

## DDL Applications to the Seventh Grade EFL Classroom in Japan

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## 中学1年生の英語授業におけるDDLの実践

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In recent years, data-driven learning (DDL) has often been applied in L2 classrooms for tertiary learners, but it remains rare at the pre-tertiary level. In order to explore the potential for effectiveness at the secondary level, paper-based DDL activities were implemented as a supplement to a communicative (meaning-based) lesson in a junior high school EFL class in Japan. Twenty-six seventh grade students took part in a single lesson that lasted 50 minutes. An analysis of pre- and post-test writing indicated that the majority of students were able to learn and correctly produce not only target grammar (demonstrative adjectives *this* and *that* and possessives) but incidentally learned the correct use and placement of articles in simple sentences. These results suggest the use of DDL can be effective when concordance lines are carefully controlled for grammar and vocabulary.

近年, 大学等の高等教育の第二言語の授業において, DDL (data-driven learning, データ駆動型学習) が導入され, 効果をあげている。しかしながら, 小中高校の第二言語の授業でDDLが活用される事例は少ない。本研究では, 中等教育のレベルにおけるDDLの普及を目指して, コミュニケーションと意味伝達重視の英語授業に, 生徒のレベルに適したペーパー版DDLを導入した。実践には中学1年生26名が参加し, 学習ターゲットは「指示代名詞の *this* と *that* 」と「所有格」であった。DDL実践の効果を検証するために, 英語のライティングをプリテストとポストテストとして実施したところ, 1名を除いた全生徒においてライティングの得点が上昇し, 統計的にも有意な差が確認された。生徒のプリテストとポストテストにおけるライティングを個別に観察, 比較したところ, 学習ターゲットの文法項目のみならず, 冠詞の使用, 文構造の把握等の点においてもライティングに改善が見られた。これらの結果から, 指導者が的確に文法や語彙のレベルを調整した英文を生徒に提示する場合, DDLの効果が高いことが確認された。

キーワード: DDL, EFL Grammar, Noticing, Communicative Classroom

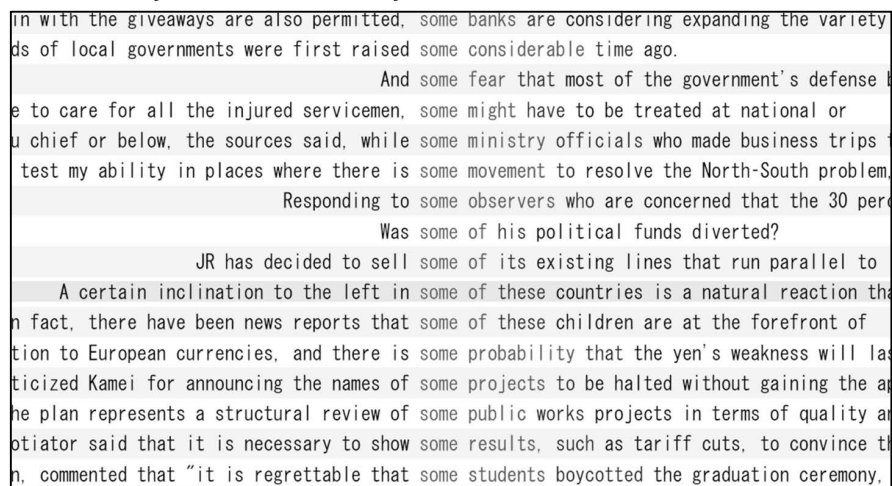
## Introduction

## What is DDL?

Originally suggested by Johns (1991), data-driven learning (DDL) is one method for teaching L2 vocabulary and grammar using a corpus, which is a body of language data, and search software. For example, when the word *some* is searched, the corpus search software, called a concordancer, extracts all occurrences of this word from the database and shows these aligned in the center of a computer monitor (see figure 1). This display of the searched word is called a keyword in context, or KWIC (pronounced *quick*). The sentences on the screen are called concordance lines. The data

shown in figure 1 was extracted from a newspaper corpus. Users can sort the sentences according to the words that appear to the left or right of the search word *some*. In figure 1, the sentences were sorted in alphabetical order of the words to the right, and were highlighted. When the sentences are sorted, it is easier for learners to notice patterns and form hypotheses about language rules. In figure 1, for example, students will find countable plural nouns after *some*, such as *banks*, *observers*, *projects*, and *results*. In contrast, when a singular noun comes after *some*, such as *probability* and *movement*, the nouns are uncountable.

Figure 1

*Screenshot of Concordance Lines for the KWIC some*

With DDL, teachers do not explain the English grammar, but instead allow students to discover language rules by themselves. Thus, DDL is inductive; it promotes noticing and fosters student autonomy. Although DDL itself is not communicative, it is certainly student-centered. When it is implemented as a supplement to a communicative (meaning-based) language class, it can help students develop their explicit knowledge of vocabulary and grammar through discovery and active learning.

DDL can be introduced in two instructional ways in ESL classrooms: digital-based and paper-based. For digital-based DDL, students use computers or tablets to search a corpus and observe the concordance lines that appear on the screen, such as those in figure 1.

For paper-based DDL, they observe concordance lines that have been purposefully selected and printed on a worksheet by their instructor (see figure 2). By extracting specific concordance lines for students, the instructor can choose examples that will be helpful and effective for identifying and learning the target language rules. In addition, the vocabulary and grammar levels used in the concordance lines can be strictly controlled, so more complex grammar and vocabulary and exceptions to rules can be screened out. In this way it is possible to provide level-appropriate material using paper-based DDL.

### Communicative Language Teaching and DDL

Communicative language teaching (CLT) and task-based language teaching (TBLT) have become mainstream approaches for teaching foreign or second languages (Ellis, 2018; Willis, 1996; Willis & Willis, 2007). For L2 learners, "the general goal of language learning is the fluent, accurate, and pragmatically effective use of the target language" (Ellis, 2003, p. 103). In Japan, teaching English to foster students'

communicative ability and to encourage L2 interaction, as opposed to traditional teacher-centered lessons, has been a practical reform in English education. The Ministry of Education, Culture, Sports, Science, and Technology (MEXT) has mandated an urgent requirement to encourage Japanese L2 learners to develop basic communication skills (MEXT, 2008; MEXT, 2018). According to the revised Course of Study for junior high school, which will be fully implemented from 2021, MEXT expects learners to have opportunities to interact with peers without advanced preparation, and expects teachers to conduct English lessons using English. For elementary school, a fully revised Course of Study has been created for 2020, which outlines learning English as a subject from Grade 5, and emphasizes oral activities.

Although the importance of communicative meaning-focused learning has been established (Ellis et al., 2020; Long, 1985; Willis, 1996; Willis & Willis, 2007), there have been criticisms. With regard to TBLT, Swan (2005) argued "[t]he naturalistic communication-driven pedagogy characteristic of task-based instruction has serious limitations, especially as regards the systematic teaching of new linguistic material" (p. 397). Izumi (2016) warned that if a grammatical feature is not salient for Japanese learners, the chance for acquisition could be low. In other words, less salient grammatical features need teacher intervention. The use of DDL counters this criticism, and its use at the junior high school level addresses the point made by Torikai (2011) who emphasized the importance of learning grammar at the junior and senior high school level as a critical period for language acquisition. Benesse (2014) reported that in survey results of randomly selected Grade 7 students in Japan, 70.1% ( $n=1,057$ ) indicated that they felt that English grammar was difficult. We believe paper-based DDL may be a solution.

## DDL Application in L2 Secondary-Level Classrooms

Meta-analyses of DDL studies have established the effectiveness of learning vocabulary and grammar using DDL (Boulton & Cobb, 2017; Lee, et al., 2018; Mizumoto & Chujo, 2015), however, most studies are focused on university-level learners. Its use with secondary school learners has been limited. Crosthwaite (2020, p. IX) pointed out that "...378 separate publications are featuring the empirical study of DDL. Of these, only 19 explicitly state that the participants are in high school." Boulton and Cobb (2017) also reported in their meta-analysis that only 10 of 88 samples were from secondary level learners.

We know that DDL can be effective, but is it the right fit for younger students? From among the limited number of studies available, Takahashi and Fujiwara (2015) reported results from a study in which they taught singular and plural forms of nouns to 52 sixth graders using paper-based DDL. An identical listening test was administered as a pre-test, post-test and retention test. Students listened to two recorded sentences and chose the correct one, for example: *I like rice.* and *I like rices.* The DDL group showed a statistically higher score increase over the control group. Furthermore, the retention test score, two weeks after instruction, did not decrease.

In another study, DDL was implemented in three different junior high schools with 38 ninth graders, 20 ninth graders and 51 eighth graders, in schools A, B and C, respectively (Nishigaki et al., 2015). The grammar items students learned were different among the groups and included post-modifiers, the passive voice, the present perfect, SVOC sentence patterns, infinitives, and similar items. Treatment and control group scores were analyzed and compared. The results showed that both the treated and control groups improved between the pre-tests and post-tests. However, for the retention tests, the test score for the DDL group increased and that of control group decreased. As a result, the gap between the two groups became statistically significant. This suggests that teacher-centered grammar learning and student-centered DDL were both effective for students in understanding the grammar, but that the DDL instruction allowed students to retain this knowledge longer. This further suggests that the use of DDL with younger students is not only possible, but can be effective.

Several challenges for using DDL at the primary and secondary level have been identified. Hirata (2018) points out that teachers are not familiar with corpora and do not know how they can apply it in L2 classrooms. Pérez-Paredes (2020) ascribes challenges to the limited number of level-appropriate corpora for secondary-level learners. In commonly used concordance lines such as those shown in figure 1, the language that emerges from authentic corpora is complex,

confusing, and consequently overwhelming for beginner-level students. In addition to the lack of level-appropriate corpora, the scarceness of user-friendly DDL search tools are another problem to be overcome. And finally, not all schools have internet access or the necessary ICT technology.

## Purpose and Research Questions

To address these challenges, in this study we have implemented paper-based DDL to allow for control of level-appropriate concordance lines and eliminate the need for technology. The purpose of this study was to explore the efficacy of using DDL as a supplement to a communicative (meaning-based) class in a secondary school in Japan by measuring any gains between pre- and post-writing tests. Specifically:

(RQ1) Can the use of paper-based DDL be effective in teaching specific target grammar (the demonstrative adjectives *this* and *that*, the possessives *my*, *your*, *Ken's*) to seventh grade students?

(RQ2) How did students modify their incorrect understanding of grammar rules, as shown on the pre-test, in their writing outcomes following the DDL activities?

## Methodology

### Participants

The participants were 26 EFL Japanese students (12 males and 14 females) in Grade 7, and were aged 12–13. The students belonged to the same municipal junior high school and had studied in the same primary school. The school district participated as a MEXT English-education-for-a-regional-base program for four years, and the students have participated in the program since Grade 3. All the participating students had been studying English formally at school as an activity for two hours a week from Grade 3 under the city-wide program, using the same sets of textbooks. From Grade 5, students began studying English as a subject for two hours a week. From Grade 7, the number of hours increased to four hours per week. Although the students have studied English from Grade 3, there is no extracurricular exposure to English, and they have limited or no exposure to English in their daily lives.

### Target Grammar

The target grammar item from the MEXT-authorized school textbook was *this is* and *that is*. In these types of sentences, the possessive forms are often included. The instructor had found that her students had no clear idea of how possessive forms were used. Therefore, both *this is* and *that is*, as well as possessive forms such as *my*, *your*, and *Miho's* were included in the concordance lines on the DDL worksheets.

### Class Procedure and Research Design

The class was conducted on September 10, 2019. Table 1 provides an overview of the procedure: (1) meaning-based instruction, followed by the (2) pre-test, then (3) DDL-based instruction activities, followed by (4) the post-test (See Appendix). To measure the effects of the DDL instruction, the pre-test and post-test were administered before and after DDL activities. Students had a single lesson lasting 50 minutes. The meaning-based lesson had three phases: (a) a warm-up with “teacher talk” (a short presentation in English, detailed below); (b) a verbal introduction and verbal implicit input of the target grammar item; and (c) oral activities (listening, speaking and interaction), via the government-authorized school textbook. After the pre-test was administered, the paper-based DDL activities were introduced and included individual work, group work and a class discussion. The post-test was administered at the end of the class. The details of each step are provided below.

**Table 1**  
Class Procedure

Phases	Activities
(1) Meaning-based Instruction	(a) Warm-up (b) Verbal introduction (c) Oral activities Listening Speaking Interaction
(2) Pre-test	
(3) DDL-based Instruction	(a) Individual work (b) Group work (c) Class discussion
(4) Post-test	

#### Warm-up: Teacher Talk

After a brief introduction of the native assistant English teacher (ALT) by the Japanese teacher (JT), the two teachers engaged in “teacher talk.” They spoke together in slow, clear English so students could concentrate on listening comprehension. After the talk, the JT and the ALT asked the students easy comprehension questions. This phase is essential for involving students in natural English conversation and for enhancing students’ input and output. The conversation, follow-up questions by the teachers, and students’ answers were in English, but some Japanese was used for clarifying any uncertain points students brought up.

### Verbal Introduction

In this second phase, the JT used PowerPoint slides to introduce the target grammar items *this is* and *that is* (from the textbook), and the possessives such as *my*, *your*, *Miho’s* (which will appear in the DDL activities). While showing various pictures of her family members and their belongings, the JT modelled the target grammar items by repeating verbally and implicitly *This is my...., That is Miho’s....,*” and using the question form *Is this your... ?* In this phase, the instruction was mostly conducted in English, with Japanese used for clarification.

### Oral Activities

In order to conduct the class as usual, the JT used an authorized textbook. Similar to their regular English classes, the students first practiced input by listening to a conversation that included the target grammar and completed an activity by matching the spoken dialogue with corresponding pictures. Next, the students practiced output by using the target phrases based on another textbook activity.

### DDL Activities

The fourth phase consisted of three steps: (a) individual student observation of the printed concordance lines (shown as complete sentences); (b) a group-based exchange of the students’ findings, and (c) a class exchange of group findings, and a summary and confirmation of the target grammar rule by the teacher. The worksheet used in the lesson is shown in figure 2. In figure 2, the sentences 1 and 2 in List 1 (リスト1) include an article, while 1 to 6 in List 2 (リスト2) include possessives.

**Figure 2**  
Paper-based Concordance Lines Showing Students’ Notes

1 リスト1		
1	This is a dog.	これは 犬です。
2	That is a cat.	あれは 猫です。
2 リスト2		
1	This is my pen.	これは 私のペンです。
2	This is my notebook.	これは 私のノートです。
3	This is your eraser.	これは あなたの消しゴムです。
4	That is your pencil case.	あれは あなたの鉛筆ケースです。
5	This is Andy’s ruler.	これは アンディーの定規です。
6	That is Miho’s textbook.	あれは ミホの教科書です。

In the first step, students were asked to individually observe the concordance lines and were given minimal instruction. They were asked to compare the English sentences with the Japanese translations, and to draw circles, squares, and triangles using different colors to represent subjects, verbs, articles or possessives, and complements of the two languages. When students traced the same shapes or colors, they identified the different positions of these language items in the sentences. They also compared sentences in the top column (リスト1) and the bottom column (リスト2) and reported on any similarities or differences. They explored the language data at their own pace in order to notice any patterns or formulate any grammatical rules. Their findings varied according to their individual proficiency levels, so some students noticed the target grammar items, but others may have focused on other aspects.

In the second step, the students exchanged their findings in small groups of four. Through sharing, they were able to broaden their knowledge. This step also accelerates and encourages student-centered learning by giving them opportunities to contribute to other group members, and by receiving positive feedback.

In the third step, one student from each group presented the main findings to the class and the teacher wrote the students' central ideas on the blackboard. Following this, the teacher summed up the target grammar rule to consolidate all the things noticed by the students. By observing, discussing and sharing their findings with other class members, students were able to discover the grammar themselves instead of being passively taught by the teacher.

### Evaluation

A written pre-test was given to all students after the meaning-based textbook activities and prior to the DDL activities, and a post-test was given immediately after the DDL activities. Both tests are provided in the Appendix. For the tests, students read Japanese sentences and wrote equivalent English sentences. The pre-test and post-test were similar but not identical. For example, Question 4 on the pre-test required the translation *This is Ken's pen*. On the post-test, this was *This is Riko's pen*. The pre- and post-tests were scored by the teacher after the English lesson. The tests were scored by the same rater twice. When discrepancies were found, the average score was used.

Scores were rated with a maximum of four points. The teacher gave one point if a student wrote the whole sentence without target-grammar errors for each Japanese-to-English translation. Sentences without a period or words with noun

errors which did not affect students' grammatical accuracy were counted as correct sentences (e.g., *coala* written instead of *koala*).

## Results and Discussion

### Writing Test Scores

The first research question on the potential effectiveness of DDL was measured using the writing tests. Table 2 shows the descriptive statistics gained from the pre-test and the post-test. The full mark for both tests was four. The average score on the pre-test was 1.19, and 2.65 on the post-test. The result of a *t*-test verified effectiveness ( $t(25) = -5.72, p = .000$ ). The effect size was also large ( $d = 1.09$ ). By taking a closer look at students' scores, results showed that all students except one improved.

Regarding the first research question, it is clear that students were able to identify, learn and apply their understanding of the target grammar by writing in English using the correct targeted English grammar. This suggests that the DDL activities were effective.

**Table 2**

*Descriptive Statistics for the Writing Tests (Full Score: 4 points)*

Tests	<i>n</i>	<i>M</i>	95% CI	<i>SD</i>
pre-test	26	1.19	[.71, 1.68]	1.21
post-test	26	2.65	[2.06, 3.25]	1.47

### Students' Self-Correction

To address the second research question, we looked closely at the students' improvement as demonstrated on their writing tests. The comparison of students' writing outcomes from the pre-test and post-test illustrate how each student improved their knowledge of the target grammar using DDL.

#### Possessives

In looking at pre-test Question 4 in figure 3, we can see that the student did not write the possessive, and the name *Ken* started with a lowercase letter. Both issues were corrected in the post-test. This is an example of a direct application of the learned target grammar. (Note that for figures 3-10, the pre-test appears first, followed by the post.)

Figure 3

Post-test (Second Image) Showing Improvement for the Use of the Possessive and Proper Noun Capitalization

日本語	英語
1 これは私のカバンです。	1 This is my bag.
2 これはコアラです。	2 This is coara.
3 これはあなたの本です。	3 This is your book.
4 あれはケンのペンです。	4 That is ken pen.

日本語	英語
1 これは私のつくえです。	1 This is my disk.
2 これは犬です。	2 This is a dog.
3 これはあなたの教科書です。	3 This is your pen.
4 あれはリコのエンピツです。	4 That is Riko's pencil.

In figure 4, interestingly, this student wrote *your book* as *you're book* on the pre-test. We might presume that s/he heard and learned *you're* in the oral input activities and applied it erroneously in the pre-test, but corrected it in the post-test. S/he realized that *your* is needed before the noun. S/he also heard and learned the possessive (without the apostrophe *s* as in *Kens pen*) from the oral presentation of the words. After the DDL activities, s/he was able to correct the written forms, and this shows the importance of the input of written English as well as spoken English. In this case as well, we can see that this student was able to provide the missing article for Question 2 in the post-test, showing a clear understanding of the application of the article. Similarly, in figure 5, we see that the student heard *a you are* for *your*, but was able to correct this on post-test.

Figure 4

An Example of Student's Written Self-Correction for Possessives and Articles

日本語	英語
1 これは私のカバンです。	1 This is my bag.
2 これはコアラです。	2 This is koara.
3 これはあなたの本です。	3 This is you're book.
4 あれはケンのペンです。	4 That is Kens pen.

日本語	英語
1 これは私のつくえです。	1 This is my desk
2 これは犬です。	2 This is a dog.
3 これはあなたの教科書です。	3 This is your tekistbook
4 あれはリコのエンピツです。	4 That is Riko's pencil.

Figure 5

An Example of Student's Written Correction of an Oral Assumption

日本語	英語
1 これは私のカバンです。	1 This is my bag.
2 これはコアラです。	2 This is a coara.
3 これはあなたの本です。	3 This is a youare book.
4 あれはケンのペンです。	4 That isa pen.

日本語	英語
1 これは私のつくえです。	1 This is my desk.
2 これは犬です。	2 This is a dog.
3 これはあなたの教科書です。	3 This is your tekistbook
4 あれはリコのエンピツです。	4 That is Riko's pencil.

### This and That

In figure 6, we can see that the student heard *this* as *dis* in the communicative activities, and was able to correct this after using DDL. However, from Q4 on the post-test, we can see that *that* was not learned yet and written as *Tate*.

Figure 6

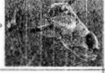
An Example of a Student Self-Correction the Oral dis with the Written this


日本語	英語
1 これは私のカバンです。	1 Dis is my bag.
2 これはコアラです。	2 is it coara.
3 これはあなたの本です。	3 your my book.
4 あれはケンのペンです。	4 is it Ken pen.

日本語	英語
1 これは私のつくえです。	1 This is my besk.
2 これは犬です。	2 This a dog.
3 これはあなたの教科書です。	3 This is your tekestbook.
4 あれはリコのエンピツです。	4 Tate is Riko pencil.

From figure 7, we see that this student could not initially write *this*, but learned that a sentence starts with *this* and *that* and was able to include the possessives *my* and *your* on the post-test. However, s/he missed the be-verb that follows *this* and *that*.

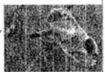
**Figure 7**  
Student Understanding that a Sentence Begins with *this*


日本語	英語
1 これは私のカバンです。	1 I am bag
2 これはコアラです。 	2
3 これはあなたの本です。	3
4 あれはケンのペンです。	4

日本語	英語
1 これは私のつくえです。	1 This my
2 これは犬です。 	2 This dog.
3 これはあなたの教科書です。	3 This your
4 あれはリコのエンピツです。	4 That Riko pen.

On the pre-test in figure 8, the student wrote *This* instead of *This is*. This means the student failed to pick out the *this is* and *that is* chunks from the oral activity. However, after the DDL activities, s/he was able to write these correctly as well as the possessives, *your* and *rico's* in the post writing.

**Figure 8**  
Student Understanding that a Sentence Includes *this is*

日本語	英語
1 これは私のカバンです。	1 This is your bag.
2 これはコアラです。 	2 This coara
3 これはあなたの本です。	3 This your book
4 あれはケンのペンです。	4 Ken pen

日本語	英語
1 これは私のつくえです。	1 This is my tukue.
2 これは犬です。 	2 This is a dog.
3 これはあなたの教科書です。	3 This is your kyoutasyo.
4 あれはリコのエンピツです。	4 That is rico's pencil.

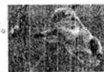
### Articles


We can also see that in figures 3, 4, 6 and 8, these students missed the article on Question 2 for the pre-test (*a coara* [koala]), but all wrote the article in the post-test (*a dog*). Although articles were not targeted in this study, students noticed and learned them by themselves. This kind of incidental learning is an added benefit of DDL.

### Word Order

In figure 9, the student did not use the correct word order for Question 4 and wrote *This pen is Ken*. However, this was corrected on the post-test.


**Figure 9**  
Example of a Student Self-Correcting Word Order


日本語	英語
1 これは私のカバンです。	1 This is my bag.
2 これはコアラです。 	2 This is koara.
3 これはあなたの本です。	3 This is you are book
4 あれはケンのペンです。	4 This pen is Ken

日本語	英語
1 これは私のつくえです。	1 This is my desk.
2 これは犬です。 	2 This is dog.
3 これはあなたの教科書です。	3 That is you textist book.
4 あれはリコのエンピツです。	4 That is riko pencil

The correct re-ordering is seen in figure 10 as well. This student wrote *It ther ken is pen* on the pre-test for Question 4. However, in the post-test, s/he was able to correct the word order with *That is Riko pencil*. On the pre-test, s/he also missed the be-verb in the sentences, but in the post-test, correctly included *is* in each sentence as well as the article *a* for *dog*. Although s/he was not able to apply the possessive in *Riko's*, correct production and clear improvement is shown in the post-test.

**Figure 10**  
Example of a Student Self-Correcting Word Order and Be-verb

日本語	英語
1 これは私のカバンです。	1 It this my caban.
2 これはコアラです。 	2 It this coara.
3 これはあなたの本です。	3 It this your book.
4 あれはケンのペンです。	4 It ther ken is pen.

日本語	英語
1 これは私のつくえです。	1 This is my tebru
2 これは犬です。 	2 This is a dog.
3 これはあなたの教科書です。	3 This is your tyst boog,
4 あれはリコのエンピツです。	4 That is Riko pencil.

### Conclusion

Studies have shown that the use of data-driven learning can be very effective at the university level. In this study, we have shown that DDL can be used effectively with junior high school students as a supplement to communicative (meaning-based) learning. The meaning-based activities provided oral input for students, which was reflected albeit sometimes incorrectly on the pre-test. By providing students with the opportunity to notice the demonstrative adjectives *this* and *that* and possessive patterns, they were able to understand, incorporate and produce this targeted grammar. In addition, students also noticed and were able to understand and incorporate the use of articles. This small study addresses the criticism that meaning-based instruction alone may not be sufficient, particularly for non-salient issues.

### Acknowledgements

This research was supported by JSPS KAKENHI Grant B (2020-2023:Representative C. Nishigaki) Number JP20H01277.

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## Appendix

### Pre-test

問題を解いてみよう！(1)

1年 組( ) 氏名 \_\_\_\_\_


次の日本語を英文にしましょう。

	日本語		英語
1	これは私のカバンです。	1	..... ..... .....
2	これはコアラです。 	2	..... ..... .....
3	これはあなたの本です。	3	..... ..... .....
4	あれはケンのペンです。	4	..... ..... .....

### Post-test

問題を解いてみよう！(2)

1年 組( ) 氏名 \_\_\_\_\_

	日本語		英語
1	これは私のつくえです。	1	..... ..... .....
2	これは犬です。 	2	..... ..... .....
3	これはあなたの教科書です。	3	..... ..... .....
4	あれはリコのエンピツです。	4	..... ..... .....