Bilingualism: Language and Cognition

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Peer Commentaries

Cite this article: MacWhinney B (2022). The future of DLL. *Bilingualism: Language and Cognition* **25**, 394–395. https://doi.org/10.1017/S1366728921000808

Received: 24 July 2021
Revised: 25 August 2021
Accepted: 25 August 2021
First published online: 10 November 2021

Keywords:
CALL; virtual reality; second language acquisition

Address for correspondence:
Brian MacWhinney, Department of Psychology, Carnegie Mellon University, Pittsburgh PA 15213, USA E-mail: macw@cmu.edu

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CAMBRIDGE UNIVERSITY PRESS

The future of DLL

Brian MacWhinney

Department of Psychology, Carnegie Mellon University, Pittsburgh PA, USA

Li and Lan (2021) provide a very useful guide to the state of the art for digital language learning (DLL), as well as its promises for the future. The explosion of commercial interest in systems for DLL has been triggered by the increasing power of computers and the Internet. In practice, these systems have paid little attention to advancing our understanding of the long-term effects of reliance on DLL as opposed to more traditional methods for language learning. The reluctance of commercial systems to examine learning effects in detail is understandable, given their interest in maximizing consumer uptake, rather than dissecting the learning process. However, from the viewpoint of second language acquisition (SLA) research, designing of optimal DLL systems needs to be based on empirical tests of alternative forms of DLL across varying learner first languages, abilities, preferences, and levels. As suggested in MacWhinney (2017), the best way to achieve these goals for SLA would be for researchers to collaborate on the construction of a shared platform for DLL. However, without substantial funding for such an activity, it may be difficult for academics to join in this way. Barring that, we can rely on partial evaluations of specific research applications, many of which are nicely reviewed by Li and Lan (2021).

The idea of using data collected through DLL to understand the joint effect of cognitive, social, affective, developmental, and neural processes on language learning is a great one. Optimal progress in language learning will certainly involve balancing constraints from all these inputs. As noted in MacWhinney (2017), the best approach to DLL may involve providing a wide range of learning options from which the learner can select the approaches that best match their current desires, understanding, and available times for learning. Given the multifaceted nature of language learning (MacWhinney, 2015), it is likely that learners will need to select from different methods to improve along varying dimensions. For example, a beginning learner may wish to focus on acquiring core vocabulary with simple methods such as illustrated flashcards. Soon after that, the learner may want to learn some children's songs by heart to control basic vocabulary and pronunciation. More advanced learners interested in cultural expression may want to focus on reading texts in L2. Their reading skill could improve most quickly with texts that have rollovers for translation of new words. At a different stage, learners may prefer to listen to movies, documentaries, or other programs with either subtitles or captions.

We may eventually be able to construct a DLL environment that is fully immersive, using devices such as the Optimus Quest headset and environments programmed with rich language learning adventures. In such a system, when one walks through the zoo, the animals may begin to engage you with dialog, telling you about their abilities and asking you about your own interests. Or you could book a flight to Florence, where you would visit with Da Vinci and Michelangelo to learn about their lives in direct conversation with their avatars, as they give you a tour of the city and their art works. Afterwards, you could book a table at a gourmet restaurant and converse with the waiter and other guests at your table to choose dishes and learn about methods of cooking. Of course, the system would try to help you out when you are missing words and making errors, but you could adjust the level of feedback to match your own tolerance level. All of this is imaginable, given the pace of advancing technology. But would these interactive experiences fully supplant other methods that focus more on understanding syntactic structure, picking up conversational patterns, and widening one's lexicon in specific areas? Would they give you an ability to translate from Italian to English? And for languages with other orthographies such as Chinese, would they allow you to learn enough characters to be able to read even simple texts? Based on your successes with avatars, you might imagine that you could then converse fluently with native speakers. You might soon come to realize that native speakers are making assumptions and shortcuts that you had never learned from the avatars.

Worse still, you may find that wearing virtual reality goggles gives you headache. To avoid this, it might well be better for you to travel physically to Florence. In that case, you can still rely on DLL to advance your understanding. If each monument and work of art in the city comes along with a QR code that triggers an explanation in Italian in both written and audio form, and if your smart phone can translate menus and signs for you, then you can quickly begin to feel immersed in the culture of Florence. For more advanced learners, the city government of Florence could train guides in shops with conversational topics that can help you understand their products, or they could coach tour guides in museums to help

you understand the background of specific works of art. Returning to your hotel room, you could replay the conversations of the day along with the transcript provided by automatic speech recognition to find things that you may have missed while interacting in person.

To back up all these new DLL methods, the best systems will measure learners' progress. Based on these measurements, the system will recommend specific exercises or activities. For example, it might make more sense for the learner to work through cloze materials targeting the learning of clitics, rather than spending additional time interacting with QR codes. For the system to make these judgments, it will need to have data from hundreds of learners, along with complete profiles of variations in learning, background, and aptitudes. It may also need to use neuroimaging methods to understand changes in processing on the neural level. All these new developments are possible, but they will arrive most quickly if researchers and commercial systems could work together to build a shared platform for language learning.

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https://doi.org/10.1017/S1366728921000808 Published online by Cambridge University Press