DATA-DRIVEN LEARNING APPROACH
TO MARITIME ENGLISH

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Abstract. In the current context of exponential growth of knowledge, it is necessary to acquire new skills to enhance our knowledge in accordance with the fluctuating needs on the labour market. These new skills, such as problem analysis, information management, information assessment, may be developed through the data-driven learning (DDL) approach which fosters autonomy and self-directed learning thus developing life-long skills. This paper describes the application of DDL approach in teaching Maritime English which places the student in the centre of the process, while the traditional role of the teacher is transformed into a mentor, a guide, an advisor. In the process, the students are exposed to large amounts of authentic linguistic data in the form of corpora, which they actively search and study the patterns thus learning to learn.

Keywords: data-driven learning; authentic materials; student-centred approach; Maritime English

Introduction

New technologies have invaded every aspect of our lives and have changed the way we do our daily tasks, our work, our activities, our communications, and they have even changed the way we teach and learn. Today, the teaching of facts seems to have become secondary, while the teaching of new skills such as problem analysis, critical thinking, interpreting, researching, drawing inductive and deductive conclusions, comparing, making and testing hypotheses, etc. has become central to foreign language teaching. The new information and communication technologies have significantly changed the role of the teacher, who is no longer the only source of knowledge, but becomes a mentor, supervisor, guide and advisor. Consequently, the role of the student has also changed. Students should be actively involved in the learning process, they should take the initiative in their learning process, use learning strategies suitable for their individual needs according to their preferences and they should be able to self-assess their own progress. All this brings new

challenges into the classroom, which includes the selection of appropriate language technologies for teaching a particular topic.

This paper describes how we can introduce modern technologies into the Maritime English classroom by using and developing the aforementioned skills based on the data-driven learning (DDL) approach. In the context of language learning and teaching, this means exposing students to large amounts of authentic linguistic data in the form of corpora and enabling them to actively investigate language and analyse language patterns (Boulton 2009). The idea of using corpora in language teaching for DDL is not new (Johns 1991), but has not been extensively researched or applied in the context of Maritime English teaching (Borucinsky and Kegalj, forthcoming). The paper describes how data from the corpora can be used for teaching Maritime English and presents the challenges and benefits of such learning.

1. Background

Corpora are large collections of authentic texts (Stefanowitsch 2020, p. 1) that can be used in empirically-based linguistic research. They have also found application in foreign language teaching as an aspect of data-driven learning. In recent decades, corpora have been used in various ways to enhance pedagogical practice and the effectiveness of data-driven learning with corpora has been demonstrated in a number of experiments, some of which we will mention for illustrative purposes. Kennedy and Miceli (Kennedy and Miceli 2001), for example, studied the effects of DDL on students' writing skills. The authors found that in this context it was important to train students to become researchers, as their lack of corpus-investigation skills and research experience led them to erroneous conclusions. Chambers and O'Sullivan (Chambers & O'Sullivan 2004) investigated the impact of DDL on students' writing skills. They found a number of positive outcomes, including a reduction in native language interference and the identification of appropriate lexicogrammatical structures. Boulton (Boulton 2010) conducted a study with lower-level students using printed corpus data, which showed that learners performed slightly better with the DDL approach than with the traditional approach. However, as Boulton (Boulton 2010, p. 550) notes, the main advantage of DDL is not in these results, but in the fact that the exposure to large amounts of data in DDL leads to a lot of incidental learning, i.e. students learn things they are not explicitly taught. Chujo et al. (Chujo et al. 2012) conducted a study with beginner level students of engineering and found that DDL can be quite effective in teaching noun phrases. Yılmaz and Soruç (2014) investigated how corpora can influence vocabulary acquisition. Their results showed that concordances are more effective than traditional methods in vocabulary learning and that DDL turned students into language researchers thus making them more autonomous in their learning. Vyatkina (Vyatkina 2016) investigated how DDL affects learning lexicogrammar and concluded that learners' overall proficiency has increased owing to the DDL approach. The results of the study conducted by Boulton

and Cobb (Boulton & Cobb 2017) suggest that DDL is more effective when students work directly with the corpus rather than with printed handouts, and that smaller tailor-made corpora seem to be more effective than large general language corpora. Gilquin (Gilquin 2021) conducted an experiment with upper-intermediate learners that focused on constructions, rather than individual lexicogrammatical structures. The experiment showed both the advantages and disadvantages of the DDL approach. Like the previous experiments, this one showed that DDL, among other things, promotes learners' inductive skills and enables them to create new instances of constructions under study.

Although this list of experiments conducted is not exhaustive, it shows, on the one hand, the interest of researchers in the topic of using corpora as sources of data for a different kind of learning and, on the other hand, the advantages that corpora bring to learning. The data they provide enable students to recognise patterns, extract frequencies of occurrence and thus draw inductive conclusions about the context in which a word appears, its most frequent collocations, different meanings of a word, etc. Students self-direct their own learning (Boulton 2012) and have to use various skills such as predicting, analysing, interpreting, researching, focusing, comparing, distinguishing, reasoning, etc (O'Sullivan 2007, p. 277). As Boulton points out, "The basic methodology of DDL involves L2 users exploring the target language for themselves rather than 'being taught'" (Boulton 2015, p. 269).

2. Using corpora in ME classroom

Römer (2009) distinguishes between two main uses of corpora in teaching, direct and indirect. In indirect use, corpora are used as reference material and source of data for what is to be taught in class. In this case, corpora are used by researchers, authors of teaching materials and teachers when making decisions about what to teach, when searching for authentic examples, when designing texts or exercises. In this sense, corpora can influence on the course syllabi and the content of teaching materials. The direct approach, i.e. the data-driven approach, implies hands-on use of corpora in class by teachers and students. In the following chapters, we will explain both applications in the teaching of Maritime English.

2.1. Indirect application of DDL in ME classroom

Maritime English teachers are often at a loss because teaching materials on a particular topic are scarce or do not meet the needs of certain students. They, therefore, need to create tailor-made materials, which is where corpora may prove to be useful.

One of the ways corpora can be used in teaching Maritime English will be illustrated through the example of corpus of Vessel Traffic Service (VTS) communications. The authors are currently compiling a pilot corpus of spoken VTS messages which will evolve in several phases. The process itself is lengthy and challenging as it involves several stakeholders (VTS, Harbour Master's Office, Port Authorities and the

relevant Ministry). The aim is to compile a corpus covering about 12 hours of VTS communication on various topics. First, a spoken corpus of VTS messages needs to be compiled and converted into an electronically readable format. Nowadays, this can be dome using a speech-to-text application. Unfortunately, these applications are not yet completely reliable in terms of their output, so this has to be checked manually. Once the corpus has been compiled, it will be uploaded to a corpus tool, e.g. Sketch Engine, Wordsmith, AntConc, LancsBox, etc., which can automatically tag and lemmatise the corpus, allowing different types of data to be extracted from it. Such a corpus will be further used in various ways (Witt 2021). One of them is to analyse and classify the conversations according to the most frequent situations. This would make it possible to design real-life scenarios for use in class, in which students would do a role play based on actual situations. Witt (Witt 2021) further illustrates the possible indirect use of such a corpus, such as the creation of conversation examples, vocabulary lists, language structures, etc.

According to IMO Model Course 3.17 (2015), the Communicative Approach is the primary approach that should be applied when teaching Maritime English. Due to the fact that Maritime English is a variety of ESP (English for Specific Purposes), the Communicative Approach may be complemented by other approaches or methodologies that meet the requirements of such a specialized language course. Content-based instruction (CBI) is one method of achieving this by integrating the acquisition of content (subject matter) and the development of language competence. This approach implies that language is regarded as a medium for learning content and that content is viewed as a resource for learning and enhancing language. CBI emerged in the United States and Canada in the late 1980s and has since developed further in Europe as Content and Language Integrated Learning (CLIL). CLIL is an umbrella term for many types of CBI and refers to any language acquisition in which a target language to be learned is also used to provide content (subject matter) to learners. Coyle (Coyle 2007) suggests that some of the benefits of CLIL include the development of learners' problem-solving skills, the improvement of their vocabulary acquisition and grammatical awareness, and their linguistic independence when they have the opportunity to learn through the language rather than in it. CBI and CLIL, if implemented, can be challenging for both Maritime English instructors and subject teachers. Therefore, IMO Model Course 3.17 suggests twinning as a potential solution, i.e. establishing collaboration between Maritime English instructors and subject teachers.

Corino and Onesti (Corino & Onesti 2019) view Data-Driven Learning (DDL) as a scaffolding method that supports the linguistic aspect of Content and Language Integrated Learning (CLIL) and the importance of data-driven materials to enhance language learning. DDL practises "align with current theories and practises of Second Language Acquisition, namely constructivist and learner-centred approaches to language acquisition" (Corino & Onesti 2019, p. 2). These practices support the requirements of modern communicative language teaching

to use authentic language materials and to develop "metalinguistic knowledge and learner autonomy" (Godwin-Jones 2017, p. 9). Corpora provide data, but it is up to learners to interpret the observed information. For this reason, it should be noted that DDL can be more challenging for learners than more conventional approaches. However, the main argument for employing DDL in CLIL contexts is that language is the key to accessing content (Corino & Onesti 2019, p. 5).

Corpora can be further exploited to create Maritime English Service Lists, or a word list of the most frequent and key words in Maritime English, along the lines of West's General Service List of English Words (1953), which strongly influenced the design of the curriculum. This may prove particularly useful as new technologies and knowledge emerge and teaching materials need to keep pace with changing trends. Compiling a specialised corpus consisting of recently published materials on new technologies and then extracting key words and phrases from it might provide an insight into the language that needs to be taught, the phrases and vocabulary of "contemporary" Maritime English. Such a service list was compiled for Marine Engineering by Đurović (Đurović 2021) based on instruction books. Such lists could have an impact on the design of Maritime English teaching syllabi.

2.2. Direct application of DDL in ME classroom

This approach is more teacher- or student-directed, as teachers and students themselves tackle the corpus data. This involves analysing frequency lists to find the most frequently used words or word combinations in a given register. Then, there is the study of concordances, which can provide information about the meaning of the word being searched for, the most common structures in which that word occurs, the context of the word, and so on. Borucinsky and Tominac-Coslovich (2021) have highlighted some of the ways in which corpora can be used for teaching Marine Engineering English. The authors describe the main features of the corpus analysis tool Sketch Engine, such as wordlists, word sketches, concordances and thesauri, and how these can be utilized for teaching/learning Marine Engineering English.

ME teachers can use some ready-made corpora for teaching purposes or decide to compile their own corpus for a specific purpose. As for ready-made corpora, some attempts have been made to compile a corpus of Maritime English, e.g. Hong and Jhang (Hong and Jhang 2010) compiled the Maritime English Corpus (MECO), which consists of about one million words and Lu et al. (Lu et al. 2017) compiled a Maritime Legal English Corpus (MLEC), which consists of maritime institutional law texts. Bocanegra Valle and de la Campa Portela (2012) compiled the ECOMARS corpus, which contains actual instances of spoken English in maritime communications and the authors listed possible uses of such a corpus, e.g. to expose students to real-life communication, to train listening comprehension skills, to design teaching materials, etc.

The second option is to create a corpus ourselves. The corpus of VTS messages mentioned above could be used to teach both lexicogrammatical and pragmatic

aspects of this particular ME register. Once the corpus is compiled, it will be used for different tasks depending on the specific language skill to be practiced. For example, students could extract key words and phrases and analyse them in terms of the topic they cover or parts of speech they belong to so they gain an insight into the vocabulary used in this particular register. They can focus on new vocabulary and investigate it further in the corpus. Figure 1 shows how corpora can provide information on the use of synonyms, which can help students to distinguish between the use of two words.
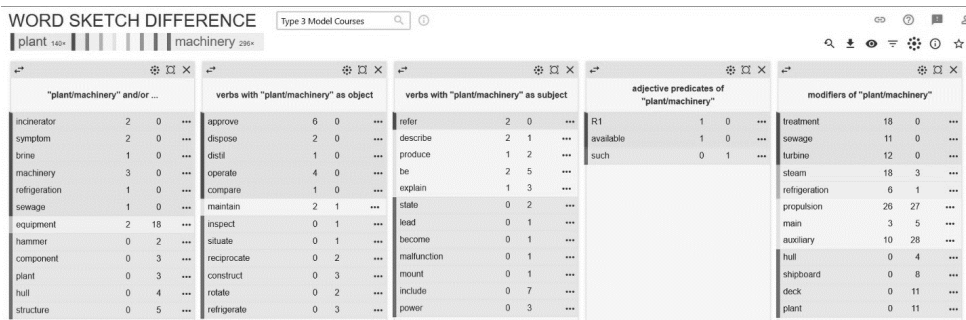

Figure 1. The representation of the difference between plant and machinery in the corpus analysis tool Sketch Engine (source: authors derived from online corpus analysis tool Sketch Engine)[1]

Furthermore, the students could explore the most frequent collocations of specific key words which provides knowledge and understanding of the immediate surroundings of a particular word as shown in Figures 2 and 3.
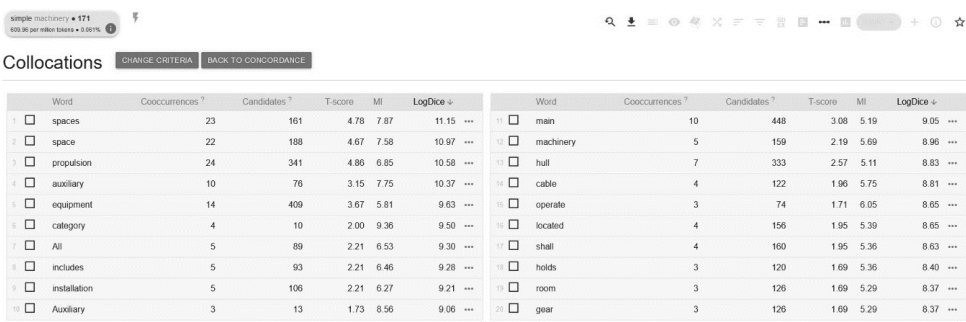

Figure 2. Most frequent collocations of the noun *machinery* in a corpus compiled of instruction books in the Sketch Engine tool
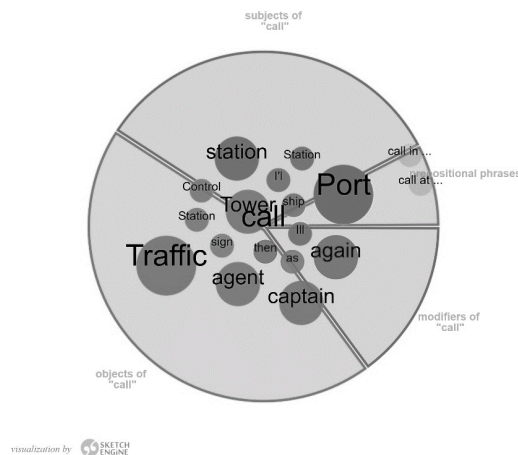*Source:* Authors derived from online corpus analysis tool Sketch Engine.

Figure 3. Sketch Engine visualisation of collocations with the word
call from the pilot corpus of VTS communications
Source: Authors derived from online corpus analysis tool Sketch Engine.

By concordance line searching the students can infer the meaning of a particular word based on the co(n)text in which it is used (Figure 4).
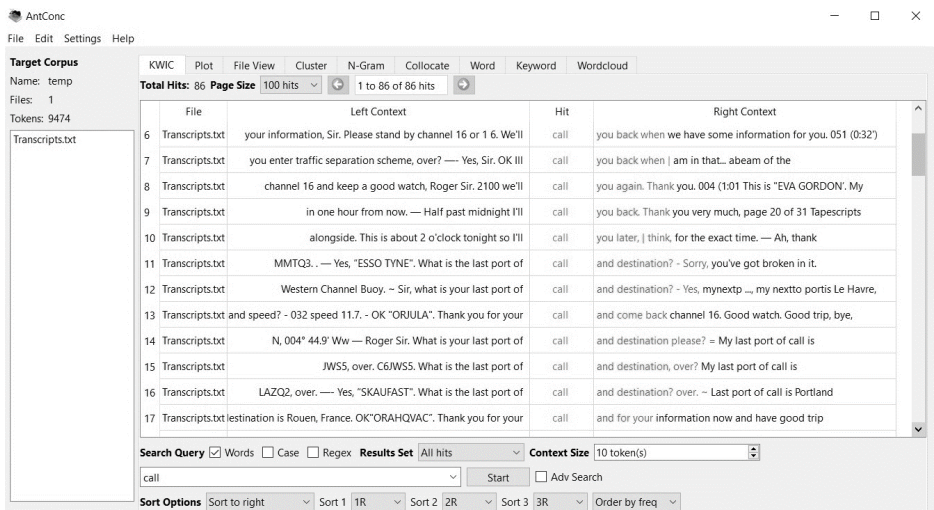

Figure 4. Example of concordance lines from the corpus of VTS
communications for the word *call* from the AntConc programme
Source: Authors derived from freeware corpus analysis toolkit AntConc[2].

By focusing on the key word in context (KWIC), students examine the context of the expression and find patterns in its use. The choice of a particular activity depends on a number of factors, from the students' IT skills to the content being taught. Activities can also range from those more controlled by the teacher to completely autonomous ones that leave the students to explore by themselves. For example, the VTS communication corpus mentioned earlier, which is currently under construction, will also be used as a learner corpus, meaning that it can be used to investigate common errors or it can be given to students so they could detect errors or places of potential risk and correct them accordingly.

Through this inductive approach, students are more actively involved in their own learning, encouraged to pose questions, find ways to answer them, do their own research and provide answers. This active involvement reverses their role from a purely receptive one to a proactive and productive one, developing skills and competencies not only in language proficiency, but also in other areas of human activity.

3. Advantages and challenges of corpus approach to ME

All the previously mentioned examples of using DDL in the ME classroom pose a great challenge not only to the teacher but also to the student. A recent study by Gilquin and Granger (Gilquin & Granger 2022) states that the main advantages of the DDL as a method are that it introduces authentic language into the classroom and students have extensive exposure to language. This enhances vocabulary acquisition and knowledge of language patterns (Gilquin & Granger 2022, p. 2). Another advantage lies in the special nature of DDL, which, as John (John 1997, p. 101) has metaphorically put it, makes every student a Sherlock Holmes, which promotes motivation and makes students more autonomous in their learning. They go through a process Bernardini (Bernardini 2004, p. 22) calls "discovery learning", where they take responsibility for their learning. By exploring, investigating and comparing linguistic structures, students become more aware of their common errors, which is why DDL has been shown to be particularly useful for teaching writing (Chen and Flowerdew 2018; Karpenko-Seccombe 2021).

On the other hand, this approach can be quite time-consuming, as it requires training of both the teacher and then the students, as well as the preparation or selection of the appropriate corpus for use in class. This could lead to frustration for both teachers and students. Because of such obstacles, they might also find DDL discouraging. In addition to these psychological challenges, there are also technical challenges, as DDL requires the use of technology that is sometimes not available and requires a certain level of IT skills to be able to tackle corpora. Also, as Gilquin and Granger (Gilquin & Granger 2022) point out, there are few ready-made teaching materials available. Finally, students may be discouraged by the amount and type of data they encounter, as they are not used to the role of the researcher. For this reason, the introduction of DDL in the classroom needs to be

gradual and carefully planned, because despite these challenges, it offers many benefits that should not be neglected.

Conclusion

The DDL approach to language teaching has been both advocated and criticised so far, but its advantages and benefits prove that it should have its place in a modern language classroom. In this paper, we have focused on how DDL might be implemented in the teaching of Maritime English in order to provide a basis for the future application of this method in the teaching of this particular language variety. Although we face the same obstacles in applying DDL as previous studies have shown, DDL can still be seen as a promising method that introduces students to large amounts of authentic data and stimulates the development of various skills that are not necessarily related to the language itself, but to cognitive skills that can be used in other domains. DDL has also shown to be flexible, adaptable to different levels of knowledge and learning styles. Therefore, it could be considered for integration into future IMO Model Courses as it is complementary to the approaches already in use. As potential pitfalls and challenges have already been identified, it would be necessary to develop a contingency plan for such situations, thus taking advantage of all the benefits that DDL offers. This includes, first and foremost, training the ME teachers in corpus skills so that they themselves can handle corpus data with confidence and pass on the knowledge to students.

NOTES

1. LEARN HOW LANGUAGE WORKS. Web site. *Sketch Engine*. Available from: https://www.sketchengine.eu/.
2. AntConc Homepage. Web site. Laurence Anthony's Website. Available from: https://www.laurenceanthony.net/software/antconc/.

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