Speaking to write: examining language learners' acceptance of automatic speech recognition as a writing tool

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Abstract. This mixed-methods one-shot study examines L2 writers' perceptions of using Automatic Speech Recognition (ASR) to write using the Technology Acceptance Model (TAM), based on three criteria: usefulness, ease of use, and intention to use. After receiving training on Google voice typing in Google Docs, 17 English as a Second Language (ESL) students carried out two ASR-based writing tasks over a two-hour period. After the treatment, participants filled in a TAM-informed survey and participated in semi-structured interviews to measure their perceptions based on the target criteria. Findings indicate positive perceptions of ASR as a writing tool in terms of usefulness (language learning potential) and ease of use (e.g. user-friendly voice commands). We believe that these positive perceptions might lead to an intention to continue to use ASR, suggesting that the technology has L2 pedagogical potential.

Keywords: automatic speech recognition, L2 writing, technology acceptance model.

1. Introduction

Good writing requires attention not only to linguistic form but also to content, context, genre, and the writing process (Hyland, 2011). However, in ESL writing classes, students often focus on form, to the detriment of the other aspects, as they believe this is what will have the greatest impact on their grades (Ding & Zhao, 2019).

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Using ASR, a technology that converts speech to text, may remove some of the burden of producing error-free form, allowing students to pay attention to other aspects of writing such as content. Not only is this technology accessible and free (e.g. Google voice typing in Google Docs), but it fulfills Chapelle's (2001) criteria of an effective Computer Assisted Language Learning (CALL) tool: ASR has potential for language learning through the feedback, presents opportunities to engage with language at an appropriate level (it is the learner's own text), allows for an attention to meaning as the learner constructs a text, provides for an authentic use of language in a text type the learner will frequently encounter, contributes to the development of effective writing strategies, and is practical (e.g. available at no cost). Despite its multiple affordances, there is only one study examining ASR as an L2 writing tool, and it is in the context of children with emerging literacy (Arcon, Klein, & Dombroski, 2017).

The aim of this study is to determine if adult language learners would accept to use ASR to write academic texts using the framework adapted from Venkatesh and Davis's (2000) revised TAM. TAM posits that users' intentions to use new technologies is based on perceived usefulness and perceived ease of use. Perceived usefulness is conceptualized as "the degree to which a person believes that using a particular system would enhance his or her job performance", while perceived ease of use is the degree which learning a new technology is perceived as "free from effort" (Davis, 1989, p. 320). Venkatesh and Davis (2000) revised the original TAM framework to add factors that influence perceived usefulness: job relevance (*academic relevance* in this study; the degree to which the technology is applicable to the task), output quality (how well the technology performs the task), and result demonstrability (the tangible results of using the technology to complete a task). The study was guided by the following research question: How do L2 students perceive ASR as a writing tool in terms of usefulness, ease of use, and intention to use?

2. Method

This mixed-methods study was conducted with 17 ESL students enrolled in a university-level English for Academic Purposes class in Quebec, Canada. Individual research sessions began with training on using Google voice typing in Google Docs. Two short writing tasks were then carried out following the procedure used in the participants' writing class. To measure their perceptions of using ASR to write, the participants were then asked to complete a TAM-informed survey consisting of statements measuring perceived usefulness, perceived ease of use, and intention to use, scored on a seven-point Likert scale. Later,

semi-structured interviews were conducted to explore participants' perceptions of writing using ASR. Means of the survey responses were calculated and interviews were analyzed for positive, negative, neutral, or mixed perceptions (Saldaña, 2009).

3. Results and discussion

As illustrated in Table 1, an analysis of the TAM survey showed positive perceptions, as the means of the items for each category were above the level of neutrality (i.e. four), indicating that the users saw the technology as useful, easy to use, and consequently, they intend to use it again in their future language learning endeavors. Interviews revealed that participants appreciated the ease of producing texts without having to worry about orthography and grammar, the possibility to improve their pronunciation and self-efficacy when speaking, and the user-friendly voice commands. However, some participants felt their current level of English was not high enough to use ASR, since their utterances were not always intelligible to the technology. Others, however, found practice helped them overcome this issue. These results confirm our hypothesis that participants would appreciate the affordances offered by ASR as a suitable tool to use for writing.

Table 1. Descriptive statistics of survey results: main categories

TAM Constructs	Mean/7	SD
Perceived Usefulness (α =.82)	4.71	1.69
Cognitive Influences (α =.83)	4.71	1.77
Academic Relevance (α =.92)	4.16	1.80
Output Quality (α =.96)	4.10	1.79
Result Demonstrability (α =.52)	5.84	1.30
Perceived Ease of Use (α =.88)	5.25	1.58
Intention to Use (α =.60)	5.78	1.10

The positive perceptions of ASR as a writing tool can be better understood when examining the TAM constructs through the lens of Chapelle's (2001) criteria for evaluating CALL tools. Participants found the technology useful (it promoted language learning) and authentic (it was used to write authentic texts), and it fostered a focus on meaning (not form). There was learner fit, as ASR allowed participants to work at their level of English on texts for their ESL class, creating the potential for a positive impact on their writing abilities and grades. In terms of ease of use, participants appreciated the ease with which they could get the

meaning of their ideas into texts without focusing on form, and the practicality of using a tool that is already available for free on their devices (which they already use to compose shorter text messages in their L1s).

4. Conclusions

The purpose of this study was to examine ESL learners' perceptions of using ASR to write academic texts in English to assess its usability as a writing tool. Both quantitative and qualitative data indicate that users had positive perceptions, suggesting that this technology has the potential to be used by and to benefit L2 English writers.

Certain limitations must be taken into consideration. This research was completed during the COVID pandemic, and the university from which the participants were recruited was completely shut down. Participants studied at home and had very few opportunities to speak English. This may have affected their fluency and pronunciation, thus diminishing the accuracy of the ASR output and their positive perceptions of the usefulness of the tool. Additionally, this was a one-shot intervention, and we recognize that the effective use of ASR when writing may take time and practice. This lack of practice may have limited the participants' perceptions of the usefulness of the technology.

Now that the suitability of using ASR for writing has been established, the next stage is to assess its pedagogical effectiveness (Cardoso, in press). Studies are needed to determine its true pedagogical potential, as well as strategies for its use and best practices for classroom implementation. Research is also needed into using ASR to write in other L2s. French is an interesting target language because of its unpredictable orthography (e.g. the phoneme /ɛ/ can be spelled as *-ait, -ê*, or *-aient*). ASR may offer affordances for students to learn about grapheme-to-phoneme associations in such a language. Writing involves more than creating texts with correct form. Writers deserve a technology that allows them to focus on other elements of writing such as content and genre. ASR has the potential to be such a technology, as its use yields positive perceptions among ESL learners.

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