

# Prompt-Related Challenges: Using a Mobile Application to Measure Spoken Fluency

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## Abstract

The language-based justification for Rikkyo University's English discussion class (EDC) is to build second language (L2) spoken fluency. However, instructors lack a quantitative and objective method for monitoring their students' spoken fluency. Thus, assessing the EDC's ability to increase L2 spoken fluency is challenging. One possible solution is to develop a mobile application that measures students' in-class L2 spoken fluency in terms of speech rate, pause frequency, and peer-based perceived fluency during the 3/2/1 activity, a modified version of the 4/3/2. When testing our mobile application in class, one issue concerns the textbook prompts for the 3/2/1 activity. In this paper, we investigate one participant's spoken fluency for six weeks to exemplify the prompt-based challenges, which include a) a lack of topic repetition, b) no strategy training, and c) an under-utilization of formulaic utterances presented in the textbook. Possible solutions include recycling previous prompts, adding strategy training to the mobile application features, removing the third prompt, and embedding target formulaic utterances. Implementing these changes to the textbook might mitigate some issues experienced by mobile application users.

**Keywords:** *Discussion, Speaking, 4/3/2*

## Introduction

There has been a growing interest in spoken performance assessment in the field of second language (L2) development (Ogawa, 2022). During the speaking part of English proficiency exams such as the International English Language Testing System, candidates deliver opinion-based monologues. Spoken fluency, as defined by the speed and ease of speech, accounts for a significant portion of the variance in human ratings of these opinion-based monologues, whereas accuracy and complexity account for only a small amount (Ogawa, 2022). Students at Rikkyo University desire to live abroad, work for international companies, and make foreign friends, and by extension, they wish to build L2 spoken fluency to meet the demands of real-world communication (Hurling, 2012). Throughout the Spring 2023 semester, we have been conducting tests on a beta version of our mobile application

designed to measure spoken fluency in classroom settings during their 3/2/1 activity. The activity comprises speakers delivering the same monologue three times to three partners for three minutes, two minutes, and one minute (Appendix A). The activity's conditions of time constraint and content repetition help speakers increase their utterance fluency, which, theoretically, streamlines their L2 speaking process.

English discussion class (EDC) instructors implement the activity for at least 13 of the 14 weeks. In the EDC textbook, there are three prompts for the activity. The first two prompts are always opinion-based or experience-based questions (Appendix B). The third prompt includes sharing three interesting ideas or facts from the reading passage (Sturges et al., 2023), which refers to the passage assigned each week as homework; it is designed to introduce the topic for the next lesson (Hurling, 2012). As classes consist of 11 students, the instructors participate in the activity as well; therefore, they might not notice the strategies implemented by the students. For example, participants seem to approach the third prompt (i.e., share three ideas or facts from the EDC textbook's reading passage) with differing strategies, one of which is reading aloud from the passage in their textbooks. However, reading aloud inflates their fluency scores on the mobile application. Having accurate representations of their current performance is important for a) monitoring students' progress, b) providing useful instructions for improvement, and c) setting realistic spoken fluency goals. Thus, our objective is to investigate participants' transcripts and data to uncover issues and present potential solutions. In the following literature review, we review the pivotal studies on and theories for L2 spoken fluency development.

## Literature Review

### Earlier 4/3/2 Studies

Early studies have manipulated the 4/3/2 activity's conditions of content repetition and time constraint to investigate the efficacy of 4/3/2. This activity, similar to 3/2/1, consists of speakers delivering the same monologue thrice to three different partners, but the duration is four, three, and two minutes (Maurice, 1983). In de Jong and Perfetti's (2011) study on content repetition, participants who repeat the same content for all three rounds retain spoken fluency gains in a delayed posttest four weeks after the activity, whereas the participants who deliver monologues on different content do not. They suggest that participants who repeat language proceduralize the linguistic knowledge, thereby shifting their fundamental cognitive processes, which leads to observable increases in fluency. The term "proceduralization" refers to one of the processes in skill acquisition theory (SAT), a learning theory used to describe skill development.

SAT proponents, such as DeKeyser (2017), believe that the process of acquiring any skill, including the development of L2 spoken fluency, comprises three stages. The first stage is referred to as the declarative stage, wherein students develop knowledge about the processes necessary for task completion. In the procedural stage, they begin to practice these processes, and in the automatic stage, they perform the task consistently without any effort by repeated practice. When researchers refer to repeated practice, the optimal level of difficulty varies with students' prior learning, but generating skills or retrieving knowledge

from memory is desirable as long as students are equipped “by virtue of prior learning to succeed at that generation” (Bjork & Bjork, 2020). Content repetition plays an important role in moving formulaic utterances from the procedural stage to the automatic stage as it assists with long-term memory formation. Certain aspects of speaking performance such as formulaic utterances, when automatized, allow speakers to focus their attention on necessary features (Gatbonton & Segalowitz, 1988).

In other studies, Boers (2014) and Thai and Boers (2016) investigate the condition of time constraint. Participants who deliver monologues under the decreasing time condition (i.e., 4/3/2) outperform participants’ spoken fluency who have performed under a constant time condition (i.e., 3/3/3). Researchers use Levelt’s (1993) model of speech production to explain the effects of manipulating task variables on cognitive processes involved in producing speech. The main processes are the conceptualizer, formulator, and articulator. In the first process of speech production, the conceptualizer organizes thoughts and ideas into a coherent message, cultivating a pre-verbal message. Next, the formulator then transforms the intended message into linguistic representations including selecting words and organizing the structure of utterances. The articulator coordinates the motor movements for speech production, involving muscle activation, timing, and communication of phonemes, syllables, and words. In addition to utilizing the same cognitive processes of speech production, Gatbonton and Segalowitz (1988) recommend mimicking psychological pressures of real-world communication.

For example, the act of conceptualizing can be cognitively demanding for both first language speakers and L2 speakers as they carefully consider their intended speech before expressing it (Bui et al., 2019). Formulating and articulating can also be challenging for L2 speakers due to the heightened cognitive demands of retrieving relevant L2 lexical and syntactic information necessary for pre-verbal messages (Bui et al., 2019). Therefore, L2 speakers must allocate their attentional resources across the three stages of speech production (Ahmadian & Tavakoli, 2011; Skehan, 2014). L2 speakers might pay greater attention to formulating and articulating rather than conceptualizing by content repetition; this can lead to automatized changes in fundamental cognitive processes. In addition to the benefits of content repetition, Boers (2014) and Thai and Boers (2016) reason that the added time pressure condition of 4/3/2 might create the impetus to increase L2 spoken fluency automating the cognitive processes of conceptualizing, formulating, and articulating.

Without any pedagogical intervention, de Jong and Perfetti (2011) acknowledge that there exists uncertainty regarding exactly which lexico-grammatical items articulated during students’ monologues have been proceduralized. To address the ambiguity, researchers recommend supplying students with exemplars and encouraging integrating input into monologues (Boers, 2014; Thai & Boers, 2016). From these early studies, researchers interpret results based on SAT and Levelt’s (1993) model of speech production. They show that the conditions of content repetition and time constraint help students build L2 spoken fluency while acknowledging a need to incorporate pedagogical interventions to monitor the process of proceduralizing linguistic knowledge.

### Later 4/3/2 Studies

Reacting to these early studies' demand for focusing on target linguistic forms, researchers have explored the ability of pedagogical intervention to further L2 development. In Tran and Saito's (2021) study, providing corrective feedback on students' lexicogrammatical accuracy after each round not only improves accuracy but also does not diminish L2 spoken fluency gains. Researchers believe that incorporating formulaic utterances (i.e., automated language chunks) can increase students' L2 spoken fluency (Tavakoli & Wright, 2020). Ogawa (2019, 2021) investigates the extent to which encouraging the use of formulaic utterances by way of pedagogical interventions improves L2 spoken fluency. She uses three types of pedagogical interventions: input flooding, input enhancement, and peer feedback. For input flooding, she provides the participants with many instances of target language structures before the activity in exemplar monologues. For input enhancement, she highlights the target language structures in these exemplar monologues via italicizing, bolding, or emphasizing voice. Lastly, for peer feedback, during the activity, listeners use a checklist to indicate target language structures speakers use while delivering monologues. In the study, the group with all three pedagogical intervention types shows the most spoken fluency gains compared to the comparison group and the input-only group.

Unlike early studies of time pressure and repeated practice, pedagogical intervention is not an inherent condition of the 4/3/2 activity. Students can complete three iterations of their monologues without receiving feedback, whereas without the decreasing time condition and content repetition condition, the activity is no longer considered to be 4/3/2. However, feedback as a pedagogical intervention can be one of the most effective tools for enhancing students' academic achievements (Hattie & Timperley, 2007). Effective feedback can help students a) raise awareness of desired performance, b) know their current performance, and c) utilize strategies to bridge the disparity between their current performance and their goal, thereby enabling them to adjust their future actions and behaviors (Brooks et al., 2019). These three aspects of effective formative feedback are exemplified in the studies by Tran and Saito (2021) and Ogawa (2019, 2021) insofar as researchers raise awareness of desired performance, provide feedback on participants' current performance, and help participants utilize strategies to bridge the disparity.

One gap in the literature is to explore how instructors can use technology to provide in-class feedback on students' 3/2/1 performance. Using technology might assist the process of providing feedback by automating specific tasks such as analyzing speech rate, detecting pauses, or mean length of run while also providing a platform for classmates' perceived fluency ratings. Currently, instructors can only feel that their students are becoming more fluent. By leveraging mobile applications, instructors can streamline the feedback process while providing detailed, objective assessments on current and desired performances. During the pilot study, some challenges stem partially from the textbook prompts (Appendix B). Therefore, the following research question might shed light on these issues: What textbook-related challenges associated with the 3/2/1 prompts arise from providing participants' utterance fluency scores to track their monologic L2 speaking performance?

## Methods

### Participants

Participants ( $n = 35$ ; 20 females and 15 males) of the survey were first-year university students at a private university in Tokyo, Japan, and enrolled in the authors' EDC during Spring 2023. They were at least 18 years old and had completed at least six years of formal English as foreign language education prior to entering university (mean = 8.4). The participants ranged from B1 to C1 on the common European framework of reference (CEFR). The participant that we selected, pseudonym Jun, was from this pool of participants. The criteria for selection were that the participant had to have signed the consent form, attended all lessons, use the mobile application during the 3/2/1 activity, and exhibit patterns of participants' recordings and transcription. Before the semester, he passed Level 2 of the Eiken and had completed B1 on the CEFR. Jun's classmates ( $n = 11$ ; 4 females and 7 males) also participated in the study; they were B1 on the CEFR (i.e., a low Level 2 by Rikkyo University's system of labeling English proficiency). In total, 43 students from the authors' classes participated in the study. Three participants from Jun's class participated in the survey.

### Instruments

#### *Mobile Application*

Our spoken fluency application is designed to measure the utterance fluency of English language learning students. The features include measuring untrimmed and trimmed speech rate, pause frequency, articulation rate, and listener-based perceived fluency to provide feedback on students' spoken fluency performance across the semester. The application is in beta testing for iOS and thus has not yet been validated for in-class use. This semester, we have gathered data to validate the mobile application for measuring in-class L2 spoken fluency.

#### *Audacity*

Audacity is a free software by Audacity Team (<https://audacityteam.org/>) and is used for multi-track audio editing and recording digital audio. It is compatible with macOS, Linux, Windows, and other Unix-like operating systems. As of December 6, 2022, Audacity holds the title of the most downloaded software at FossHub, with over 114.2 million downloads since March 2015 (Appendix C).

#### *WhisperX*

Whisper is an open-source automated speech recognition system that has been trained using 680,000 hours of supervised data from various languages and tasks from the Internet (Radford et al., 2022). This has resulted in enhanced resilience to accents, background noise, and technical jargon. WhisperX, a variant of Whisper, provides word-level time stamps to incorporate precise temporal information (Bain et al., 2023). This system combines forced phoneme alignment and voice activity detection techniques to achieve its performance in word segmentation and long audio transcription, thereby giving practitioners and researchers

a tool for quick and accurate analysis of spoken language data (Bain et al., 2023).

### ***Praat***

Praat is a free phonetics software tool used for speech analysis (Boersma & Van Heuven, 2001). It is compatible with multiple operating systems and can examine and reconstruct acoustic speech signals. It provides a wide array of functions, such as speech analysis, manipulation, and synthesis, along with the capability to generate visuals.

### ***Survey***

The survey was in English and Japanese (Appendix D). The participants (n = 35) responded to our survey regarding reading aloud, which had the following two questions:

- a) When you were using the spoken fluency mobile application today, did you read aloud from the textbook's reading passages?
- b) If you read aloud from the textbook while using the mobile application, what is your reason for doing so? Reply in English or Japanese.

After the first survey, we created a second survey using the replies received to create an updated checklist (Appendix D).

- a) Below is a list of possible reasons for reading aloud while using the mobile application during the 3/2/1 activity. If you read aloud, please check all the reasons that apply.

### **Procedures**

After receiving approval from the Center for Foreign Language Education and Research at Rikkyo University, participants met once per week for 14 weeks. During Week 1, they learned how to use the mobile application. They participated in the 3/2/1 activity for the first time in Week 2. The instructions from the textbook were, "Talk to a partner. Say as much as you can. Don't worry about grammar or vocabulary" (Sturges et al., 2023). The goal was for participants to incorporate the formulaic utterances introduced in the EDC textbook and to speak as quickly as they could (Appendix E). The survey was distributed via Google Forms to participants during Weeks 6 and 7. The secondary author also conducted a follow-up interview in Week 8 with Jun and his classmates regarding their transcripts and survey results.

For every lesson, we used the prompts in the textbook (Appendix B). However, for Week 7, we recycled the same prompts from Week 3 to compare spoken fluency performances. We compared Week 3 performances because during Week 2, participants were still unfamiliar with 3/2/1. Participants had no pre-planning time to replicate real-world speaking conditions. After collecting the recordings, we transcribed them using WhisperX, then used a program written by the secondary author to convert transcripts to TextGrid, a visual aid that matches audio to transcriptions (Appendix F). We also used Audacity to view audio waveforms when doing the initial analysis. TextGrids were manually reviewed in Praat to a) align word

boundaries with the audio, b) add any missing fillers (e.g., uhs and ums), and c) delete any background voices. Then, we converted the file to JSON data to analyze the speech event and analyze the data (e.g., mean length of run). These newly analyzed speech events were collated into a single CSV file, further subject to statistical analysis.

### Analysis

For the quantitative analysis, six utterance fluency features were chosen from Suzuki et al.'s (2021) study. In this study, certain features seemed more highly correlated to perceived fluency than others. Hence, we selected trimmed speech rate, untrimmed speech rate, pause frequency, length of run, and pause location. We added pause length to better explain the results. For all graphs, we used untrimmed speech rate in syllables per minute (SPM) because speech rate had been the strongest indicator of perceived fluency. We analyzed the spoken fluency results using descriptive statistics. Table 1 explains the spoken fluency features.

**Table 1**

*Utterance Fluency Measures*

| Type                                     | Utterance Measure                              | Description   |
|--|--|---|
| Composite (speed and breakdown)          | Average Number of Trimmed SPM                  | Delete needless repetition (i.e., as in clearly a result of disfluency, not for purposes of emphasis) and fillers (e.g., uh, um), then divide the total number of spoken words by the duration, in minutes, of the speech.  |
| Composite (speed, breakdown, and repair) | Average Number of Untrimmed SPM                | Divide the total number of spoken words by the duration, in minutes, of the speech. Total number of words includes fillers, false starts, and repetitions.  |
| Composite (speed, breakdown, and repair) | Mean Length of Run                             | Calculate the average number of untrimmed syllables in each uninterrupted speech segment between pauses, then add one to the total number of pauses, indicating the number of fluent sequences between silent breaks to determine the run count. The total syllable count would be divided by the run count. The syllable count can be verified on <a href="http://syllablecounter.net">syllablecounter.net</a> . |
| Pure (breakdown)                         | Average Frequency of Pauses per Minute         | Fillers (e.g., um, uh) and silence were counted as pauses. Pauses were determined using Praat. Calculate the average number of pauses divided by the time.  |
| Pure (breakdown)                         | Average Number of Mid-Clause Pauses per Minute | Count the number of filled or silent pauses located in mid-clause and divide the number by the total speaking time.   |
| Pure (breakdown)                         | Mean Length of Pause                           | The length of silent pause was 300 ms as used in Ogawa's (2021) study. Pauses were determined using Praat. Calculate the average length of pauses by adding all pause times and divide by the number of pauses.   |

For the qualitative analysis section, we categorized potential problems into themes (e.g., participants who read aloud during the third prompt and lack of formulaic utterance use).

Survey questions and follow-up interviews with Jun and his classmates were categorized using thematic analysis to identify common themes, and the results were checked by both authors to reach an agreement regarding the categories that the individual responses should be placed in. Last, we used descriptive statistics to rank the most popular responses for the “select all that apply” question regarding their rationale for reading aloud.

## Results and Discussion

Figure 1 shows the average untrimmed speech rate of Jun and his classmates ( $n = 11$ ) for all rounds of the 3/2/1 activity over a period of six weeks from Week 2 to Week 7.

**Figure 1**

*Average Untrimmed SPM of Jun and His Classmates*

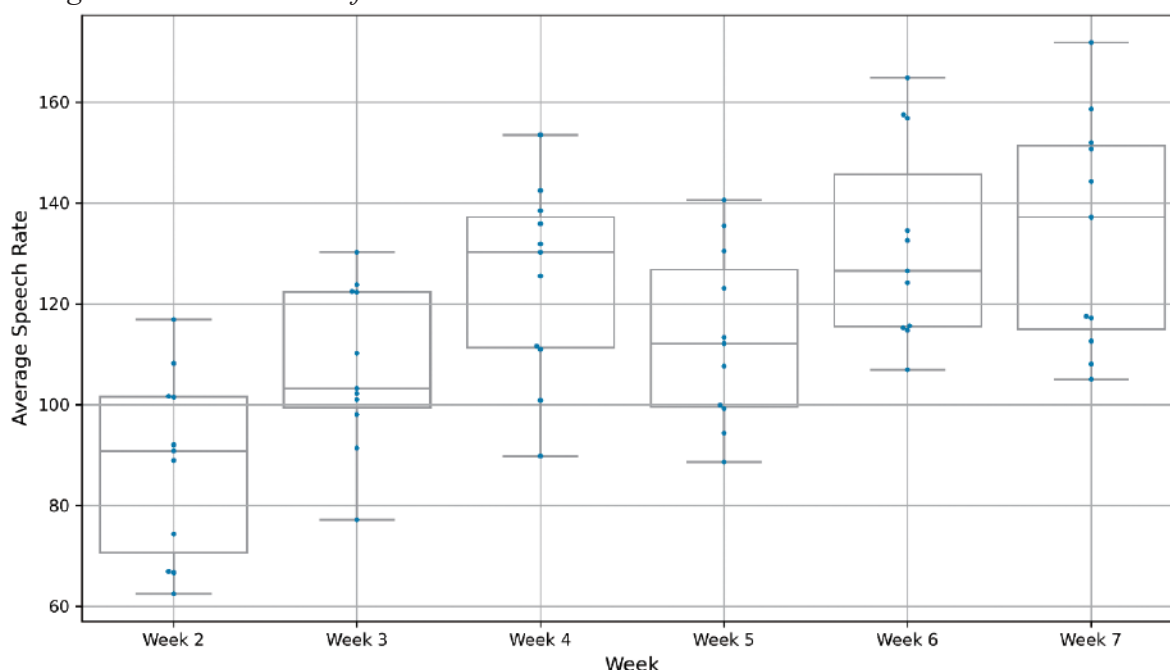


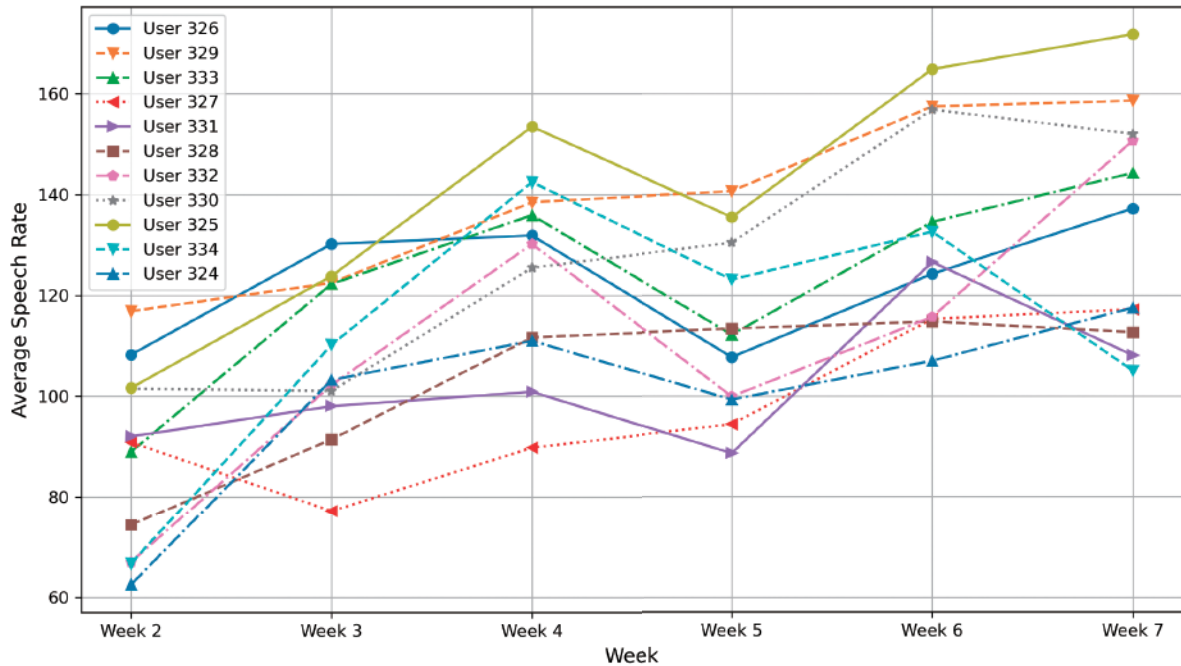
Figure 1 revealed an uptrend in speech rate, with a slight decline observed in Week 5. Based solely on this information, we cannot determine whether the 3/2/1 activity caused the speech rate increase as this sample was limited to 11 participants from a single site (Appendix G). The results aligned with previous 4/3/2 studies as they also showed that participants increased speech rate. From Week 2 to Week 3, the increase might be because Week 2 was the participants’ first time completing the 3/2/1 activity, so their initial performance gain might be the result of increased activity familiarity. The decrease from Week 4 to Week 5 might be caused by unfamiliarity with the prompt topics (i.e., part-time jobs and self-sufficiency) and possibly due to the anxiety participants might have felt as Week 5 was their first discussion test. Lastly, another possible explanation apart from the efficacy of 3/2/1 for the increase from Weeks 3 to 7 is the amount of L2 exposure participants had throughout the semester in other university English classes.

Although all participants increased their speech rate from Week 2 to Week 7, their



increases varied in degree. Figure 2 shows the individual progress of Jun and his classmates in terms of untrimmed speech rate in SPM over six weeks for only the last round of 3/2/1.

**Figure 2**  
*Individual Untrimmed SPM of Jun and His Classmates*

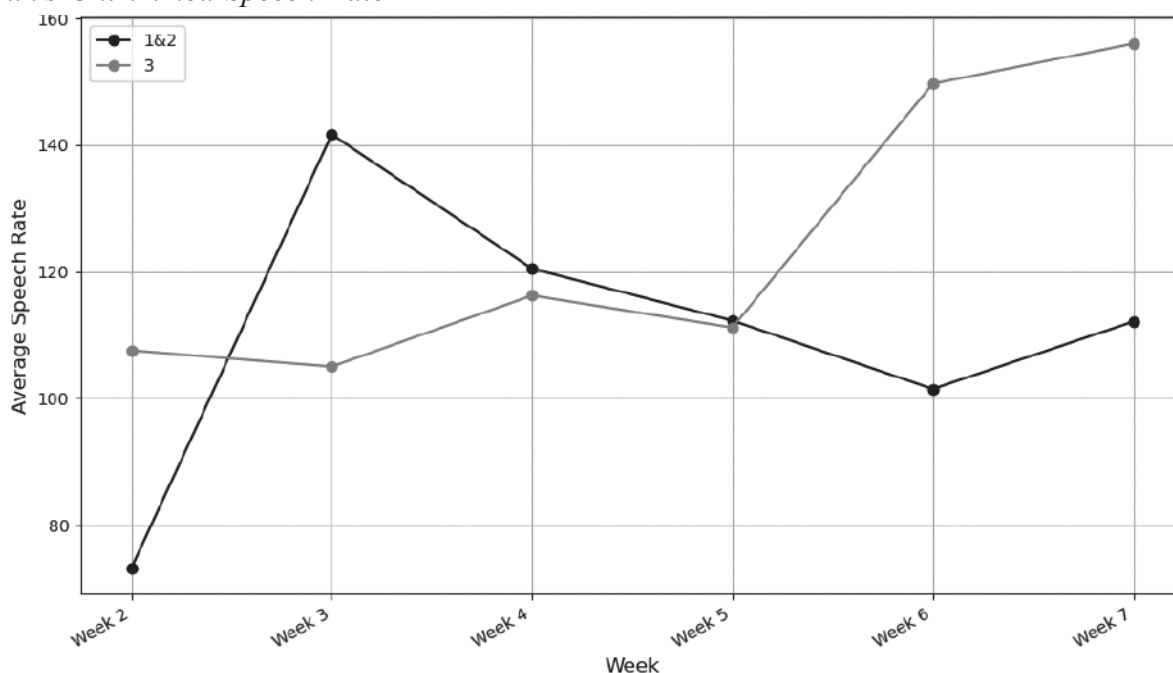


All participants had faster SPM in Week 2 than Week 7 (Appendix G). Moreover, from Week 3 to Week 7, nearly all participants except User 334 (light blue triangles) performed at a higher SPM. User 334 received a 110 SPM in Week 3 but 105 SPM in Week 7. Some participants recorded greater increases than others in SPM from Week 3 to Week 7. For example, User 325 (lime green circles) received 124 SPM on the mobile application in Week 3 and increased to 172 SPM in Week 7, which was an increase of 48 syllables. According to the secondary author, this participant worked hard and did relatively little reading aloud for the third prompt as compared to the others. Jun, User 324 (dark blue triangles), received 103 SPM in Week 3, and 118 SPM for Week 7. Users 331 (purple triangles) and 326 (dark blue circles) respectively received an SPM of 98 and 130 in Week 3 and 108 and 137 in Week 7; therefore, only a 10-syllable and 7-syllable increase was recorded.

To gain a better understanding of these results, we divided Jun’s monologue into the first and second prompts (personal opinions and experience-based prompts) versus the third prompt (find three interesting ideas from the reading) to investigate Jun’s untrimmed speech rates (Figure 3).

**Figure 3**

*Jun's Untrimmed Speech Rate*



Jun's untrimmed speech rate for the first and second prompts increased sharply from Week 2 to Week 3, perhaps in part due to the increased familiarity with the activity. After Week 3, his SPM had steadily decreased, whereas for the third prompt, he had increased his untrimmed speech rate from Weeks 5 to 7.

We further investigated this difference between the prompts across six utterance features. In Table 2, we present a comparison of Jun's performance in the third round of the 3/2/1 activity from Week 3 and Week 7, differentiating between the first and second prompts from the third prompt.

**Table 2**

*Jun's Utterance Fluency for the First, Second, and Third Prompts*

|                           | Prompts          |       |            |             |       |       |            |             |
|---------------------------|------------------|-------|------------|-------------|-------|-------|------------|-------------|
|                           | First and Second |       |            |             | Third |       |            |             |
|                           | Weeks            |       | Totals     |             | Weeks |       | Totals     |             |
|                           | 3                | 7     | Raw Change | % of Change | 3     | 7     | Raw Change | % of Change |
| Untrimmed Speech Rate SPM | 156.5            | 136.7 | 19.8       | (12.7)      | 139.5 | 209.9 | 70.4       | 50.5        |
| Trimmed Speech Rate SPM   | 118              | 108   | 10         | (8.475)     | 140   | 180   | 40         | 28.571      |
| Avg. Pause Frequency      | 25.0             | 21.5  | 3.5        | (16.3)      | 17.2  | 19.8  | 2.6        | 15          |

|                        | Prompts          |        |            |             |       |      |            |             |
|------------------------|------------------|--------|------------|-------------|-------|------|------------|-------------|
|                        | First and Second |        |            |             | Third |      |            |             |
|                        | Weeks            |        | Totals     |             | Weeks |      | Totals     |             |
|                        | 3                | 7      | Raw Change | % of Change | 3     | 7    | Raw Change | % of Change |
| Avg. Pause Length      | 0.8              | 1.4    | 0.6        | 75          | 0.9   | 0.8  | 0.1        | (11)        |
| Avg. Mid-Clause Pauses | 6                | 13.333 | 7.333      | 122.217     | 1     | 0    | 1          | (100)       |
| Mean Length of Run     | 5.9              | 5.5    | 0.2        | (6.8)       | 7.1   | 11.7 | 4.6        | 64.8        |
| Time in Seconds        | 19.2             | 39.1   | 19.9       | 103.646     | 34.8  | 16.3 | 18.5       | (53.2)      |

During Weeks 3 and 7, Jun experienced an undesirable outcome in five utterance fluency measures for the first and second prompts, despite addressing the same 3/2/1 questions as he did in Week 3. These measures were untrimmed and trimmed speech rates, pause length, mid-clause pauses, and length of run. However, one positive development was that he slightly reduced pause frequency. The secondary author noted that in class, he seemed to become increasingly confident in his ability to answer the first two prompts. For the third prompt, Jun always read aloud, resulting in a dramatic increase in his utterance fluency measures. All but pause frequency were positively impacted. Moreover, without separating the prompts, the application recorded 103 SPM in Week 3 and 118 SPM in Week 7. To explain this result, although he answered the first and second prompts at a slower pace in Week 7 compared to Week 3, he compensated by reading aloud during the third prompt more quickly for Week 7 than Week 3.

To provide further clarification regarding the results, we included transcripts of Jun’s 1-minute speeches. The results were categorized into different prompts (Table 3). The bold italics in the table signified instances when Jun borrowed lexico-grammatical items from the prompts. The prompts were as follows: “Did you study *hard to get into university*?” “Why did you *decide to go to this university*?” and “Share three interesting ideas or facts from the reading.”

**Table 3**  
*Jun’s Untrimmed 1-Minute Transcripts*

|              | Week 3   | Week 7  |
|--------------|--|---|
| First Prompt | I didn’t study <i>hard to get into university</i> because I don’t like studying. | Yes, I did. I studied <i>hard to get into university because uh I failed to get into university</i> last year. So I uh must study hard last year. |

|               | Week 3   | Week 7   |
|---------------|--|--|
| Second Prompt | I <b><i>decided to go to this university because</i></b> uh <b><i>I passed</i></b> only this university in March.  | uh I <b><i>decided to go to this university because I passed</i></b> uh Rikkyo, Seijo, and Toyo, so I uh selected Rikkyo University.   |
| Third Prompt  | Uh <b><i>I am interested in</i></b> uh reading this students who take entrance exams learn time management skills which are useful not just at university but for the rest of their lives. Universities are reviewing their wall interesting systems that may lead to new kinds of tests and vocational schools are quicker and cheaper and. | uh <b><i>I'm interested in</i></b> first as the world becomes more connected to the Internet, there will be many more examples in the future. Second, movie from Studio Ghibli and popular hits like Demon Slayer. |

As can be seen from the transcriptions, Jun changed the content of his answers. For example, he said that he did not study hard to get into university because he did not like studying; however, in Week 7, he responded that he studied hard because he failed to get into university the previous year.<sup>1</sup> For the second prompt, he said that he only passed Rikkyo University, but in Week 7, he stated that he passed three universities and selected Rikkyo. The secondary author asked Jun for his rationale for changing his response to these questions to which he replied that formulating the response of not studying hard to get into university was less challenging than failing to get into university. In other words, he created answers that were inauthentic because the real answer was perceived by him to be too difficult to explain in English. There might also be external reasons such as Jun feeling more familiar with his classmates to share this information. Changing the content of his answers might be problematic as according to the results of de Jong and Perfetti's (2011) study, content repetition with repeated practice helps build spoken fluency. From our results, students might need additional planning time to provide monologues authentic to their beliefs with linguistic support from their instructor or peers to formulate their monologues. They also might benefit from knowing the rationale behind 3/2/1 (e.g., advantages of content repetition).

Regarding reading aloud for the third prompt, we had expected participants would, to an extent, extract language from the first and second prompts for support, but we had not expected that participants would rely on reading aloud from the textbook for the third prompt. As a result, the feedback Jun received via the mobile application on his current performance did not reflect his ability because reading aloud artificially boosted his fluency as he could read aloud more quickly than he could generate speech. In the survey, we asked participants, "How often do you read aloud from textbook reading passages during the 3/2/1 activity?" and 48.57% stated sometimes (n = 17), 25.71% stated rarely (n = 9), 14.29% said often (n = 5), 8.57% said never (n = 3), and 2.86% said always (n = 1). In Table 4, the survey question was as follows: "If you read aloud from the textbook while using the mobile application during the 3/2/1 activity, what is your reason for doing so?" (Check all that apply).

<sup>1</sup> We double checked to ensure that this participant was in fact the same participant as Week 3 because his answers to the same questions were contradictory.

**Table 4***Participants' (n = 35) Rationale for Reading Aloud*

| <b>Rationale for Reading Aloud</b>                                  | <b>No. of Participants</b> | <b>% of Agreement</b> |
|---|----------------------------|-----------------------|
| My mobile application score improves by reading aloud.              | 18                         | 58.06                 |
| Reading aloud helps me to improve my spoken fluency.                | 16                         | 51.61                 |
| I can answer the third prompt of three interesting ideas and facts. | 14                         | 45.16                 |
| It is difficult to recall the ideas from the reading passages.      | 14                         | 45.16                 |
| I do not have enough of my own ideas to speak for the entire time.  | 9                          | 29.03                 |
| I can help others understand my ideas better.                       | 9                          | 29.03                 |
| Speaking English is difficult.                                      | 8                          | 25.81                 |
| There is no rule against reading aloud from the textbook.           | 7                          | 22.58                 |
| I cannot summarize the ideas from the reading passage.              | 3                          | 9.68                  |
| I have written my answers in the textbook.                          | 1                          | 3.23                  |
| Reading aloud is more enjoyable than speaking.                      | 1                          | 3.23                  |

From the results, 58.06% of participants stated that reading aloud improves their score on the mobile application, followed by 51.61% who felt that reading aloud during 3/2/1 helps improve their spoken fluency. Further, 45.16% stated that they read aloud to answer the third prompt tied with the belief that recalling ideas from the reading was challenging. From the results, students might need an explanation of why they are not allowed to read aloud as they believe that doing so helps them build their spoken fluency. In terms of Bjork and Bjork's (2020) desirable difficulties, reading aloud would be less challenging than generating ideas from memory, but low proficiency students might not be equipped to succeed in generating contents of the textbook unless they have pre-planning time and additional strategies to expand their answers. In the Rikkyo University (2021), textbook writers stated that for low proficiency classes, instructors might consider allocating one minute pre-planning time to either write down or think about their ideas, whereas higher proficiency classes can begin speaking without planning time. Moreover, they wrote that instructors should consider the temporary strategy of reversing the timing (i.e., 1/2/3 rather than 3/2/1), which would equate to temporarily eliminating the condition of time constraint to support content expansion, to help low proficiency students speak for three minutes.

In terms of Levelt's (1993) model, by reading aloud, students were not engaged in the same cognitive speech production processes as they would be decoding, rather than encoding, conceptualizations and formulations; therefore, when answering the third prompt, they would not experience the same psychological pressures when engaged in speech. One of the conditions of Gatbonton and Segalowitz's (1988) creative automatization was mimicking psychological pressures of real-world communication. Experiencing these pressures might help further build their confidence when engaging in real-world communication. In the Rikkyo University (2021), the writers stated, "The fluency questions are simple to allow students to focus on improving fluency skills, rather than worrying about content or vocabulary." However, 45.16% of participants felt that recalling ideas from reading passages

was difficult, and 29.03% stated that they did not have enough of their own ideas to speak for the entire time. However, textbook writers proposed that the three questions before and the three after the reading could be suitable additional prompts for students (Rikkyo University, 2021).

### Utilization of EDC’s Formulaic Utterances Within 3/2/1

Apart from Jun’s change in the content of his responses and a reliance on reading aloud as a strategy to increase utterance fluency, we investigated the utilization of EDC’s formulaic utterances (Appendix E). From Table 4, Jun used the EDC discussion skill of reasons within his 3/2/1 monologues; however, if he were to incorporate additional formulaic utterances, this integration might increase his spoken fluency (Ogawa, 2021). We analyzed the prompts to count instances of formulaic utterance use embedded within the prompts (Table 5).

**Table 5**  
*Formulaic Utterance Use Within 3/2/1 Prompts*

| Formulaic Utterances     | Textbook Examples of Formulaic Utterances                                       | Example 3/2/1 Prompts from the Textbook  | No. of Instances |
|--------------------------|---|--|------------------|
| Follow-up Questions      | What...? Who...? Is...?<br>How...? Would...? If...?<br>Which...? Do...? Did...? | Which social media do you use? How often do you use social media? Do you think learning a foreign language is important? | 23               |
| Reasons                  | Why do you think so?  | Why? Why or why not?   | 6                |
| Examples                 | For example?  | What examples of pop culture do you like?  | 2                |
| Opinions                 | What do you think about...?   | n/a  | 0                |
| Connecting Ideas         | Do you agree/disagree with?   | n/a  | 0                |
| Viewpoints               | How about from the viewpoint of...?   | n/a  | 0                |
| Advantages/Disadvantages | What is one advantage/disadvantage of...?                                       | n/a  | 0                |
| Source of Information    | How do you know about that?   | n/a  | 0                |

From Table 5, follow-up questions were the most prevalent 3/2/1 prompt-type with 23 instances. Unlike the other utterances, follow-up questions lacked any corresponding responses. For instance, responses to opinions were as follows: “In my opinion...” and “I think...” and for connecting the formulaic responses: “I disagree with... He said..., but I think...” Follow-up questions, although prevalent in the EDC textbook’s 3/2/1 activity, might not elicit the target linguistic forms (i.e., formulaic utterances) presented throughout EDC because there were no corresponding responses. In Ogawa’s (2021) study, she had peers provide feedback on the amount of formulaic utterance use, and participants did increase the

use of the formulaic utterances as a result. In addition to peer feedback, another possibility would be to embed the formulaic utterances within the prompts and have a rating system within the mobile application to rate the degree to which participants used the formulaic utterances. These features might encourage students to utilize various target formulaic utterances. Connecting ideas, viewpoints, disadvantages/advantages, and sources of information were excluded from the current textbook’s 3/2/1 prompts. One potential solution would be to include a diversity of formulaic utterances. An example of connecting and giving reasons would be as follows: “Aki says that foreigners should visit Tokyo rather than Kyoto. Do you agree with her? Why or why not?” (Appendix H).

### Recycling EDC’s Prompts Across the Semester

Table 6 below revealed transcripts from Jun’s first, second, and third prompts. The first and second prompts for Week 6 were as follows: “Would you like to go abroad? (e.g., to travel, to study, to work) Why or why not?” and “If you went abroad, would you go to an English-speaking country or somewhere different? Why?” The third prompt was “Share three interesting facts or ideas from the reading.”

**Table 6**

*Trimmed Transcripts of Jun’s First, Second, and Third Prompts*

| Prompts | 3-Minute  | 2-Minute  | 1-Minute   |
|---------|---|---|--|
| First   | <i>I would not like to go abroad</i> because I’m afraid of plane. I don’t like high. <i>I would not like to go abroad.</i>  | <i>I would like to go abroad to travel</i> because I want to see the pyramids and other things.   | <i>I would like to go abroad to travel</i> because I want to see pyramid.  |
| Second  | <i>If I went abroad, I would go to an English-speaking country</i> because I can speak Japanese and English, but I want to communicate, so <i>I would go to an English-speaking country.</i> I’m interested in... | <i>If I went abroad, I would go to an English-speaking country</i> because I can speak Japanese and English <i>only</i> , but I want to communicate to abroad people, foreign people, <i>so I want to go to an English-speaking country.</i> I’m interested in... | <i>If I went abroad,</i> I wouldn’t go to <i>somewhere different speaking country</i> because I want to go to Egypt. I’m interested in ... |

| Prompts                | 3-Minute  | 2-Minute  | 1-Minute   |
|------------------------|---|---|--|
| Third                  | One of the best ways to learn a foreign language is to experience the culture and language together by studying or living abroad. <i>Second</i> , living in a dormitory didn't have to use a foreign language to communicate and did not improve their language skill much. <i>Finally</i> , eating food from home country either from restaurants abroad or sent from home can also help people overcome homesickness. | One of the best ways to learn a foreign language is to experience the culture and languages together by studying or living abroad. <i>Second</i> , living in a dormitory didn't have to use a foreign language to communicate and did not improve their language skills much. <i>Finally</i> , eating food from home country either from restaurants abroad or sent from home can also help people overcome homesickness. | One of the best ways to learn a foreign language is to experience the culture and languages together by studying or living abroad. Living in a dormitory didn't have to use a foreign language to communicate and did not improve their language skill much. Eating... |
| First Prompt Revisited | <b><i>If I went abroad, I would like to go to abroad to travel because I</i></b> like castle. I want to go to...  |   |  |

As seen in Table 6, for the first prompts, Jun changed his answers again from not wanting to go abroad to wanting to visit Egypt. The secondary author stated that Jun changed his opinion of not wanting to go abroad because after the first round, the author suggested to him that if he did not like flying, he could instead go by boat. The idea of going by boat changed Jun's opinion. Later, however, he stated that he did not want to go to Egypt, but he felt that the answer would be easier to say than that he did not want to go abroad because of his fear of heights. He also changed from wanting to go to an English-speaking country to communicate in English to not wanting to go to an English-speaking country because he wanted to go to Egypt. One possibility is that he was persuaded by his classmates to change his answers.

In addition to reading aloud, Jun also relied on the strategy of slightly altering the prompts to integrate them into his monologues. These slight changes were bolded and italicized in Table 5. From the trimmed transcriptions of his three speeches, 122 syllables (23.02%) were derived from slightly manipulating the prompt, 272 syllables (51.32%) came from reading aloud from the textbook reading passage, and 136 syllables (25.66%) were self-generated (i.e., without the help of the textbook or prompts). Slightly manipulating the prompt would be classified under Gatbonton and Segalowitz's (1988) creative automatization. To further support the automatization of these slightly manipulated linguistic items, recycling the prompts might be helpful. Topics also vary in degrees of familiarity to participants; so, instead of the mobile application comparing performances between topics, comparing performances within topics might represent participants' utterance fluency gains.



Bui et al. (2019) investigated the spaced learning effects of task repetition on accuracy, complexity, and fluency. They found that the time between initial and repeated performances seemed to play a moderating role in the impact of task repetition on speed fluency. Specifically, the benefit of increased speed fluency was most pronounced when there were immediate or shorter intervals between performances. However, for the measure of repair fluency, scores were higher for one-week intervals between performances. From the results of their study, Bui et al. (2019) explained that as the interval between practice sessions increases, lexico-grammatical items become less readily accessible for retrieval. With longer intervals, it can be presumed that students would need to begin from the beginning and recreate the process of conceptualization and formulation. Consequently, this would result in noticeably reduced fluency in their spoken output. From some participant performances, we believe that the effects of spaced learning might help automatize these prompt responses (Appendix H).

### ***Limitations***

This pilot study was subject to certain limitations. Firstly, the participant pool was restricted to a limited number of individuals; moreover, these participants were from the authors' own classes. The study also relied on descriptive statistics rather than inferential because of the small number of participants, and the sample was not multi-site, thereby eliminating the generalizability of these findings beyond our participants. Although these observations were based on our participants, the prevalence of these practices such as reading aloud for the third prompt remained uncertain, especially in the context of using the mobile application. Another limitation pertained to the survey employed in the study, which was not formally validated. Therefore, there might have been alternative methodologically rigorous approaches to generate reasons for reading aloud that could have been implemented.

### **Conclusion**

Monitoring progress matters as the language-based rationale for EDC is to build their spoken fluency, and with detailed feedback, instructors can make better pedagogical decisions. Hence, we developed a mobile application to measure in-class L2 spoken fluency of monologic speeches during the 3/2/1 activity, a modified version of the 4/3/2 activity by Maurice (1983). We investigated one participant's monologic utterance fluency for six weeks to exemplify the problems that occurred with monitoring his spoken fluency for formative feedback purposes. The possible issues concerned a) a lack of repetition of topics, b) no strategy training during pre-planning time, and c) an under-utilization of formulaic utterances. Potential solutions included recycling previous prompts, removing the third prompt of sharing three ideas and facts, and creating additional prompts embedded with target formulaic utterances to encourage use. Avenues for future research include the effects of such changes on mitigating issues experienced by mobile application users.

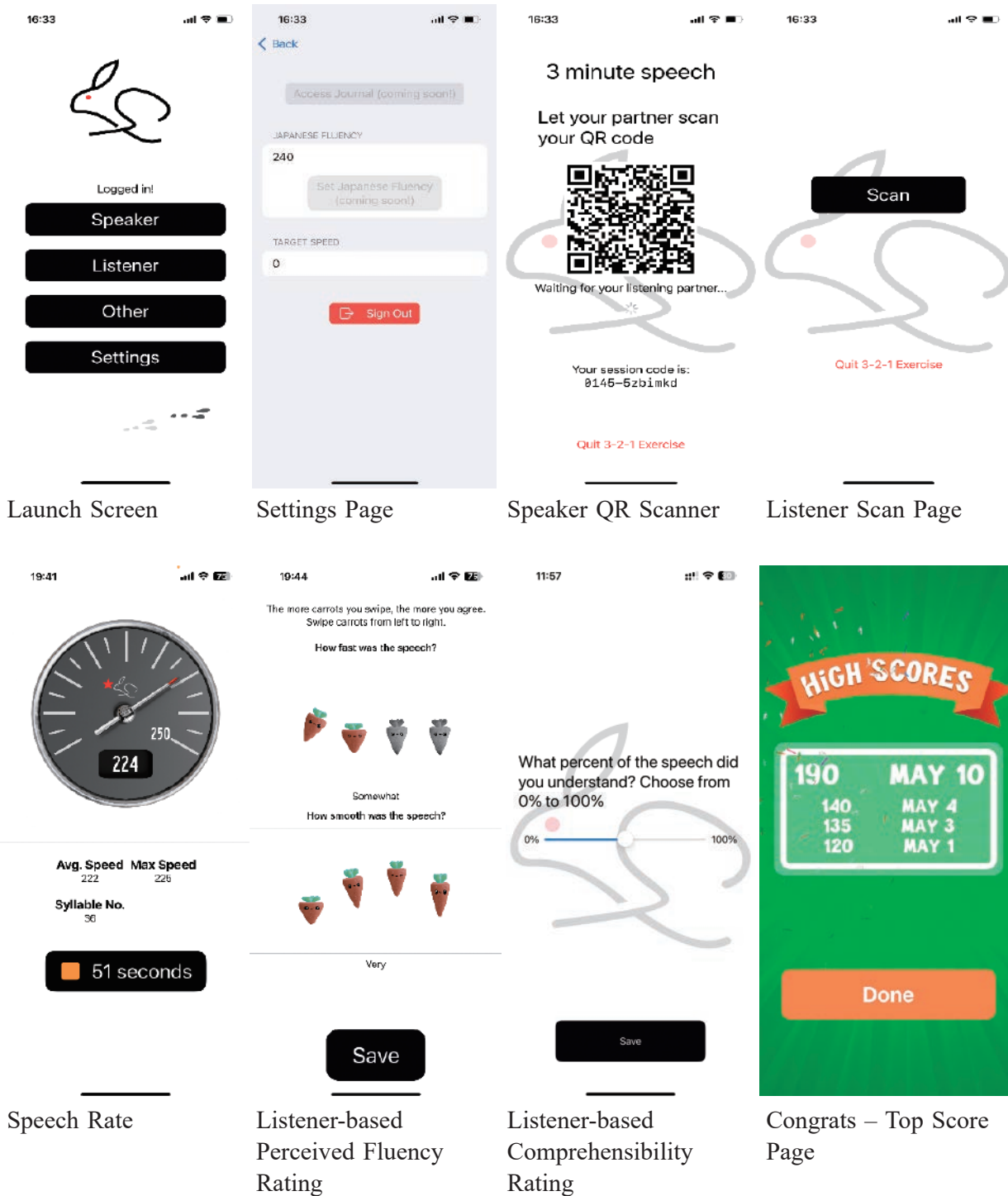
## References

- Ahmadian, M. J., & Tavakoli, M. (2011). The effects of simultaneous use of careful online planning and task repetition on accuracy, complexity, and fluency in EFL learners' oral production. *Language Teaching Research*, 15(1), 35–59.  
<https://doi.org/10.1177/1362168810383329>
- Bain, M., Huh, J., Han, T., & Zisserman, A. (2023). WhisperX: Time-accurate speech transcription of long-form audio. *arXiv*. <https://doi.org/10.48550/arXiv.2303.00747>
- Bjork, R. A., & Bjork, E. L. (2020). Desirable difficulties in theory and practice. *Journal of Applied Research in Memory and Cognition*, 9(4), 475–479.  
<https://doi.org/10.1016/j.jarmac.2020.09.003>
- Boers, F. (2014). A reappraisal of the 4/3/2 activity. *RELC Journal*, 45(3), 221–235.  
<https://doi.org/10.1177/0033688214546964>
- Boersma, P., & Van Heuven, V. (2001). Praat, a system for doing phonetics by computer. *Glott International*, 5(9), 341–347.
- Brooks, C., Carroll, A., Gillies, R. M., & Hattie, J. (2019). A matrix of feedback for learning. *Australian Journal of Teacher Education*, 44(4). <https://doi.org/10.14221/ajte.2018v44n4.2>
- Bui, G., Ahmadian, M. J., & Hunter, A. (2019). Spacing effects on repeated L2 task performance. *System*, 81, 1–13. <https://doi.org/10.1016/j.system.2018.12.006>
- De Jong, N., & Perfetti, C. A. (2011). Fluency training in the ESL classroom: An experimental study of fluency development and proceduralization. *Language Learning*, 61(2), 533–568. <https://doi.org/10.1111/j.1467-9922.2010.00620.x>
- DeKeyser, R. M. (2017). Knowledge and skill in ISLA. In S. Loewen & M. Sato (Eds.), *The Routledge handbook of instructed second language acquisition* (pp. 15–32). Routledge.
- Gatbonton, E., & Segalowitz, N. (1988). Creative automatization: Principles for promoting fluency within a communicative framework. *TESOL Quarterly*, 22(3), 473–492.  
<https://doi.org/10.2307/3587290>
- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77(1), 81–112. <https://doi.org/10.3102/003465430298487>
- Hurling, S. (2012). Introduction to EDC. *New Directions in Teaching and Learning English Discussion*, 1(1), 2–10.
- Levelt, W. J. M. (1993). *Speaking: From intention to articulation*. MIT Press.  
<https://doi.org/10.7551/mitpress/6393.001.0001>
- Maurice, K. (1983). The fluency workshop. *TESOL Newsletter*, 17, 429.
- Ogawa, C. (2019). *A one-semester form-focused intervention on the development of speaking proficiency*. [Doctoral dissertation, Temple University]. Temple University Libraries.  
<https://doi.org/10.34944/dspace/2025>
- Ogawa, C. (2021). Revised 4/3/2 task: Fluency training with formulaic language in the EFL classroom. *The Journal of Asia TEFL*, 18(4), 1108–1127.  
<https://doi.org/10.18823/asiatefl.2021.18.4.3.1108>
- Ogawa, C. (2022). CAF indices and human ratings of oral performances in an opinion-based monologue task. *Language Testing in Asia*, 12(4).  
<https://doi.org/10.1186/s40468-022-00154-9>

- Radford, A., Kim, J. W., Xu, T., Brockman, G., McLeavey, C., & Sutskever, I. (2022). Robust speech recognition via large-scale weak supervision. *arXiv*.  
<https://doi.org/10.48550/arXiv.2212.04356>
- Rikkyo University. (2021). *Instructor Handbook: English Discussion Class*.
- Skehan, P. (2014). *Processing perspectives on task performance*. John Benjamins Publishing Company. <https://doi.org/10.1075/tblt.5>
- Sturges, J., Arthurson, D., Itoi, K., Koike, A., & Reid, S. (2023). *What's your opinion? Interactive skills for effective discussion – Book II*. (3rd ed.). DTP Publishing.
- Suzuki, S., Kormos, J., & Uchihara, T. (2021). The relationship between utterance and perceived fluency: A meta-analysis of correlational studies. *The Modern Language Journal*, 105(2), 435–463. <https://doi.org/10.1111/modl.12706>
- Tavakoli, P., & Wright, C. (2020). *Second language speech fluency: From research to practice*. Cambridge University Press. <https://doi.org/10.1017/9781108589109>
- Thai, C., & Boers, F. (2016). Repeating a monologue under increasing time pressure: Effects on fluency, complexity, and accuracy. *TESOL Quarterly*, 50(2), 369–393.  
<https://doi.org/10.1002/tesq.232>
- Tran, M. N., & Saito, K. (2021). Effects of the 4/3/2 activity revisited: Extending Boers (2014) and Thai & Boers (2016). *Language Teaching Research*.  
<https://doi.org/10.1177/1362168821994136>

## Appendices

### Appendix A: Spoken Fluency Mobile Application



### Appendix B: 3/2/1 Prompts in the EDC Textbook

| Week/<br>Lesson | 3/2/1 Prompts   |
|-----------------|---|
| 2               | <ul style="list-style-type: none"> <li>▪ Who are your best friends? What do you talk about?</li> <li>▪ Who do you talk to when you have a problem? Why?</li> <li>▪ Share three interesting ideas from the reading.</li> </ul>   |
| 3               | <ul style="list-style-type: none"> <li>▪ Did you study hard to get into university?</li> <li>▪ Why did you decide to go to this university?</li> <li>▪ Share three interesting ideas or facts from the reading.</li> </ul>  |
| 4               | <ul style="list-style-type: none"> <li>▪ Before coming to university, did you think it would be easy or difficult to make friends at university?</li> <li>▪ What do you want to do after you graduate from university? (e.g., job, family, travel)</li> <li>▪ Share three interesting ideas or facts from the reading.</li> </ul>     |
| 5               | <ul style="list-style-type: none"> <li>▪ What kind of part-time job would you like to try?</li> <li>▪ In what ways are you independent? (e.g., living alone, doing housework, making important decisions)</li> <li>▪ Share three interesting ideas or facts from the reading.</li> </ul>  |
| 6               | <ul style="list-style-type: none"> <li>▪ Would you like to go abroad? (e.g., to travel, to study, to work) Why or why not?</li> <li>▪ If you went abroad, would you go to an English-speaking country or somewhere different? Why?</li> <li>▪ Share three interesting ideas or facts from the reading.</li> </ul>                     |
| 7               | <ul style="list-style-type: none"> <li>▪ What examples of traditional culture do you like? Why?</li> <li>▪ What examples of pop culture do you like? Why?</li> <li>▪ Share three interesting ideas or facts from the reading.</li> </ul>  |
| 8               | <ul style="list-style-type: none"> <li>▪ What customs do you follow? (e.g., on holidays, at festivals, in daily life)</li> <li>▪ What customs from other countries have you experienced? (e.g., Halloween, birthday cake, Chinese New Year)</li> <li>▪ Share three interesting ideas or facts from the reading.</li> </ul>            |
| 9               | <ul style="list-style-type: none"> <li>▪ Do you think learning a foreign language is important?</li> <li>▪ What foreign languages have you studied? How did you study those languages?</li> <li>▪ Share three interesting ideas or facts from the reading.</li> </ul>   |
| 10              | <ul style="list-style-type: none"> <li>▪ Do you want to use a foreign language at work? Why or why not?</li> <li>▪ How do you balance studying with other activities? (e.g., going to club activities, working part-time, enjoying free time)</li> <li>▪ Share three interesting ideas or facts from the reading.</li> </ul>          |
| 11              | <ul style="list-style-type: none"> <li>▪ Which social media do you use or not use? Why?</li> <li>▪ How often do you use social media?</li> <li>▪ Share three interesting ideas or facts from the reading.</li> </ul>  |
| 12              | <ul style="list-style-type: none"> <li>▪ What public rules do you usually follow? (e.g., at school, on trains, in restaurants, on the street)</li> <li>▪ What are some common bad manners in public places? (e.g., on trains, in cafes, at university)</li> <li>▪ Share three interesting ideas or facts from the reading.</li> </ul> |

| Week/<br>Lesson | 3/2/1 Prompts   |
|-----------------|---|
| 13              | <ul style="list-style-type: none"> <li>▪ Is poverty a problem in Japan?</li> <li>▪ What can younger people do to help elderly people?</li> <li>▪ Share three interesting ideas or facts from the reading.</li> </ul>  |
| 14              | <ul style="list-style-type: none"> <li>▪ What is your best memory from your first semester at university?</li> <li>▪ What was difficult about your first semester at university?</li> <li>▪ What skills and personal qualities have you developed at university?</li> </ul> |

Note. Adapted from *What's Your Opinion? Interactive Skills for Effective Discussion—Book II*, by Sturges et al., 2023.

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### Appendix D: Questions and Prompts for Survey on Reading Aloud

|   |   |
|---|---|
| 1 | When you were using the spoken fluency mobile application today, did you read aloud from passages in the textbook? 今日、Spoken Fluencyモバイルアプリケーションを使用する際、教科書の文章を音読したのですか? Yes, no, I don't remember   |
| 2 | When using the mobile application, how often do you read aloud from reading passages in the textbook? モバイルアプリケーションを使用する際、教科書の文章を音読する頻度はどのくらいですか? Never, rarely, sometimes, often, always  |
| 3 | If you read aloud from the textbook while using the mobile application, what is your reasoning for doing so? (You can reply in Japanese or English) モバイルアプリケーションを使用しながら教科書を音読する場合、その理由は何ですか? (日本語でも英語でも構いません。) (short answer response)  |
| 4 | <p>Below is a list of possible reasons for reading aloud while using the mobile application during the 3/2/1 activity. If you read aloud, please check all that apply. 以下は、3/2/1の活動でモバイルアプリケーションを使用しながら音読をする場合に考えられる理由です。音読をされる方は、該当するものをすべてチェックしてください。</p> <ul style="list-style-type: none"> <li>▪ I can improve my spoken fluency (speed of speech) by reading aloud. 私は、音読することでスピーキングの流暢さ（話すスピード）を向上させることができます。</li> <li>▪ I am lacking enough content to speak for the entire given time. 与えられた時間のすべてを話すには、内容が不足している。</li> <li>▪ The third question asks me about interesting facts and ideas from the reading. I cannot recall the ideas and facts from the reading passages. 3つ目の質問は、読書から得た興味深い事実やアイデアについて尋ねるものです。リーディングパッセージからアイデアやファクトを思い出すことができない。</li> <li>▪ Speaking English is difficult for me. 英語を話すことは私にとって難しいことです。</li> <li>▪ I enjoy reading aloud more than speaking. 話すことよりも音読の方が楽しいです。</li> <li>▪ I can improve my mobile application score by reading aloud. 音読をすることで、流暢な話し方のモバイルアプリケーションのスコアを向上させることができますね。</li> <li>▪ There is no rule against reading aloud from the textbook. 教科書を音読してはいけないという決まりはありません。</li> <li>▪ Other:</li> </ul> |

### Appendix E: Discussion and Comprehension Skills

| Unit Goal                        | Lesson No. | Discussion Skill                         | Examples  |
|----------------------------------|------------|--|---|
|                                  | 1          | Introduction to English Discussion Class |   |
| Sharing and Supporting Opinions  | 2          | Opinions                                 | In my opinion, ... I think...<br>What do you think?   |
|                                  | 3          | Supporting Opinions                      | One reason/example is...<br>Why do you think so?  |
|                                  | 4          | Follow-up Questions                      | What...? Which...? How...?<br>Do you...? Can you...?  |
|                                  | 5          | Comprehension Skills                     | Do you understand?<br>I see. I understand.  |
| Organizing a Discussion          | 6          | Connecting Ideas                         | I agree/disagree. You said...<br>What do you think of my idea?  |
|                                  | 7          | Joining a Discussion                     | Can I start? Can I say something?<br>Would anyone like to ask a question?                             |
|                                  | 8          | Changing Topics                          | What shall we discuss first/next?<br>Is there anything more to add?<br>So, we agree/disagree about... |
|                                  | 9          | Paraphrasing                             | In other words...?<br>So, do you mean...?<br>I mean...  |
| Challenging and Evaluating Ideas | 10         | Different Viewpoints                     | From (X's) point of view...<br>How about (X's) point of view?   |
|                                  | 11         | Balancing Opinions                       | One advantage/disadvantage of...<br>What's one advantage/disadvantage?                                |
|                                  | 12         | Sources of Information                   | According to...<br>I read/heard/saw/learned...<br>Where did you read/see/hear that?                   |
|                                  | 13         | Clarification                            | Can you explain?<br>What do you mean?<br>Could you repeat?  |
|                                  | 14         | Review                                   |   |

Note. Adapted from *What's Your Opinion? Interactive Skills for Effective Discussion—Book II*, by Sturges et al., 2023.

### Appendix F: Example Output Data From Automated Analysis

| Transcript  | Transcript (Raw)  | Pauses  | Utterance Fluency  |
|---|---|---|--|
| My best friend is <b>redacted</b> He is my high school student My high school friends She knows a lot of things and intelligent [1] Why are they your friends | My best friend is <b>redacted</b> He is my high school student My high school friends She knows a lot of things and intelligent Why are they your friends I | 1: Unfilled Pause - [12.4–14.8] [Length: 2.4]<br>2: Unfilled Pause - [16.4–19.2] [Length: 2.8]<br>3: Unfilled Pause - | pause count 22<br>total pause length 71.4<br>articulation rate |

| Transcript   | Transcript (Raw)  | Pauses   | Utterance Fluency  |
|--|---|--|--|
| <p>[2] I think they know a lot of things and they make they make me happy and [3] I feel I feel exciting when they when I talk to them [4] I talk to I [5] I talk to my high school friends when I have a problem This is because they know they know [6] me [7] they know a lot of things about me and and [8] they [9] they can they can give me best advice for me [10] And [11] about about [12] about university universal universal course I will I will talk to I [13] will talk to my college friends when I have a problem about college [14] about college and [15] This is girls They are they are my [16] they are same They are same [17] They are same [18] They are same So they know a lot of things about my courage [19] But my high school student is different High school student is not my is not same courage [20] we can we can not [21] to talk about my problem [22] I like she's cute and she's intelligent and and</p> | <p>think they know a lot of things and they make they make me happy and I feel I feel exciting when they when I talk to them I talk to I I talk to my high school friends when I have a problem This is because they know they know me they know a lot of things about me and and they they can they can give me best advice for me And about about about university universal universal course I will I will talk to I will talk to my college friends when I have a problem about college about college and This is girls They are they are my they are same They are same They are same They are same So they know a lot of things about my courage But my high school student is different High school student is not my is not same courage we can we can not to talk about my problem I like she's cute and she's intelligent and</p> | <p>[25.7–28.6] [Length: 3.0]<br/>                     4: Unfilled Pause - [33.8–41.2] [Length: 7.4]<br/>                     5: Unfilled Pause - [42.1–43.1] [Length: 1.0]<br/>                     6: Unfilled Pause - [52.2–53.9] [Length: 1.7]<br/>                     7: Unfilled Pause - [54.4–56.5] [Length: 2.2]<br/>                     8: Unfilled Pause - [60.6–66.4] [Length: 5.8]<br/>                     9: Unfilled Pause - [66.7–68.5] [Length: 1.8]<br/>                     10: Unfilled Pause - [72.7–74.0] [Length: 1.3]<br/>                     11: Unfilled Pause - [74.2–76.2] [Length: 2.0]<br/>                     12: Unfilled Pause - [77.4–78.5] [Length: 1.1]<br/>                     13: Unfilled Pause - [84.8–86.0] [Length: 1.2]<br/>                     14: Unfilled Pause - [92.5–93.6] [Length: 1.1]<br/>                     15: Unfilled Pause - [94.7–98.8] [Length: 4.1]<br/>                     16: Unfilled Pause - [101.1–102.4] [Length: 1.2]<br/>                     17: Unfilled Pause - [104.8–106.0] [Length: 1.2]<br/>                     18: Unfilled Pause - [106.5–109.7] [Length: 3.2]</p> | <p>4.7<br/>                     mean length of run 10.4<br/>                     syllables (untrimmed per minute) 241<br/>                     start time in seconds 3.8<br/>                     end time in seconds 157.4<br/>                     speech rate (trimmed per minute) 94.2<br/>                     Untrimmed total syllable count 153.6</p> |



| Transcript | Transcript (Raw) | Pauses  | Utterance Fluency |
|------------|------------------|---|-------------------|
|            |                  | 19: Unfilled Pause -<br>[114.0–115.8]<br>[Length: 1.8]<br>20: Unfilled Pause -<br>[123.9–126.1]<br>[Length: 2.2]<br>21: Unfilled Pause -<br>[127.6–128.8]<br>[Length: 1.2]<br>22: Unfilled Pause -<br>[131.7–153.3]<br>[Length: 21.6] |                   |

**Appendix G: Untrimmed Speech Rate (n = 11) Average of All 3/2/1 Rounds for Six Weeks According to Automated Transcription Method**

| Users | Speech Rates |        |        |        |        |        |
|-------|--------------|--------|--------|--------|--------|--------|
|       | Week 2       | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 |
| 324   | 63           | 103    | 111    | 99     | 107    | 118    |
| 325   | 102          | 124    | 153    | 135    | 165    | 172    |
| 326   | 108          | 130    | 132    | 108    | 124    | 137    |
| 327   | 91           | 77     | 90     | 94     | 115    | 117    |
| 328   | 74           | 91     | 112    | 113    | 115    | 113    |
| 329   | 117          | 122    | 138    | 141    | 157    | 159    |
| 330   | 101          | 101    | 125    | 130    | 157    | 152    |
| 331   | 92           | 98     | 101    | 89     | 127    | 108    |
| 332   | 67           | 102    | 130    | 100    | 116    | 151    |
| 333   | 89           | 122    | 136    | 112    | 135    | 144    |
| 334   | 67           | 110    | 142    | 123    | 133    | 105    |

**Appendix H: New 3/2/1 Prompts**

| Week | Prompts   |
|------|---|
| 2    | <ul style="list-style-type: none"> <li>▪ Who are your best friends?</li> <li>▪ What do you talk about with your best friends? (e.g., movies, music, classes, club activities, relationships)</li> <li>▪ When you have a problem do you usually talk to your friends or family? Why?</li> <li>▪ In your opinion, what is the importance of having friends?</li> </ul>  |
| 3    | <ul style="list-style-type: none"> <li>▪ Who are your best friends?</li> <li>▪ What do you talk about with your best friends?</li> <li>▪ Did you study hard to get into this university? Why or why not?</li> <li>▪ Why did you decide to go to this university?</li> <li>▪ Do you think high school is stressful?</li> <li>▪ What are examples of stressful experiences for high school students?</li> </ul> |

| Week | Prompts   |
|------|---|
| 4    | <ul style="list-style-type: none"> <li>▪ Did you study hard to get into this university? Why or why not?</li> <li>▪ Why did you decide to go to this university?</li> <li>▪ Did you think it would be easy or difficult to make friends at university?</li> <li>▪ Why did you think it would be easy or difficult?</li> <li>▪ What do you want to do after you graduate from university? (e.g., job, family, travel)</li> </ul>   |
| 5    | <ul style="list-style-type: none"> <li>▪ Did you think it would be easy or difficult to make friends at university?</li> <li>▪ Why did you think it would be easy or difficult?</li> <li>▪ What kind of part-time job would you like to try?</li> <li>▪ In what ways are you independent? (e.g., living alone, doing housework, making important decisions)</li> <li>▪ Do you think it is important to be independent? Why or why not?</li> </ul>   |
| 6    | <ul style="list-style-type: none"> <li>▪ What kind of part-time job would you like to try?</li> <li>▪ In what ways are you independent? (e.g., living alone, doing housework, making important decisions)</li> <li>▪ Would you like to go abroad? (e.g., to travel, to study, to work) Why or why not?</li> <li>▪ If you went abroad, would you go to an English-speaking country or a non-English-speaking country? Why?</li> <li>▪ What country would you visit? Why?</li> </ul>  |
| 7    | <ul style="list-style-type: none"> <li>▪ Would you like to go abroad? (e.g., to travel, to study, to work) Why or why not?</li> <li>▪ If you went abroad, would you go to an English-speaking country or a non-English-speaking country? Why?</li> <li>▪ What are your favorite examples of traditional culture? Why? (e.g., music, tea ceremony, Obon festival, judo)</li> <li>▪ What are your favorite examples of pop culture? Why? (e.g., music, anime, manga)</li> <li>▪ Do you prefer traditional culture or pop culture? Why?</li> </ul>   |
| 8    | <ul style="list-style-type: none"> <li>▪ What are your favorite examples of traditional culture? Why? (e.g., music, tea ceremony, Obon festival, judo)</li> <li>▪ What are your favorite examples of pop culture? Why? (e.g., music, anime, manga)</li> <li>▪ What Japanese customs do you follow? (e.g., on holidays, at festivals, in daily life)</li> <li>▪ What foreign customs have you experienced? (e.g., Halloween, birthday cake, Chinese New Year)</li> <li>▪ Do you prefer Japanese customs or foreign customs? Why?</li> </ul>  |
| 9    | <ul style="list-style-type: none"> <li>▪ What examples of Japanese customs do you follow? (e.g., on holidays, at festivals, in daily life)</li> <li>▪ What examples of foreign customs have you experienced? (e.g., Halloween, birthday cake, Chinese New Year)</li> <li>▪ Do you prefer Japanese customs or foreign customs? Why?</li> <li>▪ What foreign languages have you studied? Why?</li> <li>▪ Do you think learning a foreign language is important? Why?</li> <li>▪ In your opinion, what is the best way to study a foreign language? (e.g., watching tv, reading, listening to music, making foreign friends) Why?</li> </ul> |

| Week | Prompts   |
|------|---|
| 10   | <ul style="list-style-type: none"> <li>▪ What foreign languages have you studied? Why?</li> <li>▪ Do you think learning a foreign language is important? Why?</li> <li>▪ Jun believes everyone should use a foreign language at work. Do you agree?</li> <li>▪ Why or why not?</li> <li>▪ From the viewpoint of university students, what are good ways to relax during the semester? (e.g., going to club activities, hot springs, drinking tea, hanging out with friends)</li> <li>▪ What are the advantages of relaxing during the semester?</li> <li>▪ What are the disadvantages of relaxing during the semester?</li> </ul> |
| 11   | <ul style="list-style-type: none"> <li>▪ Jun believes everyone should use a foreign language at work. Do you agree?</li> <li>▪ Why or why not?</li> <li>▪ From the viewpoint of university students, what are good ways to relax during the semester? (e.g., going to club activities, hiking, going to hot springs, drinking tea)</li> <li>▪ What are some examples of social media?</li> <li>▪ Ryo thinks the best social media for students is Instagram. Do you agree?</li> <li>▪ Why or why not?</li> <li>▪ What is one disadvantage of social media?</li> </ul>   |
| 12   | <ul style="list-style-type: none"> <li>▪ What are some examples of social media?</li> <li>▪ Ryo thinks the best social media for students is Instagram. Do you agree?</li> <li>▪ Why or why not?</li> <li>▪ What is one disadvantage of social media?</li> <li>▪ What do you think about following public rules? (e.g., school rules, train rules)</li> <li>▪ Why?</li> <li>▪ From the viewpoint of teachers, what are the advantages of following rules? (e.g., doing homework)</li> </ul>   |
| 13   | <ul style="list-style-type: none"> <li>▪ What do you think about following public rules? (e.g., school rules, train rules)</li> <li>▪ Why?</li> <li>▪ From the viewpoint of teachers, what are the advantages of following rules? (e.g., doing homework)</li> <li>▪ Aki thinks that poverty is a problem in Japan. Do you agree?</li> <li>▪ How do you know about that?</li> <li>▪ What can younger people do to help elderly people? (e.g., do household work, make conversation, offer to buy groceries)</li> </ul>   |
| 14   | <ul style="list-style-type: none"> <li>▪ Aki thinks that poverty is a problem in Japan. Do you agree?</li> <li>▪ How do you know about that?</li> <li>▪ What can younger people do to help elderly people? (e.g., do household work, make conversation, offer to buy groceries)</li> <li>▪ How do you know about that?</li> <li>▪ Who are your best friends?</li> <li>▪ What do you talk about with your best friends? (e.g., movies, music, classes, club activities, relationships)</li> <li>▪ When you have a problem do you usually talk to your friends or family? Why?</li> </ul>   |

Note. Adapted from *What's Your Opinion? Interactive Skills for Effective Discussion—Book II*, by Sturges et al., 2023.