

Learning Vocabulary with SkELL: Developing a Methodology with University Students in Japan Using Action Research

Henry TROY

Abstract

Corpora are becoming more prevalent in the language classroom, especially in the development of dictionaries and course materials. Nevertheless, corpora are still perceived by many educators as difficult to use directly in the classroom, which is also known as “data-driven learning” (DDL). This study investigates the student and teacher reactions to the use of SkELL, a free online corpus designed to be user-friendly, for vocabulary learning at a university in Japan. Action research is utilized to refine the teaching methodology, with changes to the method based on student and teacher feedback after each of the four implementations of DDL. The results show that the students enjoyed using SkELL and felt it was effective for vocabulary learning, while the teaching methodology grew in efficiency throughout the course.

Introduction

The use of corpora in the language classroom, in one form or another, is increasing. The most common ways in which they may be utilized are via dictionaries and textbooks which now draw on corpus-acquired data. With

dictionaries, it has been described as a “revolution”, and corpora are now used as an integral part of their development (Breyer, 2011, p. 12; Tribble, 2015, p. 38), and while they are still less utilized in course books, their influence is growing (McCarten, 2010). However, despite a rise in investigative studies of more direct applications of corpora in EFL and ESL classrooms (Breyer, 2011; Mizumoto & Chujo, 2015), overall they have not become prevalent in the way some in the early 1990s predicted (Breyer, 2011). Thus, the idea of data-driven learning (DDL) developed by Johns (1986; 1988; 1991), where a corpus is used directly in the language classroom by students, remains on the “periphery” of language teaching (Karras, 2015, p. 169).

The main reasons that DDL has failed to break through in all but specific higher education settings are threefold. First, teachers themselves either lack the training or motivation to employ such methods. Although teachers may be aware of corpora, they lack the skills needed to incorporate them into lessons (Tribble, 2015). Second, there are logistical requirements that many educational institutions simply cannot meet, such as a need for computers or tablets (Lenko-Szymanska, 2017). Finally, students can be resistant to DDL, as they also require training and user-friendly resources to engage with it effectively, both of which may be lacking (Hirata & Hirata, 2019; Kilgariff et al., 2015; Lenko-Szymanska, 2017).

In terms of DDL research, although the number of relevant studies has risen significantly since 2000, these investigations have tended to have a relatively narrow focus. Almost all DDL studies are done at universities, and so they are not easily applied in other educational fields (Lenko-Szymanska, 2017). Moreover, the majority of DDL studies are more greatly concerned with quantitative results by assessing gains in test scores with a particular learning methodology. Although this is of value, qualitative studies of DDL are also extremely important (Chambers, 2007). In order to create effective and efficient methods with which to utilize DDL in the language classroom, the reactions of teachers and students

to those methods need to be investigated. In a rare study of teachers' views on DDL conducted by Breyer (2011), most said they do not use it in their classes, but would be keen to do so if there were ready-made materials. Similarly, when discussing his own approach to DDL, McNair (2018) explained "as a teacher, I would be more likely to try something if a fellow teacher has had success with it than if I only read about it in an academic article" (p. 232). As for student reactions, it is of "crucial importance" that more studies of student-based evaluations of DDL are conducted, according to Hirata and Hirata (2019, p. 236).

EFL education in Japan is especially lacking in DDL and the use of corpora in general. The country is making some progress with English education, as from 2020 it became a compulsory subject even for elementary school students, and all university students do at least one year of English even if it is not their major (Jones, 2019). However, EFL lessons in primary and secondary education in Japan are still overwhelmingly focused on passing exams rather than achieving communicative competence (Hirata, 2018), and those that do want to be able to speak English effectively usually rely on private language schools, private lessons or cram schools to achieve this (Jones, 2019). Japan ranked 55th out of 100 nations in the English Proficiency Index (2020), and one way to improve EFL education in Japan is through modernising the way it is taught. There have been very few studies into the effectiveness of DDL in the EFL classroom in Japan, and those that have done them strongly urge further research (Hirata & Hirata, 2019; Mizumoto & Chujo, 2015).

This study, therefore, investigates the effectiveness of an action research-based approach to DDL for vocabulary acquisition in an EFL class at a university in Japan, using SkELL as the corpus. The study aims to assess student reactions to the methodology in order to improve it, and also to document the teacher's (myself) experience of its utilization. This will somewhat cover the shortfall in qualitative research on teacher and students' reactions to DDL, and do so in a location where such research has been scarce. The study follows on from my

investigation conducted via an indirect implementation of DDL, with concordance lines on paper used in a mixed-methods approach to helping students learn phrasal verbs at a private language school in Japan (Troy & Millar, 2019). In contrast to that study, this investigation has the students using a corpus directly in the classroom, is more focused on the qualitative rather than quantitative results and is conducted at a university rather than a private language school.

Literature Review

SkELL: What Is It?

SkELL (Sketch Engine for Language Learning) is a free, online corpus which allows users to search for words or phrases without requiring registration (SketchEngine, 2020). The English Corpus for SkELL contains texts obtained from a variety of fields, with the most prevalent Wikipedia articles (about 38.88%), English Web (30.91%), Time stamped web corpus (14.07%) and the British National Corpus (8.71%). It is updated regularly and is currently on its 3.10 version (SketchEngine, 2020). SkELL is itself a component of Sketch Engine, which allows for the “building, managing and exploring of large text collections in dozens of languages” (SketchEngine, 2020). In essence, Sketch Engine allows users to develop their own corpora, while SkELL is a ready-made corpus which is designed to be user friendly.

SkELL was developed with language learners and teachers in mind, so its interface and features are made to be as user-friendly as possible. “Corpora for all” is its strapline, according to the developers (Kilgariff et al., 2014). It is widely used in lexicography and to some extent in English language teaching (Barrs, 2016; Kilgariff et al., 2014). As is the case with most corpora, the user searches for a word or phrase, and sentences including the expression from the texts are listed. The user can then use other features such as Word Sketch, which is “used to reveal how the words behave collocationally and grammatically” (Barrs, 2016), and Similar Words, which functions as a thesaurus. The frequency

of the word in a “hits per million” measurement is also given.

Given its functionality and accessibility, there are several potential benefits to using SkELL for language researchers, teachers and learners. As with all corpora, analysis of the frequency, collocations and other lexico-grammatical features of certain words can be undertaken by linguists. For teachers and students, there is the possibility of SkELL assisting with language learning, especially as the interface is easier to use than other corpora (Kilgariff et al., 2015). As Barrs (2016) puts it, “for language education in particular, the advancements in simplifying the access to large-scale corpora means that corpus-based data can become a regular part of language learning” (p. 25).

Previous DDL Studies with SkELL

There have been several studies of Sketch Engine or SkELL applications in the language classroom, although very few of these have taken place in Japan, and most have focused on languages other than English. Chinese seems to be the most-commonly analysed (Kilgariff, Keng & Smith, 2015; Smith et al., 2008). There have also been attempts to outline particular methodologies with which SkELL could be used in the classroom (Thomas, 2016).

One of the few pieces of research on SkELL used in the English language classroom in Japan was conducted by Hirata and Hirata (2019). In their study, 26 female university students were trained in using SkELL before being asked to create dialogues and text utilizing the corpus, after which they presented and discussed them in the lesson. Finally, they would identify difficult words, answer questions about them and attempt to make their own texts using the target vocabulary. After the process was complete, the students were surveyed about their reactions to SkELL and their impression of English education in Japan. On the positive side, the results showed students generally thought SkELL was more useful for study than dictionaries, most rated SkELL as user-friendly, and the majority enjoyed the opportunity to use authentic materials. However, there were mixed responses in terms of whether SkELL or dictionaries assists with learning

more, and just 46% of respondents said SkELL increased their motivation to study. The study concludes that it would be best for teachers to carefully select which sentences from SkELL the students use for study, and that it is useful for the students to use SkELL on their phones or tablets (Hirata & Hirata, 2019).

Previous DDL Studies Without SkELL

There has been a wealth of investigations into DDL in the language classroom using corpora aside from Sketch Engine and SkELL. Most of these have been concerned with whether using DDL can result in improvements in student learning, specifically by using pre and post-tests to measure vocabulary acquisition, and often by comparing with the performance of a control group.

A meta-analysis of 29 studies, all of which compared DDL with a control group, conducted by Lee et al. (2019) found that positive-to-medium effect sizes were recorded for both investigations which took place over short-term and long-term periods. Their results also suggested that advanced students improved more significantly. Similarly, a large meta-analysis by Boulton and Cobb (2017) looked at the results of 64 studies and also found that the vast majority resulted in significant gains in test scores from DDL treatment. A smaller meta-analysis by Mizumoto and Chujo (2015) looked exclusively at DDL applications in Japan, and of the only 14 they found, 12 were carried out by one of the two authors of the meta-analysis, suggesting a lack of research into DDL in Japan in general. This also meant almost all the studies had the same types of students, which tended to be low-level, and the authors themselves urged other researchers to conduct more research on DDL in Japan (Mizumoto & Chujo, 2015).

The settings, participants, and methods by which DDL has been implemented in studies have varied considerably. Studies using DDL often have a control group learning with a dictionary for comparison, such as the one by Karras (2015) with Vietnamese students, which found an advantage for DDL over dictionaries, but there are also those where a traditional method of teaching is contrasted with DDL. In the investigation by Troy and Millar (2019), a scaled-

down version of the British National Corpus called BNCweb was utilized with paper-based concordance lines used in the classroom, with another class learning the same vocabulary via a more traditional approach for comparison. The findings showed test score rises for both groups, although with this study there was a small but not statistically significant advantage for the non-DDL class. There has also been comparison of how effective DDL can be if used directly or deductively (e.g., using the corpus with a computer, tablet or phone; more autonomous), versus indirect or inductively (e.g., with paper-based materials; more teacher-controlled). Lee and Lin (2019) found both approaches effective in their study of EFL students in Taiwan, although they argue that the inductive approach “prevents learners from fully benefiting from its (DDL’s) potential advantages” (p. 24).

Student and teacher reactions to DDL are usually included as supplementary findings in studies rather than the primary focus. Common positive responses to DDL from students include that it uses authentic language (Chambers, 2005; Yoon & Hirvela, 2004), it allows for more autonomous learning (Friginal, 2018), and that students tend to respond positively to the opportunity to learn by discovery (Chambers, 2007; Chambers, 2010; Yoon & Hirvela, 2004). However, DDL is often criticised for being too time-consuming, technology-dependent and requiring significant training for teachers and students to use effectively (Gilquin & Granger, 2010).

Research Questions

Given the stated aim of garnering student and teacher reactions in order to develop an efficient method of using DDL in the EFL classroom, the following research questions were formulated for this study:

1. To what extent do the students enjoy using DDL via SkELL for vocabulary learning?
2. To what extent do the students feel learning is achieved using this method?

3. How effective is an action research-based approach to refining a method for DDL implementation?

Method

Setting and Participants

The research was conducted at a university in Japan with one class of EFL students. In total 16 second-year students took part, including 14 females and two males, all of whom were over a lower intermediate to upper intermediate proficiency level. Although a relatively small study, the size is typical of DDL studies in general (Boulton & Cobb, 2017). All participants signed a consent form before the course, agreeing that their participation would be used for research purposes, and their gender and age may be identified, but not any personal information such as their name. None of the students had ever used or encountered SkELL before.

SkELL Implementation

The classes took place in 2019 and were part of a course called ‘Core English 3’, which is a second year EFL class for students who have chosen English as their major. In this class, six new advanced vocabulary connected with the topic are studied each unit, with there being four units during the semester for a total of 24 words. The lessons focusing on these new vocabulary occurred once every three or four weeks.

The class members were told not to do the textbook work on the vocabulary, or to check the meaning in a dictionary, and instead were given a training session on how to use SkELL. In the training session, the students were shown how to search for a word on SkELL, as well as the functions of the corpus. They were then asked to search for a word, assess its frequency, read four teacher-chosen sentences with the word and discuss its form and meaning with a partner, before checking Word Sketch for more information and writing an example sentence with the word. This methodology would then be updated after each lesson based

Figure 1

1. Go to skell.sketchengine.co.uk and search for *incredulous*.
2. Look at the hits per million. Is this a common word?
3. Now read sentences 3, 6, 13 and 30. What type of word is *incredulous*?
What can you tell about the word's meaning from the sentences?
4. Now click on 'word sketch'. Which words are often used with *incredulous*?
5. Try writing an example sentence for *incredulous*.

on student survey responses and teacher observations. This process was repeated four times (one for each unit). The students were allowed to use a mix of English and Japanese when discussing with their partner. This method is similar to the one recommended for SkELL use in the language classroom by Kilgariff et al. (2015). Figure 1 illustrates the steps to the initial methodology.

Data Collection

Data were collected mostly via student surveys. The students were surveyed after each of the four lessons when SkELL was used, with a longer questionnaire asking for more detailed reactions given at the end of the course. These surveys all asked about enjoyment and degree of learning, but also what they thought could be improved about the method. Based on this feedback and the teacher's own observations on the method efficacy, the method was then adapted for the next application. This is an **action research** approach, where a particular method is attempted, then adapted, then tried again, and this process is repeated until (it is hoped) an optimal methodology is developed (Loewen & Plonsky, 2016). It is argued by McNair (in Friginal, 2018) that using action research in order to achieve a more effective method for DDL is an area in need of greater exploration.

At the end of the course, the students were also asked if they would be willing to participate in a follow-up survey on whether they still used SkELL six months later in early 2020. Nine students indicated they would be willing to do this, but in the end only two completed it.

Findings

Action Research in the DDL Class

After each application in the DDL class, the procedure was edited to reflect student feedback and teacher observations. A summary of the most common feedback from students, as well as the changes to methodology based on the feedback received can be seen in Table 1.

Table 1

Class	Areas identified as in need of improvement (no. of students)	Areas identified as in need of improvement (by teacher)	Changes for subsequent application
1	<ul style="list-style-type: none"> - More time needed to do the tasks (2) - Want feedback to see if their example sentences were appropriate (4) 	<ul style="list-style-type: none"> - Some pairs included two low-level students unable to cope - Word Sketch confused some students 	<ul style="list-style-type: none"> - Give more time - Only recommend Word Sketch for some words - Do feedback at the end highlighting good example sentences - Groups of three or four instead of pairs - Allow students to check similar words on some words
2	<ul style="list-style-type: none"> - More time needed (2) - Sometimes still do not know the meaning at the end of the process (2) 	<ul style="list-style-type: none"> - Students spend too long on each word 	<ul style="list-style-type: none"> - Do one word beforehand as homework to increase class time - Use “good” example sentences from a variety of students at the end to increase motivation - All students to check similar words on any they do not understand after partner discussion
3	<ul style="list-style-type: none"> - More time needed (3) - Some words are difficult to learn through SkELL (2) 	<ul style="list-style-type: none"> - Students still spending too long on each word - Sense of achievement is somewhat lost for students if they cannot complete the process 	<ul style="list-style-type: none"> - Encourage students to move on after a maximum of five minutes per word - Partners instead of groups to speed up the process - Spend more time on feedback at the end to ensure students feel they understand the words
4	<ul style="list-style-type: none"> - Similar Words and Word Sketch were not always useful (1) - Difficult to understand the nuance (1) 		

The final method proved to be the most efficient in terms of time management, and it was notable that no students wrote that more time was needed in the final survey, even though this had been a frequent complaint in all the previous questionnaires. By the end of the course, I could conceive of no obvious changes that I felt would significantly improve the methodology.

Student Enjoyment

The first question on each survey the DDL class took asked them to score their level of enjoyment of the methodology for vocabulary learning on a scale of 1 (“I loved it”) to 5 (“I hated it”). The descriptive statistics showing the averages, range and mode in the DDL class are displayed in Table 2.

The results show that in general the students enjoyed the SkELL method throughout the course, with no student ever saying they disliked this technique, and the average hovering around 2 (“I liked it”) in all four lessons. However, there was no clear increase in enjoyment of SkELL and DDL as the course progressed, even as the method was adapted.

In terms of student comments, in all surveys they identified that being able to guess the meaning of words was enjoyable. This was mentioned by at least four students in every survey, and in the final survey seven students wrote this was a reason for enjoying the approach. It was notable that after the first application several students said they enjoyed the novelty of trying a new way to learn new

Table 2

DDL Class			
Lesson	Average	Range: 1 (I loved it) – 5 (I hated it)	Mode
1	2.15	1 (I loved it) – 3 (It was okay)	2 (I enjoyed it)
2	1.92	1 (I loved it) – 3 (It was okay)	2 (I enjoyed it)
3	2	1 (I loved it) – 3 (It was okay)	2 (I enjoyed it)
4	2.08	1 (I loved it) – 3 (It was okay)	2 (I enjoyed it)

words, but this was not mentioned on any follow-up surveys. On the other hand, after students were allowed to use the Similar Words tool, this started being mentioned as a positive feature of the learning method in the final two surveys.

Student Assessment of Learning

The second question asked in the surveys was for the students to assess if the method was helping with their learning of vocabulary. As with the question on student enjoyment, the scale was 1–5, with this time 1 representing “Yes, completely”, and 5 indicating “No, not at all”. The results are illustrated in Table 3.

The assessment of vocabulary learning in the DDL class was overwhelmingly positive throughout the course. The average response score remained between 1 and 2 in every survey, and there was a slight improvement in the students’ views on their learning from the beginning of the course to the end, although this mostly occurred after the second application and then remained stable for the final two classes. There was no significant change in the range or mode of the answers given.

The most frequent positive feedback from students about vocabulary learning through SkELL was that it helped them to remember the meaning. This was often explained with reasons like “imagining helps me to remember” and “I can think more deeply about the meaning this way”. One student even compared SkELL with learning via a dictionary by asserting that “if I search with dictionary, it’s

Table 3

DDL Class			
Lesson	Average	Range: 1 (Yes, completely) – 5 (No, not at all)	Mode
1	1.92	1 (Yes, completely) – 3 (Sort of)	2 (Yes, somewhat)
2	1.75	1 (Yes, completely) – 3 (Sort of)	2 (Yes, somewhat)
3	1.77	1 (Yes, completely) – 3 (Sort of)	2 (Yes, somewhat)
4	1.77	1 (Yes, completely) – 3 (Sort of)	2 (Yes, somewhat)

easy to search but easy to forget. Using SkELL, I can remember for long time”. On the other hand, some students struggled to understand the meaning even after the process was complete, and two students mentioned explicitly that they would rather learn via another method, such as a translation device or illustrations.

End of Course Surveys

The students were given a short questionnaire at the conclusion of the course. They were asked to compare SkELL with learning via a dictionary, whether they would use SkELL in the future and to list any other comments. The results of this survey are illustrated in Table 4.

The students that preferred dictionaries pointed to their greater speed and convenience, while those who chose SkELL repeated the reasons given in previous surveys, such as the deeper understanding of meaning and that the meaning is easier to remember that way. The majority of respondents said they would use SkELL in the future, and they liked the various features such as Word Sketch and Similar Words, as well as wanting to use the example sentences so they feel they are using a word naturally. The students who do not plan to use SkELL in the future mostly said it was too difficult for them to use, or that it takes too long.

There was also a delayed survey sent out to the DDL class students who volunteered six months after the course conclusion to check if they were still using SkELL. Only two students answered the survey; one said they still used

Table 4

Question	Answers		
1 - Comparing using SkELL to learn words and just checking the meaning in a dictionary, which do you prefer?	Dictionary: 46.2%	SkELL: 53.8%	
2 - Do you think you will use SkELL to learn words in the future?	Yes: 61.5%	No: 30.8%	Unsure: 7.7%

SkELL, while the other said they did not. Both students still felt very positive about having practised vocabulary learning with SkELL, and expressed a desire to learn via a corpus more in the future.

Teacher Observations

Most of the observations I made regarding the strengths and weaknesses of the teaching method matched those of the students. On the positive side, there was much more student engagement in the DDL class in attempting to learn the vocabulary than with previous classes who had just done the textbook activities. Most of the students seemed to enjoy the process of deduction, and they also benefited from being able to use Japanese with their partner when necessary. The method also became more efficient as the classes went on, as the students got more used to using SkELL and the process itself was streamlined.

On the other hand, time management remained an issue throughout the course. Although the methodology grew in efficiency, it still took up longer than seems justifiable given vocabulary practice was only a supplementary rather than primary goal of the course. I tried to act as facilitator throughout the activities, giving hints to students that were struggling and pushing along those that were taking too long, but this meant that every time the process seemed rushed.

One important observation I made during the course was that positive feedback at the end of the activity is vital. The students appreciated the checking of example sentences at the end as it not only showed them the “correct” meaning of the expression, but also boosted their motivation when it was their sentence that was selected to be shown. By the end of the course, I attempted to ensure each student had at least one of their sentences displayed as a “good” example, as I could see the positive impact it had.

Discussion

Assessment of Enjoyment and Learning

It is clear from the student responses that in general they enjoyed the DDL

method of learning vocabulary. The least positive answer received about the methodology overall was that “it was okay”, and even that answer was the least common of those given. This enjoyment of using a corpus in the language classroom matches the findings of previous studies (Chambers, 2005; Chambers, 2007; Hirata & Hirata, 2019; Yoon & Hirvela, 2004). Students often pointed to the satisfaction of discovering word meaning via a deductive strategy, and this has been noted as one of the benefits of DDL (Chambers, 2007; O’Keeffe & McCarthy, 2010; Yoon & Hirvela, 2004). Similarly, the fact that the process is perceived to be too time consuming by students and teachers has been observed in past investigations (Gilquin & Granger, 2010).

One significant aspect of the student feedback in terms of enjoyment was that the number of specific negative comments from students in regard to the methodology decreased significantly as the course progressed. In the survey after the first application of DDL, 12 “areas to improve” comments were received from students. This fell to eight after the second time, rose to ten after the third, before finally falling to just two following the final class. In the post-course survey, five negative comments about using SkELL were made. This reduction in issues students had with SkELL may suggest that the process of actively using a corpus and improving on how it is used by taking into account student feedback reduced any issues they had with the method. This seems to endorse McNair’s (in Friginal, 2018) argument that action research is an appropriate way to find effective methods of DDL delivery. Moreover, with some researchers suggesting greater teacher training in DDL would improve and increase its application in the language classroom (McNair in Friginal, 2018, Tribble, 2015), it seems from this feedback that greater student exposure to DDL would also have similarly positive results.

Although assessing any learning that took place in the classroom requires more quantitative results, this investigation did allow for the students’ self-assessment of their learning. The results showed that the students overwhelm-

ingly felt the DDL method had been effective at assisting them with vocabulary learning. As was mentioned, there is strong evidence that DDL can assist with gains in test scores related to learning vocabulary (Boulton & Cobb, 2017; Lee, Warschauer & Lee, 2019), but there has been less research on how much students *feel* they are improving. The results of this study, therefore, which showed the students felt even more positive about their vocabulary learning than they did about their levels of enjoyment of the methodology, suggest that they do feel DDL improves their ability to learn. The slight preference of those who took the DDL class for using SkELL to learn vocabulary over dictionaries was further evidence of the faith students developed in the method, and this was broadly in line with the results of Hirata and Hirata's (2019) study.

Teaching Methodology

Having been through four iterations, by the end of the course a final teaching method utilizing SkELL for vocabulary learning had been developed. The instructions for the students when working on the word “accomplishment” are outlined in Figure 2.

The students used iPads to search for the words while working in pairs. Since each pair only received one iPad, this forced the students to work together since they had to browse with another person. The steps varied somewhat depending on the word, as I would assess each word beforehand to see whether using the

Figure 2

Go to <https://skell.sketchengine.co.uk/>

1. Search for the word **accomplishment**.
2. Read sentences 22, 27 and 36. What type (noun, verb, adjective, etc.) of word do you think it is? What might the meaning be?
3. If you wish, check the ‘modifiers of accomplishment’ section of *word sketch*.
4. If you want to, check the *similar words* section.
5. Try writing an example sentence using **accomplishment**.

Figure 3

1. Search for the word **flourish**.
2. Read sentences 7, 11, and 29. What type (noun, verb, adjective, etc.) of word do you think it is? What might the meaning be?
3. Try writing an example sentence using **flourish**.

Word Sketch or Similar Words functions was useful for that particular expression or not. As an example, Figure 3 shows a word with fewer steps.

With the word “flourish”, the information provided through Word Sketch and Similar Words was not deemed to be useful for the students, so they were not included in the process. As mentioned, the students would do one word by themselves for homework before class, and the other four or five in the lesson. The process differed from the original shown in Figure 1 mostly in that there is less for the students to do. Instead of reading four sentences, this was reduced to three. Moreover, using Similar Words or Word Sketch was made optional for some expressions, and removed as a step entirely for others, as was the case with “flourish”. Once all the pairs had finished discussing the words and writing their example sentences, “good” sample sentences would be displayed on a projector. Deciphering which sentences were deemed to be “good” examples was done by the teacher while monitoring the class.

This structure for using SkELL for vocabulary learning bears some similarities with that of Hirata and Hirata (2019), as both include looking words up in the corpus and writing text using the target language. However, the process was less controlled in their study, as the students themselves identified words to look up with SkELL rather than having words chosen for them to research. It was also noted in Hirata and Hirata’s (2019) study that some students found being presented with the 50 sentences per page that SkELL provides “overwhelming” (p. 246), so it is perhaps preferable to have just a few sentences identified as useful, as was done with this final version of the methodology.

This approach to having students learn vocabulary with SkELL has three

main advantages. First, the process is relatively fast for DDL, as the students need only read three sentences on SkELL, and if they soon feel they understand the word, they only need to write an example sentence to demonstrate this. This is in contrast to my previous study (Troy & Millar, 2019), where there was an average of eight sentences per word, as well as comprehension questions for the students to answer. The second major advantage is that the students have several chances to discover meaning. While the main objective is to gain an understanding of the word by reading the target sentences, the students also have Similar Words and Word Sketch to assist them if necessary, along with the assistance of their partner and the teacher. Even when the students fail to grasp the meaning after all of those steps, there is feedback at the end when students can see their classmates' example sentences. Finally, the student feedback shows that they generally enjoyed the process more than their usual method of using a dictionary, and a small majority thought it was better for their learning too. Although the process was still time consuming even after four attempts, its efficiency increased as the course went on.

Conclusion

In answer to the first of the research questions this study asked, it was found that the participants generally enjoyed the process of using SkELL. Moreover, they overwhelmingly felt the method assisted them with vocabulary learning. The argument can also be made that using action research did assist with making the process more efficient and effective, although this is based mostly on the teacher's assessment, as student reactions got only slightly more positive as the course went on.

Despite the attempt to make this study longitudinal by surveying students six months after the course, the lack of responses meant that whether the students felt the method effective enough to continue on their own or not could not be determined. Another limitation of this study was that it was small, with just 16

students taking the DDL class. However, this is not unusual for DDL studies, as in Boulton and Cobb's (2017) meta-analysis 19 of the 64 studies had 16 participants or fewer. The focus of this study was also narrow, with only qualitative data acquired rather than an investigation of more quantitative findings, such as potential gains in test scores. Nonetheless, this was done because the majority of DDL studies concentrate mostly on quantitative data, and it is not possible to develop an effective method for implementing corpora more widely in the language classroom without a greater focus on what students want from the process.

This paper echoes Hirata and Hirata's (2019) call for larger scale studies of this type to get the views of a wider range of students. Particularly useful would be studies done with SkELL for different levels of students, to assess the system's effectiveness at each level, or even with a different corpus made specifically for a certain level of student. There also needs to be greater qualitative research done on a longitudinal scale. This was an aim of this study, but a far higher number of student responses are needed to better ascertain how effective SkELL can be in the long term. Most of all, more applications of DDL in the language classroom need to focus on efficiency and convenience, as the time-consuming nature of the process as well as its perceived difficulty remain the biggest roadblocks to its wider usage. As was the case with this study, action research is perhaps the most effective way to achieve this, and I am in agreement with McNair (in Friginal, 2018) that "action research is how teachers spread corpus-based lessons to other teachers" (p. 232).

It is my belief that SkELL can be useful in language classrooms for vocabulary learning. Although some training is required for both teachers and students to use it effectively, it is user-friendly enough that this training need not last long, and it can for the most part be done reactively via teacher moderation, facilitation and feedback. I would also argue that corpora are still underused in the language classroom in general, and those that believe DDL should be used more widely need to endeavour to make it as easy, effective and efficient as possible so as to

persuade those less eager to include it in their classes and curriculums.

References

- Barrs, K. (2016). Using the Sketch Engine Corpus Query Tool for Language Teaching. *The Language Teacher*, 40(2), 23–26.
- Boulton, A., & Cobb, T. (2017). Corpus Use in Language Learning: A Meta-Analysis. *Language Learning*, 67(1), 1–46. <http://dx.doi.org/10.1111/lang.12224>
- Breyer, Y. A. (2011). *Corpora in Language Teaching and Learning: Potential, Evolution, Challenges*. Peter Lang.
- Chambers, A. (2005). Integrating Corpus Consultation in Language Studies. *Language Learning and Technology*, 9(2), 111–125.
- Chambers, A. (2007). Popularising corpus consultation by language learners and teachers. In Hidalgo, E., Quereda, L. and Santana, J. (Eds.), *Corpora in the Foreign Language Classroom* (1–16). Rodopi.
- Chambers, A. (2010). How can data-driven learning be used in language teaching? In O’Keeffe, A. and McCarthy, M. (Eds.), *The Routledge Handbook of Corpus Linguistics* (345–358). Routledge.
- EF English Proficiency Index. (2020). Retrieved from <https://www.ef.com/wwen/epi/>
- Friginal, E. (2018). *Corpus Linguistics for English Teachers: New Tools, Online Resources, and Classroom Activities*. Taylor & Francis.
- Hirata, Y. (2018). E-learning courseware for language education in Japan: its application and student perceptions. *Open Learning*, 33(2), 83–98. <http://dx.doi.org/10.1080/02680513.2018.1454833>
- Hirata, Y. & Hirata, Y. (2019). Applying ‘Sketch Engine for Language Learning’ in the Japanese English classroom. *Journal of Computing in Higher Education*, 31, 233–248. <http://dx.doi.org/10.1007/s12528-019-09208-z>
- Johns, T. (1986). Micro-Concord: A Language Learner’s Research Tool. *System*, 14(2), 151–162. [http://dx.doi.org/10.1016/0346-251X\(86\)90004-7](http://dx.doi.org/10.1016/0346-251X(86)90004-7)
- Johns, T. (1988). Whence and Whither Classroom Concordancing? In Bongaerts, P. de Haan, P. et al. (Eds.), *Computer Applications in Language Learning* (9–27). Dordrecht: Foris.
- Johns, T. (1991). Should you be persuaded?: Two examples of data-driven learning materials. *English language research journal*, 4, 1–16.
- Jones, B. A. (2019). The Role of English Education in Japan. *Memoirs of Learning Utility Center for Konan University Students*, 4, 21–31.
- Karras, J. N. (2015). The effects of data-driven learning upon vocabulary acquisition for secondary school students in Vietnam. *ReCALL*, 28(2), 166–186. <http://dx.doi.org/10.1017/S0958344015000154>
- Kilgariff, A., Baisa, V., Busta, J., Jakubicek, M., Kovar, V., Michelfeit, J., Rychly, P., & Suchomel, V. (2014). The Sketch Engine: ten years on. *Lexicography*, 1, 7–36. <http://dx.doi.org/10.1007/s40607-014-0009-9>

- Kilgariff, A., Keng, N., & Smith, S. (2015). Learning Chinese with the Sketch Engine. In Zou, B., Smith, S., and Hoey, M. (Eds.), *Corpus Linguistics in Chinese Contexts* (63–73). Palgrave Macmillan.
- Kilgariff, A., Marcowitz, F., Smith, S., & Thomas, J. (2015). Corpora and Language Learning with the Sketch Engine and SkELL. *Revue Francaise de Linguistique Appliquee*, 20(1), 61–80. <http://dx.doi.org/10.3917/rfla.201.0061>
- Lee, H., Warschauer, M., & Lee, J. H. (2019). The Effects of Corpuse Use on Second Language Vocabulary Learning: A Multilevel Meta-analysis. *Applied Linguistics*, 40(5), 721–753.
- Lee, P. & Lin, H. (2019). The effect of the inductive and deductive data-driven learning (DDL) on vocabulary acquisition and retention. *System*, 81, 14–25. <http://dx.doi.org/10.1016/j.system.2018.12.011>
- Lenko-Szymanska, A. (2017). Training Teachers in data-driven learning: Tackling the challenge. *Language Learning & Technology*, 21(3), 217–241.
- Loewen, S. & Plonsky, L. (2016). *An A-Z of Applied Linguistics Research Methods*. Palgrave.
- McCarten, J. (2010). Corpus-informed course book design. In O’Keeffe, A. & McCarthy, M. (Eds.), *The Routledge Handbook of Corpus Linguistics* (413–427). Routledge.
- McNair, J. (2018). Using a Concordancer for Vocabulary Learning with Pre-Intermediate EFL Students. In Friginal, E. (Ed.), *Corpus Linguistics for English Teachers* (224–232). Taylor & Francis.
- Mizumoto, A. & Chujo, K. (2015). A meta-analysis of data-driven learning approach in the Japanese EFL classroom. *English Corpus Studies*, 22, 1–18.
- O’Keeffe, A. & McCarthy, M. (eds.) (2010). *The Routledge Handbook of Corpus Linguistics*. London: Routledge.
- Sketch Engine. (2020). Retrieved from <https://www.sketchengine.eu/skell/>
- Smith, S., Chen, A., & Kilgariff, A. (2008). A corpus query tool for SLA: learning Mandarin with the help of Sketch Engine. In Lewandowska-Tomaszczyk, B. (Ed.), *Corpus Linguistics, Computer Tools, and Applications: State of the Art* (673–686). Peter Lang.
- Thomas, J. (2016). *Discovering English with Sketch Engine: A Corpus-based Approach to Language Exploration*. 2nd ed. Versatile.
- Tribble, C. (2015). Teaching and language corpora: Perspectives from a personal journey. In Lenko-Szymanska, A. & Boulton, A. (Eds.), *Multiple Affordances of Language Corpora for Data-driven Learning* (37–64). John Benjamins.
- Troy, H., & Millar, N. (2019). Evaluating the use of data-driven learning to teach phrasal verbs at a private language school in Japan. *Bulletin of Nagoya University of Foreign Studies*, 5, 321–347.
- Yoon, H. & Hirvela, A. (2004). ESL student attitudes toward corpus use in L2 writing. *Journal of Second Language Writing*, 13, 257–283. <http://dx.doi.org/10.1016/j.jslw.2004.06.002>