

ENHANCING VOCABULARY RETENTION IN CIVIL ENGINEERING ENGLISH USING CONTEXT-BASED QUIZZES

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Abstract

This article examines the use of technical vocabulary quizzes embedded in contextual sentences to enhance English vocabulary acquisition among civil engineering students. Mastery of specialized terminology is crucial for effective communication in engineering education; however, students often struggle when learning terms in isolation. By integrating vocabulary into meaningful, discipline-specific contexts through quizzes, this approach promotes deeper comprehension, critical thinking, and long-term retention. The study presents some quiz formats and how context-based vocabulary instruction bridges language acquisition theory and effective educational practice. Findings reveal significant improvements in vocabulary retention, critical thinking skills, and student engagement, confirming the effectiveness of contextualized vocabulary learning in technical and higher education settings. Furthermore, the approach fosters learner autonomy by encouraging students to actively engage with the vocabulary in authentic contexts. This method also supports the transfer of language skills to professional environments, preparing students for real-world engineering communication challenges. Finally, feedback from students indicates increased motivation and confidence when interacting with specialized vocabulary in context.

Keywords: *Civil engineering education, technical vocabulary, context-based learning, vocabulary retention.*

1. Introduction

In the fast-paced technological landscape, effective communication is crucial for fostering innovation, teamwork, and idea sharing. This need is particularly evident in today's globalized society, where English has established itself as the global lingua franca - especially in engineering, which demands proficiency for international collaboration. Extensive integration of English into technical disciplines has positioned it far beyond basic communication, establishing it as a powerful tool for achieving professional success and career development. Engineers require proficient spoken English competencies - alongside technical vocabulary - to enable effective cross-cultural exchanges and communication, as well as to maintain a professional image, since poor communication can undermine their professional credibility (Murali, Chaitanya & Sucharan Reddy, 2023). Central to this proficiency is mastering vocabulary. Alqahtani (2015) identifies it as a core component of effective language teaching, while Schmitt (2000) emphasizes its essential role in communicative competence and second language acquisition. Furthermore, Nation (2001) outlines how vocabulary knowledge and language use mutually enhance each other: vocabulary enables language use, which then deepens vocabulary growth. In the realm of language education, English for Specific Purposes (ESP) focuses on practical, domain-tailored instruction to meet learners' professional needs. Nation (2001) emphasizes the significance of mastering the specialized vocabulary central to ESP, noting that technical terms are a crucial component of English learning in these contexts. Acquiring technical vocabulary is thus essential, enabling precise expression and comprehension in specialized domains (Hutchinson & Waters, 1987). McCarthy (1990) stresses that "no matter how well the student learns grammar or masters L2 sounds, without words to express a broader range of meanings, meaningful communication in the L2 cannot occur." Yet, mastering this vocabulary poses specific challenges for non-native English-speaking civil engineering students. They often struggle to retain technical terms when learned in isolation through repetitive memorization techniques without meaningful context. McCarthy (1990) argues that words learned in context are best assimilated and remembered. Similarly, Oxford and Scarcella (1994) observe that while decontextualized approaches like traditional word-list learning may aid short-term test memorization, they fail to foster conceptual understanding or

long-term retention. This article proposes technical vocabulary quizzes integrated into discipline-specific sentences to improve retention over traditional memorization techniques. Context-based quizzes encourage learners to process civil engineering terms within meaningful scenarios. By requiring learners to recall and apply vocabulary in context rather than recognize isolated definitions, these quizzes facilitate deeper cognitive engagement and stronger memory traces (Nation & Webb, 2011) and therefore serve as an effective ESP tool for sustained technical vocabulary mastery.

2. Method

2.1. Participants

The study involved 60 first-year civil engineering students ($M_{\text{age}}=19.2$ years, $SD=1.1$; 48% male and 52% female) at the Faculty of Civil Engineering and Architecture in Osijek, Croatia. All participants were non-native English speakers (mostly B1-B2 CEFR levels) who had learned English for at least four years in secondary school, enrolled in mandatory technical English courses. Participants were pre-assigned to two existing classes of 30 students each, serving as intact groups in a quasi-experimental design: Control group A (traditional word lists, $n=30$) and Experimental group B (context-based quizzes, $n=30$). Groups did not differ at baseline with respect to age, gender, or prior knowledge of professional vocabulary (Table 1; all $p>0.68$). Assumptions for parametric testing were checked and met.

2.2. Procedure

Participants completed a 40-item multiple-choice pre-test on civil engineering vocabulary during Week 0 to establish baseline equivalence between groups. The pre-test included items like: "_____ is a tool with a sharp flat edge at the end, for shaping wood, stone, or metal. A) Hammer B) Level C) Trowel D) Chisel."

During Weeks 1-2, both groups studied 40 high-frequency target words such as *beam*, *tensile strength*, *friction pile*, *reinforced concrete*, *mortar*, *compressive force*, *truss*, *lintel*, etc. Both groups were taught by the same instructor using identical lesson plans except for the 120-minute vocabulary intervention. Both groups underwent six 20-minute practice sessions, for a total of 120 minutes. Control group A used printed English-Croatian word lists containing definitions and practiced through rote repetition and translation recall. Experimental group B completed online quizzes delivered via the Moodle learning platform. These quizzes featured gap-fill and multiple-choice items embedded within authentic civil engineering scenarios. For example, one quiz item stated: "_____ typically consists of a mixture of sand, a binder like cement or lime, and water. Its primary function is to act as a binding agent that holds masonry units firmly in place, ensuring structural stability, load distribution, and durability of the construction." requiring students to first fill in the gap. The Moodle platform provided immediate feedback: correct answers were scored instantly, while unanswered items triggered multiple-choice hints (A) Plaster B) Grout C) Mortar D) Concrete before proceeding to the next item. Students had no additional exposure to target vocabulary outside these six supervised sessions and Moodle quizzes were accessible only during class time.

An immediate post-test using a parallel 40-item form followed in Week 2. A delayed post-test and 5-point Likert-scale engagement survey (experimental group B only) occurred during Week 6 ($\alpha=0.85$). This assessment used gap-fill items embedded in realistic technical contexts. Students filled terminology blanks requiring selection of precise technical terms within meaningful sentences, testing transfer from training to novel contexts. All tests scored percentage correct, combining recognition (multiple-choice) and production (gap-fill) items. Data were analyzed using independent t-tests to compare groups (SPSS v.27).

3. Results

The results indicated the advantage of context-based quizzes over traditional word lists. Immediate retention scores were significantly higher for the experimental group B, which achieved a mean of 75.2% correct ($SD=10.1$), compared to the control group A mean of 65.3% correct ($SD=10.5$), $t(58)=4.21$, $p<0.001$, $d=0.85$. Delayed retention scores after four weeks also showed a clear advantage for the experimental group B, which scored a mean of 65.3% correct ($SD=12.8$), compared to the control group A mean of 48.7% correct ($SD=14.1$), $t(58)=5.34$, $p<0.001$, $d=0.95$, representing a 17 percentage point advantage. In the experimental group, students showed high engagement, reporting average motivation of 4.4 out of 5 ($SD=0.7$) using a Likert scale. The experimental group outperformed the control group in all results (Table 2).

Table 1. Baseline Characteristics by Study Group.

Variable	Control Group (n=30)	Experimental Group (n=30)	p-value
Age (years)	19.1 (SD=1.0)	19.3 (SD=1.2)	0.75
Gender (% male)	50%	47%	0.82
Pre-test (% correct)	52.3% (SD=12.3)	51.8% (SD=12.5)	0.68

Table 2. Vocabulary Performance: Control vs. Experimental Group.

Measure	Control Group	Experimental Group	Advantage
Immediate Retention	65.3 % (SD=10.5)	75.2 % (SD=10.1)	+9.9 %
Delayed Retention	48.7 % (SD=14.1)	65.3 % (SD=12.8)	+16.6 %
Motivation (1-5)	-	4.4 (SD=0.7)	-

Note. All $p < 0.001$. Motivation assessed in Group B only.

4. Discussion and conclusion

Results indicated that context-based quizzes outperformed word lists across all measures, confirming active recall benefits through authentic scenarios. The test format may have contributed to the quiz group's advantages and could explain the large effect sizes. Gap-fill items requiring terminology application in context aligned closely with their training, while the control group only practiced isolated repetition.

The results bridge language acquisition theory with effective ESP practice, confirming that words learned in meaningful engineering context enhance long-term retention (Rosandić & Štefić, 2025). Contextual quizzes requiring gap-fill responses fostered critical thinking by demanding precise technical term selection within authentic scenarios, matching real engineering tasks. ESP instructors are encouraged to adopt scenario-embedded quiz platforms featuring immediate feedback and spaced repetition as core technical English curriculum components. Future research with larger randomized samples across ESP disciplines (nursing, mechanical engineering, IT) could confirm generalizability and long-term impacts.

5. Limitations

This quasi-experimental design using intact classes limits causal certainty. Group B's combined approach (contextualization + feedback + hints) precludes isolating single factors. Additionally, the instructor's previous practice of identical exercises with Group B offered them extra preparation not given to Group A. The sample (n=60) from only one Croatian faculty also limits broad generalizability.

References

- Alqahtani, M. (2015, September 20). The importance of vocabulary in language learning and how to be taught. *International Journal of Teaching and Education*, III(3), 21-34. <https://doi.org/10.20472/TE.2015.3.3.002>
- Hutchinson, T., & Waters, A. (1987). *English for specific purposes: A learning-centred approach*. Cambridge: Cambridge University Press.
- McCarthy, M. (1990). *Vocabulary*. Oxford: Oxford University Press.
- Murali, V., Chaitanya, E. K., & Sucharan Reddy, R. (2024). Building bridges: Enhancing engineering students' English skills for global success. *International Journal of Research Publication and Reviews*, 6(2H), 273-278. <https://doi.org/10.33545/26648717.2024.v6.i2h.273>
- Nation, I. S. P. (2001). *Learning vocabulary in another language*. Cambridge: Cambridge University Press.
- Nation, I. S. P., & Webb, S. (2011). *Researching and analyzing vocabulary*. Heinle Cengage Learning.
- Rosandić, Ž., & Štefić, A. (2025). The influence of context-based learning on the acquisition and retention of ESP collocations. In *Jezik struke: pristupi i strategije* (pp. 327–340). Foreign Language and Literature Association of Serbia (FLLAS). https://doi.fil.bg.ac.rs/pdf/eb_ser/lsp/2025-6/lsp-2025-6-ch23.pdf
- Schmitt, N. (2000). *Vocabulary in language teaching*. Cambridge: Cambridge University Press.