

The Effect of Learning Conditions on Collocation Gains: A Case Study of Task-based Dictionary Use Instruction

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Abstract: To examine the effect of learning conditions on collocation gains, 88 Chinese EFL students were assigned randomly to one of three different learning conditions, i.e. dictionary use with prior instruction, dictionary use without training, or explicit collocation teaching. They were asked to fill in the missing verb in ten V + N target collocations embedded in sentences. A screen recorder was used to keep track of the students' lookup behaviour in the two conditions involving dictionary use such as every input of the searched word, every move and click of the mouse, every step of collocation search and the time length of dictionary consultation. After completion of the assignment all the students were given corrective feedback to the collocation task and marked their corrections on the test paper. Two weeks later, an unexpected retention test was administered. The study showed that dictionary use following a five-step training session reaped significantly more collocation gains than dictionary use without prior instruction and explicit collocation teaching. Compared with those who used the dictionary without prior training, the students with prior dictionary instruction employed more effective strategies concerning the selection of lookup words and the location and identification of collocation information. They took a more conscientious approach to dictionary use and retrieved more correct target verbs. Apart from lending new support to the continuous appeal for a position of dictionary use instruction in the EFL pedagogy, the study also provides a detailed demonstration of task-based dictionary training applicable to classroom practice.

Keywords: LEARNING CONDITIONS, COLLOCATION LEARNING, DICTIONARY SKILLS, DICTIONARY LOOKUP BEHAVIOUR, DICTIONARY USE INSTRUCTION

Opsomming: Die invloed van onderwysomstandighede op die aanleer van kollokasies: 'n Gevallestudie van taakgebaseerde woordeboekgebruiksonder-rig. Om die invloed van onderwysomstandighede op die aanleer van kollokasies te ondersoek, is 88 Chinese EVT-studente lukraak aan een van drie verskillende onderwysomstandighede onder-werp, nl. woordeboekgebruik met voorafgaande onderrig, woordeboekgebruik sonder enige oplei-ding, of gebruik met uitvoerige aanwysings vir die aanleer van kollokasies. Hulle is ook gevra om die ontbrekende werkwoord in tien V + N-doelkollokasies wat in sinne gebruik is, in te vul. 'n Skermopnemer is gebruik om die studente se naslaangedrag in die twee onderwysomstandighede wat woordeboekgebruik behels, te monitor, bv. elke keer wanneer die woord wat nageslaan word, ingetik word, elke beweging en klik van die muis, elke stap van die kollokasiesoektog en die tyds-

duur waarin die woordeboek geraadpleeg is. Ná voltooiing van die opdrag is al die studente korrektiewe terugvoer rakende die kollokasieopdrag gegee en hulle het hul korreksies op die toetsblad aangebring. Twee weke later is 'n onverwagse retensietoets uitgevoer. Die studie het aangetoon dat woordeboekgebruik wat volg op 'n onderrigsessie bestaande uit vyf stappe 'n baie groter invloed op die aanleer van kollokasies gehad het as woordeboekgebruik sonder enige voorafgaande opleiding en uitvoerige aanwysings vir die aanleer van kollokasies. Indien die studente wat die woordeboek sonder enige opleiding gebruik het, vergelyk word met dié wat voorafgaande onderrig ontvang het, kan gesien word dat laasgenoemde groep effektiewer strategieë rondom die seleksie van naslaanwoorde en die vind en identifisering van kollokasie-inligting toegepas het. Hulle het 'n meer doelgerigte benadering tot woordeboekgebruik gevolg en meer korrekte doelwerkwoorde gevind. Buiten die verlening van nuwe steun aan die volgehoue pleidooi vir woordeboekgebruiksopleiding in die EVT-pedagogie, verskaf hierdie studie ook 'n gedetailleerde voorbeeld van taakgebaseerde woordeboekopleiding wat op die klaskamerpraktyk toegepas kan word.

Slutelwoorde: ONDERWYSOMSTANDIGHEDE, AANLEER VAN KOLLOKASIES, WOORDEBOEKVAARDIGHEDE, WOORDEBOEKNASLAANGEDRAG, WOORDEBOEKGEBRUIKS-ONDERRIG

1. Introduction

As an important indicator of learners' communicative competence and language proficiency, collocation has been a recurrent topic of interest for EFL researchers and teachers. Abundant evidence shows that collocation acquisition is a slow and difficult process which is complicated by various interlexical and intralexical factors (Peters 2016, Boers et al. 2014, Yamashita and Jiang 2010) and that even advanced learners experience difficulties in producing appropriate collocations (Durrant and Schmitt 2009, Li and Schmitt 2010, Laufer and Waldman 2011, Alzi'abi 2017). To assess the role that the dictionary can play in helping EFL learners meet the big challenge of collocation learning, an increasing number of dictionary-based collocation studies have been carried out. Researchers have examined the contribution of dictionary use to collocation reception, production and retention (Laufer 2011, Li and Xu 2015, Alzi'abi 2016, 2017, Chen 2017, 2020), investigated users' lookup behaviour and skills (Komuro 2009, Wu 2011, Lew 2012, Chen 2017), and compared the efficacy of collocation learning between dictionaries of different types, media and presentation modes (Lew and Radłowska 2010, Dziemianko 2020, 2011, 2012, 2014, 2017, Dai et al 2019). In addition, studies have been conducted to explore the approaches to and effectiveness of dictionary skills training for collocational competence development (Kim 2017, 2018, Basal 2019). However, no efforts have been made yet to gauge the effect of learning conditions on collocation learning which involves dictionary use. There is no evidence that dictionary use is more effective than the prevailing approach of explicit collocation teaching in the classroom and vice versa. It has been established that dictionary use can contribute positively to collocation production and retention as compared

with no dictionary use (Laufer 2011, Li and Xu 2015, Chen 2017, Alzi'abi 2017), but it remains unproven whether dictionary use with prior training will necessarily bring about significantly better results than other learning conditions like dictionary use without instruction and explicit collocation teaching. Besides, more research is needed to compare how trained dictionary users behave differently from the untrained during collocation consultation. Although Kim (2017) validated the effectiveness of dictionary training for improving the participants' productive use of collocation, she took a product-based approach, i.e. comparing the participants' performance of collocation tasks before and after dictionary training without investigating their specific use of lookup strategies during a collocation search. More insights would have been gained if a process-oriented approach had also been adopted. In Kim (2018), think-aloud protocols were used to examine the participants' lookup behaviour, but as cited by the same author, there are disadvantages inherent in this data collection method such as overshadowing the non-reportable perceptual and memory processes and participants' being prone to reactivity which can potentially trigger changes in their cognitive processes. Actually, thanks to technological development, nowadays screen recorders are easily available which can be used to keep track of dictionary users' lookup behaviour, including which words are searched, the number of lookups, every move and click of the mouse, what information is used, and the time length of dictionary use. It is believed that screen video recordings can provide a lot of authentic data to show how learners actually use the dictionary. In view of all this, the present study aims to investigate the effect of learning conditions on collocation gains, comparing the collocation retention scores yielded by dictionary use with prior training, dictionary use without training and explicit collocation teaching. It also attempts to compare the lookup behaviour of learners with and without dictionary use instruction by means of screen recording.

2. Defining collocation

Despite a broad consensus on the significance of collocation for fluent and idiomatic use of language, no universal agreement has been reached when it comes to the definition of collocation. Generally speaking, there are two approaches to collocation: the phraseological approach and the frequency-based approach. The former regards collocation as a type of restricted word combination based on semantic criteria (Cowie 1981, Wray 2002, Nesselhauf 2003, Laufer and Waldman 2011) while the latter refers collocation to the regular co-occurrence of words within a given span (Sinclair 1991, Hoey 2005). In the present study, the author adopts the former approach, defining collocation as habitually occurring lexical phrase that is characterized by relative transparency in meaning and form-restricted co-occurrence of elements like *lift a ban*, *hold a record*, *say a prayer* (Laufer and Waldman 2011: 648).

3. Previous dictionary-based collocation studies

3.1 Users' lookup behaviour

A number of researchers have investigated how learners use dictionaries for collocation learning. Wu (2011) conducted a questionnaire survey on Chinese EFL learners' lookup habits and preferences for collocation search. It was found that the participants usually looked for collocation information during writing and translating. Most of them attributed their reluctance to seek collocational information to a lack of time and even if they did, they would encounter such difficulties as confusion about where and how to find the relevant words and how to deal with what they had found. The study also investigated what type of dictionary was used most often for collocation consultation, what type of collocation was searched for most frequently, how the participants chose the keyword in a collocation for dictionary lookup, and how to optimize the presentation of collocation information in the dictionary. Instead of trying to paint a general picture of learners' collocation lookup habits, Lew (2012) focused on one specific lookup strategy, i.e. how learners decided which component word of a multi-word combination to look up in the dictionary. Forty Polish learners were required to select one word from each of 36 multi-word expressions that they would most readily look up. The results showed that word frequency and part of speech were strong predictors, yet the position of the word within the multi-word expression did not make much difference.

To explore learners' ability to retrieve information from a collocation dictionary, Komuro (2009) gave 26 Japanese university students a task to fill in the sentence blank for target collocations. They were found to be more successful in completing adjective–noun collocations (71.5%) than they were for verb–noun collocations (61.2%) and preposition–noun collocations (57.3%). Most of the participants had difficulty in making decisions about which collocate to choose from the near-synonymous collocates listed in the entry.

Research findings show that learners have inadequate dictionary skills. In a study to examine Arab EFL learners' use of electronic dictionaries to judge the appropriateness of collocations, Alzi'abi (2012, cited in Alzi'abi 2017) pointed out that even with dictionary assistance, the participants did poorly on the tests as they were incapable of taking full advantage of the collocational information in dictionaries. Li and Xu (2015) invited 32 Chinese EFL learners to perform a meaning determination task of verbal phrases with an online dictionary. The participants were unable to differentiate meanings of words and were pre-occupied with familiar meaning. They also tended to ignore the use of hyperlinks for cross reference. Similar findings were reported in Chen (2017) which tracked users' consultation behaviour with CALL software. The participants hardly used or even noticed the hyperlink function of the electronic dictionary. They were unable to distinguish between senses of a polysemous word, inclined to choose the sense listed at the beginning of an entry, and apt to lose

patience when faced with overcrowded entry information. Those findings were confirmed again by Chen (2020) through a retrospective questionnaire survey administered to EFL learners who used smartphone dictionaries for a collocation production task. Based on their findings, the researchers (Chen 2017, 2020, Laufer 2011, Li and Xu 2015) advocated inclusion of dictionary use instruction in the EFL pedagogy.

3.2 Dictionaries' contribution to collocation learning

Ample evidence indicates that dictionaries can provide useful assistance in collocation reception, production and retention. Laufer (2011) presented 95 EFL learners with a task to fill in the missing verb in target verb–noun collocations. It turned out that for the intermediate group, the use of the dictionary resulted in an increase of 150% of correct collocations as compared with the pre-test, and the pre-intermediate group improved by 96%. Chen (2017) asked 52 English majors at a Chinese university to complete a collocation fill-in task first dictionary-free and then with a CALL dictionary. Statistics showed that the number of correct verbs for the 12 target collocations increased from 0.25 in the pretest to 5.90 in the test, and in the posttest, 2.13 correct verbs were retained. As further corroborated by Chen (2020) in which 62 English majors completed a ten-item collocation fill-in task with smartphone dictionaries, the use of a dictionary also contributed significantly to the learners' productive knowledge of collocations, increasing from 0.23 correct verbs in the pretest to 5.82 in the test. Despite a significant loss of the target collocations after a week (from 5.82 to 2.00 words), the participants still gained 1.77 words as compared with the pretest.

Li and Xu (2015) examined the use of a dictionary for collocation decoding rather than encoding. The participants were required to complete a meaning determination task, using an online dictionary to choose from the given options the right meaning for the target verbal phrases. A significant difference was identified between the task performance before and after dictionary consultation (26.52% vs 49.69%). Alzi'abi (2012, cited in Alzi'abi 2017) also looked at dictionary use in relation to collocation reception. More than 100 English majors at a Syrian university were instructed to judge the appropriateness of 20 verb–noun combinations. They substantially improved their performance with the aid of an electronic dictionary. In Alzi'abi (2016), the participants were asked to provide three noun collocates to replace the *etc.* used in verb definitions to stand for the nouns that can collocate with the defined verb. Then they were guided to judge, according to the verb definitions, the appropriateness of a set of four noun collocates used with each defined verb. It was found that the participants could only provide 40% correct noun collocates, but they did much better in the judgment test, suggesting a positive role of a dictionary in helping users identify erroneous collocates. The limited help the dictionary offered for the production of collocations was attributed to the lack of clarity in the defini-

tions as well as the use of *etc.* that proved more difficult to decipher (Alzi'abi 2016: 322). It should be noted though, that such a testing form seemed to be too challenging for EFL learners who may have limited vocabulary knowledge in general and collocational knowledge in particular.

In Alzi'abi (2017), 88 MA English majors were instructed to provide, upon dictionary consultation, three additional adverb collocates for each target verb. There was a significant improvement in the participants' performance when they used the dictionary. Nevertheless, only about 10% of the responses were appropriate and the scores were all well below an average level. Actually, as with Alzi'abi (2016), this kind of testing form seemed to be more directly concerned with the participants' collocational knowledge than with the effect of dictionary use.

Compared with its contribution to collocation reception and production, the dictionary seems to play a lesser role in collocation retention. Laufer (2011) found that the intermediate group retained about 1.5 new collocations on average and the pre-intermediate group could only remember about 0.5. Chen (2017) also demonstrated that the participants' collocation retention rate was only 36.1%, close to what was found in Chen (2020), i.e. 34.5%. The low retention scores were actually not surprising, because for one thing, retrieving information successfully with a view to completing a task at hand by no means guarantees that the retrieved information will be stored in long-term memory, and for another, users are not always successful at finding the desired information in the first place (Boers and Lindstromberg 2012: 92). Presumably, the dictionary may be likely to play a greater part in collocation retention if a learning process is involved.

3.3 Skill training in collocation consultation

To date, there is only sporadic empirical research on how to train learners to master collocation lookup skills and how to increase learner autonomy through dictionary use instruction. Among the few studies are Kim (2017, 2018). In Kim (2017), 59 Korean EFL learners were trained to consult an online dictionary for collocation production in the order of node word selection, word sense distinction, collocate type location and feasible collocate identification. A comparison between a pretest and a posttest on collocation production demonstrated that teaching dictionary skills substantially improved learners' ability to produce natural collocations. As indicated by an end-of-semester survey, the participants perceived the instruction as necessary and helpful in gaining collocational competence. More importantly, they began to develop the habit of consulting collocation dictionaries after receiving the instruction. Innovative as it is, the study did not monitor the process of dictionary use. No information was provided about what strategies were adopted for collocation search or how the learners changed their dictionary consultation behaviour. The findings would

be more convincing if the learners' lookup behaviour were observed closely and analyzed in detail.

In her another noteworthy study, Kim (2018) compared four participants' dictionary consultation behaviour while correcting collocation errors before and after dictionary use instruction by using think-aloud protocols. At the first meeting, the participants wrote an essay and then used an online dictionary to correct the wrong collocations sorted out and marked by the researcher. They verbally reported on the cognitive process they went through during the error correction. At the second meeting four weeks later, the participants were given the same four-step dictionary skills training as in Kim (2017) on the selection of a node word, the distinction of senses, the location of collocate types and the identification of possible collocates. After the instruction, the participants performed the same correction task as was given at the first meeting. The study showed that all the four participants made remarkable progress in the collocation correction task, increasing the success rate from 55% at the first meeting to 90% at the second meeting. What was more encouraging was that, the participants significantly changed their dictionary consultation behaviour. The research thus highlighted the pedagogical need to impart collocation lookup skills in L2 writing classes to foster collocational competence and learner autonomy. Kim's research added further evidence about the effectiveness of dictionary training for collocation production, yet it should be pointed out that the number of participants ($n = 4$) was far too small to warrant generalizations. Besides, the participants were highly motivated language learners and were not quite typical of Korean college students in general. Furthermore, as acknowledged by the author, completing the collocation task while thinking aloud may slow down task execution, neglect the non-reportable process or potentially distort the participants' cognitive processes. More authentic data would be collected if a non-intrusive method like screen recording were used.

Basal (2019) carried out an interesting experiment in which the experimental group behaved like novice lexicographers and were guided to create a collaborative online dictionary while learning adjective–noun collocations. By using concordances, the Oxford Online Dictionary, the World Wide Web and Google Docs, 53 EFL learners at a Turkey university were instructed to find from authentic texts the target collocations and appropriate example sentences. It was found that compared with the traditional group who learned the target collocations through exercises and teaching, the experimental group performed significantly better on both the immediate and the delayed posttests. The study confirmed the effectiveness of using online tools for learning collocations. It should be noted that the small number of participants in the experimental group ($N = 28$) limited the generalizability of the results. Nevertheless, the introduction of new technologies and online resources to collocation teaching can present new windows of opportunities for this challenging task.

Alzi'abi (2017) identified a non-significant relationship between training in dictionary use and collocation production performance. Among the 88 partici-

pants, only about 55% had received some kind of dictionary training. Data analysis indicated that basic prior training in dictionary usage did not make any positive impact on the participants' overall performance on verb–adverb collocation production. According to the researcher, the participants probably did not receive proper instructions on the best way to use dictionaries of any type, or they might have been taught how to utilize bilingual dictionaries or possibly paper dictionaries rather than electronic ones. Still, there might be another possible explanation, i.e. the form of the test may not be an effective indicator of dictionary use competence. The participants were asked to give three additional adverbs other than those in the dictionary. This does not directly concern their ability to use the dictionary. Instead, it is more related to their collocational knowledge.

4. The study

Inspired by Kim (2017, 2018), the present study also involved the instruction on collocation lookup skills, but the author took both product-based and process-based approaches, looking at both the performance of a collocation task as a result of dictionary use and the whole process of using the dictionary. Besides, Kim (2017, 2018) focused on the use of a collocation dictionary, which may not be applicable to EFL learners in China who seldom turn to collocation dictionaries but prefer to use general dictionaries for collocation searches. Therefore, the present author devised her own teaching approach based on the use of learners' dictionaries. Another noteworthy point is that, different from most previous studies reviewed in Section 3.2, the present study involved the learning process, i.e. all the participants were given the corrective feedback to the task and asked to rectify their original wrong answers on the test paper.

4.1 Research questions

The author seeks to address the following research questions:

- (1) Do different learning conditions bring about significantly different results of collocation gains? Which learning condition yields the highest retention scores? Here three conditions are involved, i.e. dictionary use with prior training, dictionary use without training and explicit collocation teaching.
- (2) What are the differences in the lookup behaviour between the participants who use the dictionary with prior instruction and those without?

4.2 Participants

The participants of the study were from three parallel classes at a Chinese university. They are the first-year English majors with at least six years of EFL

learning experience and similar linguistic and cultural backgrounds. As measured by one-way ANOVA, there is no significant difference in their score of National English Examination for University Entrance [$F(2, 87) = 1.308, p = 0.276 > 0.05$], indicating that the three classes are at a comparable level of English proficiency. An informal survey done by the author showed that none of the students had received any dictionary training back in high school, and that they had never used any online English monolingual learners' dictionary. Ninety students took part in all the three stages of the study, but two of them who knew three target collocations were sifted out, thus leaving 88 students for the final analysis.

4.3 Design of the collocation task

Target collocations

The study targets at V+N collocations which are difficult for EFL learners to acquire (Durrant and Schmitt 2010, Nesselhauf 2003, Boers et al. 2014). The target collocations were selected according to several criteria. The components of the collocations are high-frequency words which are familiar to the participants but the combinations are assumed to be new to them. The mutual information of each collocation is above 3 as checked through the BNC, which indicates that they are habitually co-occurring pairs. All the target collocations are transparent in meaning without distinctive register features and they are all covered by the dictionary used in the study. Originally, 15 V+N collocations had been chosen. After a brief survey administered to a parallel class of 30 students who had similar English proficiency to the participants of the study, five were ruled out, as they were familiar to some of the students. Thus, only ten collocations remained.

Task design

A collocation task was designed which was composed of ten sentences, each of which contained a V + N target collocation with the verb missing. The participants were asked to provide a verb to complete the target collocation according to its Chinese translation. Gap filling is a common form of learning exercise used in EFL classroom teaching in China. It is also one of the five sections included in the Test for English Majors (TEM, Band 4), a nation-wide test to measure English majors' language proficiency.

All the sentences were carefully modeled on the concordance lines in BNC or the example sentences from learners' dictionaries other than the dictionary used for the present study. They consisted of frequent words that are familiar to the participants and have a stand-alone context with the Chinese explanation of the target collocation to avoid ambiguity, e.g. *The tree ___ a small, bitter fruit.* (结果实) (see the appendix).

4.4 Dictionary used for the study

The dictionary used for the study was the fifth edition of *Longman Dictionary of Contemporary English* (LDOCE5) which can be accessed freely on <https://www.ldoceonline.com>. LDOCE5 presents collocation information in at least four ways. As displayed in Figure 1, collocation patterns are presented in bold in each sense of the headword above an example (or examples) like *pace of, at a steady/slow etc. pace*. Some collocations are integrated in bold into examples like *quicken one's pace, a walking pace* and *take a pace*. Some are treated as a multi-word subsense headword that can be retrieved through hyperlinks, such as *keep pace, set the pace, and force the pace*. In addition, a COLLOCATIONS box shows different types of collocations related to the entry headword, such as adjective–noun collocations, noun–noun collocations, verb–noun collocations and other phrases. Generally, LDOCE5 offers rich and easily accessible collocation information.

pace

From Longman Dictionary of Contemporary English

pace¹ /peɪs/ ●●○ **W3** noun 🗣️ 🔊

1 **SPEED OF EVENTS/CHANGES** [singular] the speed at which something happens or is done

pace of

🗣️ The pace of change in our lives is becoming faster and faster.

at a steady/slow etc pace

🗣️ Public spending continues to rise at a steady pace.

2 **WALK/RUN** [singular] the speed at which someone walks, runs, or moves

pace of

🗣️ You need to step up the pace of your exercises.

at a slow/leisurely/brisk etc pace

🗣️ Lucy set off at a leisurely pace back to the hotel.

🗣️ He quickened his pace, longing to be home.

🗣️ Traffic slowed to a walking pace.

3 **STEP** [countable] a single step when you are running or walking, or the distance you move in one step

pace backwards/towards/forwards etc

🗣️ He took a pace towards the door.

🗣️ Rebecca walked a few paces behind her mum.

4 → keep pace (with something/somebody)

5 → go through your paces

6 → put somebody/something through their paces

7 → set the pace

8 → force the pace

9 → be able to stand the pace

The screenshot shows the dictionary entry for 'Pace' in the LDOCE5. It is organized into two main sections: 'COLLOCATIONS' and 'VERBS'. Under 'COLLOCATIONS', there is a sub-section 'ADJECTIVES/NOUN + PACE' which lists: 'rapid/fast' (The rapid pace of change creates uncertainty.), 'slow' (The pace of life in the countryside is slower.), 'a steady pace' (The economy was growing at a slow but steady pace.), and 'at your own pace (=at the pace that suits you)' (This allows each child to learn at his or her own pace.). The 'VERBS' section lists: 'the pace quickens/accelerates' (The pace of change is quickening.), 'the pace slows/slackens' (After a surge in exports, the pace slackened considerably the following year.), 'gather pace (=happen more quickly)' (Support for the campaign is gathering pace.), 'keep up the pace (=continue to do something or happen as quickly as before)' (China's society is transforming but can it keep up the pace?), and 'keep up with the pace (=do something as fast as something else is happening or being done)' (It's essential that we constantly update our skills and keep up with the pace of change.).

Figure 1: Screenshots of *Pace* in *LDOCE5*

4.5 A five-step dictionary training session

To impart the basic skills and strategies needed for collocation searches, a dictionary training session was devised. Chen (2017, 2020) provided useful reference for the training design as the studies shared some similarities in research design to the present one in terms of participants (similar linguistic background and English proficiency level), the dictionary used for research (the same type of learners' dictionary in the electronic form), and the collocation task involved (the same type of collocation). Based on Chen's findings, the training focused on five steps of dictionary use for collocation production, i.e. **Decide — Search — Locate — Interpret — Use.**

Step 1: Decide

To look for collocation information in a learner's dictionary, the first step is to determine which keyword of a collocation to look up. Chen (2017) identified through log files that some learners tended to figure out the English equivalent to the Chinese verb and then look it up in the dictionary, an ineffective or even futile strategy also found by Chen (2020) through a retrospective questionnaire survey. Therefore, to begin with, the importance of the keyword determination strategy was stressed and the participants were trained how to choose an appropriate keyword for consultation. They were also reminded not to employ inefficient or even wrong strategies. For example, to search for a verbal collocate for *__ a ban* (撤销禁令), instead of using the English equivalent to 撤销 as an entry word, the participants should select the noun *ban* as the keyword to look up, as conventionally most learners' dictionaries list V+N collocations under the noun entry. Besides, there may be more than one English equivalent to a Chinese verb, and some may be semantically acceptable yet syntagmatically inappropriate to collocate with a certain noun. For instance, *cancel, annul, revoke* are all equivalent to 撤销, yet *cancel/annul/revoke a ban* are obviously unacceptable.

Step 2: Search

After the keyword is decided on, the second step is to enter its correct form in the search bar. The participants' attention was drawn to the fact that different from print dictionaries, electronic dictionaries may have different search routes. They were shown that in *LDOCE5*, inflected forms like singular and plural nouns may have different collocates, that the use of the article before a noun may or may not be useful for collocation searches, and that some collocations can be retrieved by inputting the whole collocation while others cannot. To increase the chances of success and to save time as well, a more desirable practice was to use the base form of the entry word, i.e. to drop all its affixes or the article. For instance, to complete *__ one's teeth* (长牙齿), a better suggestion was to use the singular form *tooth* instead of the plural form *teeth*. In the same manner, to fill in the blank in *____ a bet* (下赌注), *bet* would be a better option than *a bet*.

Step 3: Locate

The third step is to find where the target collocation is. Some headwords can be used in more than one word class, for example, as both a verb and a noun. The participants were instructed to locate the right entry quickly according to word classes. For instance, in *LDOCE5*, *bet* as a verb is explained first, followed by its noun entry. To search a verbal collocate for *____ a bet* (下赌注), the participants

were advised to skip the verb entry, scroll down the page quickly and get directly to the noun entry where the target collocate can be located.

Chen (2017, 2020) reported that learners tended to look at the first or the beginning part of an entry. They seldom used the hyperlink function of the dictionary for a further search and were apt to lose patience when reading lengthy entries. Those problems were taken into consideration during dictionary training in which the following major points were introduced to the participants. Firstly, read collocation patterns and sentence examples within the entry, especially words in bold, where target collocations may be presented. Secondly, do not ignore the hyperlink function of the dictionary, for some collocations are listed as subsense headwords with their meaning and usage hidden. For example, as shown in Figure 2, some collocations of *joke* are presented together with a hyperlink label. A click on the label will lead one instantly to the meaning and examples of the searched collocation. Thirdly, pay attention to the COLLOCATIONS box which contains various collocations about the headword. And fourthly, try to be patient during dictionary search, especially when reading a long entry.

joke¹ /dʒəʊk \$ dʒoʊk/ ●●● **S2** **W3** noun [countable] 🔊 🔊

1 something that you say or do to make people laugh, especially a funny story or trick
joke about

🔊 a joke about absent-minded professors
🔊 I couldn't go out with someone **for a joke**, could you?

2 → **be a joke**

3 → **go/get/be beyond a joke**

4 → **something is no joke**

5 → **somebody can take a joke**

6 → **make a joke (out) of something**

7 → **somebody's idea of a joke**

8 → **the joke's on somebody**

Figure 2: Screenshot of *joke*

Step 4: Interpret

After the desired target collocation is located, the next step is to interpret. Previous studies (Li and Xu 2015, Chen 2017, 2020) proved that dictionary users have difficulty in understanding the meaning of collocations, especially in distinguishing different collocations related to a same headword. Therefore, the participants were given the following advice. Firstly, learn to distinguish word senses within a polysemous entry. Take *drop a case* (撤销诉讼) for example. *Case* has several different senses, some of which have a signpost at the very beginning of each sense for users to capture its meaning, like EXAMPLE, SITUATION, REASON/ARGUMENT, LAW/CRIME, BOX/CONTAINER (see Figure 3). The participants were instructed to read all the signposts, compare different senses and choose the one which fits the given context in the sentence.

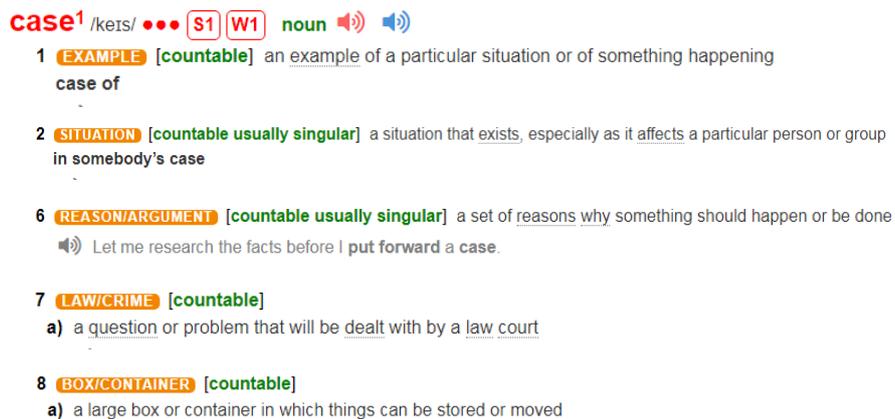


Figure 3: Screenshots of *case*

Secondly, pay close attention to the explanation and particularly the example that supports the meaning of a certain collocation. For instance, Figure 4 shows that more than five collocations are included in the COLLOCATIONS box of *nose*, all of which are different in meaning. The participants should read and compare these collocations carefully before deciding on which one to choose.

VERBS

blow your nose (=clear your nose by blowing strongly into a piece of soft paper or cloth)
She blew her nose on a large white handkerchief.

wipe your nose (=wipe liquid away from your nose)
The boy wiped his nose on his sleeve.

pick your nose (=remove substances from inside your nose with your finger)
Stop picking your nose, Freddy.

wrinkle your nose (=move the muscles near your nose when you do not like something)
Susan looked at the meal and wrinkled her nose.

hold your nose (=so that you cannot smell a bad smell)
The smell was so revolting that I had to hold my nose.

Figure 4: Screenshot of COLLOCATIONS box of *nose*

Thirdly, learn to distinguish between different collocations boxes. *LDOCE5* offers more than one COLLOCATIONS box for some headwords. For example, two boxes of COLLOCATIONS are presented, each for one sense of *perfume* (see Figure 5). The participants were guided to choose the box intended for the meaning that suits the given context.

COLLOCATIONS – Meaning 1: a liquid with a strong pleasant smell that women put on their skin or clothing to make themselves smell nice

VERBS

wear perfume
What's that perfume you are wearing?

dab perfume on something (=quickly put perfume on)
She dabbed some perfume on her throat.

COLLOCATIONS – Meaning 2: a sweet or pleasant smell

ADJECTIVES

sweet
She breathed in the sweet perfume of the roses.

Figure 5: Screenshots of *perfume*

Step 5: Use

When the desired collocates is identified, the last step is to use it in the context. The participants were trained to use the right form of the verb and make inflectional changes when necessary. For example, the sentence *The government has ____ a 10-year ban on arms sales to Africa* involves the present perfect tense, which means the verb here should be a past participle. Therefore, the right form is *lifted* instead of *lift*.

4.6 Procedure

The study was divided into three stages. In the first week, a preparatory session was given to all the three classes to acquaint them with the linguistic phenomenon of collocation including its definition, features and classification, along with a brief introduction of *LDOCE5* covering its website, search routes, features and functions.

The second week started with a pretest on the participants' prior knowledge about the target collocations. The pretest paper was the same as the one used in the condition treatment. The participants were asked to complete it without a dictionary or any other form of assistance. Then the three classes were assigned randomly to one of the following treatment conditions:

- (1) Dictionary use with prior instruction (Condition A): the participants received a fifteen-minute training session focusing on the five steps of dictionary use for collocation search, i.e. Decide — Search — Locate — Interpret — Use (see Section 4.5), and after that, they used *LDOCE5* to complete the collocation task.
- (2) Dictionary use without prior instruction (Condition B): the participants were asked to perform the collocation task with *LDOCE5* on their own.
- (3) Explicit collocation teaching (Condition C): the teacher listed each of the target collocations on the blackboard with its verbal collocates capitalized for visual salience, explained its meaning, illustrated the L1 and L2 congruency and gave example sentences which are different from the task sentence to support its use in a specific context. After that, the participants were asked to complete the task.

Students in Conditions A and B performed the task in a language lab equipped with computers, each of which was downloaded with a convenient access route to *LDOCE5*. *Screen Recording Expert V7.5* (<http://www.tlxsoft.com/index1.htm>) was preinstalled in the computers to record users' lookup behaviour, including what headwords they input, which part of dictionary information they focused on, whether or not they clicked on hyperlinks, and how long they spent on searching. Every shift of screen window, every move of the mouse and each step of dictionary search were captured in real time.

After completing the collocation task, all the participants received the corrective feedback to the task. They were asked to mark their corrections with colour pens so that their corrections can stand out against their original answers on the test paper before they handed it in. The marking of task performance was based on the original non-colour answers on the test paper.

An unexpected retention test was administered two weeks later. The participants were required to complete the same task again without any form of assistance. The retention test was the same as that in the previous stage except for the reshuffled order of sentences to avoid a carry-over effect.

4.7 Data analysis

Four kinds of data were collected: pretest score, task score before correction, retention test score, and each participant's screen recording (from Conditions A and B). The maximum test score is 10 points with one point for each correct response. Minor mistakes such as misspelling or a wrong use of verb tenses still merited one point. Screen recordings were scrutinized for the following data: 1) the time length of dictionary search, 2) the number of words searched, and more importantly 3) each step of dictionary lookup. Quantitative data were put into analysis using SPSS 20 and qualitative data were compared to identify the differences in dictionary consultation behaviour between the two dictionary classes.

5. Results and discussions

5.1 Effect of learning conditions on collocation retention

Table 1 shows that in the pretest, the students can only provide an average of 0.31 correct verbs for the ten target collocations. It can be seen from the raw data that only three out of 88 students were familiar with two target collocations and several others knew one. This is an expected finding as the target collocations were supposed to be unfamiliar to the students. The results of univariate GLM in Table 2 indicated that the students in the three conditions were not significantly different from each other in their prior knowledge about the target collocations [$F(2,85) = 0.946, p > 0.05$].

Table 1: Descriptive Statistics (Dependent Variable: pretest score) (Max = 10)

| Condition | Mean | Std. Deviation | N |
|-----------|------|----------------|----|
| A | 0.43 | 0.634 | 28 |
| B | 0.23 | 0.430 | 30 |
| C | 0.27 | 0.640 | 30 |
| Total | 0.31 | 0.575 | 88 |

Table 2: Tests of Between-Subjects Effects (Dependent Variable: pretest score)

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|-----------------|-------------------------|----|-------------|--------|-------|---------------------|
| Corrected Model | 0.625 ^a | 2 | 0.313 | 0.946 | 0.392 | 0.022 |
| Intercept | 8.422 | 1 | 8.422 | 25.484 | 0.000 | 0.231 |
| Condition | 0.625 | 2 | 0.313 | 0.946 | 0.392 | 0.022 |
| Error | 28.090 | 85 | 0.330 | | | |
| Total | 37.000 | 88 | | | | |
| Corrected Total | 28.716 | 87 | | | | |

a. R Squared = .022 (Adjusted R Squared = -.001)

The retention scores in the three conditions were also analyzed through univariate GLM. As displayed in Table 3, Condition A brought about the best retention score ($M = 6.43$), followed by Condition B ($M = 4.73$) and then Condition C ($M = 4.37$). A significant difference was identified in the mean scores of the three conditions with a medium effect size [$F(2, 85) = 4.417, p = 0.015 < 0.05, \eta^2 = 0.094$] (see Table 4). The results of Post-hoc tests (LSD) in Table 5 demonstrated that Condition A yielded significantly higher retention scores than Condition B ($p = 0.024 < 0.05$) and Condition C ($p = 0.006 < 0.05$) while Conditions B and C did not differ from each other substantially ($p = 0.614 > 0.05$). The plot in Figure 6 also showed that Condition A was more conducive to collocation retention than Conditions B and C.

Table 3: Descriptive Statistics (Dependent Variable: posttest score) (Max = 10)

| Condition | Mean | Std. Deviation | N |
|-----------|------|----------------|----|
| A | 6.43 | 2.873 | 28 |
| B | 4.73 | 2.559 | 30 |
| C | 4.37 | 2.965 | 30 |
| Total | 5.15 | 2.911 | 88 |

Table 4: Tests of Between-Subjects Effects (Dependent Variable: posttest score)

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|-----------------|-------------------------|----|-------------|---------|-------|---------------------|
| Corrected Model | 69.389 ^a | 2 | 34.695 | 4.417 | 0.015 | 0.094 |
| Intercept | 2355.287 | 1 | 2355.287 | 299.839 | 0.000 | 0.779 |
| Condition | 69.389 | 2 | 34.695 | 4.417 | 0.015 | 0.094 |
| Error | 667.690 | 85 | 7.855 | | | |
| Total | 3069.000 | 88 | | | | |
| Corrected Total | 737.080 | 87 | | | | |

a. R Squared = .094 (Adjusted R Squared = .073)

Table 5: Multiple Comparisons (Dependent Variable: posttest score)

| (I) Condition | (J) Condition | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|------------------|------------------|--------------------------|------------|-------|-------------------------|-------------|
| | | | | | Lower Bound | Upper Bound |
| A | B | 1.70* | 0.736 | 0.024 | 0.23 | 3.16 |
| | C | 2.06* | 0.736 | 0.006 | 0.60 | 3.53 |
| B | A | -1.70* | 0.736 | 0.024 | -3.16 | -0.23 |
| | C | 0.37 | 0.724 | 0.614 | -1.07 | 1.81 |
| C | A | -2.06* | 0.736 | 0.006 | -3.53 | -.60 |
| | B | -0.37 | 0.724 | 0.614 | -1.81 | 1.07 |

Based on observed means.

The error term is Mean Square (Error) = 7.855. *. The mean difference is significant at the .05 level.

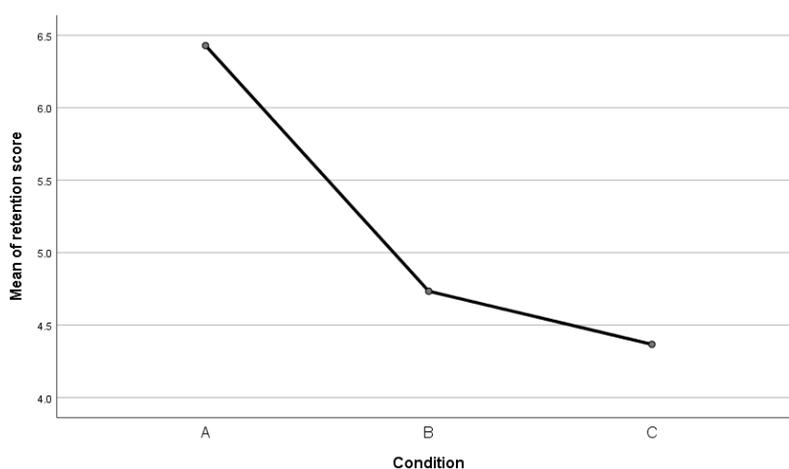


Figure 6: A plot of means of retention scores

The study reveals that learning conditions exert a significant effect on collocation gains. The students who had been trained on dictionary use achieved the best collocation retention. As will be explained in Section 5.2, compared with the students who used the dictionary without prior training, students who received training were equipped with better lookup skills and more effective strategies. They searched more words, decided on the right lookup word, read information more carefully and were more aware of the hyperlink function, thus retrieving more correct verbs in the first place. Obviously, dictionary training proved to be effective as it helped to improve students' skills and facilitate the long-term retention of retrieved collocations. Compared with traditional collocation teaching in which students remained as passive receivers of

collocational knowledge, the use of a dictionary involved more cognitive efforts on the part of users, which might leave a deeper memory trace, thus better retention. Nevertheless, it should be noted that dictionary use without prior training did not bring about significantly better retention than the explicit teaching condition (see Table 5). As will be presented in Section 5.2, those students had limited dictionary skills and encountered many problems and difficulties during dictionary consultation. The inadequate competence in dictionary use apparently reduced the usefulness of the dictionary for collocation learning, which further points to the significance of dictionary use instruction.

Different from previous research which mostly examined the contribution of dictionaries to collocation comprehension, production and retention in incidental conditions, the present study involved the learning process, i.e. the students were given corrective feedback to the task and were asked to rectify their own answers with colour pens for the sake of visual salience. It turned out that the retention scores in the study were higher than those in most previous research. As displayed in Table 3, the retention rate of the two dictionary classes reached 64.3% and 47.3% respectively. Compared with Laufer's study (2011) in which the intermediate participants retained only about 1.5 new collocation against a total of 12 target collocations, Dziemianko's (2012) in which the electronic dictionary users recalled 28.7% of productive collocational knowledge, and Chen's (2017, 2020) which yielded a retention rate of 36.1% and 34.5% respectively, the present study produced more promising results. It can be hypothesized that dictionary use combined with learning activities can contribute more to collocation gains than dictionary use merely intended for task completion.

5.2 Differences in dictionary use between students with and without dictionary training

Each student's screen recording was scrutinized carefully and comparisons were made between the two conditions of dictionary use from the following aspects:

5.2.1 The success rate of task completion

The data for this part were collected from the test paper. An independent samples T-test was conducted to compare task scores from Conditions A and B. As Table 6 shows, the students in Condition A obtained an average of 6.21 correct verbs from the dictionary while those in Condition B made only 3.63 right responses to the ten target collocations. A significant difference was identified ($p < 0.001$). In other words, dictionary use with prior training yielded significantly better task performance than autonomous dictionary use.

Table 6: Independent Samples Test of Task Score (Max = 10)

| | Condition | N | Mean | Std. Deviation | Std. Error Mean | t | Sig.(2-tailed) |
|------------|-----------|----|------|----------------|-----------------|-------|----------------|
| Task score | A | 28 | 6.21 | 1.475 | 0.279 | 6.219 | 0.000 |
| | B | 30 | 3.63 | 1.671 | 0.305 | | |

5.2.2 The number of words looked up

The author identified the number of words searched by each student from their screen recordings. Table 7 indicates that the students in Condition A consulted 9.43 headwords on average whereas those in Condition B looked up an average of 7.63 words. The results of the independent sample T-test revealed a significant difference ($p = 0.002 < 0.005$), pointing to the fact that substantially more words were consulted in Condition A than in Condition B.

Table 7: Independent Samples Test of the Number of Lookup Words

| | Condition | N | Mean | Std. Deviation | Std. Error Mean | t | Sig.(2-tailed) |
|------------------------|-----------|----|------|----------------|-----------------|-------|----------------|
| Number of lookup words | A | 28 | 9.43 | 1.399 | 0.264 | 3.196 | 0.002 |
| | B | 30 | 7.63 | 2.646 | 0.483 | | |

5.2.3 The time length of dictionary consultation

Table 8 shows that the average time length of dictionary consultation was 13.82 minutes in Condition A and 12.57 minutes in Condition B. The results of an independent sample T-test revealed no significant difference between the two conditions ($p = 0.180 > 0.05$).

Table 8: Independent Samples Test of the Time Length of Lookup

| | Condition | N | Mean | Std. Deviation | Std. Error Mean | t | Sig.(2-tailed) |
|-----------------------|-----------|----|-------|----------------|-----------------|-------|----------------|
| Time length of lookup | A | 28 | 13.82 | 3.300 | 0.624 | 1.357 | 0.180 |
| | B | 30 | 12.57 | 3.739 | 0.683 | | |

5.2.4 Lookup skills and strategies

A. Deciding which keyword of a collocation to look up

The screen recordings demonstrated that some students in Condition B

adopted an "equivalent" strategy when making decisions on which keyword of a collocation to look up. For example, to complete the collocation *grant one's wish* (满足愿望), they chose to search *meet* or *satisfy*, which are English equivalents to 满足. Similarly, a few students entered *cancel* when they tried to fill up the collocation *drop the case* (撤销诉讼), taking *cancel* as an English equivalent to 撤销. Another problem is that some students searched part of a collocation or a whole collocation which they assumed to be correct, using *the time*, *the case*, *the queue*, **force strike*, **mind the time*, **recognize the time*, **pray a prayer* as lookup words instead of searching the noun in the collocation which is a more effective strategy. The case was much better in Condition A. The screen recordings showed that a majority of the students selected the noun in the collocation as the lookup word. Only two students searched *the time*, *the case*, probably due to their absent-mindedness during dictionary training.

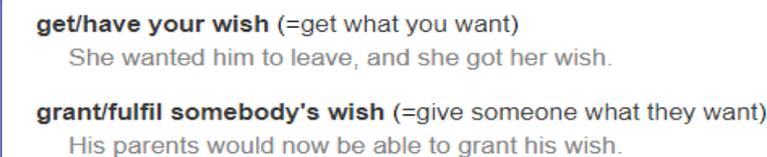
B. Locating the needed collocation information

As can be observed from screen recordings, the students in Condition B encountered many problems when they tried to locate the desired collocation information. In *LDOCE5*, headwords of different word classes are treated according to use frequency. For instance, *strike*, *fight* and *wish* are explained as a verb first, followed by a noun entry. Many students were unaware of the arrangement order of word classes and started by reading the whole long verb entry, only to find that the noun entry is far behind. And when they finally got to the noun entry, they had probably lost their patience, thus making a hasty choice. Confused by the design of dictionary information displays, some students spent unnecessarily long time reading irrelevant information such as **More Results** listed on the right of the screen which are intended to lead users to other information. Curiously, several students read the information in the Register box or even the Grammar box in the entry. Instead of paying close attention to the examples within the entry which may contain collocation information, many students chose to read **Examples From Corpus** presented at the end of the entry, which are just a pile of sentences from corpus without specific senses distinguished. Furthermore, a majority of the students did not click on the hyperlink label, either because they did not see the label at all or because they did not know that it would lead them to the information they may need. Another noticeable problem is that the longer entry the dictionary offers, the less chances of success in retrieving the correct information.

Fortunately, these above-mentioned problems are much less found in Condition A. Most of the students chose to skip the verb entry and came directly to the noun entry, which saved them a lot of time and energy. They were aware of the hyperlink function of the dictionary and, with a couple of exceptions, did click on the label. Nevertheless, these students also had trouble with long entries. The screen recordings showed that quite a few students missed the correct information when faced with a lengthy entry.

C. Interpreting the collocation information

Interestingly, the students in both conditions of dictionary use experienced similar difficulties in interpreting and distinguishing meanings. Many were confused by the seemingly synonymous collocations and failed to choose the right one for the given context. The following pairs of collocations caused high error rates in both conditions, i.e. *get/have ones' wish* vs. *grant/fulfill one's wish*, *have a fight* vs. *pick a fight*, and *dismiss a case* vs. *drop a case*. To fill in the sentence *So far we have been unable to ___ her wish* (满足愿望), some students read the COLLOCATIONS box (see Figure 7) and chose *get one's wish* (实现愿望) instead of *grant/fulfil one's wish* (满足愿望), probably because they failed to notice the difference in the subject when the two verbs *get* and *grant* are used.

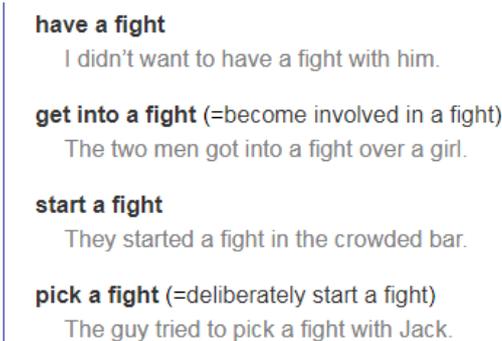


get/have your wish (=get what you want)
She wanted him to leave, and she got her wish.

grant/fulfil somebody's wish (=give someone what they want)
His parents would now be able to grant his wish.

Figure 7: Screenshot of the COLLOCATION box of *wish*

In the sentence *He tried to ___ a fight with me* (挑衅打架), the Chinese translation clearly states that the fight is deliberately started, but many students still used *have a fight* (打架). It can be seen from Figure 8 that the four collocations, *have a fight*, *get into a fight*, *start a fight* and *pick a fight* are synonymous in some degree. It is easy for users to get confused if they do not read carefully.



have a fight
I didn't want to have a fight with him.

get into a fight (=become involved in a fight)
The two men got into a fight over a girl.

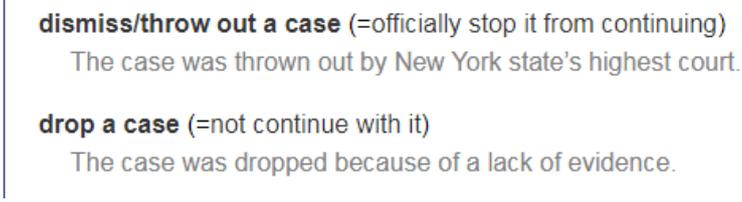
start a fight
They started a fight in the crowded bar.

pick a fight (=deliberately start a fight)
The guy tried to pick a fight with Jack.

Figure 8: Screenshot of the COLLOCATIONS box of *fight*

Likewise, many students were unable to distinguish *dismiss a case* (驳回、撤销诉讼) from *drop a case* (撤销、撤回诉讼). Figure 9 demonstrates that the difference

between those two collocations lies in one key word, i.e. *officially*. Both the explanation and the sentence example indicate that *dismiss a case* should be an action taken by a court or other authority instead of by an individual. The sentence *The lawyer advised him to ___ the case since he stands little chance to win* (撤销诉讼) shows that the action is performed by an individual, so the right answer should be *drop a case* rather than *dismiss a case* which was used by many students. It would be more helpful for users to choose the right collocation if the dictionary provided a more explicit example to support the use of *drop a case*.



dismiss/throw out a case (=officially stop it from continuing)
The case was thrown out by New York state's highest court.

drop a case (=not continue with it)
The case was dropped because of a lack of evidence.

Figure 9: Screenshot of the COLLOCATIONS box of *case*

In a nutshell, the difficulties in distinguishing between different collocations resulted either from the carelessness or the limited lexical/grammatical knowledge on the part of users or from the insufficient examples given by the dictionary.

D. Other issues

The screen recordings revealed some other issues which are mostly concerned with the attitude towards dictionary use. The students in Condition B were more inefficient in dictionary use. One typical example is that a student spent more than five minutes reading the entry of *time*, moving the mouse up and down repeatedly over the entry, but eventually failed to locate the target collocation. Many students were also not patient enough during dictionary consultation. For example, the COLLOCATIONS box of *strike* contains many collocations related to the headword, such as *go on a strike*, *begin a strike*, *call a strike*, *stage a strike*, *end/call off a strike*, and the target collocation *break a strike* is given at the end of the box. Many students did read the box, but they did not scroll down to the end of the box, thus missing the target collocation. It was also found that a couple of students consulted the dictionary for only three headwords out of the ten target ones, either out of laziness or self-confidence that they knew the target collocations so it was unnecessary to use the dictionary.

Comparatively speaking, the students in Condition A took a more conscientious approach to dictionary use during the task. Many were found to read the same entry information more than once until they located the desired in-

formation. They also searched more headwords. Four students even took notes and wrote down the dictionary information on the test paper. Nevertheless, quite a few students were still not attentive enough. Sometimes they read repeatedly over the entry but still failed to identify the correct information. The students' task scores showed that none of the students retrieved all the right verbs for the ten target collocations. Given that all the target collocations are covered by the dictionary and that they had been trained how to search a collocation, a success rate of 62.1% is still not satisfactory enough. Being careless may be one of the reasons. Obviously, it takes time to develop good habits of dictionary use.

6. Conclusion

By engaging students in collocation learning under different conditions, the study identifies a significant effect of learning conditions on collocation gains. Dictionary use with prior training yielded better collocation retention than dictionary use without training and explicit collocation teaching. The task-based dictionary use instruction proves to be viable and effective. Compared with those who used the dictionary autonomously, the students with prior training were more skillful and employed more effective strategies concerning the selection of lookup words and the location and identification of collocation information. Being more careful, patient and involved in dictionary consultation, they had a higher success rate of task completion and achieved better collocation retention. In addition to proving the effectiveness of dictionary training for the improvement of users' skills and collocation retention, the study also demonstrates how to devise and perform a five-step procedure of task-based dictionary use instruction.

It is no easy job to help language learners grow into proficient and competent dictionary users. A well-designed task-based training session in dictionary use can help learners to develop practical skills, adopt effective strategies and modify their lookup behaviour, but a single training session is far from enough. As evidenced by the study, the students who were taught how to use *LDOCE5* still had difficulties in dealing with long entries and distinguishing between different collocations. Some were still too careless to notice easily retrievable information. To grow into ideal dictionary users, EFL learners should receive systematic and comprehensive dictionary use instruction. To this end, teacher training has become necessary and important. To educate EFL learners on dictionary use, EFL teachers should be confident about their own dictionary use skills and familiar with teaching content and methodology. An in-service training course in dictionary use offered by Bae (2015) and short-term workshops of teacher training proposed by Chi (2020) are worthwhile endeavors to equip EFL teachers with "lexicographical knowledge and teaching methodology to ensure they are well-equipped to design dictionary use learn-

ing activities suitable for their students" (Chi 2020: 92). Still, more efforts should be made to explore and experiment in this field.

Based on the study, some suggestions are made to improve the design of the online version of *LDOCE5*. When it comes to information displays of polysemous headwords with more than one word class, it is advisable to make use of the hyperlink function, making the entries of each word class available upon a mouse click and concealing entries of other word class, so that dictionary users can directly get to the target entry. Since long entries pose problems for many dictionary users, such a treatment can reduce distraction from other unrelated information and improve the success rate of information retrieval. The design of search routes should be more user-friendly. In *LDOCE5*, some collocations can be searched by typing in the whole collocation while others cannot. It would be time and effort-saving if all the collocations presented in the COLLOCATIONS box were made retrievable via inputting the whole collocation in the search bar. Sometimes users may need to confirm the existence or the use of certain collocations. A same search route should also be applicable to all cases of search, as in *LDOCE5* the use of *a/an* and *the* plus a noun may lead one to the target information only in some cases. In addition, to help users better understand and distinguish between collocations, all collocations in the box should be given an explanation and supported with more typical examples. Furthermore, as revealed by previous research (Li and Xu 2015, Chen 2017, 2020) and confirmed by the present study, many users tend to ignore the use of hyperlink function of e-dictionaries, so it would be more desirable if the hyperlink labels in *LDOCE 5* were highlighted for visual salience. The colour and font of collocations in example sentences should also be more eye-catching, so that users will not miss them easily. As suggested by Diemand-Yauman et al (2011: 111), superficial changes to learning materials could yield significant improvements in educational outcomes. This may also apply to dictionary use. Dziemianko (2015) proved that functional labels in colour significantly increased the speed and effectiveness of online dictionary search and enhanced short-term retention. It is believed that judicious use of colour and font or other highlighting methods in the dictionary interface design will benefit users of e-dictionaries.

It should be acknowledged that the study has a number of limitations. Due to time constraints in the classroom, the task only involved ten target collocations. The results would be more convincing if a bigger sample size of data were collected. Besides, the study did not consider the influence on collocation extraction of such factors as the type of target collocations, the sentences used, the differences in entry length or the positioning of collocations within entries. In addition, the study employed a screen recorder to keep track of how each student consulted the dictionary. This method can provide authentic data about every input of searched words, every move or click of the mouse and every step of dictionary consultation, yet more insights would be obtained if it were combined with other methods like retrospective interviews. Furthermore, the comparisons were made between the students with and without dictionary

training. If the same group of students were compared before and after they received dictionary use instruction, more would be revealed about how they improved their skills and modified their consultation behaviour.

As a worthwhile research area, dictionary use instruction should receive more attention from both lexicographic researchers and EFL teachers. Future research can focus on the integration of dictionary training with language learning, the scientific design of learning tasks to practice dictionary consultation, or the optimization of the content and methodology of dictionary use instruction. It may also be interesting to explore the long-term effects of dictionary training on user's overall language development. And it should be noted that with e-dictionaries gaining popularity, the dictionary use instruction should be based on the consultation habits and reference needs of e-dictionary users.

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Appendix

A Collocation Task

Directions: Each of the following sentences contains a V + N collocation. Please provide an appropriate verb to complete the target collocation according to the Chinese translation given in the brackets.

1. When people are lining up in a shop, it is impolite to try to _____ **the queue**. (插队, 加塞儿)
2. Her youngest daughter has just learned to _____ **the time**. (识钟表, 看钟表)
3. The government has threatened to bring in the army to _____ the 10-month-old **strike**. (迫使罢工结束)
4. She _____ **a prayer** for their safe return. (祈祷)
5. He tried to _____ **a fight** with me. (挑衅打架)
6. So far we have been unable to _____ her **wish**. (满足愿望)
7. The tree _____ a small, bitter **fruit**. (结果实)
8. What he wanted me to do was to _____ him a big **cheque**. (开支票)
9. The lawyer advised him to _____ **the case** since he stands little chance to win. (撤销诉讼)
10. Look at the colour of you! You really _____ **the sun**, didn't you? (被晒黑)