, while the CALL researcher was concerned with ensuring that the game worked, that it was pitched at the right level for the students, and was beneficial for their learning.

One clear example of the co-creation process in action was to do with the development of the content of the stories. The teacher was keen on ensuring that there were a good number of vocabulary words in each story. The game developer was concerned that this would detract from the game element. The NLP and Irish speaker was more concerned with maintaining the narrative aspect of the story. At each step of the development process, there were collegial discussions between each of the team members with each person outlining their point of view. Each member recognised that the other members had a different perspective and that it was important to take these into consideration and that compromise was necessary.

From the inception of the collaborative undertaking, it became evident that every team member would make distinct contributions to the CALL development process. The game designer's understanding of game dynamics and commitment to preserving the game's atmosphere was instrumental in shaping the project. The teacher had expertise in the school curriculum, and understood the limited time dedicated to Irish language instruction within the school timetable, and the essentiality of providing relevant resources to students. The Irish language specialist was instrumental in maintaining a consistent standard of Irish throughout the project's progression. The CALL researcher recognised that certain compromises would be necessary to achieve the intended outcome. Despite not precisely achieving the ‘Goldilocks zone’, a harmonious collaborative effort prevailed, steering clear of the disorderly tendencies and ‘Cruella de Vil chaos’.

## 5. Conclusions

When developing CALL resources, it is important to have a multidisciplinary team. The team should adopt a co-creation approach, where each member is valued for their individual contributions and perspectives. CALL is a multi-disciplinary enterprise. No one person has all the knowledge required to develop a CALL resource, but with a co-creation perspective, where mutual respect is paramount and a shared vision reigns, there is no doubt that the final product will add up to more than the sum of its parts.

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