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Becoming a DDL teacher in English grammar classes: A pilot study

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ABSTRACT

This study explores the process of becoming a data-driven learning (DDL) teacher in EFL grammar classes. An in-service teacher wholly new to the DDL approach joined and received training in it over four months. He first studied what DDL was and how it was used in language settings, going on to teach grammar to two undergraduate classes, one with DDL and the other with Grammar Translation, for comparison purposes. His overall experience of learning and teaching with these two approaches was recorded in self-reflective journals and later in interviews with the present writer. The perceptions by the two classes of the treatment they received were also surveyed to reflect the teacher's performance. The results as a whole show that the course of becoming a DDL teacher is a complex, radical and continuous series of transformations, generating new evidence in support of DDL practice.

The popularity of data-driven learning (DDL) in the past few decades has stimulated many researchers to examine its theoretical basis and pedagogical potential in language classrooms. Many agree that the nature of DDL raises several important theories in second language acquisition; two of these, which are commonly addressed, are "Discovery Learning" and the "Noticing Hypothesis" (Boulton, 2010; Boulton & Cobb, 2017; Flowerdew, 2015; Frankenberg-Garcia, 2016; Vyatkina, 2016). This is because language

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learners engaged in DDL-based activities must unaided 'notice' and 'discover' shared linguistic features/patterns from concordance. Any task then leads participants to commit themselves to the typical learning process of 'identify-classify-generalize'—a pedagogical formula prescribed by Johns (1991) and later invoked by most DDL teachers/researchers (e.g., Boulton, 2010; Lin, 2016; Lin & J.-Y. Lee, 2017; Smart, 2012, 2014). Such a learner role is described as fun in itself in *detecting* (Johns, 1991). DDL materials also encapsulate varied motivating elements for language learners because corpus data comprise authentic language information which has rich cultural and linguistic content (Boulton & Cobb, 2017; Mishan, 2004).

Numerous positive empirical reports of DDL students' learning outcomes and attitudes further confirm the pedagogical effect of DDL, which in turn validates the theoretical framework for practicing DDL in language classes. To begin with, most language students have commented favorably on their experience learning with the DDL approach (Geluso & Yamaguchi, 2014; Rezaee, Marefat, & Saeedakhtar, 2015; H. Yoon, 2008; H. Yoon & Hirvela, 2004); some even showed specific approval of its effectiveness on language learning (Geluso & Yamaguchi, 2014; Phoocharoensil, 2012). In addition, many of DDL students' language abilities have improved significantly. Specific skills include vocabulary (Jalilifar, Mehrabi, & Mousavinia, 2014; Karras, 2016), collocation (Rezaee et al., 2015; Uçar & Yükselir, 2015), grammar (Smart, 2014), self-correction (Larsen-Walker, 2017; Todd, 2001; Tono, Satake, & Miura, 2014), paraphrase (Chen et al., 2015), and writing (C. Yoon, 2016; H. Yoon, 2008; Poole, 2016; Mizumoto, Hamatani, & Imao, 2017; Z. Huang, 2014). It is true that some cautioned that DDL might not have clear effects on certain aspects of grammar (cf. Boulton, 2010; Smart, 2012); some reported that their students reacted negatively to DDL-centered treatments (e.g., Hirata & Hirata, 2013; Kennedy & Miceli, 2001); still others revealed that some students were concerned about the time and effort that such treatments required them of (e.g., Crosthwaite, 2017; Hirata & Hirata, 2013). However, by and large the mixed empirical evidence appears optimistic (Cresswell, 2007; C. Yoon, 2011), especially in light of the overall positive outcomes reported in the recent meta-analysis by Boulton and Cobb (2017).

Despite the growing recognition of DDL learners' advantages, teachers' hands-on experience with DDL approach and their perspectives of it have received far less attention and evaluation. Few educators and researchers have contributed to this area by suggesting pointers for prospective DDL practitioners (L. S. Huang, 2017), by considering the time and resources needed for preparing them (Zareva, 2017), and by investigating student-teachers' perceptions of teaching by DDL (Breyer, 2009; Lin, 2016). However, the very course of becoming a DDL teacher, in particular for in-service teachers, still remains an area in need of investigation (Lin, 2016). Findings about this would not only portray for interested readers what such a developmental course is like, but provide evidence of the pedagogical suitability of DDL approach from the teachers' standpoint, thus amplifying an overall evaluation of DDL. Finally, in-depth accounts of such experience may afford insights into the longstanding paradox: that while educators/researchers in general approve of corpus use and its effects in language learning, such endorsement has mostly arisen from experimental sites, rather than actual practice by in-service TESOL/TEFL teachers (cf. Boulton, 2010; Ebrahimi & Faghih, 2017; Leńko-Szymańska, 2014; Lin, 2016).

Hence, the study aims to trace comprehensively the development of a DDL teacher by considering the experience of an in-service teacher who joined an intensive training project to use DDL in grammar classes. His perceptions of both learning about the approach and of actually teaching with it were qualitatively examined. His experience of this training was then compared with his teaching using Grammar Translation. Both classes were then survey to highlight and compare the teacher's experiences with those of the participating students.

2. Method

2.1. The Participating Teacher

The teacher chosen for this study was an in-service English teacher seeking a Master's degree in Curriculum and Instruction at a Taiwanese private university. Before enrolling, he had taught EFL to Taiwanese students of different levels for three years, using Grammar Translation—an approach used in all his own previous English learning.

2.2. The Training Project

This teacher was involved in a four-stage training project over a semester, each stage lasting four weeks. In Stage 1, he was first briefly introduced to the nature of corpora (e.g., what corpora are and consist of), the application of corpora in general and in language classrooms, and demonstrations of the basic skills for using online corpus systems; that is, the COCA system (Corpus of Contemporary American English, a free online corpus system containing over 520 million words: byu.edu/coca). Afterwards, he started familiarizing himself with more corpus literacy skills, primarily against the COCA system. The researcher also gave guidance and help when asked. In Stage 2, the teacher read an assigned list of journal articles and book chapters about corpus-aided language learning, which he could discuss at will. In Stage 3, the teacher observed a one-hour DDL grammar class and a one-hour Grammar Translation class; the researcher taught both classes the same grammatical points but with different methods. In the last stage, the teacher was given two weeks to prepare self-made material for two practicums, beginning two weeks afterwards. Specifically, after the present researcher had approved the teacher's teaching material, he taught for two successive weeks a one-hour DDL grammar class and a one-hour Grammar Translation class.

2.3. The Grammar Classes for the Participants

The classes agreeing to join the practicums for the study were not those observed by the teacher but general English classes at the same experimental site. Before the experiment, the classes were taught by another teacher, aiming to develop general English skills (listening, speaking, reading, and writing) in these second-year non-English majors, focusing particularly on reading, vocabulary and grammar. The students, mostly aged 19-20, had never been taught English using a DDL approach. The classes were later randomly divided into a DDL group (34 students) and a Grammar Translation group (25 students).

2.4. Materials and Treatments Used in the Participants

The teacher designed the materials used for teaching both grammar groups in the practicums. They covered the same grammatical points, but were presented differently according to the approaches taken with each group. It is particularly worth noting that the material for both groups had the same number of example sentences as input. This was important because DDL tends through concordance to involve more exposures to the target grammar points than Grammar Translation does. Experimental results might be non-comparable without a control for the frequency of exposure, not only in terms of students' performance/responses, but ultimately also that of teachers, because they are likely to make more effort if they are preparing more material.

Figure 1 illustrates the DDL materials that the teacher created to teach the patterns of *used to*. As shown, he first presented a list of concordance lines, asked students to observe the linguistic features they shared, and invited the students to answer the question below by describing any patterns they noticed after they had worked out individually or in groups. When students shared any correct findings with the class, the teacher showed agreement (e.g., *That's right, That's a correct observation,* or *Does anyone/any other group agree with their observation?*) but offered no explanations. When students had trouble describing

target grammatical patterns, the teacher asked more detailed or precise questions to guide their reply, such as *Please mark the words before the Keyword in Context*, *Please analyze again the part-of-speech of 'to'*, or *Why do you think all the verbs after the Keyword in Context are presented in –ing form.* Finally, he double-checked the students' understanding by asking them to invent one or two sentences that illustrated grammatical points/patterns they had discovered.

In contrast, with Grammar Translation the teacher first showed a grammar pattern (i.e. *be used to N/Ving*) and then explained in detail the specific language use of it (e.g., *To* here is a preposition, rather than a to-infinitive, hence followed by nouns or verbs with –ing form). Afterwards, he analyzed the grammar structure of the sentences aloud, following Grammar Translation's conventional deductive practice, instead of letting the students observe and interpret the exemplar sentences (see Figure 2). Finally, the teacher examined students' in-class understanding of the grammar by asking them for sentences that illustrated this construction.

1	Fine. I'm **used to**	it anyway.
2	They were **used to**	failure.
3	I'm **used to**	having coffee at Starbucks.
4	He's **used to**	living with Mom.
5	They are **used to**	getting what they want.
6	Kristy Martin was **used to**	taking care of everyone except herself.
7	Allan Grant was **used to**	living along and enjoyed his own company.
8	They were **used to**	working 60 hours a week.

Question. Please write down your observation of any linguistic features or grammar patterns/points about ***used to*** here.

_____

_____

Exercise. Please create one or two sentences of your own on the basis of your observation above.

_____

_____

Figure 1. Example of DDL materials

I. Grammar structure:

Subject *be used to N/Ving*

II. Grammar points:

1. In this grammar structure, ***be*** is needed before **used to**.
2. ***To*** here is a **preposition**, so it is followed by **nouns** or **verbs (-ing form)**.

III. Example sentences:

1. He is used to it anyway.
2. My brothers were used to failure.
3. The spoilt boys are used to getting what they want.
4. John was used to running two hours a day.
5. I am used to your bad habits.
6. He was used to smoking while he was driving.
7. We were not used to getting up early for class.
8. Pierre is used to giving kisses when greeting his friends.

IV. Exercise: Please create one or two sentences using the grammar structure above.

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_____

Figure 2. Example of Grammar Translation materials

2.5 The Teaching Evaluation Survey

A teaching evaluation survey immediately followed the practicums, to discover the students' perceptions of their learning experiences. The survey was a revision of 30 6-point Likert-scale questions containing items invented by the university of the experimental site to evaluate teachers' performance. Given the aim of this research, however, the revision retained only 10 items that directly invited students' judgments on the teacher's teaching attitudes (two items), teaching methods (three items), teaching materials (two items) and learning effects (three items) (See Appendix A).

2.6 Reflective Journals

To explore the teacher's perspectives on/perceptions of becoming a DDL teacher, he was asked to write journal entry covering every training stage. Each entry was at least 1,000 words long, was written his mother-tongue, Mandarin Chinese, to let him express himself more fluently. The journal entries aimed to convey in general what he experienced, in detail how he felt, at each stage what he learned, how he coped with difficulties (if any), and what he thought about DDL in comparison to Grammar Translation.

2.7 Interviews with the Participating Teacher

In addition to journal accounts, two 50-minute interviews were conducted to learn in depth about the teacher's reflections, in the hope of enriching the journal information. The first interview was conducted during the week after the four-stage training. Eight open-ended questions (Appendix B) were used to encourage the collection of interview data, with follow-up questions for any ambiguities. The interview, also in Chinese Mandarin, was digitally voice-recorded and transcribed verbatim for analysis. When initial analysis results showed that further discussion was needed for clarification, a second interview was held a week after the first. It was conducted as the first interview was, but the questions were aimed at uncertainty. Finally, the results of both interviews were translated into English for the present account.

2.8 Qualitative Data Analysis

To characterize the course of becoming a DDL teacher, the data collected from both journal entries and interviews were scrutinized using a phenomenological method of analysis (see Moustakas, 1994). To be precise, an exhaustive list of every statement made by the DDL teacher was first compiled. After unclear or irrelevant expressions were eliminated from the list, the remainder was sorted and synthesized for creating *thematic portrayals*, which became the basis for reconstructing the teachers' experiences. For reasons of space, only the final description of the teacher's experience is presented here.

2.9 Quantitative Data Analysis

A set of descriptive statistics was used to demonstrate the survey outcome of both grammar groups. The results were then used to reflect the teacher's performance, supplementing the accounts of his DDL experience.

3. Qualitative Results

The final account of the teacher's development into a DDL teacher reveals a series of complex, radical and conflicting changes. It is exhibited in the seven portrayals below, representing the teacher's transformation from the beginning through to the end of the changes.

Anticipations/excitement versus contextual bias. To begin with, the brief introduction of corpus use in language learning enabled the teacher to start the training program with great expectations and excitement. He was 'very excited because [he] could try a new [teaching] method' where he could use a corpus 'to help [students] learn the most idiomatic English' and to 'nurture their abilities of language use'. The initial demonstration of how students might interact with corpus material also led him to imagine a situation in which 'students become the host of the class' rather than being 'guests' as they used to in Grammar Translation. However, such anticipations and excitements were quickly replaced with doubts about the feasibility of DDL in the context of Taiwan. As he remarked, 'This method seems impossible for Taiwan', 'it is too ideal a practice', and 'can [Taiwanese] students learn with it?' These uncertainties stemmed from his personal experience and local observation, convinced that 'students in Taiwan are too accustomed to lessons where teachers do all the talking and students just listen', 'they have forgotten how to explore knowledge themselves', not to mention that 'they learn passively'.

Dilemma of further involvement. Before his early concerns were dissolved, the learning of operating an electronic corpus system (i.e. COCA) trapped the teacher in a greater predicament. Specifically, he described his experience of learning the corpus system as 'difficult', 'extremely labor-intensive', 'frustrating' and 'distressful'. He suffered 'many failures' in trying the 'unfriendly' system which would constantly yield nothing when he missed a mere space or dot in entering a query syntax. Compared with making sentences on his own to illustrate a grammar point for Grammar Translation, screening from numerous concordances a suitable example sentence was so dreary a task and consumed so much time that it increased his skepticism towards applying DDL in practice: 'How is it practical at all to spend so many hours on creating material for just one grammatical point?' 'How should one cope with the fact that sometimes a teacher has many different lessons or grammar topics to prepare?' 'How about teachers having other educational tasks in hand as well (e.g., serving as a homeroom teacher)?' 'DDL is not so cost-effective' in educational contexts. The reinforcement of these worries and upsetting challenges, at one point, even impelled the teacher to consider quitting the training.

Reassurance from encouraging models/observations. The teacher's doubts about applying DDL were not dispelled until he found reassurance from the practical examples described in journal articles and from observing in person the grammar classes taught separately with DDL and Grammar Translation. Explicitly, through his reading and actual class observation, he gained practical knowledge and pointers about DDL application. Most importantly, he was enthused by the different interactive models in action in the DDL and Grammar Translation classes. 'Students were busy' in class, 'they read the material, thought about it, discussed with peers' and 'shared their findings with the class'. He also noted in DDL classes 'less distance between teachers and students' than that in the Grammar Translation class. He added that he was 'moved' to realize that the DDL 'teachers were no longer like the *commander* [the students] were used to', asking them to copy/imitate what they taught. Instead, 'the DDL classes were learner-centered', with teachers 'guiding students themselves into developing the skills of exploring knowledge'.

First DDL practicum: revisiting anguish and insecurity. Nevertheless, the teacher's anxiety was renewed at leaving his comfort zone (teaching with Grammar Translation) for changes (teaching with DDL for the first time). As he described it, before the first practicum, he 'had been anxious about using this [new] approach, and even insomniac the night before'. Worse, 'disappointment' hit him as he went through the first practicum. He had imagined himself teaching a DDL class like those he had read about and observed in person, but unfortunately he felt 'unable to properly manage the teaching skills and strategies' required for DDL teaching (e.g., giving more guiding questions or getting students to

share/speak). In particular, the DDL classroom was so 'quiet' on the part of both the students (very few responded) and himself (waiting for students to respond) that he felt both parties appeared 'embarrassed'. This discomfort was sharpened by his experience of teaching Grammar Translation where he at least could say something (i.e. 'doing the talking (i.e. teaching) in class'). Compared with his practicum performance in the Grammar Translation class, which he deemed 'easy', 'smooth' and 'successful' because 'everything was in control', he was 'helpless' the first time he taught DDL and felt 'lost' doing it. Instead of getting close to his students as he had observed earlier, he perceived 'a gap between [him] and the students'. Unquestionably, 'it was the biggest, worst failure ever in [his] teaching career'.

Second DDL practicum: familiarity facilitating DDL feasibility. To his surprise, the DDL class was completely changed in the second practicum, kindling his faith in the possibility of becoming a DDL teacher. 'The (DDL) students seemed to understand the way they were to learn' with the lesson; 'they appeared focused on observing concordance lines' when the teacher asked them questions; and 'they gave a lot more (verbal) responses than they did in the first practicum…'. The fact that most student 'responses were relatively concrete (i.e. more like linguistic or grammatical information) than previously' confirmed that the 'students now knew what they were doing with the approach'. It also excited the teacher to find that 'the different pieces of information offered by students eventually formulated complete or correct answers' to his questions. He admitted that '[he] enjoyed [the process] because there were true interactions between peers and with [him]', and also because he could now recognize 'the feasibility of DDL' in the Taiwanese context. With adequate exposure to DDL practices, he concluded, 'a class can turn learner-centered…and DDL is feasible' even in Taiwan.

Self-awareness of insufficient teaching abilities and seeking improvement. After being involved in DDL training, the teacher started to notice his imperfect use of English as an authentic language and hoped for improved professionalism in teaching English through DDL. To start with, 'when going through corpus data for class material… [he] [him]self began to doubt if [he] truly understood English'. He was overwhelmed to observe 'how contextualized the authentic linguistic information (of the corpus) was'. It was also startling for him to realize 'how different words or thoughts were actually used in sentences by native speakers (of English) from us' Chinese speakers, who 'tend to rely on the language logic of [our] mother tongue … and over-generalize … to put together a new sentence that is not so correct or idiomatic'. Although stunned by corpus data, he felt that he 'learned what English to teach through learning about DDL and teaching with it'. Moreover, he commented that learning to teach with DDL also taught him 'to be *responsible*' for what to teach'. He further illustrated that he later on "paid more attention to the content that [he] was to teach'. For example, 'before delivering material to students, [he] would now read it a few more times' than he used to.

Resolution to transform future grammar classes. Although he might have to go through again the many concerns and challenges that he had already described, the teacher resolved after the project to introduce DDL to his future classes. He eventually endorsed this approach, commenting that 'the rich authentic linguistic text in a corpus presents a specific language use from various contexts' with the perception that this feature makes the learning material and the teaching of it 'alive'! Persuaded by the potential of DDL, he determined to continue with DDL instruction, and was ready to challenge 'the teaching of language use that requires in-depth understanding of its semantic context', such as different verb tenses, rather than just formulaic or pattern-ready grammar like those taught in this project. He concluded, 'I want a future class unlike the one I used to have … technical challenges (such as those mentioned earlier) are no longer concerns after experiencing the positive impact of DDL'.

4. Quantitative Results

The accounts of the teacher's experience were sustained by his students' feedback. As Table 1 shows, overall the DDL class showed slightly stronger endorsement (M = 48.85, SD = 8.37) of the treatment they received than their counterparts did (M = 46.80, SD = 8.46). Consistently, the DDL students approved of the teacher's teaching method to a fuller extent than the Grammar Translation class did; they acknowledged the teaching content shown them and believed in the learning effect of the approach they had learned with. Finally, although the two groups agreed in their estimation of the teacher's teaching attitudes, this indicates that he had had shown no partiality in teaching either group, which in turn justifies the survey results.

Table 1

Descriptive Statistics Results For The Survey Outcome Of Both Grammar Groups

Factor	Group	*N*	Mean	*SD*
Teaching attitudes	Grammar Translation	25	10.88	1.30
	DDL	34	10.88	1.37
Teaching method	Grammar Translation	25	12.92	3.05
	DDL	34	13.82	3.13
Teaching content	Grammar Translation	25	9.52	1.71
	DDL	34	9.79	1.86
Learning effect	Grammar Translation	25	13.48	3.30
	DDL	34	14.35	3.00
Total	Grammar Translation	25	46.80	8.46
	DDL	34	48.85	8.37

5. Discussion and Conclusion

To explore the course of learning to be a DDL teacher, this study qualitatively examined the experience of an in-service teacher and collected quantitative feedback from his students on their learning perceptions and on his teaching performance. The qualitative results, though containing mixed perspectives, show an overall successful case, enriching current literature in the field. To begin with, the results supplement the findings of Lin (2016), where pre-service student-teachers would consider blending DDL and conventional deductive approach in future grammar classes even though they had also encountered technical difficulties in consulting a corpus. The results also validate the claims of Breyer (2009) and Zareva (2017), both of whom posited the significance and necessity of including a DDL teacher training program in teacher education. Additionally, the qualitative account reveals important factors that may encourage a teacher to continue DDL in practical classes: positive DDL models to appreciate and most importantly hands-on experience of teaching DDL with particular reference to conventional deductive instruction. It may be worth mentioning that although some authors (e.g., L. S. Huang, 2017) claimed that the improvements of modern technology should have diminished technical difficulties in

operating corpora, this study still found its participating teacher worried about the use of a corpus and the time needed for preparing corpus-based material, as other recent researchers have warned (e.g., C. Yoon, 2016). It is nevertheless encouraging to point out that even at the cost of time and effort the participating teacher, like the teachers in Lin (2016), gained faith in the effect of DDL, although for the time being technical issues appear to be inevitable until ready-made materials become widely available for instant use (Boulton, 2010).

The quantitative survey results of the students' perceptions also lend support to the feasibility of practicing DDL in class. Such findings not only corroborate many conclusions in prior studies where students reacted favorably to DDL treatments (Boulton & Cobb, 2017; Geluso & Yamaguchi, 2014; Kılıçkaya, 2015; Lin, 2016; Rezaee et al., 2015), but resonate with the teacher's positive DDL experience in the current study. Put precisely, the DDL student participants more warmly agreed with the use of DDL as a teaching method, its content, and its learning effect than their counterparts with Grammar Translation. These positive evaluations of students affirm the teacher's perceptions, endorsing the way he delivered a DDL-based grammar unit, the DDL material he created, and the effectiveness of learning in a DDL supported manner. As Lin (2016) suggests, such evidence in turn may moderate the caution by scholars (e.g., Kılıçkaya, 2015) who warn of the use of rule-inferencing or grammar discovery in certain culture contexts, such as that of Taiwan.

It is also interesting to address the finding that both the DDL and the Grammar Translation groups evaluated his teaching attitudes similarly. By and large, this may further suggest that student acceptance of the DDL treatment is at least comparable to that of Grammar Translation. Trivial as such a point may seem, it is in reality crucial for an educational cultural context such as Taiwan where Grammar Translation has long been popular (cf. H. C. Lee, 2013; Smith, 2011) because it saves time for students (cf. Yeh, Liou, & Li, 2007)—a feature not so readily admitted in DDL advocacy.

Finally, while the findings of this study tend to recommend the DDL approach for in-service teachers, some improvements for the study per se are suggested. First, the case study here was only on a single in-service teacher of EFL in Taiwan. More empirical studies investigating a larger sample of teachers from varied contexts or institutes (e.g., high schools and colleges) are thus needed in order to test the DDL approach with a more generalizable result. Likewise, the hands-on experience of the teacher with DDL in this study was only two hours. Longitudinal investigation of such an experience in authentic classes should shed more light on the actual feasibility of DDL from teachers' perspective. Last but not least, as the participating teacher implied, the grammar concepts taught in this study, which were in a way formulaic, were perhaps better adapted to DDL or easier for students to analyze. Future studies may consider investigating or comparing DDL teachers' experience of teaching language use that is less pattern-like, such as different conditional clauses, adjective clauses versus noun clauses, or varied verb tenses.

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References

Boulton, A. (2010). Data-driven learning: Taking the computer out of the equation. *Language learning*, *60*(3), 534-572.

Boulton, A., & Cobb, T. (2017). Corpus use in language learning: A meta-analysis. *Language Learning*, *67*(23), 48-393.

Breyer, Y. (2009). Learning and teaching with corpora: reflections by student teachers. *Computer Assisted Language Learning*, *22*(2), 153-172.

Chen, M. H., Huang, S. T., Chang, J. S., & Liou, H. C. (2015). Developing a corpus-based paraphrase tool to improve EFL learners' writing skills. *Computer Assisted Language Learning*, *28*(1), 22-40.

Cresswell, A. (2007). Getting to 'know' connectors? Evaluating data-driven learning in a writing skills course. *Language and Computers*, *61*, 267-287.

Crosthwaite, P. (2017). Retesting the limits of data-driven learning: feedback and error correction. *Computer Assisted Language Learning*, *30*(6)447-473.

Ebrahimi, A., & Faghih, E. (2017). Integrating corpus linguistics into online language teacher education programs. *ReCALL*, *29*(1), 120-135.

Flowerdew, L. (2015). Data-driven learning and language learning theories. In A. Leńko-Szymańska & A. Boulton (Eds.). *Multiple affordances of language corpora for data-driven learning* (pp. 15-36). Amsterdam, Netherlands: John Benjamins.

Frankenberg-Garcia, A. (2016). Corpora in ELT. In G. Hall (Ed.). *The Routledge Handbook of English Language Teaching* (pp. 383-398). NY, NY: Routledge.

Geluso, J., & Yamaguchi, A. (2014). Discovering formulaic language through data-driven learning: Student attitudes and efficacy. *ReCALL*, *26*(2), 225-242.

Hirata, Y., & Hirata, Y. (2013). Data-driven learning and learner interviews in a Japanese context. In S. K. S. Cheung, J. Fong, W. Fong, F. L. Wang, & L. F. Kwok (Eds.), *Hybrid learning and continuing education* (pp. 122-133). Berlin, Germany: Springer Berlin Heidelberg.

Huang, L. S. (2017). Has Corpus-Based Instruction Reached a Tipping Point? Practical Applications and Pointers for Teachers. *TESOL Journal*, *8*(2), 295-313.

Huang, Z. (2014). The effects of paper-based DDL on the acquisition of lexico-grammatical patterns in L2 writing. *ReCALL*, *26*(2), 163-183.

Jalilifar, A., Mehrabi, K., & Mousavinia, S. R. (2014). The effect of concordance-enriched instruction on the vocabulary learning and retention of Iranian EFL learners. *Procedia—Social and Behavioral Sciences*, 98, 742–746

Johns, T. F. (1991). Should you be persuaded: Two samples of data-driven learning materials. *ELR Journal, 4,* 1-16.

Karras, J. N. (2016). The effects of data-driven learning upon vocabulary acquisition for secondary international school students in Vietnam. *ReCALL*, *28*(2), 166-186.

Kennedy, C., & Miceli, T. (2001). An evaluation of intermediate students' approaches to corpus investigation. *Language Learning and Technology*, *5*(3), 77–90.

Kılıçkaya, F. (2015). Computer-based grammar instruction in an EFL context: Improving the effectiveness of teaching adverbial clauses. *Computer Assisted Language Learning*, *28*(4), 325-340.

Larsen-Walker, M. (2017). Can Data Driven Learning address L2 writers' habitual errors with English linking adverbials?. *System*, *69*, 26-37.

Lee, H. C. (2013). Investigating the effects of student learning of English using COL approach based on situational theories. *Computers in Human Behavior*, *29*(6), 2211-2217.

Leńko-Szymańska, A. (2014). Is this enough? A qualitative evaluation of the effectiveness of a teacher-training course on the use of corpora in language education. *ReCALL*, *26*(2), 260-278.

Lin, M. H. (2016). Effects of corpus-aided language learning in the EFL grammar classroom: A case study of students' learning attitudes and teachers' perceptions in Taiwan. *TESOL Quarterly, 50*(4), 871-893.

Lin, M. H., & Lee, J.-Y. (2017). Pedagogical suitability of data-driven learning in EFL grammar classes: A case study of Taiwanese students. *Language Teaching Research,* (*Online First*), 1-21.

Mishan, F. (2004). Authenticating corpora for language learning a problem and its resolution. *ELT Journal*, *58*(3), 219-227.

Mizumoto, A., Hamatani, S., & Imao, Y. (2017). Applying the bundle–move connection approach to the development of an online writing support tool for research articles. *Language Learning* , *67*(4), 885-921.

Moustakas, C. (1994). *Phenomenological research methods*. Thousand Oaks, CA: Sage.

Phoocharoensil, S. (2012). Language corpora for EFL teachers: An exploration of English grammar through concordance lines. *Procedia-Social and Behavioral Sciences*, *64*, 507-514.

Poole, R. (2016). A corpus-aided approach for the teaching and learning of rhetoric in an undergraduate composition course for L2 writers. *Journal of English for Academic Purposes*, *21*, 99-109.

Rezaee, A. A., Marefat, H., & Saeedakhtar, A. (2015). Symmetrical and asymmetrical scaffolding of L2 collocations in the context of concordancing. *Computer Assisted Language Learning*, *28*(6), 532-549.

Smart, J. (2012). *Innovative approaches to ESL grammar instruction.* Unpublished doctoral dissertation, Northern Arizona University, USA.

Smart, J. (2014). The role of guided induction in paper-based data-driven learning. *ReCALL*, *26*(2), 184-201.

Smith, S. (2011). Learner construction of corpora for general English in Taiwan. *Computer Assisted Language Learning*, *24*(4), 291-316.

Todd, R. W. (2001). Induction from self-selected concordances and self-correction. *System*, *29*, 91-102.

Tono, Y., Satake, Y., & Miura, A. (2014). The effects of using corpora on revision tasks in L2 writing with coded error feedback. *ReCALL*, *26*(2), 147-162.

Uçar, S., & Yükselir, C. (2015). The effect of corpus-based activities on verb-noun collocations in EFL classes. *Turkish Online Journal of Educational Technology*, *14*(2), 195-205.

Yeh, Y., Liou, H. C., & Li, Y. H. (2007). Online synonym materials and concordancing for EFL college writing. *Computer Assisted Language Learning*, *20*(2), 131-152.

Yoon, C. (2011). Concordancing in L2 writing class: An overview of research and issues. *Journal of English for Academic Purposes*, *10*(3), 130-139.

Yoon, C. (2016). Concordancers and dictionaries as problem-solving tools for ESL academic writing. *Language Learning & Technology*, *20*(1), 209-229.

Yoon, H. (2008). More than a linguistic reference: The influence of corpus technology on L2 academic writing. *Language Learning & Technology*, *12*(2), 31-48.

Yoon, H., & Hirvela, A. (2004). ESL student attitudes toward corpus use in L2 writing. *Journal of Second Language Writing*, *13*(4), 257-283.

Vyatkina, N. (2016). Data-driven learning for beginners: The case of German verb-preposition collocations. *ReCALL*, *28*(2), 207-226.

Zareva, A. (2017). Incorporating corpus literacy skills into TESOL teacher training. *ELT Journal*, *71*(1), 69-79.

Appendix A

Instruction: Please assign to each item a number between six and one, with six showing strong agreement and one showing strong disagreement.

No	Statement	Scores
1	The teachers show professional attitudes towards their teaching.	6 5 4 3 2 1
2	The teachers demonstrate full preparation of the lesson.	6 5 4 3 2 1
3	The teaching method of the teachers triggers my learning interests.	6 5 4 3 2 1
4	The teaching method of the teachers is fairly appropriate.	6 5 4 3 2 1
5	The media or materials chosen for the instruction are helpful.	6 5 4 3 2 1
6	The materials are well organized and presented.	6 5 4 3 2 1
7	The content of the materials is helpful for learning.	6 5 4 3 2 1
8	Attending the course, I develop greater understanding of the subject.	6 5 4 3 2 1
9	I learn from the teaching of the lesson.	6 5 4 3 2 1
10	In light of its learning efficacy, I am happy to attend similar courses in future.	6 5 4 3 2 1

Appendix B

The open-ended questions used for the interview

1. In general, how did you like the experience of learning to be a DDL teacher in this project?
2. How would you describe the differences, if any, between your experience teaching with the DDL approach and the Grammar Translation?
3. How would you describe your experience of learning to be a DDL teacher in each stage of the course?
4. Did you encounter any difficulties or challenges when learning to be a DDL teacher? If so, what were they? And why?
5. How would you describe your experience of coping with the design or material of the DDL treatments?
6. How would you describe your classes when you taught them using the different treatments?
7. Would you like to share any other observations, thoughts, or perspectives relating to any of the two classes or the treatments?
8. Would you consider adopting DDL or Grammar Translation to teach English grammar in future? Why or why not?