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THE INFLUENCE OF CONTEXT-BASED LEARNING ON THE MEMORIZATION OF NEW VOCABULARY IN ESP

Abstract: There are many ways to improve learning and acquisition of new vocabulary in ESP (English for Specific Purposes). Repetition improves memorization if the information is repeated in a meaningful way. The purpose of this research was to assess the influence of deep-processing (context-based learning of collocations) on the memorization of new vocabulary in ESP (in the field of engineering). The research was carried out on the first-year engineering students. The students were divided in two groups. The first group had to memorize 20 collocations related to ESP, based only on their meaning and without any additional explanations or examples. The second group of students had to memorize the same collocations but was also given some additional information about each collocation. The final results showed a significant difference between the two groups, suggesting that additional information (context) can positively influence vocabulary acquisition. However, as this is a small-scale study, the results should be interpreted with caution. This study can be used as a basis for further research on this topic.

Keywords: collocations, context-based learning, English for Specific Purposes (ESP), vocabulary acquisition

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1. INTRODUCTION - THE ROLE OF VOCABULARY AND COLLOCATIONS IN ESP LEARNING

Vocabulary is a fundamental component of language learning, encompassing individual words, phrases, sentences, and multi-word expressions. Ur (1996, 60) states: "Vocabulary can be defined, roughly, as the words we teach in the foreign language" whereas Hiebert and Kamil (2005, 3) define it as the knowledge that the learners should have about the meanings of words. However, vocabulary mastery extends beyond mere definitions; the ability to put words in appropriate contexts in a flexible way is an additional aspect that should be taken into account when learning vocabulary. As Stahl (2005, 44) explains, "Vocabulary knowledge is knowledge; the knowledge of a word not only implies a definition, but also implies how that word fits into the world." Although there are multiple aspects of word knowledge, the majority of researchers agree that vocabulary knowledge is multi-faceted (Laufer et al. 2004, 203-208), (Milton 2013, 45-47). In other words, much more is involved in acquiring a word. Knowing a word involves mastery of a variety of aspects such as spelling and pronunciation, but also its use in different contexts, which is the real feature of a good vocabulary knowledge. Learning vocabulary is an essential part in foreign language learning and through vocabulary the students are able to master the four basic language skills. Vocabulary teaching and learning have long been undervalued in foreign language teaching but teachers nowadays generally recognize the importance of vocabulary acquisition. Many researchers have realised that the vocabulary acquisition is crucial for learning a second language as it serves as the foundation for effective communication and understanding of written and spoken language (Laufer and Nation 1999, 33-37), (Rodriguez and Sadoski 2000, 385), (Read 2007, 106-107), (Gu 2003, 1-3), (Viera 2018, 90). Schmitt (2000, 55) states that "lexical knowledge is central to communicative competence and to the acquisition of a second language". Likewise, Nation (2001, 27) describes the relationship between vocabulary knowledge and language use as complementary: a well-developed vocabulary enables effective language use, which, in turn, enhances vocabulary acquisition. The British linguist David Wilkins summarized the importance of vocabulary learning by stating "Without grammar, very little can be conveyed; without vocabulary, nothing can be conveyed" (Wilkins 1972, 10). Thus, expanding one's vocabulary is essential for achieving fluency in a foreign language. A lack of vocabulary knowledge can significantly hinder the learning process. To overcome this challenge, students must not only learn new words but also effectively store and retrieve them from memory. Cognitive psychologists distinguish between short-term and long-term memory according to duration of memory retention and storage capacity (capacity of retrieving information after the original input). Schmitt (2000, 131) emphasizes that the main purpose of vocabulary learning is to transfer lexical information from short-term to long-term memory. Words stored in long-term memory are organized based on associations and relationships, a process crucial for fluency.

Traditional vocabulary learning methods, such as rote memorization and isolated word lists, often fail to equip learners with practical language skills. As argued by Craik and Lockhart (1972, 676), deeper cognitive engagement, such as learning words in meaningful contexts, leads to better retention and understanding. Building on this theoretical foundation, this study examines how context-based learning improves the memorization and application of ESP-specific collocations, particularly in engineering disciplines.

Vocabulary acquisition in ESP has been extensively studied, with a growing consensus on the importance of contextualization. Nation and Meara (2010, 44) emphasize that learners must engage with vocabulary in authentic contexts to bridge the gap between theoretical knowledge and practical application.

Due to globalization and the dominance of English in scientific and technical communication, ESP has become increasingly significant in both academic and professional settings. As Nation and Meara (2010, 37) note, “what vocabulary to focus on should be determined by two major considerations – the needs of the learners and the usefulness of the vocabulary items”. Furthermore, ESP learners require specialized vocabulary to function effectively within their fields. This need is particularly evident in technical disciplines such as Mechanical and Civil Engineering, where vocabulary is highly specialized, context-dependent, and essential for academic success and professional competence.

ESP courses aim to develop students’ English language skills to meet the demands of the globalized workforce. Unlike general English courses, ESP is designed to address specific linguistic needs, making vocabulary acquisition a crucial aspect of ESP instruction. Given that ESP vocabulary is often domain-specific and less frequently encountered outside professional contexts, both learners and teachers face challenges in mastering it. For Coxhead (2013, 116), vocabulary acquisition is central in ESP, and McCarthy (1990, VIII) highlights its indispensability, stating, “No matter how well the student learns grammar, no matter how successfully the sounds of L2 are mastered, without words to express a wider range of meanings, communication in an L2 just cannot happen in any meaningful way”. Considering the importance of ESP vocabulary and the barriers learners may face due to their lack of knowledge in work environment, effective vocabulary learning strategies must be implemented to enhance learners’ proficiency in their respective fields (Parisa and Saba 2012, 1259). One of the most effective strategies for mastering ESP vocabulary is learning collocations - word combinations that occur naturally in language use. Collocations improve fluency, enhance comprehension, and contribute to more native-like speech. The term ‘collocation’ is derived from Latin, meaning ‘place together’. First brought up by Palmer (1938, iv) and later introduced to the field of theoretical linguistics by father of collocation, Firth (1957, 1968), who first developed a lexical and the most traditional approach, claiming that the meaning of a word is determined by the cooccurring words, and consequently, lexis is independent and separable

from grammar. Benson (1990, 85) claims that collocations are fixed, recurrent combinations of words in which each word basically retains its meaning and Carter (1994, 47) defines collocation as a term used to describe a group of words which occur repeatedly in a language. Lewis (1997, 24) defines collocations as “those combinations of words which occur naturally with greater than random frequency”. Sinclair (1991, 170) describes collocation as the occurrence of two or more words within close proximity in a text. Mastering collocations signals both linguistic proficiency and subject-matter expertise, particularly in technical fields. Studies such as Cigan (2018) highlight the role of collocations in technical education, emphasizing their benefits for domain-specific communication. Cigan’s doctoral dissertation (Cigan 2023) further explores collocational patterns in English, German, and Croatian mechanical engineering terminology. Collocations play a vital role in ESP and are considered as an indispensable factor in the English language proficiency. Therefore, helping the students learn collocations is a fundamental step in enabling them to use the language effectively.

Studies by Webb (2005, 48-51) and Elgort (2010, 393-400) confirm that learners who engage in context-based vocabulary learning outperform those who rely solely on repetition. By incorporating real-world examples and meaningful contexts, vocabulary instruction becomes more effective, enhancing both retention and practical application. This study builds on these theoretical foundations by examining how context-based learning impacts the memorization and application of ESP-specific collocations in engineering disciplines.

2. RESEARCH

2.1. Methodology

The research was conducted on 20 first-year students from two faculties: Mechanical Engineering Faculty (University of Slavonski Brod, Croatia) and Faculty of Civil Engineering and Architecture Osijek (Josip Juraj Strossmayer University of Osijek, Croatia). Participants were divided into two equal groups: Group A (10 students) and Group B (10 students). Group A followed an isolated learning approach, memorizing 20 ESP-related collocations based solely on their meanings without additional context or examples. Group B employed a context-based approach, receiving explanations and examples illustrating real-world applications of each collocation.

All students participated voluntarily in the study. The experiment aimed to assess the effectiveness of contextual learning in vocabulary acquisition by comparing the retention and application of collocations between the two groups. Data collection included pre- and post-tests to measure the students’ progress, along with qualitative feedback to evaluate their learning experiences and perceived difficulties.

2.2. Testing Procedure

The study was conducted during regular lectures and was entirely anonymous. It consisted of three parts:

A) Initial Test

An initial test comprising of 20 collocations from technical English was conducted to assess participants' prior knowledge of selected collocations (Table 1). The results indicated no statistically significant difference between the experimental and control groups regarding their familiarity with the given collocations.

Table 1. Initial test

	INITIAL TEST	
1.	klima uređaj	
2.	zračni kanal	
3.	izmjenična struja	
4.	aritmetička sredina	
5.	kuglični ležaj	
6.	granični sloj	
7.	lijevano željezo	
8.	željezna legura	
9.	građevinski inženjer	
10.	završni proizvod	
11.	izolacijski materijal	
12.	usisni takt	
13.	ulje za podmazivanje	
14.	strojarstvo	
15.	osnovni metal	
16.	energetsko postrojenje	
17.	tlačna posuda	
18.	sirovina	
19.	pravac	
20.	tlačna čvrstoća	

B) Collocation Processing

This phase involved different learning methods for Group A and Group B. The control group (A) was provided only with the meanings (translations) of individual collocations. The experimental group (B) engaged in deep processing, receiving additional explanations and contextual examples illustrating real-world usage of each collocation.

Examples of collocations used in the study:

1. *air conditioner* – klima uređaj – a device which controls the temperature, ventilation and humidity in a building or vehicle
2. *air duct* – zračni kanal – a tube or pipe for fluids, air etc.
3. *alternating current* – izmjenična struja – an electric current that reverses its direction with constant frequency
4. *arithmetic mean* – aritmetička sredina – the arithmetic average (mean) of a set of n numbers is the sum of the numbers divided by n
5. *ball bearing* – kuglični ležaj – a machine element that permits free motion between moving and fixed parts
6. *boundary layer* – granični sloj – the layer of reduced velocity in fluids, such as air and water, that is immediately adjacent to the surface of a solid past which the fluid is flowing
7. *cast iron* – lijevano željezo – an iron alloy, usually including carbon and silicon; a large range of building products are made of this material by pouring the molten metal into sand moulds and then machining, it has high compressive strength, but low tensile strength
8. *ferrous alloy* – željezna legura – any of various alloys of iron and one or more other elements, such as manganese or silicon, used as a raw material in the production of steel
9. *civil engineer* – građevinski inženjer – an engineer trained in the design and construction of public works, such as bridges or dams, and other large facilities
10. *finished product* – završni proizvod – products or goods that have been completely assembled or built
11. *insulating material* – izolacijski materijal – material that will prevent the flow of current due to its chemical composition
12. *intake stroke* – usisni takt – on the *intake* or *induction* stroke of the piston, the piston descends from the top of the cylinder to the bottom of the cylinder, reducing the pressure inside the cylinder; a mixture of fuel and air is forced by atmospheric (or greater) pressure into the cylinder through the intake port; the intake valve(s) then close
13. *lubricating oil* – ulje za podmazivanje – selected fractions of refined petroleum or other oils (with or without additives) used to lessen friction between moving surfaces; also known as *lube oil*

14. *mechanical engineering* – strojarstvo – the branch of engineering that encompasses the generation and application of heat and mechanical power and the design, production, and use of machines and tools
15. *parent metal* – osnovni metal – the metal that is to be worked; the principal metal of an alloy; any metal that will oxidize when heated in air; the metal of parts to be welded; also known as *basis metal*
16. *power plant* – energetska postrojenje – an electrical generating station
17. *pressure vessel* – tlačna posuda – a metal container, generally cylindrical or spheroid, capable of withstanding bursting pressures
18. *raw material* – sirovina – an unprocessed natural product used in manufacture
19. *straight line* – pravac – a line traced by a point travelling in a constant direction
20. *compressive strength* – tlačna čvrstoća – the amount of resistance of a material to fracture under compression

C) Retention Tests

Collocation knowledge was assessed immediately after learning. Only correctly written collocations were considered correct, meaning both words had to be accurate. The same test was repeated after four months to evaluate the impact of time on memory retention.

2.3. Test Results and Discussion

The results of initial testing for Group A and Group B are shown in *Figure 1*.

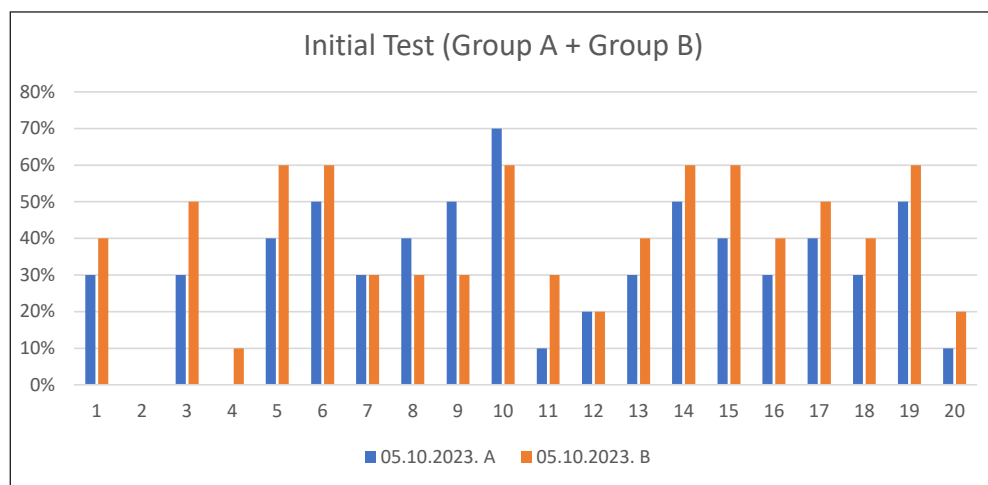


Figure 1. Initial test (Group A + Group B) – 20 collocations

The results of first test for Group A and Group B are shown in *Figure 2*.

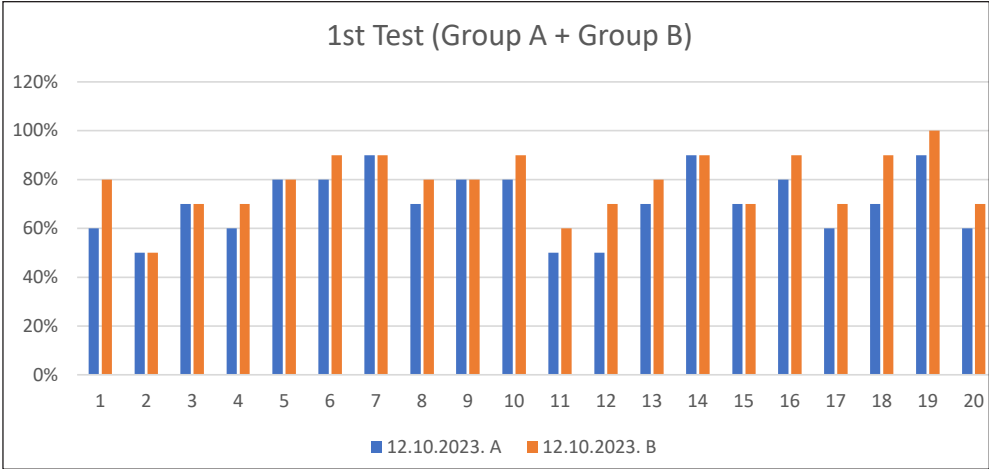


Figure 2. 1st Test (Group A + Group B) - 20 collocations

The second test was conducted after a few months and the results for Group A and Group B are shown in *Figure 3*.

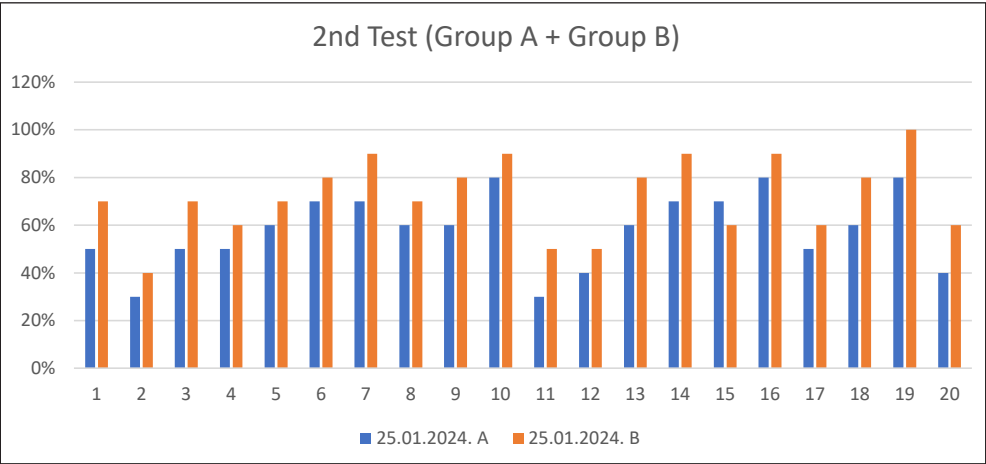


Figure 3. 2nd Test (Group A + Group B) - 20 collocations

The results of descriptive statistics for Group A and Group B (Initial Test, 1st Test and 2nd Test) are shown in *Table 2*.

Table 2. Descriptive statistics

Descriptive statistics						
Date / Group	05.10.2023 A	12.10.2023 A	25.01.2024 A	05.10.2023 B	12.10.2023 B	25.01.2024 B
Arithmetic Mean	32,5	70,5	58	39,5	78,5	72
Arithmetic Mean (%)	33%	71%	58%	40%	79%	72%
Median	30	70	60	40	80	70
Standard Deviation	17,57	12,84	15,03	17,74	11,95	15,68
Minimum	0	50	30	0	50	40
Maximum	70	90	80	60	100	100
Data Range	70	40	50	60	50	60
Coefficient of Variation %	54,07	18,21	25,92	44,91	15,22	21,78
Mode	30	70	60	60	70	70

The *p-value* (0.229) is greater than the typical significance level of 0.05. This indicates that there is no statistically significant difference between the performance of Group A and Group B in the Initial Test, indicating comparable baseline knowledge. While Group B has a slightly higher mean score (40% vs. 33%), the difference is not significant enough to rule out the possibility that it occurred by chance.

The results for 1st Test show that the *p-value* (0.054) is slightly above the typical significance threshold of 0.05. This suggests that while Group B has a higher mean score (79% compared to 71%), the difference is not statistically significant at the 0.05 level. However, it is close to being significant, indicating a possible trend that Group B performed better.

The results for 2nd Test show that the *p-value* (0.008) is well below the standard significance threshold of 0.05. This indicates a statistically significant difference between the performance of Group A and Group B. Group B (mean = 72%) outperformed Group A (mean = 58%) in this test, which suggests that the learning method applied to Group B had a significant positive impact on their performance.

The results align with existing literature, confirming the efficacy of context-based learning in ESP. By embedding collocations within authentic materials, learners not only memorize vocabulary more effectively but also develop a deeper understanding of its practical application.

The findings support the work of Nation and Meara (2010, 39), who emphasized the role of meaningful engagement in vocabulary acquisition. Furthermore, the study aligns with previous research, such as Štefić, Rosandić and Lokotar Vojnović (2012, 336-340), who argued that contextualized materials not only improve retention but also enhance motivation and practical application skills.

A notable contribution of this study is its focus on engineering-specific vocabulary, an area that has received relatively limited attention in ESP research despite its importance for technical disciplines. The findings highlight the potential benefits of incorporating context-rich materials, such as real-world examples and domain-specific scenarios, into ESP curricula to enhance vocabulary acquisition and practical application. However, the small sample size of this study limits the generalizability of the results. Furthermore, individual differences, such as prior exposure to English or varying learning styles, were not deeply examined, suggesting the need for future research to address these variables and validate the findings on a larger scale.

3. CONCLUSION

This study represents a small-scale investigation involving 20 first-year engineering students from two Croatian universities. While the findings provide valuable insights into the impact of context-based learning on vocabulary acquisition in ESP, the limited sample size necessitates caution when interpreting and generalizing these results. The outcomes should be viewed as indicative rather than definitive, serving as a preliminary exploration of this topic.

The results suggest that context-based learning enhances vocabulary retention and application particularly when collocations are taught within meaningful and authentic contexts. While the observed trends are promising, further studies are needed to confirm these effects across broader populations and different ESP contexts. The study may serve as a preliminary exploration of this topic, providing a foundation for further research rather than conclusive evidence.

The results obtained by this research suggest that teaching vocabulary through collocations results in a better learning of the words than teaching them by the means of classical techniques and enhances vocabulary retention for long-term memory. The research indicates that teaching collocations can be an effective factor in helping students remember new words more easily.

Statistical analyses revealed progressive improvement in Group B's performance compared to Group A, with Group B achieving significantly higher

scores in long-term retention tests ($p\text{-value} = 0.008$). This highlights the impact of contextualized teaching methods, which foster both memorization and the practical application of vocabulary. These findings align with existing research and underscore the need for ESP curricula to prioritize context-rich materials to bridge the gap between academic learning and professional practice.

Despite its limitations, this study makes several contributions to the field of ESP: pedagogical insights – the research confirms the efficacy of context-based learning for enhancing vocabulary retention and application, offering actionable strategies for educators; practical applications – by focusing on engineering-specific collocations, the study provides a model for developing ESP curricula aligned with professional requirements; research advancement – the integration of quantitative and qualitative methods enriches understanding of how learners acquire specialized vocabulary. The findings also contribute to broader discussions on vocabulary acquisition, supporting theories that emphasize the importance of meaningful engagement with language.

Finally, it is important to acknowledge the limitations of this study. Future research should address these limitations by exploring larger and more diverse participant groups and investigating additional factors influencing vocabulary acquisition, such as learner motivation, individual learning styles, and the use of digital tools like corpus analysis software. Such studies could validate and expand upon these findings while exploring their applicability across different ESP contexts, including fields like medicine or law.

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DER EINFLUSS DES KONTEXTBASIERTEN LERNENS AUF DEN WORTSCHATZERWERB IN ESP

Zusammenfassung

Es gibt viele Möglichkeiten, den Erwerb neuer Vokabeln in ESP zu fördern, wobei die Wiederholung eine entscheidende Rolle spielt – insbesondere, wenn die Informationen in einem sinnvollen Kontext präsentiert werden. Der Artikel untersucht, wie das Lernen im Kontext die Speicherung und Anwendung von Fachvokabular (insbesondere Kollokationen) im Bereich *English for Specific Purposes* (ESP) beeinflusst. Frühere Studien weisen darauf hin, dass die Beherrschung von Kollokationen entscheidend für die Sprachkompetenz in ESP ist. Sie fördern die Sprachflüssigkeit, das Verständnis und die professionelle Kommunikation in technischen Fachgebieten. Im Fokus dieser Studie stehen Studienanfänger (Studenten des ersten Studienjahres) aus ingenieurwissenschaftlichen Studiengängen (Maschinenbau und Bauingenieurwesen). Zwei Ansätze wurden verglichen: das isolierte Lernen (reines Auswendiglernen von Kollokationen anhand ihrer Bedeutungen) und das kontextbasierte Lernen (Lernen mit zusätzlichen Erklärungen, Beispielsätzen oder Synonymen).

Forschungsdesign:

Die Studie umfasste 20 Studierende, aufgeteilt in zwei Gruppen (jeweils 10 Personen). Gruppe A lernte die 20 ausgewählten Kollokationen isoliert, während Gruppe B zusätzlich kontextuelle Beispiele und Erklärungen erhielt. Ziel war es, den Einfluss des Kontextlernens auf die Behaltensleistung zu messen. Die Forschung erstreckte sich über einen Zeitraum von vier Monaten.

Testergebnisse:

Ein Eingangstest zeigte keine signifikanten Unterschiede im Vorwissen der beiden Gruppen. In einem Abschlusstest schnitt Gruppe B deutlich besser ab als Gruppe A, sowohl unmittelbar nach der Lernphase als auch in einem Folgetest vier Monate

später. Die Ergebnisse belegen, dass das Lernen im Kontext zu einer besseren Langzeitbehaltung führt. Es ist aber wichtig zu betonen, dass es sich um eine klein angelegte Studie handelt, die nur mit 20 Teilnehmern durchgeführt wurde. Daher sollten die Ergebnisse mit Vorsicht interpretiert werden und nicht direkt auf größere Populationen übertragen werden. Die Studie liefert jedoch wertvolle erste Erkenntnisse und kann als Grundlage für weiterführende Forschung dienen.

Schlussfolgerung:

Der Artikel hebt hervor, dass der Einsatz von kontextbasierten Lernstrategien eine effektive Möglichkeit darstellt, den Erwerb von Fachvokabular zu verbessern und langfristig zu sichern. Kontextbasiertes Lernen aktiviert tiefere kognitive Prozesse und ist effektiver als reines Auswendiglernen. Diese Methode verbindet theoretisches Wissen mit praktischer Anwendung und ist besonders für ESP-Lernende in technischen Disziplinen von Bedeutung. Diese Studie kann als Grundlage für weitere Forschungen verwendet werden, z. B. zur Analyse langfristiger Effekte kontextbasierten Lernens oder der Anwendung ähnlicher Methoden in anderen ESP-Bereichen.

Schlüsselwörter: English for Specific Purposes (ESP), Kollokationen, kontextbasiertes Lernen, Wortschatzerwerb