Research Article

Language Acquisition

Keywords: Data-driven learning (DDL), Mobile-assisted DDL, Computer-assisted DDL, CALL, MALL, Language learning, CorpusMate, Netspeak.

Computer-assisted DDL vs. Mobile-assisted DDL: Exploring EFL Learners' Preferences and Experiences with Two Corpus Interfaces

Emin Idrizi

Assistant Professor
International Balkan University, Skopje, North Macedonia

Abstract

Data-driven learning (DDL) has traditionally been studied via standard corpus interfaces, such as COCA, Sketch Engine, IntelliText, and other similar corpus tools. In addition, DDL has traditionally been seen as part of the computer-assisted language learning (CALL) approach, primarily because access to corpora and corpus interfaces has historically been limited to desktop computers. However, with the emergence of several simplified and mobile-friendly web corpus interfaces and with mobile assisted language learning (MALL) gaining momentum in language education, along with its potential in DDL, mobile-assisted DDL has become an alternative learning technique. This paper reports on a study carried out with a group of undergraduate EFL students studying at International Balkan University (IBU). In this study, the participants were given linguistic tasks to complete using new web corpus interfaces as reference tools, namely, CorpusMate and Netspeak. The first corpus interface was exploited via the traditional CALL approach, whereas the latter was utilized with mobile technology. The results of the study revealed positive learner perceptions and experiences with the newly introduced tools, while they also displayed enthusiasm and motivation to engage in DDL within the context of MALL. The present study provides valuable insights into students' perspectives and experiences with state-of-the-art corpus tools and mobile technology, which can help shape future paths for research in DDL and MALL.

1. INTRODUCTION

Since data-driven learning (DDL) was coined a term and introduced as a concept by Tim Johns in 1990, many studies have explored the effects and possible benefits of the use of computer corpora and corpus tools in the language teaching and learning process. Many studies, for example, have focused on investigating the effects of corpus use in teaching and learning language areas, such as vocabulary (e.g., Boulton & Cobb, 2017; Idrizi, 2018), whereas others have investigated the usefulness of corpus consultation in teaching and learning L2 writing (O'Sullivan & Chambers, 2006; Yoon, 2008; Gilmore, 2009; Mull, 2013; Luo & Liao; 2015). These studies, along with numerous others in various areas, have provided valuable insights into the nature and effectiveness of DDL.

Studies on DDL have shown various benefits and challenges associated with the technique in language learning settings. Mizumoto et al. (2016), for example, reported on numerous studies that suggest multiple positive outcomes of DDL for learners, which include extensive exposure to real-world language use, input enrichment from a variety of language contexts via concordance lines, increased awareness of foreign language forms and patterns, the use of inductive learning, the development of skills and communicative abilities, increased student motivation, the development of cognitive and metacognitive abilities, and the fostering of student-centered learning. Similarly, Yoon and Jo (2014) reported on thepositive impact of corpus use on students' improvement in linguistic and rhetorical skills in second language writing. Over the years, DDL-related studies have also identified obstacles when corpora are used for language teaching and learning. One of the impediments, for example, is teachers' and learners' training in corpus use

(see Gilquin & Granger, 2010). Insufficient training in the use of corpus software as well as in the interpretation of corpus output can challenge the effectiveness of DDL, whereas the time consumption required for effective training still remains a significant challenge (Crosthwaite, 2017).

As corpus studies continue to take place, some new developments and trends may give DDL new directions both in terms of research and its implementation in educational settings. One is the emergence of new simplified corpus tools or web interfaces designed with language teachers and learners in mind. In contrast to standard corpus interfaces, these tools typically have simple interfaces, easier search features, easy-to-interpret outputs, and are generally mobile-friendly. They are designed in a way that may overcome the issues mentioned earlier, such as the need for time-consuming teacher and learner training in corpus use. One example of such an interface is SKELL (Baisa & Suchomel, 2014), which stands for Sketch Engine for Language Learning and is a simplified version of the well-known Sketch Engine interface. The tool can help teachers and learners find simple examples, or simple concordance lines, for words and phrases used by native speakers, as well as find useful collocations and synonyms. Other simplified corpus interfaces include *Just-the-word*, *Linggle*, *Netspeak*, and *CorpusMate*, among others.

Another growing trend in education that may impact the direction of DDL in the future is mobile-assisted language learning (MALL). Stockwell (2016) asserts that while MALL is still a subject of continuous research and development, it has had enormous influence and will continue to transform language education. Mobile technologies provide unprecedented access to a limitless amount of resources and can offer valuable personalized and contextualized learning experiences for learners both in educational settings and beyond. MALL also has the potential to be combined with DDL, although the area still needs further exploration (Pérez-Paredes et al., 2019). This is especially true with the newly emerged mobile-friendly interfaces mentioned above. The ability of language learners to exploit corpus tools flexibly in and beyond classroom utilizing mobile technology can provide new opportunities for language teaching and learning.

Considering the new developments discussed above and the need for further research on integrating DDL into MALL, the purpose of the present study is as follows:

- To engage a group of undergraduate students or preservice language teachers in the use and exploration of two new corpus tools, namely, CorpusMate and Netspeak. The purpose is to explore their experiences and perceptions of both interfaces contrastively to identify preferred corpus features among learners.

- To examine students' experiences and opinions on the use of Netspeak within the context of mobile-assisted language learning (MALL) versus the use of CorpusMate within the traditional context of computer-assisted language learning (CALL). The main goal is to investigate learners' perspectives and feedback on the use of a corpus tool with mobile technology.

1.1 *CorpusMate* and *Netspeak* interfaces

Many corpus interfaces have emerged in recent decades that provide various linguistic search features, thus ensuring different language analyses; however, they have also been created primarily to serve a broader range of users. Some corpus interfaces, however, have been designed with language teachers and learners in mind. In this section, we briefly compare and contrast two such corpus interfaces, namely, *CorpusMate* and *Netspeak*, which are the tools used in the current study.

These corpus tools are designed to look simply and resemble standard search engines (*Figure 1*). Corpus interfaces usually use different corpus resources. *CorpusMate* uses almost 50000 documents taken from various resources, such as Elsevier, TED Talks, and simple English Wikipedia, to name just a few. The corpus falls into different topics, such as health and medicine, law, education, etc., while it also represents both written and spoken language as well as two registers, general and academic English. *Netspeak*, on the other hand, uses Google Books as a corpus to generate results on its interface.

Figure 1. Screenshot of CorpusMate interface (left) and Netspeak interface (right).

Both corpus interfaces provide lists of words and phrases in context. *CorpusMate* produces traditional concordance lines and typically generates up to 250 results, which can be expanded to 1000 concordance lines. The user can switch between a pattern view, which can help users find patterns, and an expanded view or a view with more context around the keyword. The user can also sort (alphabetically) the text on the right or left of the keyword for the purpose of finding patterns and collocates. In addition, the results can be filtered on the basis of topic (e.g., history, psychology), mode (spoken and written), and genre (general and academic). *Netspeak*, on the other hand, can also generate context for words or phrases that one searches. However, in contrast to *CorpusMate*, *Netspeak* only provides concordance lines in an expanded view, and the interface only displays several contexts, while it is on the user to expand the list of contexts for words if needed. Moreover, *Netspeak* does not provide the options that *CorpusMate* has in regard to, for instance, sorting text and using filters in searches. In fact, *Netspeak* is mostly designed to find patterns and perform other unique linguistic searches that will be discussed below rather than provide options to manipulate with concordance lines. Nevertheless, this does not mean that

Netspeak does not provide sufficient context for words; in fact, the interface has the option to expand each result into a Google Book view.

In addition to generating concordance lines and context for words, both interfaces have special features that produce unique linguistic data. *CorpusMate*, for example, has the option "compare results"; upon searching for the word *good*, the interface provides all possible forms of the word found in the corpus, that is, the comparative form *better* and the superlative *best* as well as their frequency of occurrence in percentages. Another interesting feature is the "pattern finder" option, which finds common patterns for words searched. For example, one of the most common patterns that *CorpusMate* suggests for the same keyword *good* is "to the *best* of our knowledge". Finally, the interface searches words from the perspective of the topics to which they belong. To illustrate, the results for the compound "mental health" show that the term is mostly used in psychology, health and medicine, and society.

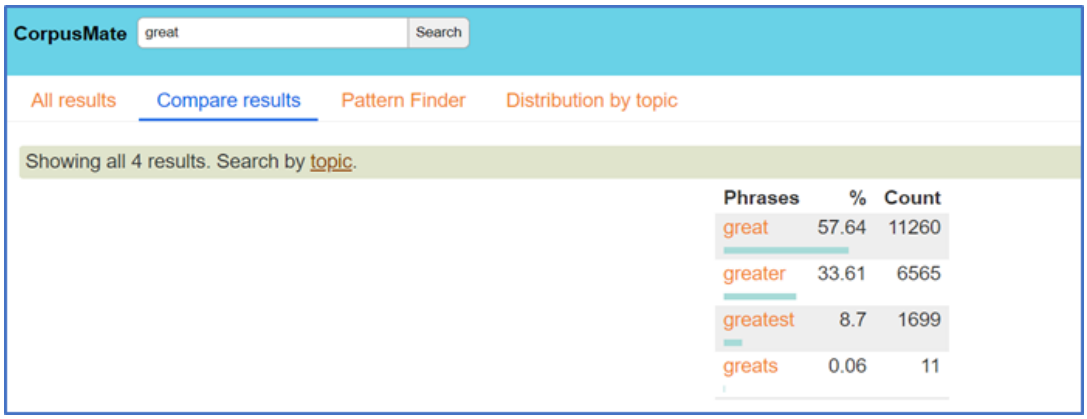

Figure 1. Screenshot of CorpusMate showing various forms of the word "great" and their frequency of occurrence in the corpus.

Despite the fact that *Netspeak* does provide context in an expanded view for words searched, the interface is not as resourceful as *CorpusMate* in terms of concordance lines and options to manipulate with them, such as sorting or filtering the searches in terms of genre. In fact, *Netspeak* is mostly designed to perform specific queries, and it is generally more straightforward in finding word patterns, collocates, missing words in phrases, etc., rather than having users find these from concordance lines, as *CorpusMate* does. In other words, *Netspeak* is mostly appropriate for an inductive approach to linguistic analysis. There are several unique linguistic searches that one can perform with *Netspeak*. For example, users can find missing words in phrases. If a question mark (?) is used in between words, *Netspeak* will find missing word(s). To illustrate, if "to be? honest" is typed in the search box on *Netspeak*, the interface identifies a range of possible words that can come in between this phrase, the most frequent being "to be perfectly honest", "to be quite honest", "to be completely honest", among others (see Figure 3 below). Users are free to use the question mark in every position (e.g., before a word) to identify frequent word cooccurrences or can use more question marks to find more than one word. An additional valuable feature is that the interface also provides the frequency of occurrence and percentages. Another

valuable feature is finding word collocation. For example, if *[quick fast] car* is typed and searched in *Netspeak*, the interface will identify the most common word that co-occurs with the word "car". The results show that *fast car* is more common in English. Another interesting and exclusive search we can perform on *Netspeak* is finding the common word order for a string of words. For example, if a string of words within curly brackets is inserted and searched, e.g., {am keen always}, the interface will show the correct and the common word order (i.e., am always keen) in English.

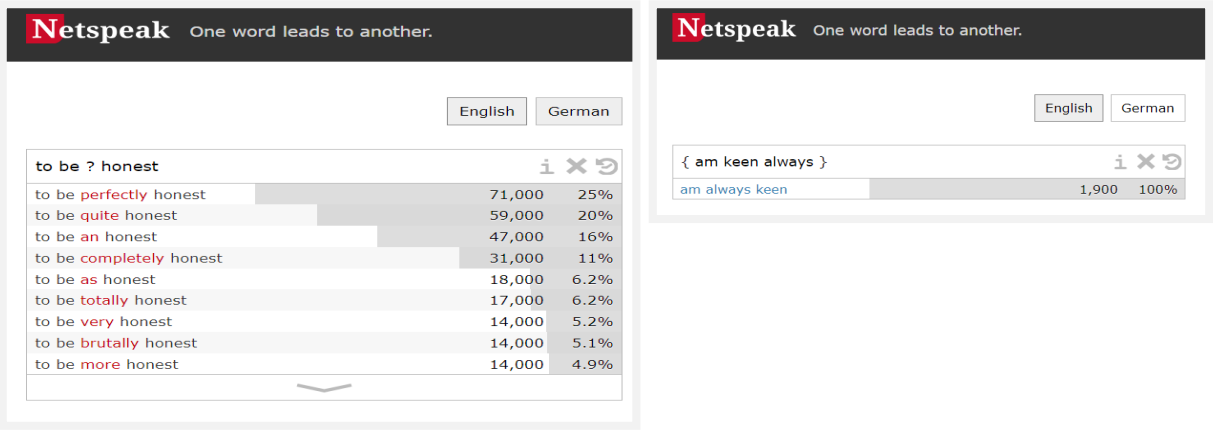

Figure 2. Screenshot of Netspeak showing sample results for missing word (left) and common word order (right) features.

Both *CorpusMate* and *Netspeak* are designed for desktop use but also offer mobile-friendly interfaces. However, *Netspeak* seems to provide a smoother and more practical mobile experience. This is because *Netspeak* upholds the same level of functionality when it is used via mobile technology compared with desktop use. On the other hand, *CorpusMate* users may encounter some limitations when they exploit the tool through mobile screens, particularly in regard to displaying and viewing concordance lines. The limited display space on mobile devices makes it difficult to see sufficient context for each concordance line, hindering effective analysis. Nevertheless, other functions of *CorpusMate*, such as pattern finder, comparison of results, etc., are completely mobile-friendly.

The two corpus interfaces discussed in this section provide engaging linguistic searches for language teachers and learners. Like other similar available interfaces online, each interface has advantages and disadvantages because no corpus interface can be considered a one-size-fits-all tool. However, by exploring the features of these interfaces from the perspective of teachers and learners, we can gain valuable insights into how practical, efficient, and beneficial these reference/learning tools are. This is precisely what the present study aimed to achieve.

2. METHODOLOGY

The current study used a survey research design, while a questionnaire was utilized as a research instrument. The questionnaire was administered via Google Forms and consisted of nine closed-ended items and four open-ended questions. Both quantitative and qualitative approaches were used to analyze the data.

The participants included a total of nineteen 3rd-year and 4th-year undergraduate students studying at the Department of English Language Teaching at International Balkan University in North Macedonia. The program is designed to equip students with English language skills as well as with knowledge and practical skills in EFL methodology to prepare them to become English language teachers in local public and private schools. In other words, the participants were considered both EFL learners and preservice teachers in the present study.

The participants were given the opportunity to use two corpus interfaces, namely, *CorpusMate* and *Netspeak*, in two one-and-a-half-hour consecutive sessions. In the first meeting, the students were initially familiarized with *CorpusMate* and its features via the CALL approach. Afterwards, they were given some language tasks to complete, which included exploring words in context with the help of concordance lines; finding word patterns; discovering collocations for words; and looking at words and phrases from the perspective of topics and genres to which they belong.

The second session followed the same procedures; specifically, the participants initially underwent short training on the use of *Netspeak* and its main features, after which some tasks were administered. Through these tasks, the students were able to use the interface further, such as identifying the missing word, looking at the use of words statistically, identifying the most common word (collocations), and word order, among others. *Netspeak*, by contrast, was exploited within the context of MALL.

Finally, the participants were administered the questionnaire, in which they provided their perspectives and reported their experience with the corpus tools and mobile-assisted DDL. The questionnaire link was sent to the participants via email, while it was filled out at their convenience. The data from the questionnaire were finally exported and partially analyzed with SPSS.

3. RESULTS

In this section, the results are analyzed via both quantitative and qualitative approaches. The data from the closed-ended items were analyzed statistically via descriptive statistics generated via SPSS, whereas the responses to the open-ended items were subjected to qualitative analysis.

The participants were asked to rate both the *CorpusMate* and *Netspeak* corpus interfaces on a scale from 1-5. As *Table 1* below indicates, the participants rated both interfaces highly, with mean scores of 4.00 and 4.37, respectively. Although the differences in ratings are slight, it is clear that students preferred *Netspeak* over *CorpusMate*.

Table 1
Student ratings of CorpusMate and Netspeak

Statistics

		Students' rating of CORPUSMATE as a reference tool to investigate language	Students' rating of NETSPEAK as a reference tool to explore language
N	Valid	19	19
	Missing	0	0
Mean		4.00	4.37
Range		3	2
Minimum		2	3
Maximum		5	5

Students' rating of CORPUSMATE as a reference tool to explore language

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	5.3	5.3	5.3
	3	3	15.8	15.8	21.1
	4	10	52.6	52.6	73.7
	5	5	26.3	26.3	100.0
	Total	19	100.0	100.0	

Students' rating of NETSPEAK as a reference tool to explore language

		Frequency	Percent	Valid Percent	Cumulative Percent
alid	3	3	15.8	15.8	15.8
	4	6	31.6	31.6	47.4
	5	10	52.6	52.6	100.0
	Total	19	100.0	100.0	

The responses varied when asked which corpus tool they found more resourceful. As the statistics below show, the majority, that is, just over half of the respondents, believe that both interfaces are equally resourceful. The rest of the responses are equally split between *CorpusMate* and *Netspeak* (i.e., each at 21%).

With respect to which tool was found to be more practical and user friendly, however, the figures show rather different results compared with previous statistics. The majority of participants, that is, 44.4%, consider *Netspeak* to be handier and easier to use, whereas roughly one-third of the participants thought that both corpus tools were easy to use.

Table 2
The most resourceful and user-friendly tool in participants' opinions

Statistics

		Which tool is more resourceful according to the participants?	Which tool is more practical and user-friendly according to the participants?
N	Valid	19	18
	Missing	0	1
Mean		2.37	2.22
Range		2	2
Minimum		1	1
Maximum		3	3

The more resourceful corpus tool according to the participants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	CorpusMate	4	21.1	21.1	21.1
	Netspeak	4	21.1	21.1	42.1
	Both	11	57.9	57.9	100.0
	Total	19	100.0	100.0	

The more practical and user-friendly corpustool according to the participants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	CorpusMate	3	15.8	16.7	16.7
	Netspeak	8	42.1	44.4	61.1
	Both	7	36.8	38.9	100.0
	Total	18	94.7	100.0	
Missing	System	1	5.3		
Total		19	100.0		

The participants were asked to provide their opinions on their preferred tool and provide reasoning for their choice in an optional open-ended question. The data indicate that all the participants provided responses, but their opinions varied. Almost half of the respondents preferred *Netspeak*, and the most common reason for their preference was that the interface was easier to use/navigate/explore and mobile friendly, whereas the other participants mentioned the simplicity and special features of the interface.

The remaining half of the participants was equally divided into those who preferred *CorpusMate* and those who thought both interfaces were good. The most common reason for

preferring *CorpusMate* was its ability to perform more in-depth analyses. According to one respondent:

S6: *Both tools are quite resourceful and valuable, but I think that CorpusMate provides the ability for a more in-depth language analysis.*

Other respondents, as pointed out earlier, felt that both interfaces were equally good. For one respondent, however, which corpus tool is more valuable is a matter of what one needs to achieve:

Q19: *I would prefer Netspeak because it is easier and faster. But if I need more information (about words), then CorpusMate is better.*

The students were asked to share an aspect that made *CorpusMate* better than *Netspeak* (if any) in another optional open-ended item in the questionnaire. Only eight concrete responses were given. Among a few aspects, the most common is that *CorpusMate* provides more information, more context, and more examples of words. Others mentioned the "topic" feature, the "pattern finder" option, and more features to be some aspects that make *CorpusMate* advantageous.

The same question was made in relation to the other interface, that is, the features and aspects that made *Netspeak* better than *CorpusMate*. Compared with the previous question, more responses were provided for this item, with twelve responses in total. The mobile-friendly format, simplicity, and practicality are the features that distinguish *Netspeak*. The rest of the features mentioned included the following: the interface provides a useful percentage/frequency of use of words and chunks; the use of books as corpus and the ability to access it; its ability to find patterns and collocations; and the "word order" feature.

To more accurately measure the extent to which students value the ability to explore a corpus via the MALL approach, the respondents were asked to rate the statement "*Netspeak* has an advantage over *CorpusMate* because it is more mobile-friendly". The figures show that the majority of respondents, that is, approximately three quarters, either agreed or strongly agreed with this statement, whereas only a small number of participants were either neutral (15%) or strongly disagreed with the statement (5%).

Table 3
Participants' thoughts on Netspeak being more mobile-friendly

Statistics

N	Valid	18
	Missing	1
Mean		2.00
Range		4
Minimum		1
Maximum		5

Netspeak have an advantage over CORPUSMATE since it is more mobile-friendly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	6	31.6	33.3	33.3
	Agree	8	42.1	44.4	77.8
	Neutral	3	15.8	16.7	94.4
	Strongly Disagree	1	5.3	5.6	100.0
	Total	18	94.7	100.0	
Missing	System	1	5.3		
Total		19	100.0		

The preservice teacher participants in the study were asked if they were likely to use *CorpusMate* in the future. As the data below show (*Table 4*), approximately two-thirds indicated that they would use the interface, while approximately one quarter was neutral, and approximately 10% felt that they were unlikely to use the interface. As future language teachers, they were also asked whether they would use the interface with their students via another Likert scale item in the survey. The data indicate that roughly two-thirds of the respondents felt that they would, whereas the remaining respondents were neutral on this matter.

Table 4

Participants' perspectives on their likelihood of continuing to use CorpusMate for both personal purposes and with language learners

Statistics

		How likely are students to use CORPUSMATE for personal use in the future?	How likely are participants to use CORPUSMATE with their students in the future?
N	Valid	19	19
	Missing	0	0
Mean		2.16	2.00
Range		3	2
Minimum		1	1
Maximum		4	3

How likely are students to use CORPUSMATE for personal use in the future?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Likely	6	31.6	31.6	31.6
	Likely	6	31.6	31.6	63.2
	Neither Likely nor Unlikely	5	26.3	26.3	89.5
	Unlikely	2	10.5	10.5	100.0
	Total	19	100.0	100.0	

How likely are participants to use CORPUSMATE with their students in the future?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Likely	6	31.6	31.6	31.6
	Likely	7	36.8	36.8	68.4
	Neither Likely nor Unlikely	6	31.6	31.6	100.0
	Total	19	100.0	100.0	

The preservice teacher participants were similarly asked if they were likely to use *Netspeak* in the future. The data (*Table 5*) indicate that the majority of them either marked that they were very likely (57%) or likely (15.8%) that they would continue to use the interface, whereas 21.1% were neutral. Only a small percentage of participants reported that they were unlikely to use the interface. They were additionally asked whether they would use the interface with their students in the future. The figures show similar results to the previous data, the difference being that the participants showed slightly less confidence (i.e., fewer participants marked "very likely", choosing "likely" instead) in contrast.

Table 5

Participants' perspectives on their likelihood of continuing using Netspeak for both personal purposes and with language learners

Statistics

		How likely are students to use NETSPEAK for personal use in the future?	How likely are participants to use NETSPEAK with their students in the future?
N	Valid	19	19
	Missing	0	0
Mean		1.74	1.84
Range		3	3
Minimum		1	1
Maximum		4	4

How likely are students to use NETSPEAK for personal use in the future?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Likely	11	57.9	57.9	57.9
	Likely	3	15.8	15.8	73.7
	Neither Likely nor Unlikely	4	21.1	21.1	94.7
	Unlikely	1	5.3	5.3	100.0
	Total	19	100.0	100.0	

How likely are participants to use NETSPEAK with their students in the future?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Likely	9	47.4	47.4	47.4
	Likely	5	26.3	26.3	73.7
	Neither Likely nor Unlikely	4	21.1	21.1	94.7
	Unlikely	1	5.3	5.3	100.0
	Total	19	100.0	100.0	

Examining the last several responses comparatively reveals that preservice teachers clearly showed greater willingness to continue using *Netspeak* over *CorpusMate* both for personal purposes and with learners. However, the percentage differences are not very significant.

The questionnaire included a final open-ended item in which participants were asked to share additional perceptions or remarks (if any). Only six responses were provided under this item, while in almost all of them, the participants reiterated the view that both interfaces were valuable. What follows are some of the final remarks:

S1: *To add an extra opinion, I would say both of the tools are helpful for students who are still learning the language, and…they can be interactive in any many ways.*

S4: *Both of these tools are very useful…*

S15: *Great tools that can help in preparing good written text.*

4. DISCUSSION AND CONCLUSION

The results of the study indicate that most of the participants preferred *Netspeak* over *CorpusMate*; on the basis of the responses, some features of the former drove their preferences. The simplicity of the tool, user-friendly characteristics, and unique search options (e.g., word order search option) were mentioned as the most important factors. This finding confirms that learner-friendly corpus interface designs are important for ensuring wider application of DDL (Jablonkai, 2022). However, the findings also suggest that some participants valued variety, preferring both interfaces, whereas others appreciated some characteristics of *CorpusMate*, the most notable being the ability to explore more concordance lines and more examples for words. All in all, as indicated by the study's data, participants generally expressed positive attitudes toward tools, DDL, and corpus-based language investigation. These results corroborate the findings of the previous work in DDL (e.g., Yoon & Hirvela, 2004; Mull, 2013; Luo & Liao, 2015)

Another finding that stands out from the results reported earlier is participants' positive reactions toward the ability to use *Netspeak* within the context of MALL. The results clearly indicated that preservice teacher participants showed positive attitudes toward the mobile-friendly feature. In fact, this was another strong reason why they preferred this interface over the other (i.e., *CorpusMate*). Importantly, the current findings suggest that incorporating DDL within the context of MALL is something that participants appreciate and praise. More studies are therefore worth conducting to investigate mobile-assisted DDL and its affordances in greater depth.

The data indicate that the majority of the respondents were willing to use both corpuses for personal use and with their students in the future. However, the figures also show that some participants were not willing to exploit the tools in the future, and this study could not provide explanations for why this was the case.

On the basis of the session observations and students' feedback, it can be argued that the user-friendly corpus tools exploited in the current research, as well as other similar tools available on the web, can be used with little or no training. The participants in the study understood with

ease the most important processes of the tools, while they generally completed all the tasks assigned successfully. Therefore, it can be argued that the traditional obstacle of needing sufficient corpus training for successful direct DDL, as indicated by previous studies (e.g., Gilquin & Granger, 2010; Quinn, 2014), can be minimized with these new corpus tools.

The current study aimed (1) to discover learners' perspectives and preferences in regard to the use of a variety of simplified corpus tools and their characteristics and (2) to explore students' feedback on mobile-assisted DDL. Although limited in terms of depth and number of participants, the study can serve as a good starting point in the area. Further research can continue investigating these corpus tools and other similar tools by exploring the affordances of mobile-assisted DDL in greater depth. The present study and other similar studies can help in future directions of DDL and MALL as well as in corpus building and corpus design for language teaching and learning to ensure more learner-friendly corpus experience in the future.

References

Baisa, V., & Suchomel, V. (2014). *SkELL: Web Interface for English Language Learning*. 63–70.

Boulton, A., & Cobb, T. (2017). Corpus use in language learning: A meta-analysis. *Language Learning*, 67(2), 348–393. https://doi.org/10.1111/lang.12224

Crosthwaite, P. (2017). Retesting the limits of data-driven learning: feedback and error correction. *Computer Assisted Language Learning*, *30*(6), 447–473. https://doi.org/10.1080/09588221.2017.1312462

Gilmore, A. (2009). Using online corpora to develop students' writing skills. ELT Journal, 63(4), 363–372. https://doi.org/10.1093/elt/ccn056

Gilquin, G., & Granger, S. (2010). How can data-driven learning be used in language teaching? *The Routledge handbook of corpus linguistics*, 359-370.

Idrizi, E. (2018). Corpora and Vocabulary Learning–Using Data-driven Learning (DDL) in Academic Settings to Boost Vocabulary Proficiency and Foster Learner Autonomy. [Unpublished doctoral dissertation] South East European University. https://repository.seeu.edu.mk/sites/thesis/ThesisSharedDocs/DR_117889.pdf

Jablonkai, R. R. (2022). Building corpora for ELT. *The Routledge handbook of corpora and English language teaching and learning*, 460-477. Routledge.

Luo Q., & Liao Y. (2015). Using Corpora for Error Correction in EFL Learners' Writing. *Journal of Language Teaching and Research*, *6*(6), 1333-1342. http://dx.doi.org/10.17507/jltr.0606.22

Mizumoto, A., Chujo, K., & Yokota, K. (2016). Development of a scale to measure learners' perceived preferences and benefits of data-driven learning. *ReCALL*, *28*(2), 227–246. https://doi.org/10.1017/S0958344015000208

Mull, J. (2013). The learner as researcher: Student concordancing and error correction. *Studies in Self-Access Learning Journal*, *4*(1), 43-55. https://doi.org/10.37237/040104

O'Sullivan, Í., & Chambers, A. (2006). Learners' writing skills in French: Corpus consultation and learner evaluation. *Journal of Second Language Writing*, *15*(1), 49–68. https://doi.org/10.1016/j.jslw.2006.01.002

Pérez-Paredes, P., Guillamón, C. O., Van de Vyver, J., Meurice, A., Jiménez, P. A., Conole, G., & Hernández, P. S. (2019). Mobile data-driven language learning: Affordances and learners' perception. *System*, *84*, 145-159. https://doi.org/10.1016/j.system.2019.06.009

Quinn, C. (2014). Training L2 writers to reference corpora as a self-correction tool. *ELT Journal*, 69(2), 165–177. https://doi.org/10.1093/elt/ccu062

Stockwell, G. (2016). Mobile language learning. *The Routledge handbook of language learning and technology* (pp. 296-307). Routledge.

Yoon, H. (2008). More than a linguistic reference: The influence of corpus technology on L2 academic writing. *Language Learning & Technology*, *12*(2), 31–48. http://dx.doi.org/10125/44142

Yoon, H., & Hirvela, A. (2004). ESL student attitudes toward corpus use in L2 writing. *Journal of second language writing*, *13*(4), 257-283. https://doi.org/10.1016/j.jslw.2004.06.002

Yoon, H., & Jo, J. W. (2014). Direct and indirect access to corpora: An exploratory case study comparing students' error correction and learning strategy use in L2 writing. *Language Learning & Technology 18*(1), 96–117. http://dx.doi.org/10125/44356

Corpus tool links:

https://corpusmate.com/
https://netspeak.org/