

Introducing Data-Driven Learning: Theory, Practice, and Evaluation

ทฤษฎี การปฏิบัติ และการประเมินผลวิธีการเรียนภาษาอังกฤษจากคลังข้อมูล

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Abstract

This paper gives a brief introduction to the Data-driven Learning (DDL) approach or the use of concordance data in the English classroom. Three aspects of DDL are discussed. First, theories in language learning that provide the rationale for the implementation of DDL in the language classroom are examined. The next part of the paper describes types of concordance-based activity with some sample materials presented. Finally, the paper provides an overview of research carried out to evaluate DDL using qualitative data, quantitative data, and combination of both types of data collection.

บทคัดย่อ

บทความนี้มีจุดมุ่งหมายเพื่อแนะนำวิธีการเรียนภาษาอังกฤษจากคลังข้อมูลภาษาอังกฤษหรือการเรียนภาษาอังกฤษจากแบบฝึกหัดที่สร้างโดยโปรแกรมคอมคอร์ดานซ์ โดยจะอภิปรายในสามประเด็นหลัก ประเด็นแรกเป็นการสรุปทฤษฎีการเรียนภาษาซึ่งสนับสนุนการเรียนดังกล่าว ประเด็นที่สองเกี่ยวกับการใช้คลังข้อมูลในชั้นเรียนภาษาอังกฤษโดยมีตัวอย่างกิจกรรมและแบบฝึกหัดที่สร้างโดยโปรแกรมคอมคอร์ดานซ์ ประเด็นสุดท้ายเป็นการสรุปงานวิจัยที่เน้นการประเมินผลกิจกรรมและแบบฝึกหัดทั้งงานวิจัยเชิงคุณภาพเชิงปริมาณและงานวิจัยที่รวมรวมข้อมูลทั้งสองประเภท

1. Introducing Data-driven Learning

In this paper, the term ‘Data-driven Learning’, hereafter ‘DDL’, is used specifically to refer to a teaching approach advocated by Johns (1991a, 1991b and elsewhere), which exploits pedagogic potential of a computer-retrieval collection of texts, known as a ‘corpus’, and of a program called a ‘concordancer’ (which retrieves and presents data from a corpus in the form of concordance lines). The term DDL, or sometimes referred to as ‘classroom concordancing’ has been defined as:

‘The use in the classroom of computer-generated concordances to get students to explore the regularities of patterning in the target language, and the development of activities and exercises based on concordance output’ (Johns & King, 1991: iii).

For those who are less familiar with computer-generated concordances, Figure 1 shows concordance lines for the word ‘chance’ taken from a corpus of an English broadsheet newspaper.

Figure 1: Concordance lines for ‘chance’

of filth on Ted Hughes, stand a	chance	against the inner life of an ex-
this season, Haslam has taken his	chance	and become a regular in the side.
Taylor said. ‘It will be the only	chance	I’ll ever have to be compared with
In a sense, this is their last	chance	. If both sides can resolve the
skills and would therefore stand no	chance	if either one of these two Tawnies
betting, in effect, that his best	chance	is to wait for the management-pilot
has the imagination to seize this	chance	is an open question. So it was
them what amounts to an outside	chance	of victory. Whoever wins, to have
sites would have a good	chance	of being free of unpleasant side
Belt this year. And to get the	chance	of appearing on a bill with Naz is
we play a flat back four I have more	chance	of playing and it will be a
age of five he had a much greater	chance	of delinquency than if he was in
sir. I’m afraid there is little	chance	of justice. You will go back to
restricted, there is a real	chance	that the society could go bust.
Prospective buyers will have a	chance	to bid for treasures not seen on
or both may wish to take one last	chance	to score some military successes
worried that he would never get the	chance	to star for his country again. So
on his jury address as the best	chance	to save his clients skin. The
their exact yield - offer a last	chance	to calibrate the seismic monitors

It can be noticed that concordance lines are basically examples of a word or a phrase presented with contexts. Concordancing software works as a search engine, looking for all instances of a search word in a corpus and listing them with the key word put in the middle of each line (known as the ‘Key-Word-in-Context’ or ‘KWIC’ format). Advantages of using a computer concordancing include a quick search of instances and the ability to sort the left and right contexts of a key word alphabetically.

The concordances presented above give learners some information about the phraseology of ‘chance’ such as typical verbs used with ‘chance’ (e.g. ‘stand’, ‘have’, ‘seize’); modifiers that determine various degrees of possibility (e.g. ‘great/greater’, ‘real’, ‘good’, ‘outside’, ‘little’, ‘no’, ‘last’, ‘only’); and syntactic patterns (e.g. ‘to have + a chance + to + verb’ or ‘to have + a chance + of + V-ing’).

To get such concordances, a corpus or a collection of texts is first needed. A

computer-retrievable corpus can be compiled by a user (e.g. by scanning texts and saving them in a text-file format), or can be obtained from existing computer-readable documents such as newspapers or articles on CD-ROMs. Then, a concordancing program such as Wordsmith or MicroConcord (<http://www.liv.ac.uk/~ms2928/index.htm>) has to be made available to extract concordance lines from the corpus. Useful information about a corpus compilation can be found in Aroonmanakun (2002).

Alternatively, if we subscribe to a corpus provider such as the Bank of English Corpus (<http://titania.cobuild.collins.co.uk>) or the British National Corpus (<http://www.sara.natcorp.ox.ac.uk>), we have access to a large corpus and can use its retrieval tools to get concordances. Concordance lines can also be found on-line at websites such as <http://www.kamakuranet.ne.jp/~someya>, <http://titania.cobuild.collins.co.uk/form.html>, and <http://iele.au.edu/corpus>. Michael Barlow’s

website (<http://www.ruf.rice.edu/~barlow/corpus.html>) is also a good starting point to look for corpora and concordancing software.

In a DDL classroom, the students are presented with authentic data in the form of corpus-based concordance citations as language input, and are asked to generalise patterns and use of target language items. In this respect, DDL can be regarded as an inductive approach to language learning where learners are encouraged to make their own interpretations of the data. What makes DDL different from other inductive approaches is an attempt to let students work directly with the corpus data, and place learners at the centre of the language learning, as Johns (1997:101) suggests:

‘The central metaphors embodying the approach are those of the learner as ‘linguistic researcher’, testing and revising hypotheses, or as ‘language detective’, learning to recognise and interpret clues from context (‘Every student a Sherlock Holmes’).

2. Theoretical underpinnings of DDL

Although DDL did not develop from a particular theory and is very much practice-oriented, there are three theoretical issues that may provide the rationale for the use of DDL in the language classroom.

2.1 *The use of computers in language learning and teaching*

In general, Computer Assisted Language Learning (CALL) plays some crucial roles in modern language teaching. First of all, it can attract learners and provide interactive facilities (e.g. multimedia and hyperlinks) that are not available in traditional written handouts or textbooks. Also, as Pennington (1996:8) suggests, CALL can be adapted to suit learners’ differences in motivation and learning styles. For example, it can be either

used as a tool of discovery learning or as a passive tutor. In terms of authenticity, CALL also provides exposure to authentic texts and authentic tasks (Healey 1999), and access to authentic audience (e.g. communicating through e-mail or Moo) (Johnston, 1999).

Despite having such advantages, not all types of CALL are used to its fullest pedagogic potential. Instead of being used to encourage a learning process, some CALL programs are merely used as ‘tutor’ whose expected roles are to pass on linguistic knowledge to the learners in the form of rules or explanations; to answer learners’ questions; and to assess learners’ performance. To make full use of CALL pedagogically, we should look for CALL that:

- (a) promotes learner autonomy by allowing learners to initiate language goals and ways to reach such goals.
- (b) does not attempt to capture or simplify language rules but to provide fact or evidence about the language from which rules can be constructed.
- (c) facilitates a holistic approach to language learning.
- (d) is implemented under a well-grounded teaching methodology with clear pedagogic purposes.

Classroom concordancing seems to meet these criteria. In (a), concordancing can take the role of ‘pedagogue’, in which the learners, not the concordance program, initiate the language investigation process. In (b), the concordance program is not designed to ‘encapsulate linguistic competence’ but to ‘simply provide the evidence needed to answer the learners’ questions, and rely on the learners’ intelligence to find answers’ (Johns 1991 a:

2). In (c) the concordance software is not designed to teach grammar but to organise language data so that learners' consciousness can be raised to particular language points. Finally in (d), the use of concordances in the classroom is based on the Data-driven Learning approach and therefore all materials and activities developed by the concordance program adhere to the same principle, that is, to provide adequate language data to facilitate the generalisation process and to stimulate inductive strategies in general.

2.2 *The use of corpus data in the language classroom*

Although the suggestion that corpus data in all cases have the advantage over native speakers' intuition in describing how language operates is debatable (Cook 1998, Widdowson 2000), there are some aspects of language that may not be easily noticed by learners (and perhaps by the teacher or the native speaker) without consulting corpus data, particularly in the form of concordance lines.

For example, corpus data in the form of

concordances can be an effective tool to raise awareness of collocation as concordance data are organised (i.e. with immediate words on the left and right contexts of a key word being sorted) to make collocational patterns more salient to learners. For example, a random selection of concordances for 'hazardous' from the Bank of English corpus shows that 'hazardous' is typically used in the same environment as words relating to artificial substances, environment, industry, health, and driving such as 'materials', 'waste', 'sites', 'your heart', and 'takeovers'.

Corpus-based concordances can also be useful for sensitising learners to the prosodies or connotations of words (Sinclair 1991, Louw 1993, Stubbs 1996). As shown below in Figure 2, concordances for 'on the brink of' and 'on the road to' suggest that, despite having similar semantics, the former often attracts words with negative meaning such as 'war' or 'disaster', whereas the latter is usually followed by words with positive or neutral connotation such as 'peace' or 'democracy'.

Figure 2: Concordance lines for 'on the brink of' and 'on the road to'

Bosnian peace talks in Geneva were The Soviet economy is poised that Kirghizia and Uzbekistan are night. The 42-year-old actor is designed to save species teetering lines of conflict in Eritrea are TIMES editorial says India is While no major commercial banks are	on the brink of on the brink of	collapse today. Reports out of the disaster, output is falling and the war. Troops have been sent in to death with spine and head injuries. extinction can have a dramatic starvation and some of the hungry chaos, and it looks at the problems failure, there are a couple of large
Ken Rutherford (61) put the side home believing he had put the world years after Lithuania's first steps firmly to support Hungary Worse, it was IBM that put Gates a diet guaranteed to put anyone Rabin said: 'We shall continue wealthiest men, started	on the road to on our road to on his road to	victory with a match-winning peace and prosperity. Dreams turned independence. Dayva said she still democracy and stability and economic riches, by handing him its monopoly good health and blokes will love it! peace." You can't bank & pound; business success in 1969 from a small

2.3 Attention to language form

Recent research on second language acquisition has suggested that there is a danger in adopting an extreme meaning-focused approach. To give an example, Skehan (1996: 22) points out that when learners rely too much on communication strategies and ‘prefabricated chunks’ to solve immediate communication problems without making longer-term progress, and when learners gain greater ‘fluency’ at the expense of ‘complexity’ and ‘accuracy’. Research into input processing (e.g. Van Patten 1990) also suggests that if learners process language input entirely for meaning, they are not likely to pay attention to language form, and input needs to be manipulated to balance processing of meaning and form.

There is also evidence from research into the nature of attention and memory that some focus on language form may facilitate the learning of the target language and help learners to improve accuracy even when the lesson focuses on meaning. Schmidt (1990), among others, puts forward an argument, known as the ‘Noticing Hypothesis’, that noticing is a facilitating condition to allow ‘input’ to become ‘intake’. Learners are likely to acquire the language forms that they have noticed in the language input, although the process by which input becomes intake may take some time.

The Noticing Hypothesis has also been applied in the context of grammar teaching under the term ‘Grammatical Consciousness-Raising’ or ‘CR’ (Rutherford 1987; Ellis 1993; Skehan 1996; Willis and Willis 1996). It has been argued that CR can be a viable alternative to traditional explicit grammar teacher, since CR aims at developing awareness of grammar and developing skills of data

observation and hypothesis testing, rather than teaching grammar as accumulated items.

In this respect, the use of DDL in the language classroom seems to be justified because concordancing can be used to help promote noticing, which in turn plays a facilitative role in converting input into intake. KWIC concordances in particular can increase saliency of the target language items by the layout and repetition of the key words. DDL can also be regarded as a strong form of CR, which can be particularly helpful in raising learners’ attention to a largely ignored area of grammar teaching such as collocation, and in developing inductive learning strategies as a tool of language learning in general.

3. From theory to classroom practice

This section will briefly discuss how DDL can be used in the language classroom. Broadly speaking, there are three types of concordance-based activity.

3.1 Classroom-based, teacher-designed concordance exercises

In most cases, the teacher decides what language points to be focused on, which may arise from the teacher’s corpus research, error analysis of learners’ work, learners’ queries, or language points relevant to the learner’s syllabus. A typical concordance task is the multiple-context, gap-filling exercise. The students are presented with concordance lines for a word with the key word deleted, and are asked to supply the missing word. This exercise is aimed particularly at developing the hypothesis testing skills. When the first line is read, a hypothesis is formed as the students come up with a possible answer. Then the hypothesis can be confirmed or rejected when they move on to read the

remaining lines. Figure 3 is a sample task of this type in which learners are asked to think

of a body part that fits in all the blanks.

Figure 3: A multiple-context, gap-filling exercise

Set A The missing word is _____

a very attractive girl with lovely _____ and skin". The pretty girl Neil _____, a grey beard and a Powerbook: _____. May I speak with you in _____, does not believe all the stories _____ and short hair peered out at him _____ and jet-black hair that she kept to _____

its next to a tall man with big _____, a quiet woman with bright shining _____, a wedge. A young woman with bright _____, a tall, dignified old man with sad _____, a very attractive woman with large blue _____

Other teacher-designed exercises include underlining or identifying words or phrases in concordance lines; identifying sources of concordance lines (Thompson 1995: 5), matching concordance lines (Johns 1991b: 43), re-ordering concordance lines (Tribble and Jones 1990: 52), and categorising concordance lines (Goodale 1995: 62-63). The task presented below in Figure 4 asks

the students to re-construct the original citations. Concordance lines are divided in halves with the second halves split up and put in the wrong order. The learners' task is to put the citations into the right order by reading the context carefully and observing lexical relations (in this case 'and other' being used to signal subordination).

Figure 4: A re-ordering task

In the following lines, the contexts after the word 'other' are in the wrong order. For example, in the first line, "measles, polio and other non-renewable forms of energy" does not make any sense. Try to put them back in order so that the first part of each context matches the second part. The first match is 'a - 7' (which reads "measles, polio and other childhood diseases"). Find the other matches.

- a) a plan to combat measles, polio and other non-renewable forms of energy (1)
- b) tax on oil, coal, natural gas and other infections. This may sound (2)
- c) proteins of humans, chimpanzees, and other household services through (3)
- d) crutches, canes, walking sticks, and other financial institutions. (4)
- e) copying Japan, Korea and other support for vulnerable women (5)
- f) mutual funds, commercial banks, and other aids to locomotion. The trial (6)
- g) meetings, film shows, exhibitions and other childhood diseases and AIDS (7)
- h) shelters, legal aid, medical care and other mammals, Wilson was able to (8)
- i) insurance, electricity, telephone and other events are invited for (9)
- j) more vulnerable to coughs, colds, and other Pacific Rim countries, or to (10)

For advanced learners, the teacher can introduce pairs or sets of concordance lines with open-ended questions such as 'what are the differences between X and Y?', or 'what is the use or function of X in these citations?'. For example, in the task presented in Figure 5 two sets of

concordance lines (in the full-sentence format) for the verbs 'suggest', 'recommend' and 'propose' were given. The difference is that in the first set the verbs follow the pattern 'verb + that + subject + should + verb (subjunctive form)' such as 'He also suggested that the organisation

should adopt new responsibilities outside Europe', whereas the word 'should' is not found in the sentences in the second set such as 'The product wrapping does suggest that it be eaten at breakfast and lunch, along

with fruit'. After studying the concordances, the students may be aware of this subtle difference, and notice that both patterns are acceptable in authentic texts.

Figure 5: A task with discussion questions

What are the differences between sentences in Set A and Set B?

Set A

1. He also suggested that the organisation should adopt new responsibilities outside Europe.
2. Her doctor suggested that she should be admitted to a psychiatric clinic.
3. Mr Delors is intending to propose that the final treaty should set out a new way of fixing the EC budget.
4. A policy document also proposes that passenger services should be run by regional private companies.
5. The American Heart Foundation recommends that less than 10 per cent of our daily calorie intake should be from fat.
6. Professor Joseph Belth recommends that a company should receive a high rating from at least three of five rating agencies.

Set B

1. The product wrapping does suggest that it be eaten at breakfast and lunch, along with fruit.
2. She suggested that Mrs Haston find another job.
3. The Clinton administration has proposed that the IMF make more money available to Russia.
4. When congressional conservatives proposed that married women be banned from working, she decried the inequality of such a notion.
5. I would therefore recommend that you arrange to take your puppy home with you when he is about 15 weeks old.
6. It's reported to have recommended that passengers be warned when there is a bomb threat to their flight.

3.2 Collaborative concordancing

Sometimes concordance exercises may come from collaboration between the teacher and the students. In this teaching scenario, the materials are not usually prepared in advance. The teacher and students can negotiate the language points to be discussed and work with 'real-time' concordances together. An activity of this type is the 'one-to-one' consultation reported in Johns (1997). The students bring their assignments for correction. Any language points arising from learners' errors or from learners' (sometimes teacher's) curiosity may become the basis of collaborative concordancing. A small corpus

and a concordancer are used as a tool for both the consultant and the students to explore language problems together. Topics of discussion range from lexis (e.g. collocation, connotation, and lexical transfer); to syntax (e.g. transitivity, countability, and blending); to organisation and discourse (e.g. structuring a list or premature evaluation). Based on the concordance findings, the teacher and the students agree on the revised versions. A summary of discussions and concordance-based, follow-up exercises can be found in a series of 'Kibitzer's available at <http://web.bham.ac.uk/johnstf>.

3.3 Autonomous concordancing

In a weak form of autonomous concordancing, the teacher still specifies language focus but the concordancing process is left to the learners. In Maneekhao (2001) and Watson Todd (2001b), for example, the teacher selected misused words from the students' assignments and asked the students to compile concordances for those words using an Internet Search Engine (<http://www.alltheweb.com>). The students were instructed to induce rules from the self-selected concordances and undertake self-correction.

Bernardini (1999) proposes a stronger form of learner-independent, task-based approach to classroom concordancing referred to as 'serendipitous browsing'. In this application, the learners decide the language items to be examined, which often come from their own queries or arise from classroom activities. Then, they retrieve concordance lines from a corpus, usually a large corpus such as the BNC, and find answers to their own questions from the concordance data. Concordance data, as Someya (2000) suggests, can also be used independently by learners as a reference when they write assignments. In his study, a group of Japanese businessmen were instructed to consult a web concordancer and a corpus of business English when they wrote business letters as part of an English course.

To sum up the section, a decision to choose the activity type depends on a number of factors such as the level of the students, familiarity with concordancing, the amount of training for independent concordancing, and the degree of learner autonomy. As mentioned above, a combination of different activity types is also possible if a task is divided into different stages. It is also

possible to start a series of concordance-based activities with a more teacher-centred task such as the teacher-designed exercises and gradually move towards independent concordancing as the lessons go on.

4. From classroom practice to evaluation

While there is a large amount of literature reporting the use of classroom concordancing and suggesting different types of concordance-based task, few studies have been carried out to evaluate classroom concordancing empirically. The section will briefly examine three types of research aimed at evaluating DDL.

4.1 Qualitative evaluation of DDL

The first type of qualitative evaluation is concerned with the learners' attitudes towards the concordance-based approach. Hardley (forthcoming), for example, used DDL materials with 25 Japanese students and designed questionnaires to find out what the learners think of concordance materials. The results showed that his beginner-level students showed a great deal of enthusiasm for and receptiveness to the DDL approach, and that the majority of students said concordance-based exercises help improve their English.

The second type of research looks into the learning process and strategies used during concordance-based activities. Bernardini (2000), working with 6 Italian students in a translation seminar, examined the learners' experiences of independent corpus investigation. She found that the learners successfully adopted cognitive and linguistic strategies to interpret and generalise their findings, particularly in observing collocation and semantic prosodies of a search word. In a similar study, Turnbull and Burston (1998) carried out a longitudinal case study of

concordancing strategies used for the investigation of self-selected concordances. The results suggested that learners experienced varying levels of success with concordancing strategies, depending on cognitive style and motivation.

The last type of qualitative research looks particularly at problems during the concordancing tasks. In a study of eight undergraduate students in the Italian programme at Griffith University, Australia, Kennedy and Miceli (2001) video-recorded learners' discussions of DDL tasks and interviewed the participants. The results suggested that although the students were capable of making some successful investigations, they still had problems with specifying searches, selecting relevant citations, and making valid generalisations. Maneekhao (2001) also found that, despite concordance materials being used quite successfully with her Thai students, a few students were unable to adapt to independent concordancing due to lack of confidence in their own discovery and inadequate proficiency to induce appropriate rules.

Qualitative evaluation of concordancing allows us to survey the learners' opinions on, and attitudes towards concordance-based tasks, which could suggest whether the students understand the use and potential benefits of concordancing. Researching on individual students by means of case studies also provides deeper insight into the process of data interpretation, the strategies used, the problems, and other factors affecting task performance. However, one has to be aware of limitations such as subjectivity of data collection and interpretation, and lack of evidence to support that concordancing has a positive learning effect.

4.2 Quantitative evaluation of DDL

The first type of quantitative research seeks to test the effectiveness of the unique format of concordancing, which presents multiple-context citations of a word. For example, Stevens (1991) conducted an experiment with students in Oman, and his findings suggested that concordance-based vocabulary exercises were more easily solved than traditional gap-filler exercises, when the testing was on learned vocabulary. Cobb (1997) suggested that Stevens' finding was replicated with the learners working on CALL-based vocabulary exercises learning new vocabulary.

The second type of study investigates the learning effect of classroom concordancing in comparison with traditional, deductive-learning materials. Gan et al. (1996) carried out an experimental study with 48 Malaysian undergraduate students to compare the effectiveness of computer-based concordancing exercises and the conventional instructional approach in the teaching of words in context (e.g. prepositions, collocation). The results showed that the subjects who learned through the computer concordancing approach performed better than those who went through conventional classroom instruction. In another study, Cobb and Horst (2001) reported that the students who were asked to work on concordance CALL programs learned more vocabulary and were able to transfer word knowledge in novel texts, and retained such knowledge over time.

Another type of research focuses on the learners' ability to make useful generalisations from self-selected concordances. Someya (2000) tested the effectiveness of a web concordancer in helping the learners write business letters

with fewer errors, and found that the experimental group made significantly fewer article and preposition errors in the six tasks analysed. In a Thai teaching context, Watson Todd (2001a) investigated the ability of learners to induce rules and patterns from self-selected concordances and to use such induction to make self-correction of their errors. Generally, the students were able to induce valid patterns from their self-collected concordances and make valid self-corrections of their errors, and there was a strong correlation between these two abilities.

Quantitative studies, particularly those using experimental research design, have the methodological advantage over qualitative studies in measuring the learning effect of concordancing. However, one has to be careful in choosing appropriate research methods (e.g. appropriate subject, length of experiment, treatment, and measurement), and in interpreting and generalising the results. In some cases, qualitative studies using methods such as interviewing or questionnaires can be supplemented to quantitative studies, so that the effect of concordancing can be measured at both 'macro' (general effect) and 'micro' (individual performance) levels.

4.3 Combination of qualitative and quantitative evaluation of DDL.

As mentioned above, it is also possible to collect both quantitative and qualitative data in the same study. Sripicharn's (2002) evaluation of classroom concordancing used by Thai learners of English can be taken as an example. The learning effect of DDL was measured using experimental research design with pre- and post-tests. The experimental group worked on concordance-based materials, whereas the control group was given corresponding non-

concordance teaching units focusing on almost the same language items. The results showed that DDL did not have a marked effect on the learning of language items presented in the materials, or on the learners' ability to transfer context observation skills to similar language tasks.

Qualitative data were also collected, and significant findings were found. For instance, the learners' attitudes towards DDL materials were elicited using questionnaires and in-depth interviews. In general, DDL materials were rated highly, particularly as a means of drawing attention to words in context. To collect more qualitative data, the learners' performance when using DDL tasks was assessed by analysing one-to-one discussions of DDL materials between the teacher and six DDL students. The results suggested that the students were able to make useful generalisations and adopted DDL strategies in dealing with the concordance data.

Conclusion

This paper has introduced the DDL approach, discussed theoretical issues in language teaching that lend support to the use of classroom concordancing, given examples of concordance-based tasks, and reviewed some literature concerning the evaluation of DDL. Like any new approaches, more studies are needed to explore DDL in these three areas, that is, to find stronger theoretical support from studies in second language acquisition; to exchange ideas on how to design DDL materials to suit learners of different proficiency and motivation; and to conduct more empirical research to provide evidence that DDL has some advantages over other approaches, for example, in the teaching collocation and words in context. In particular, it is worth pursuing more

research on the use of DDL with Thai learners and more studies on how to adapt

the approach to the Thai teaching context and culture of learning.

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