
The Impact of a Computer-Mediated Shadowing Activity on ESL Speaking Skill Development: A Pilot Study

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This pilot study explored the instructional value and potential of a computer-mediated shadowing activity for improving English as a Second Language (ESL) learners' speech intelligibility. Prospective International Teaching Assistants (ITAs), who were enrolled in an ESL classroom communication class at a large public university, completed a computer-mediated shadowing activity using two web resources, Go Animate and TED talks. Then, these adult ESL participants were surveyed on their perceptions of the efficacy of this shadowing activity for improving their pronunciation, intonation, rhythm, and fluency. In addition, participants' speech samples recorded during the shadowing activity were independently assessed by certified ESL speaking exam raters. The evaluation results, including holistic proficiency scores and rater comments, were analyzed in terms of pronunciation, prosodic control, and overall intelligibility of the speech samples. Although the study is inconclusive, findings from this case study suggest that the computer-mediated shadowing activity may well be an effective means to raise ESL learners' awareness of the problems in their prosodic control and help them to improve their speech intelligibility.

INTRODUCTION

One of the major concerns among those who work with international teaching assistants (ITAs) is speech intelligibility (Chiang, 2009; Gorsuch, 2003; Hinofotis, Bailey, & Stern, 1981; Hoekje & Linnell, 1994; Hoekje & Williams, 1992; Smith, Byrd, Nelson, Barrett, & Constantinides, 1992). In an effort to design an effective language learning activity focused on improving speech intelligibility—especially in relation to prosodic control (i.e., stress, rhythm, and intonation)—of prospective non-native English speaking ITAs, this study examined ITA and rater evaluations of a computer-mediated shadowing activity.

Speech Intelligibility

There is no universal definition of speech intelligibility, nor are there ways of measuring it due to the complex interaction of multiple variables and contextual factors that make up or

affect this construct (Derwing & Munro, 2005; Jenkins, 2006; Pickering, 2006). These factors include, but are not limited to, the speaker's accentedness and proficiency in the target language, the listener's own proficiency and familiarity with the speaker's accent, and the transmission channel (e.g., room acoustics, electronics) of the language interaction.

Previous research studies suggest that native English speakers' perception of intelligibility is significantly influenced by an ESL speaker's prosodic control (i.e., rhythm, stress, and intonation) rather than the segmental level of sound control such as accurate pronunciation of vowels and/or consonants (Anderson-Hsieh, Johnson, & Koehler, 1992; Anderson-Hsieh & Koehler, 1988; Derwing & Rossiter, 2003; Munro & Derwing, 1995; Tanner & Landon, 2009).

The findings above highlight that L2 learners may well need to improve their prosodic control in order to facilitate their intelligibility, especially when speaking to native speakers of English. However, many non-native English-speaking ITA candidates have faced the challenge of demonstrating and maintaining good speech intelligibility in order to be assigned to and function well in an undergraduate classroom. Thus far, it has become a shared concern among language educators, SLA researchers, and speech scientists to identify effective teaching and intervention methods to help ITA candidates improve speech intelligibility (e.g., Stevens, 1989).

Against the contextual backdrop above, this study examined the potential impact of a computer-mediated shadowing activity that was designed to remedy ITAs' speech intelligibility issues by helping them to improve their pronunciation—segmental sounds and word-level stress and prosodic control—rhythm, and intonation.

THE STUDY

The present research was conducted over a two-week period in a small-size graduate-level course at a large public university in the Midwestern United States. The university requires all incoming international graduate students to take an in-house oral English proficiency test (OEPT) administered by the oral English proficiency program (OEPP). The test is designed to screen prospective teaching assistants for oral English proficiency, which is part of a university-wide effort to ensure that only those who have sufficient English speaking skills are offered teaching assistantships. Those who fail to receive a passing score on the OEPT are required to enroll in a graduate-level course to improve their English speaking skills and achieve a reasonable level of speech intelligibility for the purpose of teaching undergraduate courses. Data were collected from graduate students enrolled in a section of the English speaking class.

Method

Participants

Five graduate students—four male and one female—participated in the study. Participants were all from China. They were pursuing either an MA or a Ph.D. in science fields. The students had all failed to receive a passing score on the OEPT and were subsequently placed in a graduate-level English speaking class. In order to receive a recommendation for a teaching assistantship, they needed to successfully complete the

course requirements and demonstrate that they have achieved the desired level of English speaking skills by the end of the semester.

The Intervention

To address intelligibility issues, we devised an activity called “shadowing” using two digital tools: 1) *Go Animate* (GoAnimate, 2015), a web-based digital animation creation tool and 2) *TED Talks* (TED conferences, LLC, 2015), a website that offers thousands of filmed presentations on a variety of topics. The following sections briefly explain the devised activity.

The Shadowing Activity Procedures

In the shadowing activity, students were asked to choose a TED talk to replicate, make a video with their voice-over by using Go Animate, and present their video clips for peer feedback.

Go Animate is a web-based application designed to create digital animations for presentation purposes. In addition to allowing for quick and easy creation of digital animations by offering a list of available settings, characters, and objects, Go Animate also has various sound control functions that permit the addition and customization of background music and sound effects. Furthermore, the recording function enables voice-over for the designated characters. Due to these features and the program’s user-friendly interface, Go Animate was selected as a mediating tool to facilitate the shadowing activity in our study. Figure 1 presents the screenshot of the final version of a student’s shadowed TED talk.



Figure 1. Screenshot of a Go Animate presentation video created by a student participant

The TED website was specified as the only source for finding model speeches. In addition, students were required to choose a TED Talk with an English transcription. In an effort to increase their motivation, students were encouraged to select a video by a speaker whose English they admired. After choosing a talk, they first watched the entire presentation. Then, they divided the first three minutes of the TED talk into 10-20 second-long segments and practiced the speech using the transcription.

Throughout the shadowing activity, students repeatedly listened to the model speech to improve their mimicry of the pronunciation, stress, rhythm, and intonation patterns of the speaker. In addition, they recorded and replayed their own imitated speech using the Go Animate voice recording function, and compared their own recording against the published TED talk to detect any notable differences. To facilitate the activity, the instructor gave two hours of lectures on basic English phonology covering topics such as vowel and consonant articulation, stress, rhythm, and intonation.

After sufficient practice, students added a voice-over to the animated character to finalize their video product. As in the practice phase, students were required to read aloud from the transcript. Once their work was finalized, students sent the links to their video clips generated by Go Animate to their instructor. The instructor showed their video clips in class and conducted a reflective discussion activity for peer feedback during which every shadowed speech was reviewed and critiqued by students with a focus on speech intelligibility.

In summary, every student needed to take the following steps to complete this shadowing activity:

1. Choose a TED talk and retrieve the transcript of the talk.
2. Attend two hours of lectures on basic English phonology.
3. Practice speaking by modeling the TED talk and consulting the transcript.
4. Compare the shadowed speech recording and the model speech.
5. Review and re-record the shadowed speech until satisfied with the quality.
6. Add voice-over to the character in Go Animate while using the transcript (read aloud).
7. Submit the URL of the video clip to the instructor.
8. Watch the Go Animate video clips that students created, and participate in a reflective discussion with classmates to give/receive feedback.

Data Collection and Analysis

Speech Evaluation Instrument

The speech samples were evaluated by two certified raters of the OEPT for ITA candidates by using the OEPT speaking skill assessment rubric (see Appendix B). The rubric contains six levels of speaking performance and their associated descriptors. The original rubric was slightly modified to keep the source of the rubric anonymous.

Rater Training

OEPT certified raters completed a rigorous certification process, which involved a 15-hour self-paced software program for training new raters. In this initial stage of training, raters used a standardized rubric for speech assessment to rate ITA candidates' speech samples. The second step in the rater certification process was to rate 20 to 30 ITA candidates' tests along with certified raters within two weeks immediately following the initial training to experience rating in a team of evaluators. The third step for rater certification was to complete periodic rater training assignments, attend rater training

sessions, and serve as an apprentice rater for one regular semester. During the second and third steps, the apprentice rater's ratings were carefully monitored to ensure inter-rater reliability of 0.8 or above with certified raters. Once certified, raters began formal duties while regularly attending rater training meetings to maintain the requisite level of inter-rater reliability.

In the present study, two OEPT certified raters were assigned to evaluate all five participants' shadowed TED talks by using the rubric presented in Appendix B. Further, the raters were asked to provide extensive comments on participants' speech performances, especially with regard to prosodic control and overall intelligibility. To maximize the validity and reliability of these ratings and textual comments, the five Go Animate videos were counterbalanced across the two raters to control for possible order effects.

Analysis of Speech Sample Evaluations

In order to measure improvement of participants' speaking proficiency, we compared ratings of shadowed speech samples submitted by two raters with the original OEPT test scores of all participants. In addition, two raters' evaluative comments on five speech samples were analyzed and classified into positive or negative comments. A "positive comment" refers to strengths of the speech sample, while a "negative comment" refers to weaknesses of the speech sample. After classifying the two raters' comments into either of these categories, some comments were merged into representative comments when the two raters were in agreement.

Evaluative Survey

An anonymous online survey was administered to student participants shortly after the reflective discussion session. The survey consisted of a total of eight questions including one multiple choice question on demographics, five Likert-scale items, and two essay-box items (see Appendix A).

The survey was primarily designed to elicit student participants' evaluative responses about the effects of the computer-mediated shadowing activity in the following five areas:

1. Improvement of overall speaking skills
2. Improvement of fluency in English speaking
3. Improvement of pronunciation control in English speaking
4. Improvement of intonation control in English speaking
5. Improvement of rhythm control in English speaking

The student participants' responses to the Likert-scale items were analyzed using frequency tables, and the results were carefully reviewed by both researchers before any inferences were derived.

Interview

All five student participants were interviewed for ten minutes to document their experiences with the shadowing activity and post-activity discussion. During the interview sessions with participants, researchers primarily focused on eliciting their reactions to the

review of Go Animate video clips during the reflective discussion activity, which had been designed to allow for peer/instructor feedback on speech samples.

Analysis of Interview Data

Interview data were all transcribed and subsequently open-coded (Yin, 2003). This open-coding resulted in the development of over-arching thematic categories. These categories were used to summarize participants' responses. In this process, identical comments were discarded while the recurrent responses were grouped. This process led to the development of a list of major comments pertaining to participants' experiences with the reflective discussion activity.

RESULTS

Speech Sample Evaluation Results

In order to measure the gain in speaking skill improvement after the computer-mediated shadowing activity, two trained OEPT raters evaluated five speech samples based on the OEPT standard rubric. Table 1 presents a summary of all participants' OEPT and speech sample scores.

The results show a clear gain in speech sample scores for Participants 1, 2, and 3. Most notably, Participants 1 and 2 received a passing score on the OEPT (i.e., students are ready for classroom teaching). However, there was disagreement between the two raters' scores for Participants 4 and 5. Rater A gave their speech samples a score of 2, which was identical to the two participants' OEPT scores. By contrast, rater B gave a score of 3 on their speech samples. Based on these results for Participants 4 and 5, we cannot confirm that there was an improvement for these participants.

Table 1
Participants' OEPT and Speech Sample Scores

Participant ID	OEPT	Rater A	Rater B
Participant 1	Level 3	Level 4	Level 4
Participant 2	Level 1	Level 4	Level 4
Participant 3	Level 1	Level 3	Level 3
Participant 4*	Level 2	Level 2	Level 3
Participant 5*	Level 2	Level 2	Level 3

*Indicates disagreement between two raters' scores

As presented in the method section, a qualitative analysis was conducted on the two raters' evaluative comments on the five speech samples. In this process, all comments were classified into "positive" and "negative" categories (see Appendix C for a summary).

The results indicated that all participants were found to be adequately intelligible with good prosodic control. However, as mentioned earlier, two raters disagreed in their ratings for Participants 4 and 5. The difference could be attributable to the raters' differing perceptions of the degree of intelligibility and listener effort required to achieve a rating of level 3.

The two raters did not make any negative comments on Participants 1 and 2, effectively confirming that these speakers did not display any notable problems in their speech samples. Regarding Participant 3, the raters were in agreement that the speaker had some mispronunciation issues such as substitutions of word-final consonants.

Finally, for participant 5, both raters noted a few mispronunciations in the speech sample. Furthermore, they mentioned that they would have had difficulty understanding if they were an undergraduate student in the classroom. However, Rater B indicated that he was able to follow the speaker for the most part with sufficient attention. Rater B additionally noted that without concentrated attentional effort, listeners might find the speaker unintelligible. These comments suggested that the two raters were in agreement that the speaker had an intelligibility problem, although they disagreed about the severity of the intelligibility issue. Thus, the available evidence confirms that their differing ratings on the speech sample stemmed from a difference in the raters' respective perceptions of the speech sample's intelligibility.

Student Survey Results

Table 2 shows a summary of the participants' responses to the evaluative survey. The results indicate that participants' evaluations of the computer-mediated shadowing activity were positive in the following categories:

1. Overall speaking skill improvement (OSSI)
2. Fluency (FL)
3. Pronunciation (PR)
4. Rhythm (RH)
5. Intonation (IN)

The results suggest that the computer-mediated shadowing activity was effective in improving overall speaking skills, fluency, pronunciation, rhythm, and intonation, as perceived by the participants.

Table 2
Evaluative Survey Results

Participant	OSSI	FL	PR	RH	IN
Participant 1	A	A	SA	SA	SA
Participant 2	A	A	SA	A	A
Participant 3	SA	A	D	SA	SA
Participant 4	A	N	SA	A	A
Participant 5	A	A	A	A	A
Total	5	4	4	5	5

Note. SA=Strongly Agree, A=Agree, N= Neither agree or disagree, D= Disagree

In addition to the Likert-scale based questions, the evaluative survey contained one open-ended question that asked participants to write a brief comment regarding the benefits of the computer-mediated shadowing activity. Table 3 summarizes participants' responses to the question. Participants' responses all consistently indicate that the computer-mediated activity helped them improve their speaking skills, particularly in terms of intonation. Furthermore, some of the participants mentioned the improvement of fluency, pronunciation, rhythm, and stress control. The results show that the computer-mediated shadowing activity was effective in its intention to improve participants' prosodic control.

Table 3

Benefits of the Computer-Mediated Shadowing Activity: Participants' Comments

Participant	Comments
Participant 1	I would say it improve [sic] my speaking habit regarding fluency, rhythm, and intonation.
Participant 2	Intonation, stress, rhythm, and pronunciation.
Participant 3	I think it helps improve my pronunciation and intonation a little bit.
Participant 4	I think it helps improve my pronunciation and intonation a little bit because I have to prepare and read the script out loud before recording.
Participant 5	Intonation and rhythm.

Interview Results

For each participant, a ten-minute interview was conducted. Table 4 summarizes the recurrent comments by all five participants regarding the use of Go Animate video clips in their review and discussion activity.

Table 4

Participants' Representative Interview Responses

1. It is much easier to give feedback to classmates because we are using avatars.
2. It is much more enjoyable to watch the classmates' video clips rather than just listen to their recorded speech to give feedback.
3. I felt more comfortable receiving feedback because they give feedback based on the animation video clips but not on a presentation video of me actually presenting.

As Table 4 shows, participants found it much easier to give/receive feedback when they reviewed their classmates' speech samples using Go Animate video clips. This is perhaps due to the fact that video clips generated by Go Animate used an avatar—an animated character.

Thus, students did not feel as though they were directly criticizing/evaluating their peers' speech. In addition, students reported that it was much more enjoyable to watch animation video clips during discussion as opposed to the more traditional review format—listening to audio-recorded speech samples, which is essentially sound-only.

DISCUSSION

Attention to target language features or, more specifically, *noticing* has been an important area of research in SLA as researchers have reported that raising L2 learners' consciousness to the target language features positively affects their L2 acquisition (Andrews, 2007; Ellis, R., 2001; Ellis, N. C., 2005; Fotos & Ellis, 1991; Leow, 1997, 2000; Rutherford, 1987; Schmidt, 1994, 2001). The positive impact of the computer-mediated shadowing activity reported in this study may be related to participants' increased attention to the prosodic features of their own and model speeches.

The results of the survey and speech sample analysis suggest that the computer-mediated shadowing activity may well be an effective means to improve speaking skills, especially in terms of prosodic control, for three of our five participants. The study found that the activity could also improve speech intelligibility. The use of computer-generated animation video clips is also seen to have positively affected participants in their discussion and review activity. As participants reported, providing and receiving feedback was much more comfortable and enjoyable during the post-shadowing feedback activity, potentially due to the presence of avatars in the video clips. The use of avatars seems to have a positive impact on learners' affective state when engaging in peer feedback activity, which can potentially be confrontational and may prevent students from having an honest and constructive discussion.

Limitations

First and foremost, the present study is limited in terms of its sample size, as it was conducted as a pilot study. Hence, the findings reported have no generalizability. In addition, due to the research design, there was no control over external factors that might have affected the results of the study. For instance, participants were graduate students at a university in the United States and were consequently constantly exposed to the English language. Thus, participants' improvement in speaking skills may also be attributable to their experience outside of the classroom. In addition, due to the research method used, the study cannot offer any information regarding a long-term impact of the computer-mediated shadowing activity. Thus, more research is needed to determine whether these improvements in intelligibility transfer to unplanned/spontaneous speech events.

The study is also limited in terms of its internal validity. One issue is that student participants were free to choose any TED speech. This was a pedagogical decision of the instructor in an effort to motivate his students in their engagement of the activity. However, since the content of model speeches was not controlled, the nature of the shadowing activity in which each student engaged may have been qualitatively different. Another related issue is that students were not given a fixed amount of time to practice shadowing. Some of them may have spent significantly more time practicing, which could have impacted the quality of their final products. Thus, the split ratings for Participants 4 and 5 may be related to this

potential interference. The improvement observed for Participants 1, 2, and 3 might also have resulted from their choosing easier speeches to shadow and/or spending more time practicing.

CONCLUSION

The present study was conducted with an aim to evaluate the pedagogical value and impact of a computer-mediated shadowing activity for a specific student population—prospective international teaching assistants. Three of our five participants showed an improvement in their prosodic control, and by extension, their speech intelligibility. In addition, all five participants indicated that the activity was effective in improving their English speaking skills. Given the small sample size, however, the study cannot definitively conclude that the devised activity is effective. Further research should be conducted to confirm that the activity is indeed successful in improving ESL students' speech intelligibility.

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APPENDIX A

Student Survey

Dear participant,

This anonymous survey is designed to evaluate the usefulness of Go Animate in the classroom. The survey consists of 8 questions, which takes no more than 10 minutes to complete. You are free to stop answering the survey at any time. Your feedback and input will be used to evaluate the effectiveness of this tool and improve our teaching practice.

A1) Gender:

- Male
 Female

A2) Academic program at the university (Please write your answer in the text box):

B1) In general, the activities involving the use of Go Animate have helped me to improve my English speaking skills.

- Strongly Disagree
 Disagree
 Neither Agree nor Disagree _____
 Agree
 Strongly Agree

B2) Go Animate has helped me to improve on THESE SPECIFIC THINGS related to English speaking skills (Please write your answer in the text box):

B3) The use of Go Animate (for the speaking assignment) has helped me to improve fluency (smoothness of speech) in English speaking.

- Strongly Disagree
 Disagree
 Neither Agree nor Disagree _____
 Agree
 Strongly Agree

B4) The use of Go Animate (for the speaking assignment) has helped me to improve pronunciation in English speaking.

- Strongly Disagree

- Disagree
- Neither Agree nor Disagree _____
- Agree
- Strongly Agree

B5) The use of Go Animate (for the speaking assignment) has helped me to improve intonation in English speaking.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree _____
- Agree
- Strongly Agree

B6) The use of Go Animate (for the speaking assignment) has helped me to improve my rhythm (control over natural pausing) when I speak English.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree _____
- Agree
- Strongly Agree

APPENDIX B

Speaking Skill Assessment Rubric

Performance Level	Descriptors
Level 6	Excellent and consistent across items. Majority of items indicate level 6 performance. <i>Minimal listener effort required to adjust to accent.</i> Frequent displays of lexico-syntactic sophistication and fluency. Speaker is at ease and confident fulfilling task, elaborating a personalized message, using accurate English. Errors are minor and few.
Level 5	More than adequate. Mix of level 5 and 6 performances with a few level 4 items, if any. <i>Little listener effort required to adjust to accent/prosody/ intonation.</i> Consistently intelligible, comprehensible, coherent. Strong skills across items. Wide range of vocab and syntactic structures, generally sophisticated responses. Speaker may exert some noticeable effort or show minor fluency issues in elaborating clear message to fulfill task. Errors are minor.
Level 4	Adequate and ready for the classroom without support. Majority of items indicate level 4 performance, possibly some level 5 or very few level 3 items. <i>Acceptably small amount of listener effort required to adjust to accent/prosody/ intonation.</i> <u>Consistently intelligible and comprehensible.</u> Speaker may exert a little noticeable effort, but despite <u>minor errors</u> of grammar/vocab/stress/fluency, message is adequately coherent, with correct information, some lexico-syntactic sophistication, and displays of automaticity and fluency.
Level 3	Borderline – inconsistent. Minimally adequate for classroom <u>with support</u> . Mix of levels 3 and 4; very few, if any, level 2 items. <i>Tolerable listener effort required to adjust.</i> <u>Consistently intelligible.</u> <u>Strengths and weaknesses across characteristics or items.</u> Message is generally coherent, but may require more than a little noticeable effort for speaker to compose, or delivery may be slow. Or message may be clear and expressed fluently, but language use is somewhat simplistic.
Level 2	Limited - not ready for the classroom. Mix of levels 2 and 3, or a few level 1 items, if any. Able to address prompts and complete responses. <i>Consistent listener effort may be necessary.</i> Message may be simplistic/unfocussed/incomplete/ incorrect. May struggle somewhat to build sentences/argument or to articulate sounds. May be <u>occasionally</u> unintelligible, incomprehensible, or incoherent.
Level 1	Restricted - May need more than 1 semester of support. Mix of May have difficulty completing responses.

APPENDIX C

Evaluative Comments on Speech Samples by Two Raters

Participant ID	Positive Comments	R1=Rater A R2=Rater B
Participant 1	<i>Sufficient pronunciation and intonation.</i> <i>Not much listener effort was required.</i> <i>Good enunciation and mimicking of the rhythm of the TED talk.</i> R2: Good prosodic control and highly intelligible speech. R2: In some parts, the speaker sounded like a native speaker of English.	
Participant 2	<i>Good enunciation. The speaker did a good job imitating the speed, pace, and prosody of the TED talk.</i> <i>No listener effort was required.</i> R2: Highly intelligible speech.	
Participant 3	<i>Fairly good prosodic control.</i> R2: Almost no listener effort is required. R2: Sufficient intelligibility. R2: Good pronunciation.	
Participant 4	R1: Some listener effort is required. R2: Fairly intelligible. R2: Generally good prosodic control with occasional pronunciation issues.	
Participant 5	<i>Prosody is good—it is not as flat or monotonous.</i> <i>Some listener effort is required. Without sufficient attention, some may have trouble understanding him.</i> R1: Occasional mispronunciations compromised the speaker's intelligibility. R2: Generally good intelligibility.	

Note: Italicized comments represent two raters are in agreement.

Participant ID	Negative Comments	RA=Rater A RB=Rater B
Participant 1	N/A	
Participant 2	N/A	
Participant 3	<i>The speaker seems to have a tendency to drop the word-final consonant or otherwise mispronounce or substitute the word-final consonant with another consonant. Examples are 'teach,' 'trash,' 'called,' 'rope,' 'kids,' 'sense,' 'sometimes,' and 'puzzle.'</i>	
Participant 4	R1: If I were an undergraduate student in his class, I would not be able to follow this lecture, especially the first part. R1: The speaker has a few pronunciation issues (e.g., 'causing').	
Participant 5	<i>He has a few mispronunciations (e.g., substituting 'n' for 'l' in 'little', inserting an 'r' sound in 'all'), and some word-level stress issues (e.g., 'percent').</i> <i>When I imagine myself as an undergraduate student in the classroom, I would have trouble understanding the speaker.</i> R1: The level of speaking skills for this speaker is lower than the borderline category (level 3) in which an ITA can teach while receiving language support from the instructor. R2: Some listener effort is required. Without sufficient attention, some may have trouble understanding the speaker. R2: I was able to follow his speech for the most part, but due to some mispronunciations, intelligibility of the speaker was occasionally compromised.	