

# Intelligent personal assistants and L2 pronunciation development: focus on English past -ed

Souheila Moussalli<sup>1</sup> and Walcir Cardoso<sup>2</sup>

**Abstract.** This study investigates an Intelligent Personal Assistant's (IPA) ability to assist English as a Second Language (ESL) learners in developing their phonological awareness, perception, and production of the allomorphy in regular past tense marking in English (e.g. talk[t], play[d] and add[ɪd]). The study addresses the following questions: Can the pedagogical use of IPAs improve learners' pronunciation of -ed allomorphy in terms of phonological awareness, perception, and production? What are learners' attitudes toward IPAs? The results suggest that participants improved in their ability to articulate their phonological awareness regarding the target form, and that their attitudes toward the technology was positive in terms of the four measures adopted to assess their experience (i.e. learnability, usability, motivation, and willingness to use). We discuss these findings and emphasize the pedagogical potential of IPAs for the development of L2 pronunciation, as well as their ability to personalize learning and consequently extend the reach of the language classroom.

**Keywords:** IPA, English past -ed, smart speakers.

## 1. Introduction

The use of technology in language learning provides learners with increased autonomy and opportunities to regulate their own learning, while offering easy access to information outside the language classroom (Braul, 2006). This study explores the pedagogical use of one such technology: IPAs, voice-controlled services that complete tasks by orally interacting with users. An example of a popular IPA is the Alexa App (Alexa henceforth), a virtual assistant developed by Amazon.

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1. Concordia University, Montréal, Canada; souheilamoussally@hotmail.com

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

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This study examines whether Alexa can assist English learners in developing and/or improving their phonological awareness, aural perception, and oral production of the allomorphy that characterizes regular past tense marking in English (e.g. -ed is pronounced talk[t], play[d] or add[id]). The rationale for using IPAs is based on previous research with IPAs (Dizon, 2017; Moussalli & Cardoso, 2016, 2020; Underwood, 2017) indicating that their use encourages repetition, improves listening and speaking, and can motivate learners to reformulate, self-correct, and persist in using the L2 (Moussalli & Cardoso, 2020).

In its design, this study adopts Celce-Murcia, Brinton, Goodwin, and Griner (2010) recommendation for pronunciation instruction. The process starts with awareness raising (Phase 1), then with the development of perception or discrimination abilities (Phase 2), and controlled (Phase 3) and guided oral production (Phase 4), toward a more spontaneous and automatized use of the target feature (Phase 5). This study focuses on the first four stages. In addition, it examines the participants' attitudes toward the use of IPAs to assess the tool's potential to promote learning (learnability), its usability, and potential to increase motivation and willingness to use the technology. The following questions guided this study.

- Will the pedagogical use of an IPA (Alexa) assist in the learning of English past -ed allomorphy in terms of phonological/sound awareness, perception (or phonemic discrimination), and production?
- What are learners' attitudes toward the pedagogical use of Alexa?

## 2. Method

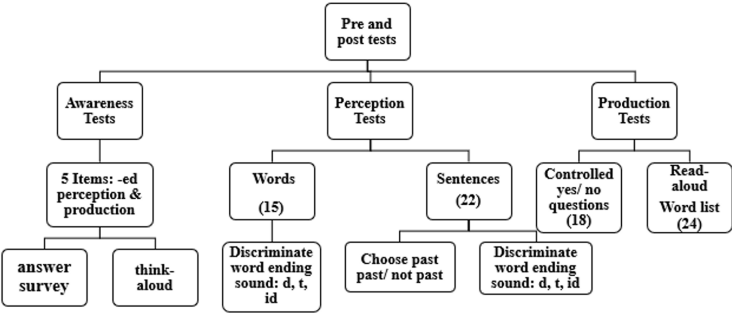
Eighteen ESL students (nine males, nine females) from different language backgrounds (CEFR<sup>3</sup> scale: B1-C2) were divided into two groups: the Alexa and the non-Alexa group. This study consisted of five main phases: (1) pre-test, (2) explicit -ed instruction, (3) app familiarization (for the Alexa group only), (4) practice, and (5) post-test. Participants completed a questionnaire about their language learning history, then completed the pre-tests assessing their past -ed knowledge. Five pre- and post-tests were created (Figure 1) following Celce-Murcia et al.'s (2010) first four stages: (1) a five-item survey about the participants' phonological awareness; (2) two perception tests: while one assessed the participants ability to discriminate the three allomorphs in sentences, the other assessed the target allomorphs in

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3. Common European Framework of Reference for languages

words produced in isolation; and (3) two oral production tests: read-aloud tasks for controlled production, and a role-playing game for guided speech.

Figure 1. Perception and production tests: pre- and post-tests



All participants underwent the five phases: pre-testing, explicit -ed instruction, and the practice phase (for both Alexa and non-Alexa group). In addition, the Alexa group was provided with an app familiarization phase. After the four-week pedagogical intervention, the participants completed the post-tests (modified versions of the pre-tests). At the end of the experiment, participants in the Alexa group were asked to complete a survey (using a nine-point Likert scale: 1=strongly disagree, 9=strongly agree) inquiring about their attitudes toward Alexa (learnability, motivation, willingness to use, and usability). They were also interviewed about their experience and attitudes toward the pedagogical use of Alexa to learn about English pronunciation. The participants in the non-Alexa group, on the other hand, were interviewed about their experience completing the assigned learning materials.

A mixed method design was used. Means and standard deviations were calculated for the five-item awareness test and nine-point Likert scale survey (n=28). Between and within mixed ANOVAs were calculated for both sets of perception and production tests. Finally, the interview data were transcribed and analyzed according to the coding methods proposed by [Saldaña \(2009\)](#).

### 3. Results and discussion

To answer the first research question, we examined the participants' development across the three levels of testing: awareness, perception, and production. The results for the phonological awareness test revealed that participants improved

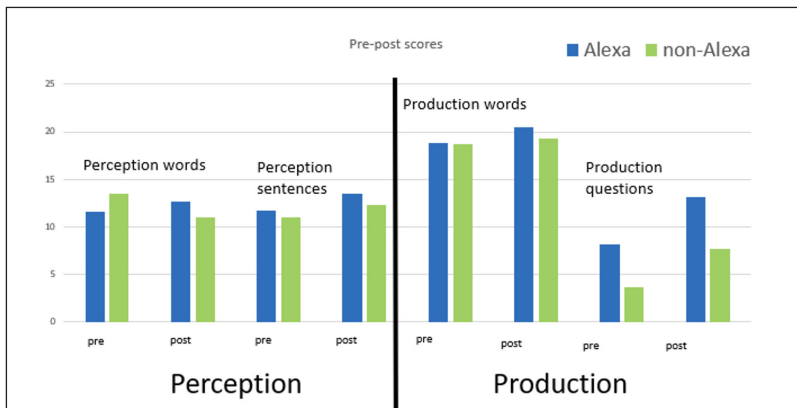
between the pre- and post-test for the first test (survey). For example, for ‘-ed accurate’ statements (e.g. “-ed in *kissed* and *jumped* sounds the same”), means increased from  $M=5.56$  to  $M=6.61$ , while for ‘-ed inaccurate’ statements (e.g. “-ed is pronounced the same in *walked*, *lived*, and *invited*”) means decreased from  $M=3.33$  to  $M=2.56$ , as hypothesized (see [Table 1](#)).

Table 1. Awareness test: means and standard deviation

	Pre-test		Post-test	
	Mean	SD	Mean	SD
Stated knowledge of past -ed pronunciation.	5.67	2.16	6.11	1.87
Kissed and jumped sound the same.	5.56	3.24	6.61	3.12
-ed is pronounced the same in walked, lived, and invited.	3.33	2.84	2.56	2.30
-ed in jumped and dreamed sound the same.	4.11	2.90	3.56	2.97
-ed in printed and dreamed sound the same.	3.89	3.32	3.22	3.20

The results for the two perception tests revealed that there were no significant differences between the pre- and post-test for all measures ([Figure 2](#)). Similarly, also shown in [Figure 2](#), the results for production were not deemed significant for any of the tests performed. Interestingly, the results of our qualitative analysis based on interviews revealed that participants in the Alexa group found it easier to produce the target [t], [d], and [ɪd] allomorphs than to perceive them.

Figure 2. Perception and production tests: results



Regarding the second question, the results revealed that Alexa has great potential as a learning tool (learnability:  $M=7.07/9$ ), it has high usability scores (usability:  $M=6.77/9$ ), it motivates the participants to learn and explore the language (motivation ( $M=7.3/9$ ), and it sparks their willingness to continue to use it in their

future language learning endeavors (willingness to use:  $M=7.73 /9$ , see [Table 2](#), where Cronbach’s Alpha values indicate satisfactory internal consistency between the items for each theme adopted). The participants also explained that the IPA was a great tool for use outside the language classroom, as a conversational partner (e.g. “is important because you sometimes don’t have other person for speak so Alexa is a tool for this when you are alone [sic]”).

Table 2. Four-theme survey: means and standard deviation

	Mean	SD	Cronbach’s Alpha
Learnability (n=7)	7.07	.36	.89
Usability (n=7)	6.77	.39	.82
Motivation (n=7)	7.36	.41	.92
Willingness to use (n=7)	7.73	.47	.94

In sum, the results revealed some improvements based on the phonological awareness tests but no significant differences between the pre- and post-tests for the perception and production, probably because of the study’s limitations: the short duration of the treatment and the low number of participants. However, the participants did find Alexa a great tool for learning and motivating them to use the L2, as attested in quantitative (phonological awareness tests) and qualitative data (interviews), thus corroborating findings highlighting the potential of IPAs to support L2 development ([Dizon, 2020](#); [Moussalli & Cardoso, 2020](#)).

#### 4. Conclusions

This study contributes to the computer assisted language learning literature by demonstrating that IPAs are valuable pedagogical tools that can extend the reach of the classroom by allowing language learners to autonomously improve aspects of their L2 phonological development (e.g. awareness of past tense marking). As far as L2 pronunciation is concerned, this study adds to the existing literature that explores the link between listening (perceptual) training and output practice on the acquisition of L2 morphophonemics.

#### References

Braul, B. (2006). *ESL teacher perceptions and attitudes toward using computer-assisted language learning (CALL): recommendations for effective CALL practice* [Master’s thesis], University of Alberta]. ProQuest Dissertations Publishing.

- Celce-Murcia, M., Brinton, D. M., Goodwin, J. M., & Griner, B. (2010). *Teaching pronunciation: a course book and reference guide*. Cambridge University Press.
- Dizon, G. (2017). Using intelligent personal assistants for second language learning: a case study of Alexa. *TESOL Journal*, 8(4), 811-830. <https://doi.org/10.1002/tesj.353>
- Dizon, G. (2020). Evaluating intelligent personal assistants for L2 listening and speaking development. *Language Learning & Technology*, 24(1), 16-26. <https://doi.org/10.125/44705>
- Moussalli, S., & Cardoso, W. (2016). Are commercial 'personal robots' ready for language learning? Focus on second language speech. In S. Papadima-Sophocleous, L. Bradley & S. Thoušny (Eds), *CALL communities and culture – short papers from EUROCALL 2016* (pp. 325-329). Research-publishing.net. <https://doi.org/10.14705/rpnet.2016.eurocall2016.583>
- Moussalli, S., & Cardoso, W. (2020). Intelligent personal assistants: can they understand and be understood by accented L2 learners? *Computer Assisted Language Learning*, 33(8), 865-890. <https://doi.org/10.1080/09588221.2019.1595664>
- Saldaña, J. (2009). *The coding manual for qualitative researchers*. Sage.
- Underwood, J. (2017). Exploring AI language assistants with primary EFL students. In K. Borthwick, L. Bradley & S. Thoušny (Eds), *CALL in a climate of change: adapting to turbulent global conditions – short papers from EUROCALL 2017* (pp. 317-321). Research publishing.net. <https://doi.org/10.14705/rpnet.2017.eurocall2017.733>

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