

Student Perception on Data-Driven Learning[‡]

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Abstract: With the boosting of information technologies, language instructors and subject teachers have been provided with new opportunities in designing teaching materials and methods. Electronic corpora and available software solutions also provide easier access to professional material, both for teachers and their students. We, therefore, sought to explore the possibilities to utilize contemporary corpus linguistics methods in teaching technical vocabulary. Specifically, we conducted research with Marine Engineering students at the Faculty of Maritime Studies Kotor, University of Montenegro, during one academic semester. The method applied was the so-called Data-Driven Learning (DDL), which anticipates the student's exposure to authentic professional material. In our specific case, it included an electronic corpus comprised of marine engineering instruction books on main engines made available to the students through the distance-learning Moodle platform. By the end of the experimental semester of teaching/learning technical vocabulary through homework assignments related to marine engineering instruction books and manuals, we conducted a semi-structured interview with the students in order to provide their feedback, impressions and suggestions. The obtained and processed data show their positive responses to corpus linguistics methods, especially towards professional material they will need to rely on during their future careers. The DDL method also proved to promote the students' autonomy and help in overcoming differences in learning strategies, which recommends it as a solid foundation for the life-learning process of the seafarers-to-be.

Keywords: Students, Data-Driven Learning, Instruction Books, Technical Vocabulary, Corpus.

1. Introduction

English for Specific Purposes (ESP) was introduced as a research area during the sixties of the previous century. It has become focused as an innovative and specific linguistic activity in teaching and learning English as a foreign language utilized for specific professional or business activities.

[‡] A more comprehensive study with quantitative research was published in [22].

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This has brought a variety of methodological approaches in linguistics research, but also relevant teaching methods thereof.

Considering the number of schools, academies and universities dedicated to the education of prospective ship crew members all around the world, English for Maritime Purposes calls for the special attention of language scholars. In addition, it is a very complex area of ESP, comprising various subregisters (nautical, marine engineering, marine electrical engineering, as well as other more specific and multidisciplinary such as maritime law, marine logistics, etc.) and genres to be explored, approached, and taught [1]. As is the case with other technical areas of maritime education, International Maritime Organization (IMO) has provided some general and more specific recommendations for teaching English for Maritime Purposes, including General Maritime English and the three areas of Specialized Maritime English. Our research focuses on the one related to teaching English (vocabulary) to marine engineers.

2. English for Marine Engineering Purposes

The main requirement of the STCW Convention** (Table A-III/1) for marine engineers in terms of the English language is “Adequate knowledge of the English language to enable the officers to use engineering publications and to perform engineering duties”). In line with this, in IMO Model Course 3.17- Maritime English, Part 2.2. “Specialized Maritime English for officers in charge of an engineering watch in a manned engine-room or designated duty engineers in a periodically unmanned engine/room”, the majority of course hours (93 out of the total 105) are dedicated to the adequate use and understanding of marine engineering publications. Considering that primarily technical vocabulary is the main predictor of reading comprehension, our research target was the technical vocabulary of marine instruction books.

3. Data-Driven Learning

In seeking the most appropriate and still innovative method for teaching ESP vocabulary, we were led by some most contemporary recommendations and research results. Moreover, we took into account the specific professional language needs and language competences required from our target language learners, including the possibility to study words in their authentic context, at the same time encouraging individual work and preparing them for life-long learning. The findings of both language instructors and scholars pointed to Data-Driven Teaching (DDT) as student-

** Standards of Training, Certification and Watchkeeping for Seafarers (STCW)

centred and content-based teaching method, which makes the student a researcher in language and its specific application. That is why it has been recently mentioned as Data-Driven Learning (DDL), as will be referred to hereinafter.

In addition, recent experimental research findings relating to hybrid teaching methods and training of students for the continuous individual process of learning showed that autonomous learning is one of the most acknowledged aspects and advantages of DDL method [2, 3].

The creator of the method and its title is a linguist named Johns [4] who looked at language learners as “detectives” [5]. Put narrowly, it is a method that relies on corpus linguistics in language teaching, which here provides direct interaction of the students with referent corpus in terms of detecting the regularities and use of certain words. In our case of teaching/learning Marine Engineering English, the most professional genre is marine engineering instruction books the proper understanding of which serves as an indispensable tool throughout a marine engineer sea service.

4. Research Setting and Methodology

Our target language learners are the students of the Marine Engineering Study Programme, specifically, at the Faculty of Maritime Studies Kotor, University of Montenegro. Considering the number of students and the course syllabi, we opted for English Language II, which is taught during the spring semester of their first academic year. This specific part of the research was part of a larger-scale one. It included the control and experimental group (60 in total) and a quantitative analysis of their respective results achieved on vocabulary tests at the beginning and the end of the experimental semester. In this part of the research, we sought to provide an overall feedback on the innovative teaching/learning method applied.

The experimental group of students (thirty in total count) worked upon the “experimental” DDL method. They were given 7 instruction books on the main engine (available on Distance Learning Moodle Platform) and were assigned 5 consecutive homework assignments. The assignments anticipated finding words (20-25) from the most frequent technical words found in marine engineering instruction books [6] and adequate translation of the three to five sentences they are found in, from at least three technical manuals (Fig. 1). In deciding on the number of assigned technical words, we were led by available time-frames and general findings and recommendations from the authors in relation to the word lists’ sizes and how fast they can be acquired [7, 8].

Assignment 1



Fig. 1 – Excerpt from the Distance Learning Moodle Platform.

In the final assignment, students had an additional task. In addition to finding the selected words in the English professional genre, they were also required to find their translation equivalent in marine engineering textbooks in Montenegrin [9, 10]. This way, although guided and monitored by the language teacher, the students worked more autonomously, combining the explicit and implicit approaches in detecting and learning technical vocabulary.

After the completed research period, our intention was to provide the student responses and reflections on the applied teaching method, consulting the best experiences in quantitative research, both from theoretical overviews and research papers [11-13], we conducted a semi-structured interview with 12 students of the experimental group who proved to be the most dedicated to fulfilling their assignments. Considering that the interviewer was the teacher, well known to the students and vice versa, the questions were put rather concise and direct, without general introductory ones.

According to the three variables of special interest to us in this research referring to the overall satisfaction of the students, their comparative analysis of the innovative and “traditional” teaching methods and their additional suggestions and remarks, we set up three preliminary question categories (Table 1).

Table 1 – Interview variables and categories^{††}.

Variables	Categories
Student satisfaction	Participation in research The most/least likable part of the research
Comparative impressions	Time and effort invested Language teacher involvement / individual work
Opinions and suggestions	Method efficiency Literature selection Additional suggestions and remarks

The interview was conducted in the Montenegrin language, thus we are here presenting only the results, presented and analysed in English.

5. Research Results

Upon the determined variables and categories, we conducted a semi-structured interview with 12 students of the experimental group that had been working by the adjusted DDL method for about 10 semester weeks. After the collection, reduction and codification of their answers, we came up with the overall results that can be presented in Table 2^{††}.

Table 2 – Data/information obtained from interviewing experimental group students.

Category	Responses (number and %)	Indicative comments
1. Overall likability of the method and impressions	12 students (100%)	"I liked working this way because I go more in-depth and to the essence and learn more than generally anticipated."
2. Efficiency	- (Extremely) efficient method for learning technical vocabulary – 12 students (100%)	"I think this is the right example of how Maritime English should be learned, from instruction books that were given to us in this research, because we are going to deal with the similar onboard." "It's easier to look for it in the dictionary, but this way is more efficient because we see the exact place where it is mentioned, in which part of the engine it is referred to." "Certainly, more efficient and interesting, would have been easier if we had had the words translated."

^{††} Table 1 and Table 2 are derived from the tables developed for wider-scale research [22].

^{‡‡} Translated from Montenegrin by the authors.

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<p>3. Dislikes</p>	<ul style="list-style-type: none"> - Translation of technical words – 1 student (8.5%) - Homework assignments, looking for words was time-consuming – 1 student (8.5%) - Home assignment (HA) no. 1; first part was the most abundant and most difficult and time-consuming - 4 students (33.5%) - HA no. 5 - Looking for different examples – 1 student (8.5%) - Don't know – 1 student (8.5%) 	<p>“Too many unknown technical words in the beginning.”</p>
<p>4. The selection of marine engineering publications/ authentic texts</p>	<ul style="list-style-type: none"> - Instruction books (as selected and given) – 4 students (33.5%) - Additional diagrams and schemes of marine systems – 4 students (33.5%) - More texts describing operation (instr. books are difficult to follow) – 2 students (16.5%) - Include a technical journal – 1 student (8.5%) - Instruction book in the national language – 1 student (8.5%) - A textbook in the beginning, instruction books later on (due to difficulty) – 2 students (16.5%) - Bilingual dictionary (possibly illustrated) – 3 students (25%) 	<p>“I think it would also be useful to use some diagrams of the systems (fuel supply to the engine, water pump, cooling system...), and then, for example, to translate them, because we would learn the names of the parts and the way it works.”</p>

5. Time spent in comparison with "traditional" methods	<ul style="list-style-type: none"> - More time needed – 5 students (41.5%) - The same or less – 6 students (50%) - Don't know – 1 student (8.5%) 	<p>"More time was needed...but we learned a lot...it is easier to get ready-made translations and examples from the teacher, but this way we are "forced" to read professional material."</p>
6. Experimental method and its use vs. "traditional" second language classes	<ul style="list-style-type: none"> - Yes (combined if possible) – 8 students (66.5%) - No – 2 students (16.5%) - Don't know – 2 students (8.5%) 	<p>„The "old" way would be easier, but this way we learn more, this way is more efficient“ „I think it is better to be done through home assignments because in the classes the students would write it down without thinking, this way at home we even have the liberty to call a seafarer and learn more translation options.“ „It keeps a better focus than the classical method.“ „Definitely...because some technical words change their meanings in different contexts. Through the examples, I could understand in which cases...“</p>
7. Suitability of the Data-Driven learning without a teacher	<ul style="list-style-type: none"> -Yes (definitely/ especially after graduation) – 11 students (91.5%) - Don't know – 1 student (8.5%) 	<p>„It's always better with a teacher due to the authority and consultations.“ „I think that working with a teacher would help a lot to those who face the Maritime English language for the first time, because the teacher can explain it and present in person.“ "It's better to have combined learning...some in the classes, some on our own..." "Words from a dictionary are hard to remember, even better if we have the examples or at least translations (so we don't look for them ourselves)."</p>
8. Additional suggestions, impressions and comments	<ul style="list-style-type: none"> - No (additional suggestions), I wouldn't change anything – 6 students (50%) - More HAs such as no. 5 – 2 students (16.5%) 	<p>„I stated them through my answers, and, considering this kind of research, you can always count on me.“ „I don't have any, except more interesting research in classes.“ "I hope we will get the word list with translation, at least before we graduate from the Faculty." "Add instruction books in our language with each assignment (for translations)," "Less words by the assignment, but more assignments."</p>

6. Discussion on the Results

As can be seen from Table 2, we presented the percentages in regard to the categorized and codified answers, but we were even more interested in their general impressions and suggestions. At first glance, we can see that

the final categorization quite resembles the initial one set as the research base (Table 2).

If we go one step further, to the next level of coding, we can generally refer to the positive and negative responses of the students to the applied DDL method and its specific elements set in this research. We can say that the most positive reactions were expressed towards the method itself and its efficiency, since all the respondents replied affirmatively to this set of questions (100%) and said they would like to do similar projects in their future classes. The responses and remarks that could be marked as negative mostly related to more time and effort required for the first and the last/fifth homework assignments, as well as the demanding technical genre in use. This can be deemed understandable having in mind that they were facing this type of assignment and material for the first time and without the presence of the teacher they are, in these cases, accustomed to. If we also take into account that the general findings are that more effort invested by the students generally results in their better performance [14, 15], this again speaks in favour of more challenging and innovative tasks to be given to students during their learning process.

One of the main ideas behind this research was not so much to obtain specific information, but, as Rubin and Rubin presented through their model, to learn more about what is important to those who are interviewed [16]. Therefore, the majority of the categories, both initially planned and finally generated, relate to the variable of the “students’ opinions and suggestions” which is a general recommendation of this kind of research [16]. In that light, regardless of the slight stress in dealing with a new concept of assignments and more individual work and responsibility thereof (individual time management, for example), the students were generally in favour of innovative types of teaching methods and use of the professional material and authentic text to work with and learn by. More specifically, the majority of the students were pro including marine engineering technical manuals in the teaching material, but also starting with a more general text-book or other descriptive texts (16.5%), additional schemes and diagrams of the marine systems (33%), and few comments that a bilingual technical dictionary and presence of the teacher would make the process easier and faster. Generally, percentage-wise (10%), they liked more autonomy in the process since it provided them with the possibility to approach the assignment more deliberately, in terms of time management, assets to use, and similar. Our results are also in line with the findings of other authors in relation to learning strategies and overcoming their limitations [17-21]. This is also put forward by one of the five basic objectives for the Engineering Officers language course (IMO Model Course 3.17 Maritime English, 2015, p.

150) as crucial for developing learning skills for the continuation of self-directed learning “at sea” [22]. It was also illustratively confirmed by some creative approaches to doing the assignments, where the students added illustrations to their findings (Fig. 2).

- Piston



Piston rings are stuck.

Klipni prstenovi su zaglavljani.

Do not put heavy engine components such as pistons, liners, cylinder heads, etc. onto the maintenance platform.

Ne stavljajte teške komponente motora kao što su klipovi, košuljice, glave cilindra, itd. na platformu za održavanje.

Fig. 2 – Excerpt from one of the homework assignments.

On the other hand, taking into account their general comments, although it is a good preparation for the life-learning process and their dealing with the technical publications throughout their careers, the students would still like to keep a combined learning method which would include learning by professional texts but with at least partial assistance and presence of the language teacher.

In addition to the student’s perception, this kind of research provides the teacher(s) with extremely valuable feedback and experiential results that lead towards the teacher’s perception of the strengths and weaknesses of the method, and possible improvements to be incorporated into the teaching method.

7. Limitations and Advances of the Study

Our research shares some limitations generally pertaining to qualitative research in applied linguistics [13]. Firstly, the responses were not given

anonymously, which could affect the objectivity in giving answers and data, in addition to possible subjectivity in data analysis and interpretation, considering the fact that they talked to their teacher who will be further involved in their assessment. This could lead to the so-called Hawthorne effect, causing the respondents to act differently (less spontaneously and naturally, possibly less sincerely) knowing that they are involved in research and not being anonymous therein [22].

At the same time, aiming to meet the requirement of adequate researcher integrity, we can also consider advantageous the fact that the interviewers were at the same time language teachers with previous experience in working with the same students. This provides for an easier fulfillment of the principles of ethics in terms of privacy protection, but also mutual relationship, trust and motivation, all contributing to the internal validity of the results. Therefore an additional advantage of our research would be working i.e. monitoring and assisting intensively and closely within smaller groups of language learners, although, at the same time, to the detriment of the generalization of possible research results and the external validity of the conclusions.

As we could see, in addition to being the interviewers, the teachers were here also interpreters of the collected data, thus having even more responsibilities and challenges on their shoulders. Given the circumstances, which can be considered as more or less favourable, we invested our best effort in achieving the principle of ethics and validity of the results, as it should be a general task of researchers [23].

Here we are noting again that our research sought to explore the possibilities of enhancing the technical vocabulary teaching, i.e. the part of classes related to lexis, which does not imply a finally designed language course whatsoever. The main goal in any language course should remain productive language knowledge, including vocabulary skills. What we need to bear in mind at all times is that words as meaning carriers are not personalized [12], i.e. they get their semantic purpose not sooner than in a specific textual and professional context. Contemporary content-based teaching methods such as DDL are offered as a possible response to overcoming the gap between scholarly and practical knowledge [22].

8. Conclusion

The aim of our research was to provide the perception of our target ESP language learners on the DDL method and the professional corpus and vocabulary material used thereof. This method, adjusted to the specific needs of our English language learners and the course requirements, in our

specific setting, utilized the selection of marine engineering instruction books on main marine engines and five homework assignments during approximately ten academic weeks. The assignments related to technical vocabulary detection and recognition were explained in detail and posted on the University's distance learning Moodle Platform, respectively. The main task was to find the designated most frequent technical vocabulary elicited from marine engineering technical manuals and determine their contextual use and translation in at least three of the available instruction books.

According to the student dedication and performance throughout the research period (spring semester), 12 selected students of the experimental group were subject to the semi-structured interview. Through the reduction and codification of their answers, we came up with a set of categories that gave us a better insight into their impressions, opinions and suggestions. This way, we are able to take into account the positive and negative effects of the method applied and prepare it in a more efficient and convenient way for the future.

It should also be noted that the tested method related only or mostly to the technical vocabulary teaching, while all the other aspects of the language teaching/learning should also be carefully incorporated into the teaching syllabi, as well, always bearing in mind the practical needs of our language learners and their professional requirements in terms of the (English) language competences.

The research provided us with valuable experience in terms of teaching and consultations with students, including the experience of using authentic material in the teaching process. These all pose an additional challenge and require additional efforts from the teachers of ESPs. In addition to becoming familiar with the specific profession the ESP is meant for, language teachers need to keep up with contemporary language teaching methodologies and decide on the best ways to adjust them to the course requirements and plans.

In addition to valuable experience and perceptions obtained, not only from the students, but for the teacher(s), as well, an additional motivation for further research and dedication comes from the positive reaction of the students and willingness to participate in similar innovative methods/research and their introduction to the teaching process.

References

- [1] M. Dževerdanović-Pejović, "Discourse of logistics and transportation", *Promet - Traffic & Transportation* 32 (6), 2020, pp. 811-819.

- [2] Q. Luo, "Application of Data-Driven learning in EFL writing instruction for engineering students," *World Transactions on Engineering and Technology Education*, 13 (3), 2015, pp. 238–244.
- [3] J. F. Agudelo and A. M. Morales-Vasco, "Project-based learning as a catalyst for students and teacher autonomy development: The experience in a State School in Nilo, Cundinamarca," *Gist Education and Learning Research Journal* 19, 2019, pp. 31–48.
- [4] T. Johns, "Should you be persuaded, two samples of Data-driven learning materials", in Johns T. and King, P. (Eds.), *Classroom Concordancing ELR Journal*, 4, 1991, pp. 1–16, University of Birmingham.
- [5] E. M. Shaw, "Teaching vocabulary through Data-driven learning," a project submitted for the degree of Master of Arts, Brigham Young University, 2011.
- [6] Z. Đurović, "Corpus linguistics methods for building ESP word lists, glossaries and dictionaries on the example of marine engineering word list", *Lexikos*, 31, 2021, pp. 259-282.
- [7] I. S. P. Nation, "How large a vocabulary is needed for reading and listening?," *Canadian Modern Language Review* 63 (1), 2006, pp. 59–82.
- [8] T. N. Y. Dang and S. Webb, "Evaluating lists of high-frequency words," *ITL – International Journal of Applied Linguistics*, 167 (2), 2016, pp. 132–158.
- [9] A. Pažanin, *Brodski motori, šesto i dopunjeno izdanje*, Split: Palga, 1998.
- [10] D. Nikolić, and R. Vujadinović, *Brodski motori II, Skripta, Kotor: Univerzitet Crne Gore, Fakultet za pomorstvo*, 2005.
- [11] A. Holliday, "Issues of validity in progressive paradigms of qualitative research", *TESOL Quarterly* 38(4), 2004, pp. 731-734. <https://doi.org/10.2307/3588292>
- [12] A. Barfield, "Lexical development and learners' practices in a content-based learning course", *Vocabulary Learning and Instruction*, 1(1), 2012, <http://dx.doi.org/10.7820/vli.v01.1.barfield>.
- [13] Z. Dörnyei, *Research Methods in Applied Linguistics*. Oxford: Oxford University Press, 2013.
- [14] J. H. Hulstijn, and B. Laufer, "Some empirical evidence for the involvement load hypothesis in vocabulary acquisition", *Language Learning*, 51(3), 2001, pp. 539-558.
- [15] D. Đorđević, and K. Lazić, "Akademski vokabular u nastavi engleskog jezika struke na master akademskim studijama", *Baština* (56), 2022, pp. 133-146. <https://doi.org/10.5937/bastina32-33886>
- [16] H. J. Rubin and I. S. Rubin, "Qualitative interviewing: the art of hearing data (2nd ed.)", Thousand Oaks, CA, Sage Publications, 2005.
- [17] B. Laufer, and J. Hulstijn, "Incidental acquisition in a second language: the construct of task-induced involvement," *Applied Linguistics* 22 (1), 2001, pp. 1-26. <http://dx.doi.org/10.1093/applin/22.1.1>

- [18] M. S. G. Hamzah, R. Kafipour and S. K. Abdullah, "Vocabulary learnings strategies of iranian undergraduate EFL students and its relation to their vocabulary size," *European Journal of Social Sciences*, 11(1), 2009, pp. 39–50.
- [19] V. Jurkovič, "Language learner strategies and language competence, a case study in the slovene higher education area," *Inter Alia* 2, 2011, pp. 42–57. <http://www.sdutsj.edus.si/InterAlia/2011/Jurkovic.pdf>
- [20] V. Jurkovič, "Effect of strategy based instruction on achievement test scores in a mixed language ability group of ESP learners", *Iberica* 25, 2013, pp. 195–214.
- [21] S. Baskin, A. Iscan, B. Karagoz and G. Birol, "The use of vocabulary learning strategies in teaching Turkish as a second language," *Journal of Education and Practice*, 8 (9), 2017, pp. 126-134.
- [22] Z. Đurović and S. Bauk, "Testing corpus linguistics methods in ESP vocabulary teaching," *Journal of Teaching English for Specific and Academic Purposes*, 10(2), 2022, pp. 319-337.
- [23] U. Sekaran and R. Bougie, *Research Methods for Business, A Skill-Building Approach*, West Sussex: John Wiley & Sons Ltd, 2016.

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