

Yamshinska Nataliia, Kutsenok Neonila, Meleshko Inna

(Igor Sikorsky Kyiv Polytechnic Institute, Kyiv)

HOW ONLINE COLLABORATION ENHANCES VOCABULARY LEARNING IN ENGLISH FOR ENGINEERING PURPOSES (EEP)

In the 21st century, engineers operate in globalized environments where effective communication in English is crucial. English for Engineering Purposes (EEP) has become a key component of professional development, emphasizing technical vocabulary, precision, and intercultural competence. Traditional classroom instruction, while effective to a degree, often limits authentic communication opportunities.

Recent advances in digital technology have introduced online collaborative learning environments, such as virtual exchange projects, shared design tasks, and international student networks. These platforms enable engineering students from different countries to communicate in English, solve problems collaboratively, and use domain-specific terminology in authentic contexts.

This study explores how online collaboration supports vocabulary acquisition in EEP, analyzing both the linguistic and social dimensions of learning.

Literature Review. The integration of online collaborative learning (OCL) into English for Engineering Purposes (EEP) has gained considerable attention over the past decade as engineering education becomes increasingly internationalized. Research conducted by John D. (2024), Azmuddin et al. (2022), Jeong, Kyeong-Ouk (2019), Santos M. (2012), and Kubi, P. A., & Annan, J. (2020) indicates that technology-mediated interaction supports the development of both linguistic and professional competencies among ESL engineering students, boosts the motivation and engagement of students in learning languages. Across these studies, OCL is presented as a means to move beyond traditional grammar-translation or individual learning models toward communicative, task-based, and socially constructed language development.

Recent research by Casañ-Pitarch, Candel-Mora, Demydenko, and Kornieva (2024) provides fresh empirical evidence of how telecollaborative tasks and project-based online learning enhance language acquisition in higher education. Their study involved foreign-language students participating in international virtual exchanges that required

joint project work, shared presentations, and peer feedback. The results demonstrated significant improvements in communicative competence, disciplinary vocabulary, and cultural awareness. The authors emphasize that task authenticity and interactivity are crucial to successful online collaboration, as students learn language more effectively when it is used to solve real-world problems relevant to their academic or professional field.

A study by Alyafaei and Mudhsh (2023) highlighted that OCL significantly improves EFL students' writing abilities. The collaborative environment fosters mutual scaffolding, allowing students to provide feedback and suggestions to each other, thereby enhancing their writing performance. This approach also promotes greater participation and collaboration among students, leading to improved writing outcomes.

Butarbutar M. (2023) emphasized that OCL facilitates flexible learning modes for practicing and developing speaking skills in EFL contexts. Through collaborative activities, interactive group projects, and peer feedback, students can engage in meaningful communication, thereby improving their speaking proficiency.

Elbaoui Shaddad and Jember (2024) explored the combined impact of feedback-supported tasks and peer-work activities on learners' engagement, self-esteem, and language growth. Their findings indicated that such collaborative practices not only enhance language skills but also boost learners' confidence and active participation in the learning process.

Oyarzun, B., & Martin, E. (2023) conducted a systematic review of research on online learner collaboration, examining collaboration technologies, design, facilitation, and outcomes. Their analysis underscores the importance of well-designed collaborative activities and effective facilitation in achieving positive learning outcomes in online environments.

Technology-Mediated Learning Environments and Platforms. Recent studies have explored various technological platforms to enhance vocabulary acquisition in English for Engineering Purposes (EEP) through collaborative learning. These platforms leverage digital tools to facilitate interactive, peer-based learning experiences, fostering the development of domain-specific vocabulary among engineering students.

Moodle: A study by Wambua A. (2025) examined the use of Moodle's interactive tools in a problem-based learning (PBL) environment. The research highlighted that tools such as forums, wikis, and glossaries enabled students to collaboratively engage with technical content, enhancing their understanding and retention of engineering vocabulary.

Google Docs: John D. (2024) investigated the use of Google Docs for real-time collaborative writing among engineering students. The study found that features like simultaneous editing and revision history tracking facilitated peer feedback and collaborative vocabulary development in technical writing tasks.

iREAD Discussion Forums: Azmuddin et al. (2022) explored the use of iREAD discussion forums to annotate and debate English for Science and Technology (EST) texts. The research indicated that this platform supported collaborative engagement with technical texts, improving reading comprehension and vocabulary acquisition among Malaysian engineering students.

Collaborative Online International Learning (COIL) Programs: Kubi, P. A., Annan, J. examined COIL programs that employed a mix of digital media and asynchronous/synchronous communication tools to connect global teams. The study highlighted that such programs facilitated cross-cultural collaboration, enhancing the acquisition of specialized engineering vocabulary through shared projects and discussions.

Across these contexts, technical affordances such as real-time editing, asynchronous discussion threads, multimedia integration, and cross-cultural collaboration were reported to enhance motivation, engagement, and vocabulary acquisition. However, several studies lacked sufficient methodological detail about platform use, limiting comparability and replication.

Reported Benefits of Online Collaboration.

Across all studies, OCL resulted in improvements in:

Language proficiency (reading, writing, vocabulary accuracy).

Collaborative and communicative competence (peer feedback, negotiation, teamwork).

Intercultural awareness and digital literacy.

Motivation and learner autonomy.

These benefits reflect the principles of connectivism (Siemens, 2005), where knowledge is distributed across networks and learning occurs through active participation. The blended use of synchronous and asynchronous communication fosters flexibility, reflection, and deeper language processing.

Challenges and Limitations.

Despite overall positive outcomes, researchers identified several limitations:

Group dynamics: unequal participation and social loafing (John, 2024).

Technical barriers: unstable internet, platform unfamiliarity (Azmuddin et al., 2022).

Methodological gaps: small sample sizes, limited control groups, lack of quantitative measurement.

Pedagogical constraints: insufficient scaffolding and teacher feedback.

These issues indicate that successful OCL for ESL engineering students requires structured guidance, reliable technology, and well-designed tasks that balance linguistic and technical goals.

Conclusions. Existing studies provide convergent evidence that technology-mediated collaboration benefits ESL engineering learners by promoting engagement, communication, and content-specific language use. The literature supports a shift toward interactive, contextualized, and globally connected models of English learning. Nevertheless, further empirical investigation is required to identify how online collaboration specifically enhances vocabulary acquisition and to determine best practices for implementing such programs at scale. The reviewed evidence suggests that online collaboration effectively supports English language development in engineering contexts, particularly when it integrates authentic technical content and intercultural interaction.

However, most studies focused on writing and reading skills; few examined vocabulary acquisition as a distinct learning outcome. Additionally, limited attention has been given to long-term retention, quantitative vocabulary gains, or the role of AI-supported tools in enhancing lexical learning.

This gap underscores the need for new research exploring how virtual collaboration tasks can systematically enhance vocabulary learning in EEP, combining linguistic assessment with analysis of interactional data.

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