Exploring AI language assistants with primary EFL students

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Abstract. The main objective of this study was to identify ways to incorporate voice-driven Artificial Intelligence (AI) effectively in classroom language learning. This nine month teacher-led design research study employed technology probes (Amazon's Alexa, Apple's Siri, Google voice search) and co-design methods with a class of primary age English as a Foreign Language (EFL) students to explore and develop ideas for classroom activities using AI language assistants. Speaking to AI assistants was considered highly engaging by all students. Students were observed to speak more English when using AI assistants in group work, and to spontaneously reformulate, self-correct, and joyfully and playfully persist with speaking English in their attempts to get AI assistants to do what they wanted them to do.

Keywords: AI, voice recognition, learning experience design, language learning.

1. Introduction

Uses of AI technologies and robots to support language learning, particularly with children, have been explored for several years (Han, 2012). Drivers for such research include the desire to give individual students more attention in large classes and the observation that children often enjoy talking to robots and are more relaxed about using a foreign language to speak with machines than with humans (Han, 2012). In short, AI has the potential to provide more, and more motivating, opportunities for children to engage in spoken interaction in the target language. However, it is only recently that increased affordability and reliability of AI technologies have made exploring this vision in everyday classrooms practical; voice interaction has improved more in the last 30 or so months than it did in its first 30 years, "word error rate for voice-recognition systems […] is now on par with humans" (Nordrum, 2017, n.p.).

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For some, the idea of affordable AI in the classroom raises concerns about the role of teachers, teacher replacement, and loss of human values. Others emphasise ways AI and teachers may work together and even 'humanise' classes, for example by removing the need for standardised testing (Luckin & Holmes, 2017). Interestingly, the idea of robot teachers doing away with the need for tests, though very differently conceived, is also present in some children's visions of robot-assisted learning (Underwood, 2016). Essentially, the enthusiastic argument expressed in one student's essay is that, as robot teachers will have a complete record of all interaction with the student, they will be able to generate an accurate assessment of competence without the need for tests. While conscious of concerns, as a teacher I personally view AI assistants as potentially engaging and useful and it is in this spirit that this study was conducted.

The study reported here is teacher-led research motivated by the desire to address classroom challenges encountered on returning to teaching primary age students, a specific example being the need to simultaneously answer spontaneous questions from several children at once (e.g. "How do you say… in English? How do you spell…? What does… mean? Etc.) and the observation that many of those questions might easily and satisfactorily be answered by currently available AI technologies. The study addresses two questions: (1) Can currently available AI technologies provide children with satisfactory answers to some of the questions that are very common in language classrooms?; and (2) How might we exploit AI to get children speaking in the target language?

Further objectives of this study are to provide insights into: ways of supporting children in developing appropriate AI-assisted task designs; classroom management issues when working with AI classroom assistants; and other practicalities such as coping with inaccurate voice-recognition.

2. Method

The 'in the wild' design approach (Rogers, 2011) adopted in this study employed existing AI technologies as probes to stimulate children and teachers to think about current and future opportunities for using AI in natural classroom settings over a period of nine months so as to address issues of novelty and ecological validity as well as revealing practical issues. During the study, the author/teacher and a class of 11 primary-age EFL students made frequent use of various AI technologies (a single Amazon Alexa; Siri on a class set of iPads: Google voice search on the teacher's mobile phone and iPads) to support various classroom activities. Example

uses included: student-directed 'free' language use in research for project work (e.g. "Alexa, how much does an Osprey weigh?"); teacher-directed controlled practice of hard to distinguish sounds (e.g. "Ok Google, show me a picture of a ship/sheep"); and challenges like "Which group can get Alexa to answer the most complicated question?". Over time we gradually moved from teacher-designed to student-designed tasks and more spontaneous integrated uses, e.g. students saying "Why don't we ask Google?".

As in Underwood (2014), I employed co-design strategies (e.g. Arnold, Lee, & Yip, 2016) to support children in reflecting on these experiences and help them develop and communicate their own ideas about what AI language assistants might be like and how they might be used. Co-design activities included developing play-doh models of 'English Helpers', describing what they could do, and designing posters and short presentations about "robot teachers" with peer feedback. As we shall see, these methods influence the kind of results obtained and will be revised in future studies (Figure 1).

Figure 1. Primary children's play-doh representations of 'My English Helper'

3. Results and discussion

Can currently available AI technologies provide children with satisfactory answers to some of the questions that are very common in language classrooms? The answer to this varied depending on which AI was used. *How do you spell* was mostly answered correctly but often too fast and is far easier for students

to make use of when they both see and hear the spelling (e.g. Siri and Google). *What does […] mean* was often answered correctly but frequently not in ways that were easily understood by primary-age EFL learners. *How do you say […] in English* was rarely understood but occasionally correctly answered, for Spanish words, by Google. Generally students quickly learnt what was not likely to get a satisfactory answer and how to phrase questions in ways that were more likely to be answered. Despite current generally poor performance on these kinds of questions, it seems highly-likely that this could be greatly enhanced through voice interaction designs specific for language classrooms and particular first language backgrounds.

How can we exploit AI to get children speaking in the target language? The children in this study were intrigued by what any particular implementation of AI was capable of and highly motivated to test their ideas through trial and error, thus engaging in extensive interactive target language speaking whilst developing potentially valuable 21st century skills for working with AI. Speaking to AIs engaged these children's natural curiosity, largely in order to explore what the AIs were and were not capable of. For these children, asking questions, giving commands (e.g. "play some music"), and getting a response appears to have made speaking English meaningful and often joyful, even when they were not understood they often tried again, reformulated, and persisted. However, activities resulting in linked utterances, students' responding to AIs utterances, and conversations were far harder, though some Alexa skills such as 'Guess the animal' worked to some extent.

How can we support children in developing appropriate AI-assisted task designs? These students tended to design AI language helpers that were anthropomorphic and more like friends that would play with them. However, the activities they would like AI assistants to engage in with them (e.g. "be my friend", "play video games with me") were under-described probably because the co-design methods employed did not sufficiently scaffold the development of such ideas. In future studies, I aim to use storyboards, scripting of skills to implement as programmes, and peer evaluation to help children design AI-assisted tasks.

What are classroom management issues when working with AI classroom assistants? Inaccurate voice-recognition can result in inappropriate search results, so ensure safe-search is on. Voice-recognition works poorly when students speak simultaneously so they need to develop turn-taking. Students engage so enthusiastically that you need to develop good strategies for stopping activity and getting attention.

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