

Learning L2 pronunciation with Google Translate

Hamidreza Khademi¹ and Walcir Cardoso²

Abstract. This article, based on Khademi's (2021) Master's thesis, examines the use of Google Translate (GT) and its speech capabilities, Text-to-Speech Synthesis (TTS) and Automatic Speech Recognition (ASR), in helping L2 learners acquire the pronunciation of English past -ed allomorphy (/t/, /d/, /id/) in a semi-autonomous context, considering three levels of pronunciation development: phonological awareness, perception, and production. Our pre/posttest results indicate significant improvements in the participants' awareness and perception of the English past -ed, but no improvements in production (except for /id/). These findings corroborate our hypothesis that GT's speech capabilities can be used as pedagogical tools to help learners acquire the target pronunciation feature.

Keywords: text-to-speech synthesis, automatic speech recognition, L2 pronunciation, Google Translate.

1. Introduction

The limited amount of time is one of the problems that teachers and second language (L2) students face in language classrooms (Collins & Muñoz, 2016). Such constraint deprives students of receiving sufficient linguistic input (e.g. listening to the L2) and producing output (e.g. speaking with others). One of the areas in which such time restrictions can negatively impact learning is L2 pronunciation, as it requires hours of practice (Everly, 2019) and it must address at least three stages of phonological development: phonological awareness, perception, and production (Celce-Murcia, Brinton, & Goodwin, 2010). To address this limitation and at the same time encourage students to practice, teachers often ask their students to engage

1. Concordia University, Montreal, Canada; hrkhademi93@gmail.com; <https://orcid.org/0000-0002-1648-1342>

2. Concordia University, Montreal, Canada; walcir.cardoso@concordia.ca; <https://orcid.org/0000-0001-6376-185X>

How to cite this article: Khademi, H., & Cardoso, W. (2022). Learning L2 pronunciation with Google Translate. In B. Arnbjörnsdóttir, B. Bédi, L. Bradley, K. Friðriksdóttir, H. Garðarsdóttir, S. Thouésny, & M. J. Whelpton (Eds), *Intelligent CALL, granular systems, and learner data: short papers from EUROCALL 2022* (pp. 228-233). Research-publishing.net. <https://doi.org/10.14705/rpnet.2022.61.1463>

in self-directed, out-of-classroom activities in the form of homework assignments, using technologies such as TTS and ASR. TTS and ASR can be used as effective pedagogical tools for pronunciation (Liakin, Cardoso, & Liakina, 2017), as they engage learners with a wide range of out-of-classroom activities, including the promotion of input (TTS) and output (ASR) practice. Their use also contributes to fostering learners' autonomy beyond the walls of classrooms (Van Lieshout & Cardoso, 2022).

However, TTS and ASR have only been studied separately (for an exception, see Van Lieshout & Cardoso, 2022). Therefore, little is known about the feasibility of using TTS and ASR combined (as found in GT) as pedagogical tools, nor do we understand what happens when learners are asked to use the technology on their own, outside of their classrooms (e.g. to complete homework assignments). To address this gap, this study asked the following question: using GT's TTS and ASR capabilities in a teacher-guided semi-autonomous context, can English learners acquire the pronunciation of English past -ed allomorphy (/t/, /d/, /id) in terms of awareness, perception, and production?

2. Method

Following a pretest-posttest research design, 20 intermediate-level English as a second language students (age: 30-40; L1: Farsi) were recruited to participate in this two-hour one-shot study. Participants took a set of pretests on awareness, perception (aural discrimination), and production of the past -ed allomorphy. Two instruments were adopted for each measure, for a total of six tests.

For awareness, participants were asked to answer four open-ended questions to determine whether they knew how past -ed is pronounced (Test 1), and then asked to match a set of past tense verbs based on how they believed their inflections are pronounced (i.e. they had to choose *used* for /d/, *added* /id/, and *asked* /t/; Test 2). For perception, two tests required participants to aurally discriminate between past and non-past constructions (Test 1) and then identify the -ed allomorph among those selected as 'past' (Test 2). Finally, for production, participants engaged in two audio-recorded tests: they read aloud a list of words containing past -ed forms (Test 1), followed by a less controlled speaking task in which they role-played an 'interview' with one of the researchers.

After completing the pretests, participants watched a video containing instructions on how the regular past tense is formed (without any information

about pronunciation), and how to use GT’s speech features. For the treatment, which emulated the completion of a homework assignment, participants engaged in activities that encouraged them to listen (via TTS; e.g. they copied and pasted a text into GT, listened to it, and then filled-in blank spaces) and produce the target forms (via ASR; e.g. they read aloud past -ed forms into GT and then verified if the intended form was transcribed correctly). At the end of the experiment, participants completed six posttests (similar to the pretests, but containing randomized items).

3. Results

Using t-tests, the participants’ performance was analyzed in terms of phonological awareness, aural discrimination (perception), and production.

Awareness: The results from the two awareness tests indicate that the pedagogical use of GT’s speech capabilities contributed to the participants’ development of awareness of past -ed allomorphy (Table 1), particularly regarding /id/ and /t/ (but not /d/; Table 2).

Table 1. Awareness #1

	Pretest		Posttest		t-test
	M/4	SD	M/4	SD	
Total	3.30	0.80	3.80	0.41	*-3.24

*p ≤ 0.05
 Note. M/4=Mean (out of 4); SD=Standard Deviation.

Table 2. Awareness #2

	Pretest		Posttest		t-test
	M/7	SD	M/7	SD	
/d/	3.90	1.45	4.35	1.14	-1.53
/id/	2.85	1.04	4	1.02	*-3.81
/t/	1.55	0.99	2.3	1.03	*-2.44
Total /21	8.30	1.69	10.65	2.00	*-5.17

*p ≤ 0.05

Perception: Findings from both tests indicate that the GT-based treatment helped the participants improve their perception of -ed allomorphy in general (Table 3) and across the three allomorphs (Table 4).

Table 3. Perception #1

	Pretest		Posttest		t-test
	M/15	SD	M/15	SD	
Total	10.65	1.98	12.25	0.91	*-5.14

*p ≤ 0.05

Table 4. Perception #2

	Pretest		Posttest		t-test
	M/5	SD	M/5	SD	
/d/	1.65	0.81	2.4	0.68	*-4.26
/id/	2.4	0.68	3.4	0.59	*-7.96
/t/	0.9	0.71	1.3	0.66	*-2.18
Total /15	4.95	1.54	7.1	1.25	*-9.73

*p ≤ 0.05

Production: Finally, the results for production in both tests (Table 5 and Table 6) indicate that the proposed pedagogical intervention had no effect on the improvement of -ed among the participants. When considered in isolation, only the production of the /id/ allomorph was positively affected by the treatment.

Table 5. Production #1

	Pretest		Posttest		t-test
	M/20	SD	M/20	SD	
/d/	7.15	2.30	6.90	2.38	1.31
/id/	5.05	1.96	5.65	2.18	*-2.85
/t/	3.60	1.57	3.65	1.69	-0.22
Total /60	15.80	5.54	16.20	5.54	-1.28

*p ≤ 0.05

Table 6. Production #2

	Pretest		Posttest		t-test
	M/10	SD	M/10	SD	
/d/	3.70	1.45	3.55	1.54	0.90
/id/	2.55	1.19	2.95	1.19	*-2.63
/t/	0.90	0.85	0.95	0.82	-0.32
Total /30	7.15	3.23	7.45	2.99	-1.24

*p ≤ 0.05

4. Discussion and conclusion

This study examined the use of GT and its embedded speech features (TTS, ASR) as L2 pronunciation learning tools to find out whether English learners can acquire the pronunciation of English past -ed in terms of awareness, perception, and production in a teacher-guided semi-autonomous context (conceptualized as a homework assignment). Our findings suggest that there were significant improvements in both the participants' awareness and perception of English past -ed allomorphy, thus confirming the hypothesis that the pedagogical use of GT and its speech capabilities can help learners acquire the target pronunciation feature in these two first stages of L2 pronunciation development (Celce-Murcia et al., 2010). However, in terms of production, no significant progress was observed, except for /id/.

Considering the above mentioned findings, the present study offers some important pedagogical implications. The most important one is that it has demonstrated that learners can acquire certain aspects of L2 pronunciation (e.g. phonological awareness and perception of past -ed allomorphy) when engaged in teacher-initiated semi-autonomous activities such as those that characterize homework assignments. Via technologies such as GT and its speech capabilities, teachers can mitigate the time limitation that precludes them from focusing on pronunciation instruction, and consequently extend the reach of their classrooms to an environment that has the potential to provide input that is abundant and varied (via TTS), with ample opportunities for production practice and feedback (via ASR).

Despite these encouraging results, there are limitations that need to be addressed in further investigation. The first main limitation relates to the two-hour duration of the study, as research has shown that English learners need more than two hours of practice to acquire past -ed (Cardoso, 2018). Although we recognize this limitation, we also acknowledge that there is ecological validity in our pedagogical implementation, as it simulates a common learning situation in which students are asked to complete homework assignments on their own, with accessible technology such as GT. Another limitation is the number (n=20) and uniformity of the target population (Farsi L1 native speakers). Although our findings support the hypothesis that GT can help these learners improve their pronunciation skills, it is not clear whether these findings are generalizable to the larger population of English learners.

References

- Cardoso, W. (2018). Learning L2 pronunciation with a text-to-speech synthesizer. In P. Taalas, J. Jalkanen, L. Bradley, & S. Thoušny (Eds), *Future-proof CALL: language learning as exploration and encounters – short papers from EUROCALL 2018* (pp. 16-21). Research-publishing.net. <https://doi.org/10.14705/rpnet.2018.26.806>
- Celce-Murcia, M., Brinton, D., & Goodwin, J. (2010). *Teaching pronunciation: a reference for teachers of English to speakers of other languages*. Cambridge University Press.
- Collins, L., & Muñoz, C. (2016). The foreign language classroom: current perspectives and future considerations. *The Modern Language Journal*, 100(S1), 133-147. <https://doi.org/10.1111/modl.12305>
- Everly, P. (2019). Expanding pronunciation instructional time beyond the classroom: Microsoft Office 2016 OneNote Class Notebook as an interactive delivery platform. *TESOL Journal*, 10(2), e421. <https://doi.org/10.1002/tesj.421>
- Khademi, H. (2021). *Learning pronunciation with Google Translate: focus on English past -ed*. Master thesis. Concordia University. https://spectrum.library.concordia.ca/id/eprint/988658/7/Khademi_MA_F2021.pdf
- Liakin, D., Cardoso, W., & Liakina, N. (2017). Mobilizing instruction in a second-language context: learners' perceptions of two speech technologies. *Languages*, 2(3), 11. <https://doi.org/10.3390/languages2030011>
- Van Lieshout, C., & Cardoso, W. (2022). Google Translate as a tool for self-directed language learning. *Language Learning and Technology*, 26(1), 1-19. <http://hdl.handle.net/10125/73460>



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

© 2022 by Editors (collective work)
© 2022 by Authors (individual work)

Intelligent CALL, granular systems and learner data: short papers from EUROCALL 2022
Edited by Birna Arnbjörnsdóttir, Branislav Bédi, Linda Bradley, Kolbrún Friðriksdóttir, Hólmfríður Garðarsdóttir, Sylvie Thoučsny, and Matthew James Whelpton

Publication date: 2022/12/12

Rights: the whole volume is published under the Attribution-NonCommercial-NoDerivatives International (CC BY-NC-ND) licence; **individual articles may have a different licence.** Under the CC BY-NC-ND licence, the volume is freely available online (<https://doi.org/10.14705/rpnet.2022.61.9782383720157>) for anybody to read, download, copy, and redistribute provided that the author(s), editorial team, and publisher are properly cited. Commercial use and derivative works are, however, not permitted.

Disclaimer: Research-publishing.net does not take any responsibility for the content of the pages written by the authors of this book. The authors have recognised that the work described was not published before, or that it was not under consideration for publication elsewhere. While the information in this book is believed to be true and accurate on the date of its going to press, neither the editorial team nor the publisher can accept any legal responsibility for any errors or omissions. The publisher makes no warranty, expressed or implied, with respect to the material contained herein. While Research-publishing.net is committed to publishing works of integrity, the words are the authors' alone.

Trademark notice: product or corporate names may be trademarks or registered trademarks, and are used only for identification and explanation without intent to infringe.

Copyrighted material: every effort has been made by the editorial team to trace copyright holders and to obtain their permission for the use of copyrighted material in this book. In the event of errors or omissions, please notify the publisher of any corrections that will need to be incorporated in future editions of this book.

Typeset by Research-publishing.net
Cover photo by © 2022 Kristinn Ingvarsson (photo is taken inside Veröld – House of Vigdís)
Cover layout by © 2022 Raphaël Savina (raphael@savina.net)

ISBN13: 978-2-38372-015-7 (PDF, colour)

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

Legal deposit, France: Bibliothèque Nationale de France - Dépôt légal: décembre 2022.