ICALL's relevance to CALL

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Abstract. The term Intelligent Computer Assisted Language Learning (ICALL) covers many different aspects of CALL that add something extra to a CALL resource. This could be with the use of computational linguistics or Artificial Intelligence (AI). ICALL tends to be not very well understood within the CALL community. There may also be the slight fear factor around ICALL, as it may seem very complicated and hard to understand. There is also the fact that ICALL resources tend to not be widely used in CALL as they may not be sufficiently robust enough for learners or they may not address a specific pedagogical need (Heift & Schulze, 2007). This paper looks at how some (basic) ICALL resources can be used in CALL. There is a need for ICALL and CALL researchers to work together to ensure that both benefit from each other's knowledge and expertise. ICALL has progressed in recent years and it is important for the ICALL community to raise awareness of what ICALL can bring to the CALL toolbox and to encourage CALL researchers to dip their toes in the ICALL waters.

Keywords: intelligent computer assisted language learning, ICALL, natural language processing NLP, computational linguistics, CL, artificial intelligence, AI.

1. Introduction

Intelligent CALL is a broad term that covers many different facets of extended or enhanced CALL, including Artificial Intelligence (AI), computational linguistics, Natural Language Processing (NLP) techniques, and speech processing techniques in CALL resources. ICALL materials can refer to resources that make extensive use of advanced techniques to support the language learning process or those that combine some extra elements to enhance a straightforward CALL resource. While in theory, the use of AI and NLP techniques in CALL should and can improve CALL resources, in practice, the development and successful

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How to cite this article: Ward, M. (2017). ICALL's relevance to CALL. In K. Borthwick, L. Bradley & S. Thouësny (Eds), *CALL in a climate of change: adapting to turbulent global conditions – short papers from EUROCALL 2017* (pp. 328-332). Research-publishing.net. https://doi.org/10.14705/rpnet.2017.eurocall2017.735

deployment of ICALL resources is very challenging and few are sufficiently robust enough to 'escape' out of the world of academia and pilot studies to actual in-classroom and informal use by real-world learners. This is not due to lack of determination or willingness on the part of ICALL researchers, but rather due to the inherent difficulties in developing such resources (Heift & Schulze, 2003; Tschichold, 2014). Another challenge is that AI and NLP researchers are generally focussed on dealing with AI and NLP domain-specific issues and do not have an ICALL application in mind from the beginning of the research project, and often, the AI or NLP tools have to be adapted or retro-fitted to the CALL domain. This paper outlines some of the ways, despite the difficulties, in which ICALL can contribute to CALL.

2. ICALL Overview

ICALL resources range from simple grammar checkers and verb conjugation tools through to complex, rich language learning environments with automatic speech recognition and enhanced AI features. Many language learners may not think they use ICALL resources, but many do, e.g. word processors with spelling and grammar checking functions. Most ICALL resources tend to focus on one particular component of the language learning jigsaw, as resources are not available to develop comprehensive ICALL systems. For example, Volodina, Pilán, and Alfter (2016) focus on a system to automatically classify Swedish learning essays, while Digichaint (Ní Chiaráin & Ní Chasaide, 2016) is an AI system for learning Irish that focuses on simple sentences. Text input is easier for ICALL systems to deal with, but speech input systems are emerging in recent years. Voice recognition systems available with smartphones show that the technology is becoming more robust and better at dealing with a variety of different accents.

Many learners use online systems for vocabulary learning. For example, Duolingo is a vocabulary learning system which uses AI to incorporate a spaced repetition component for vocabulary acquisition. Duolingo is an example of a system that started with a different goal (language translation) and has morphed into an ICALL resource.

ICALL resources can be beneficial to learners. For example, ICALL systems can provide immediate and tailored feedback to learners. It is challenging to develop these types of resources and ICALL developers spend a considerable amount of time and effort on their design, development, and implementation. Speech processing is one area that has shown a lot of promise in the ICALL arena. Students can

articulate words and the ICALL system can provide them with graphical feedback on their speech, perhaps with a comparison to that of a native speaker.

There are several basic ICALL tools and resources that can be used and developed by CALL researchers and practitioners without the need for extensive knowledge of advanced AI or NLP techniques. Many in the CALL field are unaware of what ICALL tools and resources are available to those outside the ICALL community. However, the ICALL curtain ranges from a complete blackout to a barely-there, almost transparent net curtain. While the blackout variety may be only penetrable by those with deep knowledge of advanced techniques, there are ICALL resources that could and can be used by CALL researchers and practitioners with basic linguistic knowledge of the target language. For example, there are some simple glossing tools available which CALL researchers can use to develop their own CALL resources, tailored to the needs of their learners. There are several features in learning management systems or online learning environments that can facilitate directed learning pathways through a language learning course, e.g. the conditional access feature in Moodle (Rice, 2015). While these features do not have the complexity of a customised AI system, they can approximate some of the decision tree features in AI systems. There are open source grammar checkers that CALL researchers can customise for their learners. For example, Gramadóir (Scannell, 2017) can be modified so that specific parts of the output are filtered so that the learner focus is directed to language learning goals.

3. Discussion

ICALL resource development is difficult (Heift & Schulze, 2007). It has to balance the technically challenging needs of NLP and AI, which tend to assume correct language input, with the reality that language learners will not provide correct language when interacting with an ICALL system. CALL researchers mainly have a language and pedagogy background, being less familiar with NLP and AI. They may be slightly apprehensive when interacting with ICALL researchers (and vice versa), as both communities speak a different language. ICALL researchers want to develop useful systems and input from CALL specialists can help them in this regard.

It is important to demystify ICALL and provide non-ICALLers with the confidence to try and experiment with ICALL tools. What is difficult for programmers can be easy for CALL specialists and vice-versa. This is not to say that it will be easy to develop ICALL resources or that they will be sufficiently

robust for all language learners, but it is possible to develop ICALL resources that could be used by some language learners and be helpful for them on their language learning journey.

There is a need to manage expectations around ICALL resources. They are unlikely to be completely error-free and work exactly as the learner might expect them to. However, if learners and their teachers are aware of the limitations of a given ICALL resource, it is possible to develop and use reasonably useful ICALL materials. For beginner learners, limitations on the input language 'understood' by an ICALL system may not be too problematic, as beginners generally have a limited vocabulary. For more advanced learners, unexpected outputs or reactions by the ICALL system may foster discussion around why the error occurred and encourage them to understand the complexity of the language they are learning. Heift and Schulze (2007) provide a good overview of ICALL projects that have been successful with different learner groups.

4. Conclusions

When ICALL first emerged, along with Intelligent Computer Assisted Learning (ICAL) systems, there was great hope that it would revolutionise language learning. However, the reality is that ICALL development is much more complex and challenging than was first envisioned. Disappointment and the emergence of new avenues of research have meant that ICALL research has not been very prominent in recent years (Heift & Schulze, 2007). In order to address this, it is important for ICALL and CALL researchers to work together to develop practical resources that address real learner needs. ICALL researchers want to develop useful systems and they are torn between developing technically correct systems that do not match with the needs of learners in the real world. CALL researchers can help them in this regard by giving ICALL resources another chance. ICALL resources will not replace teachers, but they can augment the resources available to language learners.

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Research-publishing.net

Published by Research-publishing.net, not-for-profit association
Contact: info@research-publishing.net

CALL in a climate of change: adapting to turbulent global conditions – short papers from EUROCALL 2017
Edited by Kate Borthwick, Linda Bradley, and Sylvie Thouësny

Typeset by Research-publishing.net

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ISBN13: 978-2-490057-04-7 (Ebook, PDF, colour)
ISBN13: 978-2-490057-05-4 (Ebook, EPUB, colour)
ISBN13: 978-2-490057-03-0 (Paperback - Print on demand, black and white)
Print on demand technology is a high-quality, innovative and ecological printing method; with which the book is never 'out of stock' or 'out of print'.

British Library Cataloguing-in-Publication Data.
A cataloguing record for this book is available from the British Library.

Legal deposit: Bibliothèque Nationale de France - Dépôt légal: décembre 2017.