

Innovations in classroom concordancing

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Abstract

This paper outlines a number of innovations in classroom concordancing that have been developed in the Faculty of Science and Technology at Kwansei Gakuin University to assist undergraduates with their learning of language for academic writing. A pilot project implementing one of these innovations is also reported. The project aims to examine the effectiveness of the classroom concordancing technique implemented through a quasi-experimental design. The pilot project is evaluated in terms of the refinements required for more extensive research.

Introduction

A growing number of studies into the effects of data driven learning (DDL) with lower proficiency students shows that DDL can improve lexis and grammar learning (Chujo, Anthony, Oghigian & Uchibori, 2012). Boulton (2010) demonstrated that lexis treated under DDL led to greater immediate gains than other treatments. Furthermore, student feedback in these studies showed that students' attitude towards DDL was positive. Following Johns (1986), most studies present learners with concordance lines, which are extracted from corpora, and a lexico-grammatical problem to solve. Lexical inference and pattern recognition, in which learners must apply a pattern in the concordance lines in order to write a sentence accurately (Gabrielatos, 2005) are common DDL problems. The problem solving involves learners reading concordance lines outwards from the centre and vertically (Chambers, 2010), a process which has been described as "the learner as researcher" (Bernadini, 2004; Johns, 1986), "the learner as detective", and "everyone a Sherlock Holmes" (Johns, 1997). In other words, DDL is considered to be learner centred and inductive, since the learners are involved in discovering patterns for themselves.

However, there are a number of criticisms to DDL. Firstly, feedback from learners has highlighted its laborious, time consuming and sometimes overwhelming nature (Cheng, Warren & Xun-feng, 2003; Sun, 2000; Yoon & Hirvela, 2004). This no doubt impacts on the motivation of learners. While Bernadini (2002) has observed that advanced learners are more engaged when doing data driven learning, Kennedy & Miceli (2010) described an intermediate case study participant who became overwhelmed with corpus access.

Secondly, recent research has contrasted DDL with more traditional approaches to grammar learning, such as the use of dictionaries (Boulton, 2010), and found no significant long-term differences between the two approaches. Furthermore, DDL worksheets tend to focus on non-authentic language manipulation. Chujo et al. (2012, p.142) acknowledge that lessons purely focused on grammar can be at odds with sustaining learners' motivation to produce language communicatively. In the Japanese context, the low motivation of non-English majors learning English at tertiary level is well known (Ryan, 2009), and science and engineering students in particular are believed to have poor classroom experiences (Apple, Falout & Hill, 2013). This begs the question of the utility of DDL in this content.

Finally, Johansson (2009) describes deductive uses of DDL, suggesting that DDL is not inherently inductive. There has been little investigation into how learners actually engage with inductive or deductive DDL problem solving exercises. Estling Vannestål and Lindquist (2007) noted that peer teaching led to increased motivation and participation, and Pérez-Parades, Sánchez-Tornel, Alcaraz Calero and Jiménez (2011) explored learner cognition by tracking learners' search terms in a corpus access activity. However, no research has examined how problem solving strategies differ between traditional approaches and DDL.

Innovations within the Faculty of Science and Technology

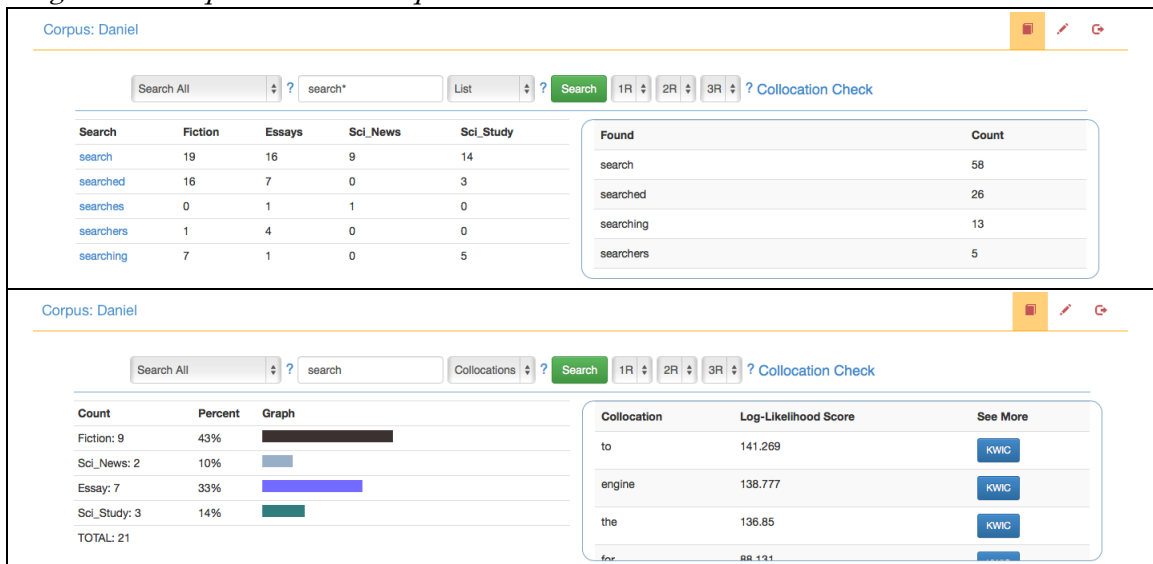
The following outlines some of the data driven learning developments which have taken place within the faculty.

Pedagogical Corpus

A pedagogical corpus (Willis, 1998) of texts which students are required to use during their undergraduate years and other similar texts was compiled. The resulting corpus was approximately half a million words. A simple web-based interface was also developed to allow multiple users within the faculty to search the corpus and retrieve concordance data, which provided an affordance for materials creation and hands on concordancing activities. The snapshots in Figure

1 show the web-based interface. The interface allows not only for concordance data retrieval, but also for numerical lists of data which allows the comparison of distributions of similar words within the corpus. It also has a collocation search which returns collocates of any search term, calculated by a log-likelihood score. This tool formed the basis of data driven learning materials and curriculum development.

Figure 1: Snapshot of the corpus interface.



Educational Developments

Materials and activities were developed while keeping in mind the relatively low level and motivation of the students within the faculty. Furthermore, the design of materials and activities took a view of learning not simply as didactic instruction, but one in which the learner plays an active role in understanding the complex systems of language, and which follows the spirit of data driven learning. An essential ingredient was exploration and problem solving through interaction. Interaction allows students to pool their cognitive resources and scaffold each other's learning (Wertsch, 1998).

Exploration of language was carried out through hands on collocations searches. By carrying out these searches, students could collaboratively try to build a map of collocations. Figure 2 shows an example prepared by the teacher for demonstration purposes. This activity was planned as part of brainstorming in the preparation for writing an essay. Key words that represent the theme of the essay were brainstormed by the students and they then explored the collocations surrounding those key words and generated the map.

Figure 2: A demonstration collocation map.

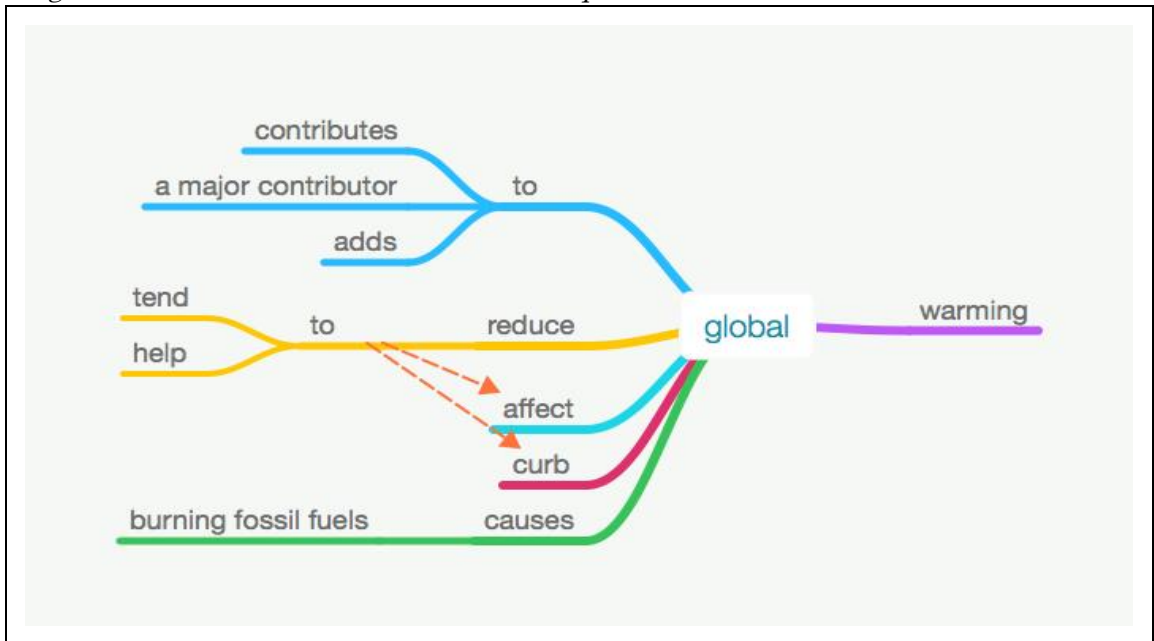


Figure 3: Example DDL paper based activity.

START 10 points

effect / effects

QUESTION 1: Translate
 Try to translate this phrase into English without a dictionary: (人)の感情に影響を与える

QUESTION 2: Skim the concordance lines and answer the questions below

effect			
1	the hobbies we do in our free time all have an	effect	on the world of business
2	the dust has an	effect	on all of us
3	the distance from the internet provider has an	effect	on the speed that you get data on your phone
4	carbon dioxide will have a negative	effect	on the temperature of the Earth
5	drinking coffee can have a positive	effect	on a person's mood
6	perhaps it's due to the terrible	effect	of the radioactive dust
7	we will also tell you about the health	effects	of dark chocolate
8	some people are worried about the harmful	effects	of information technology
9	Scientists are studying the long-term	effects	of alcohol on the brain
10	a lot of data has been collected about the	effects	of smoking.

i) There are five adjectives (形容詞) next to "effect".
 Write them in the box here.

ii) There are two patterns in the concordance lines. The first pattern has been written for you. Can you write the other pattern. Note that the () means its an option.

1. the + (adjective) + effect(s) + of
 2.

QUESTION 3: Paraphrase (言い換え). Read the following sentences. Try to paraphrase them with the word "effect". The first one has been done for you.

1. Scientists are trying to find out how caffeine influences your memory.
 2. Scientists are trying to find out **the effects of caffeine on** your memory. (1の言い換え)

3. Scientists believe that caffeine can influence your memory.
 4. (3の言い換え)

SCORE_____

Problem solving exercises involved translation, pattern hunting in concordance lines, and paraphrasing. The purpose of translation was to raise the students' awareness of the language focus. This was followed by a pattern hunting exercise during which students could have the accuracy of their translations confirmed. A paraphrase exercise then allowed students to apply their refined or new knowledge within a controlled context. During these exercises, students worked in teams and were required to suggest and discuss answers. To gamify the learning, the students were given points which they could use to bid on the accuracy of their answers. If they were accurate, they would be rewarded with double points. However, inaccurate answers resulted in lost bids. This technique allowed students to formatively assess their own work and provided the teacher a sense of where students lacked confidence in the process of data driven learning.

Figure 3 shows an example of one of the problem sheets which students worked on. The research reported here describes a pilot project that aimed to compare the DDL approach described here and a traditional approach to grammar learning with dictionaries by examining immediate gains in students' learning. More specifically, the research aimed to examine the problem solving strategies that the learners made salient through peer interaction. Sociocultural theory (Vygotsky, 1978; Wertsch, 1998) posits that thinking through interaction allows for a division of labour and a sharing of cognitive resources that can bring affordances to problem solving. This adds a new dimension to DDL research which, up to now, has mostly focused on learners interacting with materials instead of each other.

Two research questions were posed:

1. What are the differences in learning gains between DDL and traditional approaches to grammar learning in a gamified context?
2. What problem-solving strategies do learners make salient in interaction while solving grammar related problems?

Method

This study aimed to compare learning gains under two conditions, a traditional approach and a data driven learning approach to grammar. Items for the study were chosen from students' previous writing exercises, and so this study is situated as error correction and recycling of vocabulary and grammar with which students tend to have some familiarity but not full control.

Participants

Two classes of first year undergraduates took part in this study as part of their regular writing classes. In total 58 students across two classes (class A = 28 and class B = 30) participated. However, due to absences in some weeks, the final number of participants who completed all the tests was 49 (class A = 22 and class B = 27). All students had Japanese as their first language. The average score in a course entry TOEIC test was 495, standard deviation 100. The large variation is representative of the mixed levels within the classes. The lowest score was 275, the highest 740. According to information published by ETS (2013), this range covers two levels on the Common European Framework of Reference, A2 and B1, with 40 students at level A2 and 18 students at level B1.

Table 1: Examples of student errors in writing

Item	Example error
Hundred/hundreds	In my case, I pay four hundreds yen by going and returning every day.
Wonder/wondered	I wondered that how to carry such huge stones. I am wonder why did people at the time built it by
Trip	I trip England on this holiday.
Any	To improve my campus I have any ideas.
First	The first, I think the campus nee more access. In the first the transportation cost is surprisingly high.
Per	I will have to pay 1500 yen per a day. Now there is only one bus per an hour.
Almost	Almost of them are graduates of this university. Because almost lives are held in Tokyo.
Bored/boring	My daily life is bored because, I have nothing to do. I sometimes feel tired and boring but I like math and enjoy difficult math.
Agreed	We agreed each other about own hobbies. We agreed to plans are a good idea.
Cost	It is cost 12900yen, so I don't want to pay. It might be cost the government much money.

Language Items

Language items for treatment were taken from students' paragraph writing class in the previous semester. Topics included descriptions of campus life, a

report about a world heritage site and one science reporting paragraph. In total this provided 37,111 words. During assessment, common lexico-grammatical errors were noted and then double checked with the AntConc (Anthony, 2015) tool. Boulton's (2010) choices of items were decided in a similar manner. Table 1 shows the items that were chosen and examples of errors that students made.

Materials

Materials were designed specifically to highlight features of language which needed correcting. For each item, three guiding questions were posed (see Figure 3 above). In the traditional approach, the questions focused on translations, multiple choice gap fill and identification of errors. Students were directed to an online dictionary (www.alc.co.jp) commonly used during lessons. In the DDL approach, concordance lines were presented. Questions involved identification of lexico-grammatical relations, pattern matching, and identifying errors. Students were told to refer to the concordance lines to answer the questions. The materials shared the common goal of raising awareness of errors

Test Instruments

The pre-test consisted of 20 questions, 2 questions for each item. The questions were multiple choice gap fill questions in the style of TOEIC part V. The choices available contained examples of common errors. The test was administered in the second week of the course. Students were told that the questions were based on their common errors. They were also told that they would study these errors in the future. Two immediate post tests were constructed in a similar way, each consisting of 10 questions, 2 questions per item. The questions were different between pre and post tests.

Audio recordings were taken during peer interaction for one of the items. Students spoke to each other using the language laboratory microphones and headsets. The students used this system regularly in their communication classes, so they were familiar with the recording process, and it did not interfere with the grammar activities. However, even though the students were told they could speak Japanese to solve the problems, when using the headphones, most students reverted to English. This was their default behaviour when recording conversations in communication class, and it may have limited the range of problem solving strategies available to them.

Procedure

The pre-test was implemented during the second week of the semester. Two lessons in the tenth and eleventh weeks of the semester focused entirely on

studying the items. The ten items were split into two sets of five. In the tenth week, class A studied the first set under the traditional approach and class B studied the first set under the DDL approach. The following week, class A studied the second set under the DDL approach and class B studied the second set under the traditional approach. The post-tests were implemented towards the end of each lesson, and were the same for both groups of students.

In both the traditional and DDL based approaches, the lesson procedure was the same. A test-teach-test (TTT) paradigm was employed. The first “test” was the main bulk of the lesson. During this phase, students worked in pairs to solve three awareness raising questions, presented to the class on a projector. To gamify the test phase, students were given points to bid on each question. If their answers were incorrect, they would lose the points they bid. If their answers were correct, they would double the points they bid. This provided a motivating, game element to the problem solving. The three questions took approximately ten minutes to complete. Following this, the second “teach” phase allowed the teacher to provide answers and explanations. This process of test-teach was repeated for all five items. The third “test” phase implemented the post tests and provided students with immediate feedback. Table 2 shows the outline of the procedure.

Table 2: Step by step breakdown of the lesson

Classroom Procedure	Operationalisation
Step1: Test	Points based game, learners solved 3 questions related to a particular grammar or vocabulary point.
Step 2: Teach	Provide answers to the questions and explain grammar points where necessary.
REPEAT	Repeat steps 1 and 2 for four more items.
Step 3: Test	Post test of 5 items and feedback to students.

RESULTS

Test Results

Table 3 shows the change in mean scores between pre-test and post-tests for each condition. The relatively low scores on the pre-test are representative of the mixed levels within the class. The post test scores similarly show that learning had occurred among the lower proficiency students in the classes. A two-way ANOVA for repeated measures reveals a significant difference between the pre-test and post-tests ($F=203.4$) at the $p<0.0001$ level. This is not surprising given that the tests were administered immediately. The test effect is believed to be

negligible due to the large time gap between the pre-test and post-tests (Chujo et al, 2012).

Table 3: Pre and post test mean scores.

	DDL (max 10)	Traditional (max 10)	TOTAL (max 20)
Pre Test	4.71 (sd=2.16)	5.06 (sd=2.07)	9.77
Post Test	7.90 (sd=1.40)	8.12 (sd=1.89)	16.02
Difference	3.19	3.06	6.25
Change (percent)	67.7%	60.5%	64.0%

In order to compare gains between conditions accurately, it is important to verify the null hypothesis that there is no significant difference between the DDL pre-test mean and the traditional pre-test mean. To first check normality, a Shapiro-Wilk test at 95% confidence revealed that $W=0.96$ with $p=0.14$ for the traditional items, and $W=0.95$ with $p=0.03$ for the DDL items. If the Shapiro Wilk test shows significance, this means that the scores are not normally distributed. Here, the DDL pre-test scores are not normally distributed ($p<0.05$). Therefore, instead of a t-test to compare DDL and traditional pre-test scores, a Wilcoxon rank sum test with a continuity correction is applied. The null hypothesis that there is no difference in means between the DDL pre-test mean and the traditional pre-test mean is upheld ($p=0.369$).

A paired two-tailed t-test to compare gains in scores between pre- and post-tests revealed that $t=0.30$, $p=0.76$. Sample estimates of the mean gains are 3.18 for DDL and 3.06 for traditional methods. There is no significant difference in gains between the DDL and traditional methods.

Table 4: Gains for each item under a traditional approach

	Pre test	Post test	Difference	Gain
Hundred/hundreds	0.28	0.52	0.24	86.67%
Wonder/wondered	0.50	0.81	0.31	62.96%
Trip	0.52	0.81	0.30	57.14%
Any	0.69	0.91	0.22	32.43%
First	0.57	0.76	0.19	32.26%
Per	0.30	0.86	0.57	192.31%
Almost	0.48	0.66	0.18	38.10%
Bored/boring	0.64	0.86	0.23	35.71%
Agreed	0.61	0.80	0.18	29.63%
Cost	0.55	0.93	0.39	70.83%

Table 4 shows the number of correct answers in the pre- and post-tests under the traditional approach for each item. The scores have been normed to account for the different numbers of students in each group. The difference between the tests and the gain, as a percentage over the pre-test, is also presented. Table 5 shows the same results for the DDL items. Table 6 shows the comparison in gains between the traditional and the DDL items.

Table 5: Gains for each item under a DDL approach

	Pre test	Post test	Difference	Gain
Hundred/hundreds	0.25	0.48	0.23	90.91%
Wonder/wondered	0.34	0.93	0.59	173.33%
Trip	0.43	0.91	0.48	110.53%
Any	0.55	0.91	0.36	66.67%
First	0.61	0.89	0.27	44.44%
Per	0.30	0.87	0.57	193.75%
Almost	0.39	0.76	0.37	95.24%
Bored/boring	0.59	0.74	0.15	25.00%
Agreed	0.65	0.85	0.20	31.43%
Cost	0.70	0.87	0.17	23.68%

Table 6: Comparative advantage in gains for DDL

Advantage (Gain in Table 4 – Gain in Table 3)	
Hundred/hundreds	4.2%
Wonder/wondered	110.4%
Trip	53.4%
Any	34.2%
First	12.2%
Per	1.4%
Almost	57.1%
Bored/boring	-10.7%
Agreed	1.8%
Cost	-47.1%

Data from Recordings

Recordings for one item (trip) were transcribed and instances where students made problem solving strategies salient in the discourse were categorised and counted. Singular utterances that were not topicalised by the group and

subsequently died were not counted. Focusing on verbalised strategies provides comparative insight into the effect that the approaches have on how students solve the problems through peer collaboration. Table 7 summarises the analysis and provides examples of utterances in parentheses which helped define the category.

DISCUSSION

Overall, the scores improved significantly between the pre-test and the post-test under both conditions, and although the improvements were greater for the DDL items, there was no significant difference between the two conditions.

Examining the range of scores reveals a different story to those reported by Boulton (2010). In Boulton's study, the standard deviation was larger for DDL items in the post test than for traditional items, and to explain this Boulton indirectly suggests that certain learners might take to DDL more readily. However, in the study reported here, it can be seen that the variation is greater

Traditional		DDL	
Strategy	Count	Strategy	Count
Repeat the word key word. (“eh trip”)	11	Repeat the word key word. (“eh trip”)	9
Discuss the use of prepositions around the key word (eh? go TO trip go trip, go ON a trip dakke, go FOR a trip dakke)	14	Discuss the use of prepositions around key word (travel the moon, travel TO the moon)	3
Discuss surrounding content words (where is Memphis?)	17	Discuss surrounding words (have the or a; going on a trip)	20
Suggest a translation without use of key word	7		
Suggest a translation with use of key word	27		
Read the Japanese/English sentence	18	Read the concordance lines	15

Table 7. Verbalised Strategies used by students (examples in brackets)

Traditional		DDL	
Strategy	Count	Strategy	Count
Discuss form of key word (is trip a verb?, travel is maybe a noun)	17	Discuss form of key word (take a travelling; If you were travel? If you were travelling)	10
Suggest a new form for the key word (we often use “take a trip”; not trip, trips; travel is verb)	14	Suggest a new form for the key word (take a trip means travel; going on a trip is travelling)	18
Translate new form of key word from English to Japanese (take a trip means ryoko ni ikitai)	1		
Gather evidence (is family third person singular?; but you can say time travel)	2		
Read/Discuss the question (What is the problem - eh? PROBLEM?)	9	Read/Discuss the question (some words, some words?)	14
Skip a question and return later	5		

in the traditional items ($SD = 1.89$) compared with the DDL items ($SD = 1.40$). This raises the question as to what factors contributed to the difference. Furthermore, Boulton asks questions (p. 555) about the efficacy of DDL in terms of learners' preferences and the kind of training that teachers can offer. These questions can be partially explored by examining the strategies which students used.

Students generally employed a greater range of strategies for the traditional items than for the DDL items. This might be explained by the design of the materials. Translation exercises encouraged students to explore the accuracy of their suggestions. In particular, discussing the use of prepositions tended to raise questions about what preposition was correct (traditional: 14 times; DDL: 3 times). However, in most discussions with the traditional approach, students failed to reach a conclusive answer. In the DDL condition, discussions about prepositions were related only to identifying correct usage based on the evidence provided in

the concordance lines. No extended exploration beyond the presented concordance lines was necessary.

These results highlight two limitations to these activities. First, students did not take action to answer their own questions. In this respect, it may be necessary for teachers to demonstrate strategies for both recognising when they had a question, and taking steps to answer it. Asking questions is one of the defining features of DDL which the traditional design here encouraged and the DDL design did not. The observations reported here show that prepared concordance lines contain answers to questions about language which might not be congruent with questions that students have.

Another difference in discussions was related to the linguistic context surrounding the key word in example sentences and concordance lines. The discussion of linguistic context in the traditional design tended to focus on the meaning of unfamiliar words. In contrast to this, functional words in the surrounding linguistic context of concordance lines tended to be made salient. The DDL approach, then, did not encourage students to make surrounding words in concordances salient. Nonetheless, some students vocalised their reading of the concordance lines, implying that they engaged in condensed reading to a certain extent. Condensed reading is described by Gabriellatos (2005) as a reading strategy on the scale between extensive and intensive reading, and can contribute to incidental vocabulary acquisition. The traditional design, then, encouraged a more intensive exploration of a smaller range of vocabulary, whereas the DDL exercises encouraged shallow reading over a wider range of vocabulary, and prompted students to ask questions about functional words.

Finally, the design of the DDL materials were such that students were able to immediately focus on the specific errors that would be tested in the post test, whereas the errors were much less salient in the traditional approach. This is reflected in the data as students skipped back and forth between questions in the traditional approach, a strategy which did not occur in the DDL design.

SUMMARY AND CONCLUSIONS

This study sought to explore the differences in learning between traditional and DDL approaches to correcting common errors in gamified lessons with mixed level science and technology students. The results showed significant gains under both approaches, but no significant difference between the two approaches. Furthermore, as a pilot study, the results have to be interpreted within an imperfect experimental design. In fact, the discussion above reflexively serves as criticism of the differences in design of the traditional and DDL approaches.

The traditional approach, operationalised through translation, error identification exercises and the use of dictionaries, encouraged students to explore language more deeply and encouraged a more organic approach to language exploration. However, students often failed to capitalise on their own questions. The activities within the DDL approach, operationalised through the presentation of concordances, identifying and matching patterns, and error correction, provided salient focus on correct forms, but encouraged a linear path through the activities and seemed to restrict the intensive exploration of language.

One of the strengths of the study was the gamification of the lessons. The researcher observed that all students actively participated and motivation towards otherwise tedious grammar lessons seemed quite high, affording reliable results. Improvements can be made to the test procedures by including a delayed post test and correlating learners' strategies with success or failure on post test items. This line of research could prove fruitful in sifting out successful strategies for DDL that teachers could share with all students.

Another strength of the study was the analysis of learner strategies through classifying what learners made salient during peer interaction. However, in sociocultural theory, learners are known to scaffold each others' learning. By making strategies salient, students are probably helping each other enter their zones of proximal development. Discourse analysis of how zones of proximal development are constructed could provide more insight into how the process of negotiating problem solving strategies with peers leads to success on a delayed post test.

Finally, the design of the traditional and DDL approaches needs refining. Both are designed in terms of the type of materials presented to the learners (dictionary vs concordance lines) and the kinds of problem solving exercises given. In future, validity can be strengthened by keeping problem solving exercises the same between conditions, while retaining traditional and DDL paradigms through the modes of language input resources.

REFERENCES

- Apple, M. T., Falout, J., & Hill, G. (2013). Exploring classroom-based constructs of EFL motivation for science and engineering students in Japan. *Language learning motivation in Japan*, 54-74.
- Anthony, L. (2015). *AntConc* (Version 3.4.3)[Computer Software]. Tokyo, Japan: Waseda University.

- Bernadini, S. (2002). Serendipity expanded: exploring new directions for discovery learning. In B. Kettermann & G. Marko (eds.), *Teaching and Learning by Doing Corpus Analysis, 165-82*. Amsterdam: Rodopi.
- Bernardini, S. (2004). Corpora in the classroom: an overview and some reflections on future developments. In J. Sinclair (ed.), *How to use corpora in language teaching*, 15-36. Amsterdam: John Benjamins.
- Boulton, A. (2010). Data - driven learning: Taking the computer out of the equation. *Language Learning*, 60(3), 534-572.
- Chambers, A. (2010). What is data-driven learning? In A. O'Keefe & M. McCarthy (eds.), *The Routledge Handbook of Corpus Linguistics, 345-358*. New York, Routledge.
- Cheng, W., Warren, M., & Xun-Feng, X. (2003). The language learner as language researcher: Putting corpus linguistics on the timetable. *System*, 31(2), 173-186.
- Chujo, K., Anthony, L., Oghigian, K., & Uchibori, A. (2012). Paper-based, computer-based, and combined data-driven learning using a web-based concordancer. *Language Education in Asia*, 3(2), 132-145.
- Estling Vannestål, M. and Lindquist, H. (2007) Learning English grammar with a corpus: Experimenting with concordancing in a university grammar course. *ReCALL*, 19(3): 329–350.
- Gabrielatos, C. (2005). Corpora and language teaching: Just a fling, or wedding bells?. *TESL-EJ*, 8(4), 1-37.
- Johansson, S. (2009). Some thoughts on corpora and second-language acquisition. In K. Aijmer (ed.), *Corpora and Language Teaching, 33-44*. Amsterdam: John Benjamins.
- Johns, T. (1986). Micro-concord: A language learner's research tool. *System*, 14(2), 151-162.
- Johns, T. (1997). Contexts: The background, development and trialing of a concordance-based CALL program. In *Teaching and Language Corpora*, 100-115. London: Longman.
- Kennedy, C., & Miceli, T. (2010). Corpus-assisted creative writing: Introducing intermediate Italian learners to a corpus as a reference resource. *Language Learning & Technology*, 14(1), 28-44.
- Pérez-Paredes, P., Sánchez-Tornel, M., Alcaraz Calero, J. M., & Jiménez, P. A. (2011). Tracking learners' actual uses of corpora: guided vs non-guided corpus consultation. *Computer Assisted Language Learning*, 24(3), 233-253.
- Ryan, S. (2009). Self and identity in L2 motivation in Japan: The ideal L2 self and Japanese learners of English. In Z. Dornyei & E. Ushioda (eds.), *Motivation, language identity and the L2 self*, 120-143.

- Sun, Y. C. (2000). *Using on-line corpus to facilitate language learning*. Paper presented at the Annual Meeting of the Teachers of English to Speakers of Other Languages, British Columbia, Canada.
- Vygotsky, L. S. (1978). *Mind and society: The development of higher mental processes*. Cambridge, Massachusetts: Harvard University Press.
- Wertsch, J. V. (1998). *Mind As Action*. Oxford: Oxford University Press.
- Willis, J. (1998). Concordance in the classroom without a computer: Assembling and exploiting concordances of common words. In B. Tomlinson (ed.) *Materials Development in Language Teaching, 44-66*. Cambridge: Cambridge University Press.
- Yoon, H., & Hirvela, A. (2004). ESL student attitudes toward corpus use in L2 writing. *Journal of second language writing, 13*(4), 257-283.
- ETS. (2013). Mapping the TOEIC and TOEIC Bridge Tests on the Common European Framework of Reference for Languages. Retrieved from https://www.ets.org/s/toEIC/pdf/toEIC_cef_mapping_flyer.pdf