Comparing Between University Students' Presentation Performances in an Online and Face-to-Face Classroom Environment From the Perspectives of Complexity, Accuracy, and Fluency

オンライン授業と対面授業における大学生のスピーチパフォーマンスの比較
―複雑さ・正確さ・流暢さの観点から―

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Abstract

During the new coronavirus disease (COVID-19) pandemic, more schools have started online English classes in 2019. However, there is little agreement on the differences in students' performances between online and face-to-face lessons. Therefore, this study examines the differences in the speech performance of 61 university students vis-à-vis face-to-face and online classes in terms of grammatical accuracy, speed fluency, repair fluency, syntactic complexity, and lexical complexity. The results show that there are significant differences in the fluency of students' presentations between face-to-face and online classes, thus demonstrating that students are able to speak English more fluently and with fewer false starts or unnecessary repetitions in online classes. A possible reason for this finding is that the participants of this study are at the beginner level; thus, it is suggested that they do not have confidence in speaking English in the physical presence of many classmates. However, students are able to speak English with less pressure in online classes, thereby resulting in significant differences. Based on the findings, this article elucidates the growth of online lessons, especially during the COVID-19 pandemic, and includes some implications about how teachers use both face-to-face and online instructional formats.

Keywords: online English lessons, speaking presentation, COVID-19

Since the outbreak and rapid spread of the novel coronavirus disease 2019 (COVID-19), almost all facets of human life have been restricted. The field of education has not been an exception; most schools have imposed a temporal suspension of their educational activities and faced serious challenges in examining ways to continue their courses and educate their students, particularly toward reducing the spread of the virus during the pandemic (Erarslan, 2021; Hijazi & AlNatour, 2021). Consequently, most educational institutes worldwide have shifted from conventional face-to-face classes to online education.

The English courses of the Liberal Arts of Hirosaki University, which started in April 2020, were also required to adopt an online lesson format, using learning management systems, such as Microsoft Teams, Zoom, and Moodle. The unanticipated and rapid shift created great confusion and impacted not only the teachers but also the students. Most of their concern was about the successful adoption of an online lesson format for English lessons, which aimed to facilitate students' English competence as lingua franca (Center for Liberal Arts Development and Practices, 2020) without in-person interactions between not only students but also teachers and students. In addition, there were concerns about the preparation infrastructure for both teachers and students that were necessary for online lessons, such as the availability of high-speed Internet and mobile devices for online lessons. Thus, at the briefing session, in which the details about the online instructional format of Hirosaki university were provided to the teachers, some teachers showed concerns about these complete shifts in connection to online teaching, especially in English lessons. However, considering that the priority at the time was students' safety and preventing the further spread of COVID-19, all the English courses of the Faculty of Liberal Arts, Hirosaki University, were unable to avoid adopting an online instructional format.

Notwithstanding the circumstances described above, to the best of our knowledge, little research has examined the effectiveness and efficiency of emergency online teaching in terms of the difference in students' performance and achievement between online and face-to-face lessons.

Literature Review

Because of the COVID-19 pandemic, more schools have started online classes (Erarslan, 2021; Dhawan, 2020; Hijazi & AlNatour, 2021). Much research has been conducted to examine the effectiveness of online learning by comparing the advantages of traditional face-to-face classes. Paechter and Maier (2010) examine learners' preferences for online and face-to-face learning using a questionnaire comprising 25 items. A total of 2,196 students from 29 Australian universities participate in this study. The results show that the participants are satisfied with their online courses in their respective universities, thus providing favorable evaluation in general. However, upon comprehensively examining the results, it is revealed that the participants advocate different learning components for various learning objectives. With regard to interaction among learners, the participants prefer face-to-face learning. However, they prefer online learning to disseminate information. The results also reveal that, in terms of the acquisition of self-regulated learning, the participants prefer online learning. Fansury et al. (2020) investigate how the use of digital content facilitates students' motivation and interest during the COVID-19 pandemic. A total of 50 students and 20 teachers participate in the study, and they are required to respond to questionnaires and undergo interviews. The results reveal that the majority of students believe that the use of digital content facilitates the learning process during the COVID-19 pandemic because of its easy accessibility. Regarding teachers' responses, most of them appreciate the importance of digital content in teaching English because they consider that introducing digital content, especially provided directly from native speakers, improves learners' motivation and increases their interest in learning. In conclusion, Fansury et al. (2020) suggest that the use of digital content in teaching English is beneficial for students, especially during the COVID-19 pandemic, wherein students' motivation and interests are likely to be lacking.

However, there are still disagreements concerning learners' preferences for online lessons. Some studies suggest that learners prefer face-to-face to online learning. Abdulrahman (2021) reports that investigates the attitudes toward online learning of university-level Saudi students majoring in English. A total of 18 university students undertaking listening and speaking courses participate in this study and a 21-item questionnaire is used to examine their attitude toward the importance of speaking in English, teachers' use of emails to communicate

their feedback on students' English speaking tasks, online teaching of English speaking, and online learning and teaching of the English language. The results show that the majority of the participants have a positive attitude toward online learning, appreciating that delivering their speaking tasks online improves their speaking skills, videotaping their speaking tasks improves their quality, and online learning facilitates learners' independence and flexibility. However, most participants prefer face-to-face learning, reporting that online learning facilitates students' cheating. Consequently, Abdulrahman (2021) concludes that online learning cannot replace face-to-face learning. Bali and Lui (2018) examine the perceptions of 107 university students in Taiwan toward online and face-to-face learning using a 23-item questionnaire. The results show that the students' perception of face-to-face learning is higher than that of online learning in terms of social presence, social interaction, and satisfaction. The main reason for these findings is assumed to be the lack of social presence and interaction in online learning.

Artino (2010) examines the personal factors that predict students' preferences and their decisions to enroll in online and face-to-face learning. A total of 564 undergraduate students and a 59-item questionnaire were used to investigate the participants' motivational beliefs, achievement emotions, and satisfaction with the online course. The results indicate that all of the factors, motivational beliefs, achievement emotion, and satisfaction with the online course would predict students' choice of whether they take online or face-to-face courses. In particular, their self-efficacy beliefs and overall satisfaction with recent online courses have a significant impact on their reference to the instruction format. In addition, students' preference for the instruction formant can be predicted by lower task value beliefs, that is, students who find the content of the course interesting, important, and useful are likely to prefer the other instruction format. All the previous studies adopt questionnaires as the materials, which asks learners' motivation, attitude, and satisfaction towards face-to-face or online learning.

Regarding research concerning Japanese learners of English, Jung et al. (2012) examine the stress factors in online collaborative learning of 226 Japanese students from 6 universities. As a result of the exploratory factor analysis, four key factors affecting stress in online collaboration are identified: self-efficacy, instructional design, technology use, and collaborative process. In addition, Jung et al. (2012), because online learning is new to most English learners in Japan, proposes needs for serious examination in introducing this new learning formats based on the insight from foreign countries, mentioning as follows:

> Pedagogical and instructional design innovations cannot be imported from the West into such Asian settings without serious consideration of the differences in culture, learners' prior experience of such practices and whether there is a "fit" between the ideals and the reality. (p. 1018)

As described above, much research has been conducted to examine the effectiveness of online learning compared with face-to-face lessons, especially during the spread of COVID-19. However, most studies on the effectiveness of online learning or classes have only focused on learners' perceptions or preferences based on the results obtained from questionnaires or interviews rather than the actual outcome, improvement of students' performances, or development of learners' proficiency obtained from online learning. Consequently, despite the spread of online classes, differences in learners' performance between online and face-to-face lessons have not yet been established. Moreover, as Jung et al. (2012) suggest, considering that the learners' performances and their consequent achievements are strongly related to the characteristics and background of learners, which implies that the research results whose subjects are not learners in Japan cannot be generalized for Japanese learners, there is still considerable ambiguity regarding the effectiveness of online lessons for English learners in Japan. Thus, the present study aims to elucidates this issue investigating whether there are any differences in speaking performance between face-to-face and online classes.

The Purpose of This Study

To address the issue mentioned above, this study compared speech performances under two different instructional conditions: face-to-face and online lessons. As discussed above, research has tended to focus on learners' perceptions of online lessons rather than their actual performance or achievements. Therefore, it is worth investigating whether there are any differences in students' performance between face-to-face and online lessons. The research question of this study is presented as follows:

RQ. Are there any differences in students' speech performance between face-to-face and online lessons in terms of their accuracy, fluency, syntactic complexity, lexical complexity, and the number of false starts/repetitions?

Method

Participants

The participants in this study were 61 first-year Japanese university EFL students, who were divided into a face-to-face presentation group (FtF Group) and an online presentation group (OL Group). They came from a wide array of faculties: science and technology, humanities, agriculture and life science, health sciences, and education. The FtF Group consisted of 30 students, who took the course in 2019, before the COVID-19 pandemic, whereas there were 31 students in the OL Group, who took the course in 2020 during the COVID-19 pandemic. These groups are considered equivalent in terms of the placement of the English course of the Liberal Arts of Hirosaki University. However, regarding the fact that the placement test was not implemented in 2020 because of the COVID-19 pandemic, the equivalency of the two groups was not confirmed statistically, which is one of the limitations of the present study. The courses of 2019 and 2020 are different only in their instructional formats: the online and face-to-face lessons, so that other factors of their lessons, such as their teaching procedures and teaching materials, are equivalent. All the participants had studied English in Japan for at least six years as a formal subject in junior and senior high schools.

Materials

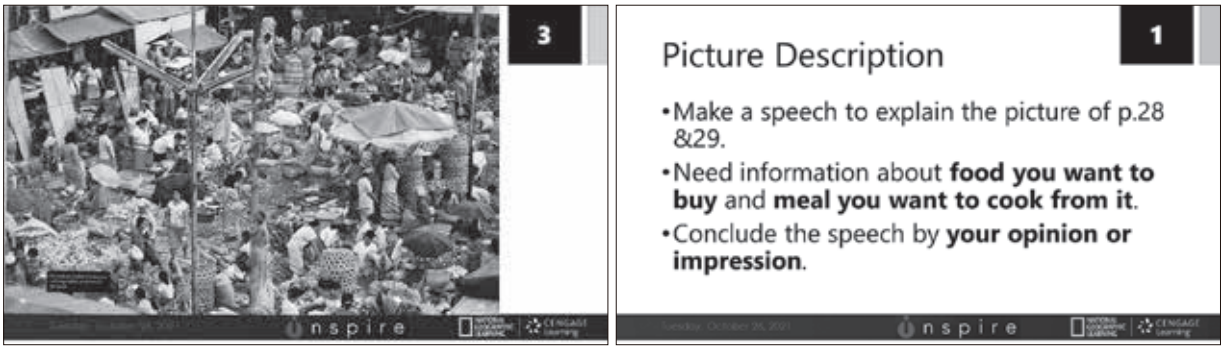
The textbook adopted in the course is Inspire 2 (Hartmann et al., 2014). This textbook mainly targets A2-B1 level learners of the CEFR. After every second unit of the textbook, a unit summary section was set, in which learners reviewed the previous two units and engaged in communicative activities utilizing vocabulary and grammatical knowledge learned in the previous units. One of the main activities in the summary section was *Big Picture Description*, in which the students were required to make a presentation describing what appears in a picture. The students' performance in this activity is the subject of the analysis in the present study.

Procedure

In the *Big Picture Description* activity, the students are required to make presentations to describe what appears in the picture. At the end of the class, just before the *Big Picture Description* activity, they are given the requirement details of the presentation about what they need to mention, the allotted time, and evaluation criteria. Based on the requirements, the students are assigned to prepare to make their presentations. An example of the slide of the first presentation is shown in Figure 1.

The students are not allowed to read the script during the presentation. Consequently, they make some local grammatical mistakes. However, as this activity is message-oriented rather than form-oriented, mistakes or errors, as long as they do not interrupt conveying the message of the speaker, are not targets for deduction of the evaluation score.

Figure 1
The Big Picture and Instruction for the First Presentation



Data Analysis

The students' presentations are videotaped and transcribed for analysis. Many studies have been published on the factors that should be adopted to measure the proficiency of spoken data. In particular, the concepts of complexity, accuracy, and fluency (CAF) have been introduced by many researchers. Data on the relationship between speaking proficiency and CAF indicate that speaking proficiency is strongly correlated with each other in CAF (Najmi, et al., 2021; Foster & Skehan, 1996; Housen & Kuiken, 2009). Complexity reflects elaborateness, richness, diversity, and variation of the language in terms of the syntax or the vocabulary (Foster & Skehan, 1996; Housen & Kuiken, 2009). Accuracy refers to "the degree of deviancy from a particular norm" (Housen & Kuiken, 2009, p.463), or "the focus is on freedom from error" (Foster & Skehan, 1996, p.304). Finally, fluency is "characterized by perceptions of ease, eloquence and smoothness of speech or writing" (Housen & Kuiken, 2009, p. 463). Data analysis was conducted based on the following criteria: To obtain the CAF values, the number of AS-units (Foster et al., 2000), types, tokens, and duration of presentation were measured based on the transcriptions. The transcribed data of the participants' presentation was divided into AS-units and errors in the data were coded by two raters and the disagreements were resolved through discussion. Finally, the values of these five factors are converted into standard scores (z-score) to compare them on the same scale.

Accuracy (AC): The ratio of error-free AS-unit
Speed Fluency (SF): Word per minute
Repair fluency (RF): The ratio of AS-units with false starts and repetitions
Syntactic complexity (S-comp): Average number of clauses per AS-unit
Lexical complexity (L-comp): Type token ratio

This study uses the computer software, JASP ver. 0.15 (JASP Team, 2021), for data analysis. To examine the difference between the face-to-face and online classes statistically, two-way ANOVAs were conducted, considering each criterion factor (accuracy, speed fluency, repair fluency, S-comp, and L-comp) and the instructional format (face-to-face and online classes) as the main factors. In addition, a post hoc test was conducted to compare each factor: accuracy, speed fluency, repair fluency, S-comp, and L-comp.

Results

Table 1 shows the descriptive statistics of the five criterion factors and instructional formats.

Table 1
The Descriptive Statistics of the Five Factors and the Instructional Format (Raw Score)

Factors	Instructional Format	Mean	SD	95% CI
AC	FtF1	0.56	0.12	[0.51, 0.61]
	FtF2	0.66	0.16	[0.60, 0.73]
	OL1	0.67	0.18	[0.59, 0.74]
	OL2	0.65	0.29	[0.55, 0.76]
FL	FtF1	101.43	23.03	[92.50, 110.36]
	FtF2	72.22	13.06	[67.16, 77.28]
	OL1	124.40	56.24	[102.59, 146.21]
	OL2	137.19	45.05	[120.37, 154.01]
FR	FtF1	0.16	0.15	[0.09, 0.22]
	FtF2	0.11	0.11	[0.06, 0.15]
	OL1	0.01	0.07	[-0.01, 0.03]
	OL2	0.02	0.09	[-0.14, 0.05]
S-comp	FtF1	1.40	0.25	[1.30, 1.50]
	FtF2	1.54	0.19	[1.46, 1.61]
	OL1	1.57	0.25	[1.47, 1.67]
	OL2	1.98	0.54	[1.78, 2.18]
L-comp	FtF1	8.04	4.36	[6.35, 9.73]
	FtF2	6.48	2.97	[5.33, 7.64]
	OL1	5.64	2.66	[4.61, 6.67]

Note: SD = standard deviation; CI = confidence interval; AC = accuracy; SF = speed fluency; RF = speed fluency; S-comp = syntactic complexity; L-comp = lexical complexity; FtF1 = the first face-to-face class; FtF2 = the second face-toface class; OL1 = the first online class; OL2 = the second online class

According to Table 1, the mean AC values seem to be lower than the other criterion factors. To examine the differences statistically, a two-way ANOVA was conducted. Tables 2 and 3 show the results of the two-way ANOVA.

Table 2
The Results of Two-way ANOVA: Within the Factors and Interaction

Cases	*SS*	*df*	*MS*	*F*	*p*	η^2
Factor	883.00	4	220.75	341.72	<.001	0.66
Factor Instructional format	91.48	12	7.62	11.80	<.001	0.07
Residuals	284.24	440	0.65			

Note: *SS* = sum of squares; *df* = degree of freedom; *MS* = mean square; *F* = F ratio.

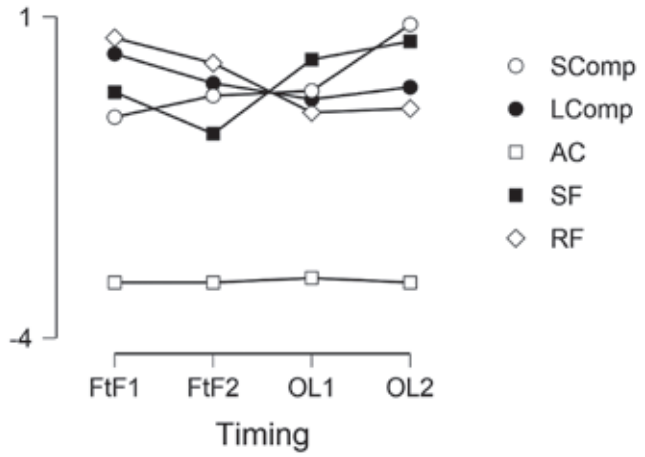
Table 3
The Results of Two-way ANOVA: Between the Factors

Cases	*SS*	*df*	*MS*	*F*	*p*	η²
Instructional format	11.55	3	3.85	5.83	<.001	0.01
Residuals	72.59	110	0.66			

Note: *SS* = sum of squares; *df* = degree of freedom; *MS* = mean square; *F* = F ratio

As a result of the two-way ANOVA, the interaction between the criterion factors and the instructional formats is significant, F (12,440) = 11.80, $p < .001$, $\eta^2 = .07$ [large effect size]. Both main effects are also significant: the main effect of the criterion factors, F (4,440) = 341.72, $p < .001$, $\eta^2 = .066$ [medium effect size], and the main effect of the instructional format, F (3,110) = 5.83, $p < .001$, $\eta^2 = .001$ [small effect size]. In addition, the effect size of the interaction between the criterion factors and instructional formats is large. These are shown in Figure 1 below. The vertical line shows the z-score of each factors and the horizontal one shows the instrctuonal formats.

Figure 2
Descriptive Plots



Note: AC = accuracy; SF = speed fluency; RF = repair fluency; S-comp = syntactic complexity; L-comp = lexical complexity; FtF1 = the first face-to-face class; FtF2 = the second face-toface class; OL1 = the first online class; OL2 = the second online class.

AC	FtF1 = FtF2 = OL1 = OL2
SF	FtF1 = FtF2 < OL1 = OL2
RF	FtF1 = FtF2 > OL1 = OL2
S-comp	FtF1 = FtF2 = OL1 < OL2
L-comp	FtF1 = FtF2 = OL1 = OL2

To examine the results in detail, a post hoc test was conducted for each criterion factor—accuracy, fluency, S-comp, L-comp, and false start—based on the instructional formats. The results of Turkey's multiple comparisons reveal that the factors that show significant differences between face-to-face and online lessons are observed in fluency ($p < .001$) and false start/repetition ($p < .001$). Therefore, it can be concluded that students show higher performances in terms of fluency and false start/repetition in online lessons than in face-to-face lessons.

Discussion

This study aims to investigate the differences in speaking performance between face-to-face and online lessons. According to the results of the two-way ANOVA, significant differences are observed in their fluency and false start/repetition, and students make a presentation more fluently and with fewer false starts or unnecessary repetitions in online lessons. The most probable reason for this result is the difference in students' anxiety related to the existence of the audience between the instructional formats. That is, in the face-to-face lessons, the students are required to make presentations in front of approximately 30 classmates, which stresses the speakers, consequently making their presentation more disfluent. However, in online lessons, the students make their presentations through computers. Even though around 30 classmates beyond the computer are virtually listening to their presentation, they are less stressed and feel less anxious compared with the face-to-face lessons, where audiences physically exist.

Another important to emerge from the data is that, between face-to-face and online lessons, no significant differences are observed in the other three criterion factors—accuracy, syntactic complexity, and lexical complexity This confirms that, even if instructional formats are different, students' presentation performances are equivalent in terms of these three factors. This result is considered to be derived from the fact that these three criterion factors are strongly related to what to say rather than how to say. In other words, the accuracy, syntactic complexity, and lexical complexity of the students' presentations are confirmed at the stage of the preparation. On the other hand, fluency and false start/repetition are directly related to performance at the exact moment of the presentation. In addition, the results strongly relate to the characteristics of the presentation task. As mentioned above, the presentation task adopted in the present study requires the participant to describe the picture, in which the participants' accuracy, syntactic complexity, and lexical complexity were inherently influenced. Above all, the results indicate the probability that online lessons have advantages when evaluating the accuracy, syntactic complexity, and lexical complexity of the students' presentations. In addition, it seems to be beneficial for students who have difficulty making presentations in front of many audiences. However, face-to-face lessons should be implemented to improve students' presentation in person, in front of the audience.

It is also crucial to note that the accuracy of the value is significantly low compared with other criterion factors throughout all the formats (FtF1, FtF2, OL1, and OL2). This seems to be because this presentation is message-oriented, and form-related mistakes and errors are not the subjects of the evaluation. Thus, it is quite probable that students' intentions do not directly focus on the accuracy of their English. However, as this English course is a part of university education, it is not appropriate to neglect the accuracy of students' English. As mentioned above, accuracy seems to be related to what to say, which is mainly dealt with at the preparation stage. Therefore, it is favorable to make educational interventions either before or after the students' presentations.

Conclusion and limitations

This study examines whether there are any differences in the speech performances of university students between face-to-face and online classes. This study also aims to highlight the advantages of face-to-face and online classes and the possible ways to improve students' speaking performances. The results indicate that fluency and false start/repetition have an impact on the difference between face-to-face and online classes, which suggests that students are able to speak English more fluently in online classes than in face-to-face classes. One of the reasons for this finding is that the participants of this study are at the beginner level; it is suggested that they do not have the confidence to speak English in front of many classmates. Nonetheless, students are able to speak English with less pressure in online classes, which results in significant differences. Thus, teachers should provide a class atmosphere without a feeling of tension with students during English-speaking classes.

While providing some important pedagogical implications, this study is limited in that the study period is short. If this study is conducted in the longer term, giving opportunities for the repeated practice of presentation in front of classmates, students will get used to making in-person speeches, and consequently, their fluency in face-to-face lessons is expected to improve. In addition, as mentioned above, the equivalency of the two groups was not confirmed statistically because the placement test was not implemented in 2020 for the COVID-19 pandemic. Moreover, there is a possibility that significant differences can be observed among other factors. Especially breakdown fluency was neglected in this study. Future research, conducted in the longer term, is necessary to reveal how teachers use both face-to-face and online instructional formats.

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