Speaking with machines
interacting with bots for language teaching and learning

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Potential impact	high
Timescale	long term
Keywords	chatbots, conversation, practice, specific tasks, interaction

What is it?

This piece explores technologies for freer communication *with* machines, i.e. bots (chatbots or conversational agents), rather than the concept of speaking *to* machines, such as Intelligent Assistants (IA) like *Alexa*. Bots are computer programmes which simulate natural intelligent communication using text or speech technologies. The first chatbot claimed to pass the Turing Test (a test to identify whether a computer is intelligent), ELIZA, was created by Joseph Weizenbaum in 1966 to imitate a psychotherapist. More recently, interest in chatbots appears to have shifted from whether they can be perceived as human to their ability to imitate natural conversations to achieve specific purposes and provide efficient customer services.

The field of Intelligent Computer Assisted Language Learning (ICALL) bridges research and practice in Artificial Intelligence (AI) and language learning (see Shultz & Heift, 2013). Language learners have been able to interact with many dialogue systems using short utterances since the 1990s. Modern chatbots use computational processes, such as Natural Language Processing and Machine

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Learning. An example of modern chatbots utilised for language learning was the introduction of bots in Duolingo, a popular language learning mobile phone application. Bots were only made available for the iOS operating system in October 2016 and were temporarily discontinued in April 2018. While bots have not yet come back, a quick search on the Duolingo app forum indicates their popularity (http://forum.duolingo.com/). User comments about the Duolingo bots particularly focus on availability of non-threatening conversational practice, opportunities to improve grammar, and immediate availability of bots as conversation partners. For instance, one forum user says:

> "I loved the feature of bots because it enables you to have a conversation without the stress of making mistakes, since you are not talking to a real person".

Example

A simple use of conversational agents in language learning would be to identify one or two chatbots, give learners a couple of conversation starters and example questions, and ask them to engage in a short conversation with the bots (see Yin & Satar, 2020). As an awareness-raising post-task activity, learners can reflect on their chat records to both focus on their language use and identify similarities and differences between chatbot and human interactions. A similar activity can be employed in language teacher training followed by a set of reflection questions to raise awareness on the limitations and affordances of chatbots, as follows.

- How easy/difficult was it for you to sustain the conversation with the chatbot?
- How coherent was the conversation?
- Did the chatbot acknowledge that it is a bot, or did it pretend to be human?

- What kind of questions or topics are bots better at answering?

- Are there any potentials for language learning in this activity (in terms of grammar, vocabulary, language skills, pragmatics: e.g. leave-takings, small talk, humour, negotiation for meaning, etc.)?

Benefits

There are many benefits to communicating with computers for language learners. First, in contexts where learners have limited opportunities for target language practice, chatbots can become an invaluable resource. During the COVID-19 pandemic, social distancing rules have meant that availability of online conversation practice has gained further prominence. Second, chatbots are patient conversational partners who do not lose patience when learners repeat the same content, make the same mistakes, or ask the same questions. Third, learners who experience second language anxiety find communicating with chatbots stress-free. Learners know that they can communicate freely without being judged by the chatbot and take as much time as they need to construct their expressions. Finally, chatbots can provide immediate correction or seek clarification when they do not understand learner input. Yin and Satar (2020) observed that chatbots, particularly if designed for pedagogical purposes, can engage in meaning-negotiation with the learners and elicit modified output especially around lexical items that cause misunderstanding (see Yin & Satar, 2020) for example, meaning-negotiation sequences). While most available bots afford written communication, there is evidence that written chat resembles speaking practice and can transfer to spoken conversation development (Satar & Özdener, 2008).

Potential issues

Unfortunately, conversational agents also have several limitations. Once the initial novelty wears out, chatbot responses can become predictable, redundant, or irrelevant, which can cause learners to lose interest. Second, learners may be annoyed if they repeatedly receive generic responses (e.g. I don't know),

or answers which do not make sense. Third, chatbots have limited capacity to engage in affective communication and give useful feedback. Fourth, they do not present an ideal model for communication as they tend to lack human interactional features (e.g. fillers, false starts, and hesitations). Fifth, chatbots are designed for specific tasks, and are not flexible conversational partners. This poses a challenge for teachers in utilising chatbots for language learning. Teachers would need to identify a specific chatbot designed to support a certain task, for instance a customer services chatbot for a context in which a learner is required to purchase goods or services.

As chatbots improve, other issues also emerge. As more capable pedagogical bots are developed, language teachers may suffer increased anxiety around the fear of being replaced by machines. When chatbots begin to resemble humans too much, they create feelings of unease not only in teachers, but also in learners. Additionally, chatbots can pose dangers to online safety and cause ethical dilemmas. There are fake social media accounts linked to bots or fraudulent applications, which are called spam or scam bots. Advice on how to identify such fake accounts can be found online. When chatbots pretend to be human (rather than identifying themselves as intelligent agents), ethical concerns also arise. This was the case for Google's Duplex when it was introduced in May 2018.

Looking to the future

Progress in AI and conversational agents is at an unprecedented speed regarding their appearance, functionality, linguistic accuracy, ability to offer specific responses, and to represent a personality. The chatbot Eugene Goostman is one example of a chatbot with a personality, which imitated a 13 year-old humorous Ukranian boy. A new development to look out for is Google's new AI: Meena. In January 2020, it was announced that compared to modern interactional bots, Meena will be "a Human-like Open-Domain Chatbot […] based on a 2.6 billion parameter end-to-end

trained neural conversational model [potentially leading] to many interesting applications, such as further humanizing computer interactions, improving foreign language practice, and making relatable interactive movie and videogame characters" (Adiwardana et al., 2020). While we can expect to interact with chatbots more often in our daily lives in the coming years, it will be important to incorporate ethical discussions around chatbot interaction in language and teacher training classes as part of digital literacy skills frameworks. We need further research and practice reports investigating the interactional engagement of different groups of language learners with various types of interaction bots to capitalise on this freely available technology, and ensure future successful incorporation of bots in second language learning and teaching.

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Resources

Advice on how to identify fake accounts: https://www.technologyreview.com/2018/07/18/141414/how-to-tell-if-youre-talking-to-a-bot/

Behind the mic: the science of talking with computers: https://www.youtube.com/watch?v=yxxRAHVtafI

Chatbots – a beginners guide: https://www.youtube.com/watch?v=JGIFN9HHl04

The case for Google's Duplex: https://www.technologyreview.com/2018/06/27/141823/google-demos-duplex-its-ai-that-sounds-exactly-like-a-very-weird-nice-human/

Watch two chatbots talk with each other: https://www.youtube.com/watch?v=WnzlbyTZsQY

Try out some chatbots yourself:

ELIZA: https://www.eclecticenergies.com/psyche/eliza

Mitsuku: https://www.pandorabots.com/mitsuku/

Alice: https://www.pandorabots.com/pandora/talk?botid=b8d616e35e36e881

If you are interested in creating your own bot you can try this: https://home.pandorabots.com/home.html

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