Using the Sentence Corpus of Remedial English to introduce Data-Driven Learning tasks

Michael H. Brown < brown-ma@kifl.ac.jp >

Abstract

Corpus Linguistics has had major effects on English language teaching and learning in the past few decades (Huang, 2011). Its influence can be seen, for example, in the development of modern dictionaries, grammars, course books, and testing design. Data-Driven Learning (DDL), or learning driven by learner access to language data found in corpora, has seen an increase in research interest, too (Cobb & Boulton, 2015). However, this research interest has not resulted in widespread classroom adoption of DDL methods in spite of generally positive findings (Cobb & Boulton, 2015). Objections to DDL often concentrate on the perceived difficulty of corpus language and software. This paper presents a method of introducing DDL tasks into a Japanese college-level EFL classroom using the Sentence Corpus of Remedial English (SCoRE) website in a way that may overcome common objections to DDL. The results of a preliminary, exploratory survey measuring student reactions to and perceptions of SCoRE-based DDL tasks are also presented and discussed.

Keywords

data-driven learning, ddl, SCoRE corpus, corpus linguistics, guided induction

1. Introduction

Corpus Linguistics has had major effects on English language teaching and learning in the past few decades (Huang, 2011). Learner dictionaries, grammar guides, course books, and other materials regularly tout their 'corpus-based' and 'corpus-informed' characteristics. Data-Driven Learning, or DDL, is a pedagogic methodology which has developed out of applications of corpus linguistics in language learning. The aim of DDL is for a language learner to "'discover' the foreign language, and that the task of the language teacher is to provide a context in which the learner can develop strategies for discovery" (Johns, 1991, p. 1) and this is generally accomplished by "provid[ing] the evidence needed to answer the learner's questions, and rely on the learner's intelligence to find the answers" (Johns, 1991, p. 2). DDL has attracted a great deal of research interest and is much discussed in the literatures of corpus linguistics, applied linguistics, second-language acquisition, and foreign-language teaching. However, despite the widespread interest from researchers, DDL has yet to be deeply embraced in actual classrooms (Conrad, 2005; Flowerdew, 2012; Römer, 2006).

There are several factors that affect the adoption, or lack thereof, of DDL in classrooms. While some teachers may be unaware of corpora or DDL, many who are aware believe that it will be too difficult to implement and will confuse or overwhelm learners wholly unfamiliar with DDL and corpora. It is these beliefs that I will address by providing a rationale for DDL, describing a method of introducing DDL activities to novices with a learner-oriented corpus, and reporting the results of a preliminary, exploratory survey measuring student reactions to and perceptions of the corpus.

2. Data-Driven Learning

DDL is based on the exploitation of corpus data by learners themselves. Corpora (electronically stored, principled collections of language-in-use) contain language data that can be extracted and analyzed. It is access to this language data that is said to 'drive' learning. The fundamental concept of DDL is that when learners have access to this language data they can then apply cognitive, pedagogic, and technological tools and techniques that offer learning benefits complementary to, or in some cases superior to, other methods. DDL has been summarized as having two defining characteristics:

> 1) real language data are used as sources of language learning materials or reference resources;
> 2) learning activities are student-centered and focus on language discovery.

> (Smart, 2014, p. 186)

There is a wide variety of purported benefits and affordances of DDL. For instance, DDL has been suggested as a way of exposing learners to authentic examples of specific linguistic items (Gabrielatos, 2005). Others have noted how DDL can empower learners by giving them more autonomy and control over how they learn (Mair, 2002). DDL tasks can be applied to the learning of collocations and phraseology (O'Keefe et al., 2007; Römer, 2009;

Vyatkina, 2016). It may be used in error correction tasks (O'Sullivan and Chambers, 2006; Tono et al., 2014). In addition, DDL can help learners develop general cognitive skills such as "predicting, observing, noticing, thinking, reasoning, analysing, interpreting, reflecting, exploring, making inferences (inductively or deductively), focusing, guessing, comparing, differentiating, theorising, hypothesising, and verifying" (O'Sullivan, 2007, p. 277). Still other research suggests DDL may improve retention and recall (Cobb, 1999; Sonbull & Schmitt, 2010).

DDL approaches are sometimes divided into two broad categories: Direct and indirect DDL (Yoon and Jo, 2014). A direct approach involves learners using computers and specialized software to explore language data in a corpus, such as grammar patterns, collocations, and high (or low) frequency expressions in a corpus, in a hands-on manner. For example, learners might use a concordancer to look up a particular lexical item. The software would output a list of lines from the corpus, often in a format known as Keyword-in-Context (KWIC), that contain the target language. Learners can then use the KWIC output to think about, reason, and develop ideas regarding the meaning, grammar, and use of the target lexical item. Figure 1 (in section three) contains an example of KWIC formatted concordance lines.

Indirect DDL approaches, on the other hand, place the teacher or some other mediator between learners and corpora (and the computer). Thus, the learners are at least one step removed from directly consulting a corpus. Indirect DDL can involve activities similar to direct approaches where learners examine concordance lines, but the software is handled by the teacher. In such cases a teacher might print out the concordance lines for an indirect approach known as paper-based DDL (Boulton, 2010).

Although direct approaches are sometimes assumed to be more learner-centered, direct and indirect approaches may be thought of in non-binary terms. Rather than being fully separate approaches, they may be seen as elements existing on a cline of learner autonomy in DDL tasks (Mukherjee, 2006). In this way indirect approaches can still feature learning based on language discovery; and direct approaches may still feature teacher-centered tasks. The key is in what kinds of tasks are undertaken.

A method referred to as Guided Induction (GI) has been proposed as an effective pedagogic strategy for DDL. Building off of the 'triple I' (illustration-interaction-induction) model of inductive learning described by Carter and McCarthy (1995), Flowerdew (2009) has described a four-step GI model:

1. Illustration: looking at data.
2. Interaction: discussion and sharing observations.
3. Intervention: optional step to provide learners with hints or guides.
4. Induction: making one's own rule for a particular feature.

In contrast to pure 'discovery learning' and the criticism it has attracted (e.g. Kirschner et al., 2006), GI has been characterized as "an approach that provides a structured, scaffolded framework for inductive learning" (Smart, 2014, p. 187).

Recent meta-analyses of DDL research have shown it to be generally effective across

a broad spectrum of contexts (Cobb & Boulton, 2015) as well as in specifically Japanese contexts (Mizumoto & Chujo, 2015). However, there remain practical criticisms and concerns. One concern is that the software used for analyzing corpora is often designed with researchers in mind and it is assumed to be too difficult for students and teachers to use in the classroom, thus making direct approaches difficult to introduce and potentially frustrating for learners. Another concern is that even in indirect approaches, learners may not be able to make sense of the content or format, or may react negatively to unfamiliar language discovery tasks, leading to frustration even in cases of indirect DDL.

Addressing these concerns requires access to a corpus that has level-appropriate language and an interface (on computer or paper) that is simple for learners to use and understand. In other words, a needs-driven corpus is required (Braun, 2007).

3. SCoRE

The Sentence Corpus of Remedial English (Chujo et al., 2015), or SCoRE, is a specialized corpus and web browser-based DDL program. It is available at http://www.score-corpus.org/en. SCoRE consists of thousands of sentences taken from a database of 30 million words. The data come from English textbooks used in Asia, graded readers, and children's websites. The careful selection of data for the corpus means that the language found in the corpus is at a level intended for English language learners.

The SCoRE website has several free tools that learners and teachers can use. It has a standard concordancing tool that will output KWIC-formatted concordance lines. Concordance lines are lines of text from a corpus that contain a designated language pattern or set of words that the user has input as search term(s). A unique tool available on the SCoRE website is the Grammatical Pattern Browser. Using this tool, SCoRE users can designate specific grammar features or patterns to study. A quiz generator that creates problem sets based on designated grammar patterns found in the corpus is available in the Japanese language version of the program. Figures 1, 2, and 3 show these tools.

Figure 1 *SCoRE Concordance KWIC Format (Search term(s): learn*)*

Figure 2 *SCoRE Pattern Browser (Designation: Relative clauses using 'someone who' constructions)*

Figure 3 *SCoRE Quiz Generator (Designation: Indefinite pronouns)*

The Japanese language version of the program also operates as a bilingual, parallel corpus. This means that every English sentence in the corpus has been translated into Japanese, and when using the Japanese language version of the program, both the original and translated sentences appear on the screen. If the English language version of the program is used, the program operates as a monolingual corpus. In either version, if a sentence is partially truncated, it can be clicked on to reveal a small pop-up box displaying the entire sentence. Figure 4 shows the parallel concordancing tool that is available in the Japanese version.

Figure 4 *SCoRE Parallel Concordance (Search term(s): learn*)*

SCoRE was developed specifically for Japanese learners of English. It is not a research corpus being used for pedagogical means, but is rather a corpus explicitly designed with the pedagogy of EAL/EFL in a Japanese context in mind. Thus, SCoRE's features are meant to address two of the main concerns regarding DDL: It aims to provide level-appropriate language and to have a learner-friendly interface.

4. Methodology and data collection

This study focused on addressing two common objections to DDL: The lack of level-appropriate corpora and the lack of learner-friendly corpus software. Thus, there were two main research questions:

1. Do learners perceive the language of SCoRE as being at an appropriate level (i.e. Can they make sense of the sentences)?
2. Do learners perceive the SCoRE software as being learner-friendly (i.e. Do they think it is easy to use)?

DDL activities using SCoRE were integrated into two sections of the same course at a type of two-year college known as a *senmongakkou* in Tokyo, Japan, which specializes in vocational and foreign language education. Students in the college's English program are

separated into four proficiency levels (level 1 is the highest) and take a variety of English classes with other students in their level. The two sections were both level 3 sections (toward the lower end of the proficiency spectrum) of a course which utilized a textbook called *Four Corners, student book 3* (Richards & Bohlke, 2012). The DDL activities using SCoRE were used to introduce and reinforce grammar rules and patterns students encountered in the textbook.

In each chapter of the textbook two explicit grammar rules or patterns are introduced. During a 15-week semester six chapters of the textbook were covered. For this project, during the first four weeks of the course I introduced the grammar rules and patterns found in the textbook to students using the book's own activities, covering two chapters (four grammar rules). During weeks five through eleven, SCoRE was introduced to the students and the grammar rules were approached using DDL activities, covering three chapters (six grammar rules). The final weeks of the course featured a mixture of textbook-based grammar exercises and SCoRE-based DDL activities.

For the DDL activities, students were given a variety of tasks utilizing worksheets with guiding questions and instructions for accessing and using SCoRE on iPads, to which all students had access. Because the students directly accessed SCoRE on iPads, this was considered a direct DDL approach. Students worked in pairs to complete the worksheets. Students had to use SCoRE to complete the worksheets. Students were allowed to choose which version of SCoRE to use to complete the worksheet tasks: the monolingual English version or the bilingual English-Japanese version. The grammar rules were not explained until after students had completed the worksheets. The guided nature of the worksheets was designed so that students could develop an understanding about the target grammar in an inductive manner. Thus, these activities were based on the concept of Guided Induction (Flowerdew, 2009; Smart, 2014).

In the first week following the middle portion of the course that introduced and used SCoRE and DDL methods, a survey was conducted. The survey instrument was a brief questionnaire which was administered to all the students in regular attendance during the pertinent weeks of the course. The survey focused on student perceptions and reactions to SCoRE. The two sections had 15 and 14 such students in regular attendance, respectively, for a total of 29 survey respondents (n=29). The gender breakdown of the respondents was 26 female students and 3 male students. All respondents indicated they had never used any kind of corpus before this course. The questionnaire had 12 items. Students selected responses based on a 6-point Likert scale. An even numbered scale was chosen in order to avoid 'middle' responses (Dörnyei & Taguchi, 2010). For each item, the students could respond with (1) *strongly disagree*, (2) *disagree*, (3) *disagree a little*, (4) *agree a little*, (5) *agree*, or (6) *strongly agree*. The items were written in both English and Japanese, and the questionnaire was administered through Google Forms. The items (in English) are presented in Table 1.

Table 1 *Questionnaire items*

	Using SCoRE is …
Item 1	… interesting.
Item 2	… easy.
Item 3	… enjoyable.
Item 4	… effective for learning grammar.
Item 5	… more interesting than regular grammar study.
Item 6	… easier than regular grammar study.
Item 7	… more enjoyable than regular grammar study.
Item 8	… more effective for learning grammar than regular grammar study.
Item 9	With SCoRE, I can study independently.
Item 10	With SCoRE, I can understand a grammar pattern before the teacher explains it.
Item 11	SCoRE's sentences are easy to understand.
Item 12	With SCoRE, I can remember the grammar I have studied.

The questionnaire collected qualitative, subjective data. It did not measure performance or gains. Rather, the questionnaire was designed to elicit responses from the students regarding their perceptions. This reflected the main research questions of whether, according to the students' perceptions, the corpus is level-appropriate and whether the software is easy to use. Items 5 through 8 were included for students to compare the SCoRE-based activities to methods of grammar study they regularly encounter. The notion of 'regular' grammar study was determined by in-class discussions about how grammar study was usually conducted in other classes at the college and when they were in high school. The students indicated that grammar is typically a topic that is presented and explained in teacher- and textbook-centered ways. Although the data are merely anecdotal, they accord with research showing that grammar study in Japanese EFL contexts is persistently characterized by teacher-centered, form-focused, decontextualized, and non-communicative approaches (Gorsuch, 2001; Kikuchi & Browne, 2009; Cook, 2012; Nishimuro & Borg, 2013; Humphries & Burns, 2015).

5. Results and discussion

Generally speaking, the students reacted well to using SCoRE. In particular, the students indicated that SCoRE was easy to use and that it was more interesting than 'regular' methods of grammar study. The responses for those particular items, Item 2 and Item 5, were

uniformly on the positive end of the scale. The full breakdown of responses along with the arithmetic mean for each item is available in Table 2. The standard deviation (SD) for each item is included primarily to show which items featured a broader distribution of responses. A visual representation of the distribution of responses for each item is provided in Figure 5.

Table 2 *Survey results (n=29)*

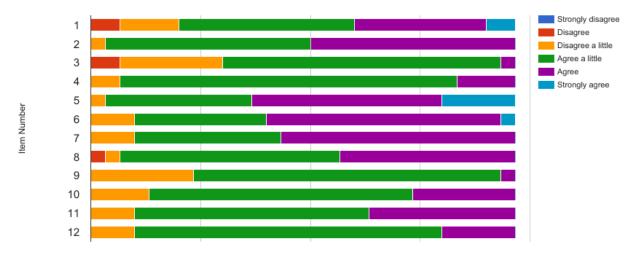|	Strongly disagree	Disagree	Disagree a little	Agree a little	Agree	Strongly agree	Mean	SD
Scale	(1)	(2)	(3)	(4)	(5)	(6)		
Item 1	0	2	4	12	9	2	4.172	1.002
Item 2	0	0	1	14	14	0	4.448	0.572
Item 3	0	2	7	19	1	0	3.655	0.670
Item 4	0	0	2	23	4	0	4.069	0.458
Item 5	0	0	1	10	13	5	4.759	0.786
Item 6	0	0	3	9	16	1	4.517	0.738
Item 7	0	0	3	10	16	0	4.448	0.686
Item 8	0	1	1	15	12	0	4.310	0.712
Item 9	0	0	7	21	1	0	3.793	0.491
Item 10	0	0	4	18	7	0	4.103	0.618
Item 11	0	0	3	16	10	0	4.241	0.636
Item 12	0	0	3	21	5	0	4.069	0.530

Figure 5 *Visual represention of the distribution of responses. For all items n=29.*

Looking at the distribution patterns can help us to understand where students tended

to converge on a set of responses, or show general agreement in their reactions to using SCoRE; and in contrast where there was greater disagreement and variation in their reactions to using SCoRE. For instance, Item 1 (SD=1.002) had the greatest variation in responses, indicating that the question of whether SCoRE was interesting to use featured the most divergent reactions among the students. In contrast, Item 4 (SD=0.458) had the least variation in responses, indicating that students tended to have the same or similar reactions when asked whether SCoRE was effective for learning grammar.

Also notable are the students' responses to Items 5, 6, 7, and 8, which were comparing the SCoRE-based activities to 'regular' grammar study methods. Those four items represent four of the five highest means in the data, the other one being Item 2 which indicated that students found SCoRE easy to use. Thus the most positive results according to the students' reactions are that SCoRE is easy to use and in several ways it may be preferable to how grammar study is usually conducted in class. Furthermore, responses to Item 11 (mean=4.241) also tended to be on the upper end of the scale, indicating that most students did not consider the language in the corpus to be too difficult.

Some items, such as 4, 8 and 12, may appear to be measuring the effectiveness of SCoRE-based DDL. This is not the case. These items, like all the others, are measuring student perceptions. Eliciting responses about whether students perceive the activities as effective can shed further light on whether SCoRE-based DDL is seen as too difficult, inaccessible, or frustrating. The generally positive responses suggest it is not.

Item 3, on the other hand, had a mixed response. Although the mean indicates a generally positive reaction from students as to whether using SCoRE was enjoyable, nine students responded that they disagreed a little (n=7) or a lot (n=2) with the statement *Using SCoRE was enjoyable*. This is the highest number of negative responses for any item on the questionnaire. However, without additional data it is unclear what this means exactly. It could indicate an issue for SCoRE specifically, an issue of the DDL tasks, or it could be related to grammar-focused study in general. For instance, some students may resist grammar study regardless of the type of treatment, resulting in floor effects (Yu & Ohlund, 2010). This lack of clarity in what the student responses represents an issue with the research design.

There are some other caveats regarding the survey instrument that should be noted as well. First, this survey was not piloted and concerns regarding how to interpret several questions and responses arose during the data collection and analysis procedures. For example, the positive responses in Item 6 may have been based on students finding Guided Induction easy to do rather than SCoRE itself being easy to use. This may apply to several other items as well. Another potential issue is that the novelty of the SCoRE-based activities was not factored into the analysis. Thus, indications that SCoRE is interesting could be because of students' unfamiliarity with it, and it is possible that its appeal would diminish over time. The same concern can be applied to the apparent preference for SCoRE-based activities over other methods. In addition, no data were collected regarding the bilingual nature of SCoRE which means there is no way of assessing how this important aspect of the corpus influenced reactions to it. In other words, it is not clear if the English sentences in the corpus are actually of the appropriate level, or whether students found them understandable only because of the availability of Japanese translations, or whether this distinction even

matters. Finally, the notion of 'regular' grammar study lacks clear definition. Although there are recurring pedagogic features that persistently characterize grammar study in Japanese EFL contexts, the complete avoidance of ambiguity is impossible in a phrase like 'regular grammar study'.

6. Conclusions and further study

Despite some concerns about the survey instrument, when viewed in aggregate the responses show positive reactions to using SCoRE. In this context, with these students, the software was perceived to be easy to use and and the corpus contained language that students were felt they were able to understand. Thus, it appears that using SCoRE was a tentative, qualified success in as much as the the language and interface of the corpus did not pose any major difficulties to the students.

However, there remain issues with the survey instrument. Although the positive responses seem to indicate that using SCoRE and the approach described in this paper can be successful in overcoming oft-cited concerns regarding corpora and DDL novices, the questionnaire did not collect enough data, or robust enough data, to make a strong case for SCoRE. Instead, this research should be viewed as a preliminary exploration of student perceptions toward SCoRE-based DDL; one that appears to have positive findings, but needs to be borne out by further research.

Such further research should begin with revising the methodology and survey instrument(s) in order to gather richer and more robust data. If positive results could then be confirmed, more follow-up work could involve investigating reactions from different kinds of learners, collecting qualitative interview data to enrich the survey response data, and explore SCoRE's bilingual features. Another strand of research could take a more objective approach and focus on the effectiveness of SCoRE-based DDL tasks by investigating outcome differences between the approach described here and other grammar study methods through, for example, pre- and post-test analysis methods.

In conclusion, the students indicated that they perceived the SCoRE language as level appropriate and the software as learner-friendly. However, issues with the methodology prevent any stronger claims about SCoRE and the students' perceptions. The findings of this preliminary study are therefore tentative and should be examined further.

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