



The affective benefits of speech recognition systems on pronunciation monitoring

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Abstract. This research aimed to investigate the effects of pronunciation monitoring on learners' affective factors through self-monitoring activities using speech recognition systems. The effect of a specifically designed pronunciation activity for Japanese university students was analyzed. The worksheet form of the activity was based on the use of speech recognition systems such as Siri and Google apps. A special focus was placed on the development of students' affective phase toward English and pronunciation learning. The research concluded that the activity had a positive impact for increasing awareness of, interest in, and motivation toward pronunciation improvement and it highlighted the important role of teaching pronunciation in English oral communication skills in the limited English exposure of the English as a Foreign Language (EFL) context.

Keywords: monitoring, pronunciation, material design and development, EFL.

1. Introduction

To investigate effective pedagogical means of monitoring in instruction, this research examined the effects of pronunciation monitoring on Japanese university English learners' affective domain through self-evaluation activities using speech recognition systems such as Siri and Google apps. The importance of monitoring and self-repair in English pronunciation acquisition has been discussed (Bailey, 1999; Kormos, 2000); however, neither the development nor the examination of implementable, systematic materials has been assessed. To fill this gap, systematic affect-oriented pronunciation activities were designed and experimented (Chujo, 2010, 2018). In these studies, Chujo (2010, 2018) revealed that developing learners' self-monitoring and self-repair skills is essential for fostering autonomous learners

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and that the monitoring activity had a strong positive impact on the learners' affective phase. In the previous studies, students used a mirror, audio recordings, and video recordings to self-monitor. The developed materials were summarized in the form of a textbook, and over 4,000 copies have been circulating in the Japanese university teaching ground. Meanwhile, instructors who used the textbooks made pedagogical requests for the inclusion of an evaluation method that was more prompt and accessible for both instructors and students. The continuing motivating force behind this redesign was a positive effect on the affective domain of the learners.

2. Theoretical background

The affective domain is believed to be very important in education and training (Heinich, Molenda, & Russell, 1993) and concerns “attitudes, appreciations, values and emotions such as enjoying, conserving and respecting” (Heinich et al., 1993, p. 104). Activities such as chants, music, and poetry are said to be effective for accessing the affective domain because they “can produce lowered anxiety and greater ego permeability among second language learners” (Richard-Amarto, 2010, p. 271). Monitoring is related to the affective domain both for language learning and for pronunciation in particular. Celce-Murcia, Brinton, and Goodwin (1996) state that

“monitoring is assuming a larger role than it has previously played in language teaching. As part of learners taking responsibility for their own learning, self-monitoring is vital to learners' sense of control over their progress” (p. 349).

Monitoring pronunciation through the use of smartphones using video and apps such as Google Translation are used not only in English education but also in multilingual language education in Japan (Iwai, 2020).

3. Material design

The materials were designed with the aim of having students realize (1) their current level of English pronunciation intelligibility, (2) the importance of pronunciation and how the lack of pronunciation skill has a negative effect on oral communication, and (3) that there are handy, efficient, and free pronunciation monitoring tools which they can easily access. The materials were developed with special emphasis on the learners' affective growth; the goals were to (1) raise students' interest in and

awareness of the elements of pronunciation in English language learning, and (2) increase their motivation for and understanding of the importance of pronunciation practice.

A worksheet was designed for the activity (Figure 1). Segmental features were targeted, with a focus on ten consonants which often cause communication breakdowns due to the negative influence of learners' first language, Japanese. These were /l/, /r/, /w/, /f/, /v/, /θ/, /ð/, /s/, /z/, and /ʃ/. In the worksheet, these targeted phonemes were placed at the beginning of each word and presented for students to pronounce in the monitoring activity. The target words were: real, volunteer, weather, locker, button, vanilla, surfing, theater, girl, and battery. The monitoring activity was designed to be simple and self-explanatory to help the learners focus on their tasks. There were five steps: (1) switch an application on the device into English language mode, (2) pronounce the presented word five times, (3) record each recognition result, whether recognition was successful or not (if the trial is not recognized, write the misrecognized word), (4) record the number of times the word is recognized among the five attempts, and (5) write a comment.

Figure 1. Worksheet sample

第1回発音確認票									
		20 年 月 日		学籍番号		氏名		使用デバイス: 使用アプリ:	
No	発音単語	1回目	2回目	3回目	4回目	5回目	認識回数	認識初回	コメント
1	real 誤認識語								
2	volunteer 誤認識語								
3	weather 誤認識語								
4	locker 誤認識語								
5	button 誤認識語								
6	vanilla 誤認識語								
7	surfing 誤認識語								
8	theater 誤認識語								
9	girl 誤認識語								
10	battery 誤認識語								

Note. 誤認識語: misrecognised word 1回目: first time 認識回数: the number of recognition
 認識初回: the first-time recognition コメント: comments

4. Methodology

The 50 participants in this study were intermediate level first year students majoring in engineering in a Japanese university. Due to Covid-19, the entire class

was conducted online; students watched and listened to the teaching materials, then practiced individually. The developed activity was implemented twice during the semester: pre and post-instruction. Between the developed activities, explicit pronunciation instruction was held. To examine the effectiveness and suitability of the activity, students responded to a written questionnaire after each monitoring activity. Students responded to the question items in the form of five-point Likert scale (one, strongly disagree, five, strongly agree) and the responses were statistically calculated for obtaining the mean (M) and standard deviation (SD).

5. Results and discussion

Thirty students used Siri, 18 used Google Translate, and two used other applications for this activity. Forty-nine students responded to the pre-instruction questionnaire and 43 to the post-instruction questionnaire. Table 1 shows the question items and their results.

Table 1. Results of pre and post instructional monitoring activity

No.	Statement	Pre-instruction		Post-instruction	
		(n=49)		(n=43)	
		M	SD	M	SD
1	I enjoyed this activity.	3.59	1.12	3.77	0.97
2	I was happy when my pronunciation was recognized.	4.08	1.04	4.30	0.89
3	I lost confidence when my pronunciation was not recognized.	3.59	1.22	3.70	1.10
4	It is a convenient way to check pronunciation.	3.59	1.14	3.84	0.87
5	It is an effective way to check pronunciation.	3.49	1.06	3.86	0.97
6	I raised my awareness toward pronunciation.	3.84	0.90	4.16	0.97
7	I raised my interest toward pronunciation.	3.65	1.01	4.00	0.87
8	I would like to attain the English pronunciation skill to be recognized.	4.20	1.02	4.40	0.69

All the results (except three which had a negative statement) showed a positive effect on the students, even in the pre-instruction phase, which was their first trial of the developed activity. However, the post-instruction results showed an even greater positive effect, revealing that the same activity presented at a different time in the class had a different degree of effectiveness.

Statements 6 and 7 showed that students raised their awareness and interest toward pronunciation through this activity [Pre (M=3.84, SD=0.90), Post (M=4.16, SD=0.97)] and [Pre (M=3.65, SD=1.01), Post (M=4.00, SD=0.87)] respectively.

Results from Statements 2 and 8 showed that even with the devices, the students' feelings were strongly engaged [Pre (M=4.08, SD=1.04), Post (M=4.30, SD=0.89)] and they exhibited a strong desire to be understood [Pre (M=4.20, SD=1.02), Post (M=4.40, SD=0.69)]. These results show that they endeavored to communicate in English using the device as an interlocutor.

The results of Statements 4 and 5 showed that the speech recognition system was a convenient and efficient monitoring tool [Pre (M=3.59, SD=1.14), Post (M=3.84, SD=0.87)] and [Pre (M=3.49, SD=1.06), Post (M=3.86, SD=0.97)].

Statement 1 revealed that the enjoyment rate was not high, as expected [Pre (M=3.59, SD=1.12), Post (M=3.77, SD=0.97)]. The on-demand instruction style might have affected these results.

The result from Statement 3 showed that loss of confidence following unsuccessful trials was stronger after instruction [Pre (M=3.59, SD=1.22), Post (M=3.70, SD=1.10)]. One possible reason could be that even with one semester of practice their performance outcome had not improved as much as they had hoped.

6. Conclusions

This research examined the effects of pronunciation monitoring on learners' affective factors through self-monitoring activities using speech recognition systems. Further research requires the examination of when (and how often) to use this method of monitoring depending on its pedagogical purposes and how to revise it to bring about an even stronger effect in the actual classroom. However, the presented self-monitoring activity provided effective monitoring tools that had a positive impact on Japanese university students' affective domain by raising their awareness, and motivation to attain intelligible pronunciation.

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