Tema

USING LEARNER CORPORA TO INFORM MATERIAL DEVELOPMENT AND CLASSROOM PRACTICES

This article examines how a university in Japan uses a longitudinal learner corpus to bridge the gap between research and classroom practice in a two-year English for Academic Purposes (EAP) program. This large-scale longitudinal corpus comprises texts collected from first- and second-year Japanese university L2 English learners (n = 701) at multiple points of time and across different writing prompts. Insights gained from an analysis of this corpus are then used to develop materials tailored to learners' backgrounds and proficiency levels, allowing for classroom practices that target student needs. The article contributes to the dialogue between research and practice by demonstrating how learner corpora can inform teaching and enhance language education.

Gavin Brooks
| Kyoto Sangyo University, Kyoto, Japan
Jon Clenton
| Hiroshima University, Hiroshima, Japan
Jennifer Jordan
| Kwansei Gakuin University, Sanda, Japan

Introduction

While corpora have a long history in applied linguistics, advancements in corpus compilation and analysis tools have significantly increased their value in classroom materials development (Brezina et al., 2019; Gablasova et al., 2019). One area of corpus linguistics that has become especially important for applied linguists and educators is learner corpora, which reflect the type of language that teachers are likely to see in the classroom (McEnery & Xiao, 2011). Learner corpora can be especially useful in materials development as they can aid in understanding what words learners use at different proficiency levels. This is important because the language of learners' L2 texts has been shown to be proficiency (e.g., Treffers-Daller et al., 2018) and task-dependent (Tavakoli & Foster, 2011).

As Mitchell and Myles (2024) demonstrate in their analysis of classroom corpora, corpora can be especially valuable in better understanding how learners use language in the classroom. Their work with the 'Learning French' corpus shows how analysing vocabulary use in authentic classroom contexts can reveal patterns that inform pedagogical practice, particularly regarding which words should be prioritised for instruction. This type of insight is especially true for Japanese university students, who typically enter university with an English vocabulary of about 2,000-4,000 words, with knowledge being more receptive than productive (Mizumoto & Takeuchi, 2009). This results in inadequate vocabulary for academic writing, impacting their success (Wadden et al., 2018). However, because their vocabulary acquisition has often been driven by exam preparation and explicit vocabulary learning, their patterns of vocabulary knowledge can differ significantly from those found in frequency lists (Brooks et al., 2025) such as the British National Corpus / Corpus of Contemporary English (BNC/COCA) word lists (Nation, 2020) or the Academic Word List (AWL, Coxhead, 2000). Learner corpora can help to mitigate this issue

by providing teachers with information about the language behaviour of learners with specific language and proficiency profiles (Gilquin, 2024).

This study analyses word presence, frequency, and range in learner essays to identify vocabulary patterns predicting proficiency, differentiating TOEFL score bands, and informing pedagogically useful word lists for Japanese university English for Academic Purposes (EAP) programs. This article first introduces the corpus and then explores its implications for university English language classrooms in Japan, specifically focusing on best practices for material development.

"This large-scale longitudinal corpus comprises texts collected from first- and second-year Japanese university L2 English learners (n = 701) at multiple points of time and across different writing prompts."

Background

Learner Corpora in EFL

Before we describe how we use corpora to assist material development in our context, we first need to briefly outline what learner corpora are, what they can tell us about learner language use, and what techniques can analyse the vocabulary found in these corpora. Learner corpora are electronic collections of texts produced by language learners (Granger, 2015). In the past, these corpora have been collected and used in several contexts. Some learner corpora, especially small-scale corpora, are collected and used by educators as part of regular classroom activities (Callies, 2019). These corpora are useful as they can help identify grammatical or lexical problems a specific group of learners is having and give examples of appropriate and inappropriate language use in a context that is familiar to the learners. Hicks and Studer (2024), for example, noted that their findings from the rich and authentic Swiss Learner Corpus SWIKO could help improve pedagogy and assist in creating differentiated teaching materials suitable for diverse classrooms. However, despite recent increases in the number of learner corpora available to teachers, along with the development of more and simpler tools to understand them, learner corpus linguistics has still not found a place in most language classrooms (Ma et al., 2023, Pérez-Paredes, 2022). Studies have shown that there are many reasons for this resistance: it can be time-consuming for learners to analyse language data and for teachers to select appropriate language data, teachers may lack confidence or skills necessary to use corpora in their classrooms, and corpus learning may be incompatible with their already packed teaching schedules (Ma et al., 2023). These practical and pedagogical barriers persist despite the growing availability of user-friendly interfaces and targeted training materials, suggesting that the issue extends beyond mere technical accessibility to deeper questions of pedagogical integration and institutional support. However, studies also show that this type of data-driven learning can be beneficial for students, and there is a pressing need for research that makes it more accessible to teachers across a variety of teaching situations (Pérez-Paredes, 2022).

The Importance of Learner Corpora for Vocabulary Instruction

One area where corpus linguistics has been useful is vocabulary acquisition. Recent improvements in computer programs have made it easier to analyze corpus vocabulary. As a result, it is possible to assemble larger corpora (for example, the 2020 English Web Corpus comprises over 38 billion words) as well as domain-specific corpora (e.g. Coxhead & Demecheleer, 2018; Green & Lambert, 2019; Lei & Liu, 2016). This has yielded improved frequency measurements for both general and domain-specific vocabulary. The same tools (e.g. NLP programs such as spaCy and R and Python packages such as Korpus) that have made the large-scale corpora possible have also made it easier to compile and investigate smaller learner corpora collected in local contexts, facilitating examination of specific L2 learner groups' vocabulary use for research and pedagogical purposes.

Gavin Brooks: Lecturer at Kyoto Sangyo University. Specialises in lexical diversity, L2 writing, and learner corpora. His recent work explores vocabulary knowledge and providing support for EAL learners in international school contexts.

Jon Clenton: Associate Professor at Hiroshima University. Specialises in L2 vocabulary acquisition, psycholinguistics, and language assessment. Co-author of a number of texts including Vocabulary and the Four Skills (Routledge, 2021).

Jen Jordan: Director of the English Language Program at Kwansei Gakuin University. Focuses on corpus linguistics, multi-word sequences, and writing pedagogy. She researches the application of linguistics to classroom practice.

For example, Treffers-Daller et al. (2018) analyzed written texts collected from 176 L2 learners to show that measures of lexical diversity predict learner CEFR levels. Research into learners' L2 spoken texts has also shown similar connections between vocabulary use and proficiency measures, such as fluency (e.g., Clenton et al., 2021; de Jong et al., 2013; Uchihara & Saito, 2019).

According to Gilquin (2024), learner corpora provide valuable insights into L1-influenced vocabulary usage and the challenges faced by various learner populations. She shows that learners with different L1 backgrounds produce distinctive non-standard combinations with high-frequency verbs, such as L1 Chinese-speaking learners using "make" with "party" because of L1 transfer, or L1 French-speaking learners' production of combinations like "make a poll" instead of the more standard "carry out/conduct a poll". By identifying these L1-specific patterns, Gilquin argues that learner corpora enable the development of pedagogical materials tailored to specific learner groups rather than relying on the more generic approaches that large corpora, such as the BNC or COCA, derived from L1 texts provide. This is supported by research from others, such as Forti (2024) who further demonstrates how proficiency-rated learner corpora serve as promising resources for data-driven learning, enabling students to become autonomous learners through direct engagement with authentic language patterns at their appropriate level. This autonomy emerges when learners use corpus tools to independently formulate queries, identify patterns in concordance lines, test hypotheses about usage, and self-correct errors based on frequency data, transforming them from passive recipients into active researchers of language (Forti, 2024).

Using Corpora to Inform Pedagogy and Material Development

The learner corpora discussed above provide a rich understanding of real-world classroom language. By informing the choice of pedagogical interventions for specific learners and contexts, and by identifying linguistic areas needing support, the analysis of learner corpora assists teachers and materials developers (McEnery & Xiao, 2011). For example, Mitchell and Myles (2024), used learner corpora to show how successful vocabulary learning correlates with several different elements, including focused practice, multimodal support, and the chance to link oral and written forms and in doing so, provide an empirical foundation for developing more effective vocabulary instruction approaches. In Japanese EAP settings, this is highly relevant because instructors need to make strategic choices about which vocabulary to emphasize and how to best integrate it into the course.

The current study

Building on prior research, this study uses a large-scale longitudinal corpus to enhance the program's teaching methods. We also hope these findings will be applicable to other teaching environments. To that end, the following three research questions are examined:

RQ1. To what extent does lexical diversity in L2 academic writing vary across TOEFL proficiency bands in a Japanese university EAP context?

RQ2. How does lexical sophistication, as measured by Age of Exposure (AoE, a standardized measure of lexical sophistication an estimate of how early in reading development first-language readers are typically exposed to a given word, Botarleanu et al., 2022), differ between proficiency levels in learner essays?

> "... our finding that learners with higher language skills used fewer sophisticated words than those with lower skills may seem counterintuitive at first. However, these findings align with previous corpus-based research [...] suggesting that proficient writers are able to more skillfully balance accessible, high-frequency vocabulary with appropriate specialised terms, prioritising clarity and coherence over complexity."

RQ3. To what extent can lexical diversity (breadth of vocabulary usages) and lexical sophistication (depth of vocabulary knowledge) differentiate between low-, mid-, and high-proficiency learners, after controlling for essay topic and individual student effects?

Methodology: The School of Policy Studies (SPS) Corpus of Written Texts

The SPS corpus comprises written texts from Japanese university students enrolled in an EAP program. For this study, we analysed essays from 701 students across multiple proficiency levels, producing 2,085 texts over two semesters. All text processing was conducted using Python 3.x with spaCy (v3.7) for lemmatization, the lexical-diversity package (v0.1.1) for vocd-D calculations, Age of Exposure scores from Botarleanu et al. (2022), and statsmodels (v0.14) for mixed-effects regression analyses.

Context and Participants

Participants were first and second-year students at a private university in Western Japan who were streamed by TOEFL scores into three proficiency bands (low, mid, and high). All students were enrolled in a required English program comprising four weekly 100-minute academic English courses each semester, including academic writing classes. The program was developed and delivered by 11 full-time coordinators alongside 35 part-time instructors. For the purpose of this study, we followed the procedures used by Tannenbaum & Baron (2011) and mapped the participants' TOEFL scores to CEFR levels using ETS's official cut scores (A2≥343, B1≥433, B2≥543, C1≥620). Because our sample ranges from 337–497, participants were classified into three groups: Below A2, A2 (343–432), and B1 (433–497); no essays reached the B2 threshold.

Corpus Design

The corpus includes four academic essays collected across two years of study. Students produced these essays as part of their regular coursework, representing different periods and complexity levels in the program. During essay preparation, participants could use dictionaries, either digital or paper based, and had time outside class to complete their work, reflecting authentic university-level writing conditions rather than exam settings. To ensure authentic student writing without external assistance, we implemented multiple safeguards. First, students completed essay outlines in supervised classroom conditions. Essays were then verified through Turnitin and reviewed by instructors to confirm alignment with the original outlines and expected proficiency levels. When essays showed potential signs of translation software or external help, we compared them with verified writing samples from the same student. In cases of mismatch, students provided oral summaries to their instructors to verify authorship. Importantly, data collection occurred between 2022 and 2023, predating the mainstream adoption of ChatGPT and similar AI writing tools, though we acknowledge this as an evolving concern for future research. The topics were both personal and academic, ranging from describing their favourite place to comparing the education systems of Japan and Finland.

Analysis and Results

We employed mixed-effects linear regression models to examine how lexical measures varied across proficiency levels, controlling for individual student variation and assignment effects. This approach allowed us to account for the repeated-measures structure of our data, as each student contributed multiple essays.

Analytical Approach

Our investigation examines how lexical diversity (measured by vocd-D) and sophistication (measured by Age of Exposure, AoE, Botarleanu et al., 2022) vary across proficiency bands and assignments. Lexical diversity refers to the variety of different words used in a text and measures how often writers use different vocabulary instead of simply reusing the same words (Jarvis, 2013). Higher diversity indicates richer vocabulary use and has been shown to correlate with L2 proficiency and writing quality (Malvern et al., 2004). To measure lexical diversity, we used the vocd-D measure, which calculates diversity through mathematical modelling of how the type-token ratio changes across random samples of different sizes from the text, making it

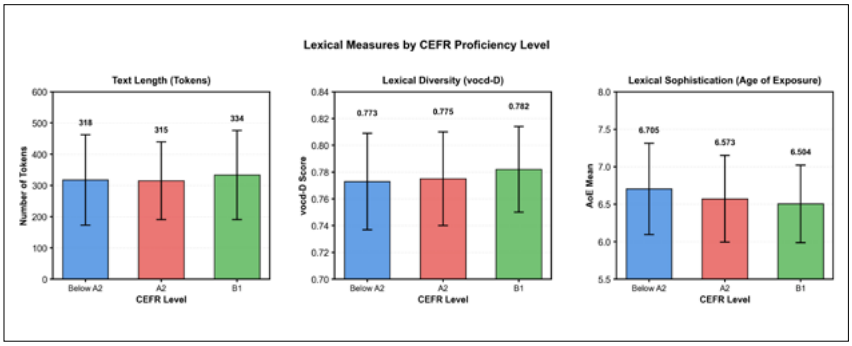

Figure 1

Descriptive Statistics by TOEFL Band

Measure	Proficiency Level	Coefficient	p-value	Interpretation
Lexical Diversity	Below A2	Reference	-	Baseline category
Lexical Diversity	A2	0.044	0.503	No significant difference from low proficiency
Lexical Diversity	B1	0.241	0.001*	Higher diversity than low proficiency

*Statistically significant at p<0.05

Note: Based on mixed-effects models analysing 2,085 essays from 701 students, controlling for assignment effects. Coefficients represent standardised effect sizes relative to the low proficiency group.

Table 1

Effects of Proficiency Level on Lexical Diversity (vocd-D)

Measure	Proficiency Level	Coefficient	p-value	Interpretation
Lexical Sophistication	Below A2	Reference	-	Baseline category
Lexical Sophistication	A2	-0.204	<0.001*	More common vocabulary than low proficiency
Lexical Sophistication	B1	-0.300	<0.001*	More common vocabulary than low proficiency

*Statistically significant at *p*<0.05

Note: Based on mixed-effects models analysing 2,085 essays from 701 students, controlling for assignment effects. Coefficients represent standardised effect sizes relative to the low proficiency group.

Table 2

Effects of Proficiency Level on Lexical Sophistication (AoE)

relatively robust to text length differences while capturing the overall vocabulary variety (Malvern et al., 2004).

AoE was chosen as our sophistication measure because it provides a developmentally-grounded assessment of word complexity that aligns well with L2 vocabulary acquisition patterns. Age of Exposure 2.0 (Botarleanu et al., 2022) builds on earlier estimates of the age at which first-language speakers are likely to acquire specific vocabulary, which rely on adult participants retrospectively estimating when they learned words or on limited child-derived data from picture-naming tasks. Instead, AoE 2.0 estimates how early readers are typically exposed to a word by simulating the human word learning process through iterative word2vec models trained on progressively larger corpora. This generates scores that can be used to predict each word's relative exposure age.

Mixed-effects models were used to account for both fixed effects (proficiency level and assignment type) and random effects (individual student variation). The primary predictor was TOEFL proficiency band (low, mid, high), with assignment type included as a control variable (see Figure 1 for the descriptive statistics). This approach enabled us to identify systematic differences between proficiency groups while accounting for topic-induced variance in lexical metrics. The large sample size (701 students) provides statistical robustness for identifying meaningful patterns in vocabulary development across proficiency levels.

Key Findings

Lexical Diversity: High-proficiency learners showed significantly greater lexical diversity in their writing compared to low-proficiency learners (see Table 1). Essays written by high-proficiency students had vocd-D scores of approximately 0.24 standard deviations higher than those by low-proficiency students ($p < 0.01$), showing they used a more diverse vocabulary and drew from a broader lexicon. Interestingly, there was no statistically significant difference between the low and mid proficiency groups, suggesting that lexical diversity may only show marked improvement at higher proficiency levels.

Lexical Sophistication: Our analysis revealed an inverse relationship between proficiency and AoE scores that aligns with effective academic writing practices (see Table 2). Both mid-proficiency (β=-0.20, p<0.001) and high-proficiency writers (β=-0.30, p<0.001) had significantly lower AoE values than low-proficiency writers. This pattern suggests that higher-proficiency students employed a greater proportion of common, high-utility vocabulary while effectively explaining complex topics. In contrast, lower-proficiency students often relied heavily on topic-specific technical vocabulary, especially those words in the prompt and instructions, and tended not to make use of the general vocabulary needed to develop ideas fully. This finding reflects that advanced writers strategically balance specialised terminology with accessible language to convey complex ideas clearly.

Assignment Effects: We observed significant effects of assignment type on both lexical measures, confirming that essay topics influence vocabulary usage. More academically demanding topics elicited both greater lexical diversity and more sophisticated vocabulary. The mixed-effects model showed significant assignment effects (p < 0.05) for both measures, though these effects were smaller than the proficiency-level differences. This finding highlights the importance of considering task characteristics when developing materials for vocabulary instruction.

Discussion

The study explored vocabulary use in essays written by Japanese university students in an EAP program, focusing on how lexical diversity and sophistication changed based on their TOEFL scores. Our findings helped us to address the three research questions we began this study with.

RQ1 asks, to what extent does lexical diversity in L2 academic writing vary across TOEFL proficiency bands? Our analysis illustrated that students in the highest proficiency band showed significantly greater lexical diversity in their written texts compared to the lower proficiency bands. Interestingly, the difference between low- and mid-proficiency learners was minimal, suggesting that only at higher proficiency levels does lexical diversity tend to significantly increase. This confirms previous research (Henriksen & Danelund, 2015; Uchihara & Clenton, 2020) showing learners often stick to familiar words ("lexical teddy bears") unless encouraged to use a wider range of vocabulary. This has implications for teaching, which we'll discuss below.

Regarding RQ2 (the relationship between lexical sophistication, AoE, and proficiency), our finding that learners with higher language skills used fewer sophisticated words than those with lower skills may seem counterintuitive at first. However, these findings align with previous corpus-based research (Gilquin, 2024; Treffers-Daller et al., 2018), suggesting that proficient writers are able to more skillfully balance accessible, high-frequency vocabulary with appropriate specialised terms, prioritising clarity and coherence over complexity. The ability to draw upon a large set of well-known core vocabulary and to use it with greater precision, fluency, and range is one hallmark of higher-proficiency learners in our dataset. Conversely, low-proficiency learners appeared to over-rely on task prompts' topic-specific vocabulary, potentially limiting their ability to communicate ideas clearly.

RQ3's combined analysis shows lexical diversity and sophistication clearly distinguish between high and low proficiency levels, with lexical diversity being especially indicative of advanced proficiency. This finding highlights the practical value of explicitly teaching students not only individual words but also how and when to use a broader range of vocabulary in their writing.

Finally, the significant influence of essay topic (assignment effects) further underscores the importance of considering task-specific vocabulary needs when developing teaching materials. Together, these findings affirm the value of the learner corpus analyses for informing targeted instructional interventions.

Pedagogical Implications

In closing, our results offer three clear, actionable steps for EAP educators and materials developers, especially in Japanese universities; we will outline these now.

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First, our findings highlight the value of explicitly prioritising the productive mastery of high-frequency vocabulary that is applicable across a wide range of genres and tasks. While not exclusively academic in nature, much of this vocabulary falls into what we could consider core academic words. Because such vocabulary forms a shared resource for academic writing, it enables students to participate more effectively in varied communicative situations, regardless of topic or discipline. Beyond genre flexibility, a strong command of this core vocabulary also gives learners the tools to paraphrase ideas and avoid unnecessary repetition, thereby improving diversity and sophistication in their writing. Rather than encouraging students to memorise increasingly obscure words, instructors should provide extensive classroom practice opportunities where learners meaningfully use core academic words in authentic written contexts. For Japanese university students, who often come with vocabulary knowledge skewed towards receptive familiarity rather than productive mastery (Mizumoto & Takeuchi, 2009), this represents a crucial instructional shift.

Second, given the lack of substantial lexical diversity growth between low and mid-proficiency groups, intermediate learners appear especially likely to benefit from materials and instruction designed to have them use a wider range of vocabulary. Classroom activities should explicitly target vocabulary expansion strategies, such as extensive reading, guided writing practice, and teacher-led vocabulary workshops, encouraging students to expand their active vocabulary repertoires beyond familiar lexical choices.

Third, an essential pedagogical insight from our learner corpus analysis is that materials should explicitly teach vocabulary use, not simply vocabulary meaning. This need to teach vocabulary use rather than isolated meanings aligns with Nation's (2013) framework of word knowledge, which identifies nine aspects of knowing a word, including not only form and meaning but crucially receptive and productive knowledge of grammatical functions, collocations, and constraints on use. As Webb and Nation (2017) emphasise, productive vocabulary knowledge, or knowing how to use words appropriately in context, develops more slowly than receptive knowledge and requires deliberate practice with the word's collocational patterns, register constraints, and discourse functions. As a result, learners often rely on comfortable, familiar lexical items because of limited instruction on actual usage contexts. Thus, teachers must move beyond simple memorisation-based approaches (Kikuchi, 2009), incorporating structured tasks and explicit instruction on effective vocabulary use. For example, classroom materials could present vocabulary in various contexts, include authentic text models at multiple proficiency levels, and provide extensive opportunities for productive practice and targeted feedback.

Our institution is already adapting our teaching materials based on students' learning profiles. By grounding material development in actual learner data, teachers acquire practical insights into real lexical usage and challenges encountered by learners, leading to refined materials more closely aligned with students' authentic needs. A crucial next step is to conduct classroom-based assessments and action research to determine the real-world effectiveness of the revised materials.

Future Directions

This study shows how learner corpora can inform targeted instruction. Future research should empirically evaluate whether corpus-informed vocabulary instruction leads to measurable improvements in learner vocabulary development through pre- and post-testing or longitudinal tracking. Encouraging more teachers to compile smaller-scale, local learner corpora could significantly enrich our understanding of context-specific vocabulary usage. We also intend to expand the analysis of our corpus to consider its longitudinal nature, hoping this will reveal valuable insights into vocabulary acquisition patterns, further refining the precision of pedagogical interventions.

Conclusion

Learner corpora represent an indispensable resource, offering teachers and materials developers clear, actionable insights into students' authentic language use. While learner corpus research has historically received less attention than studies based on L1 corpora, its practical relevance for classroom practice is clear from our findings. Our study illustrates that successful academic writing in EAP contexts depends primarily on learners' effective deployment of common academic vocabulary, rather than introducing specialized or rare terms.

As language educators, we have the responsibility and opportunity to leverage learner corpora directly in our teaching and material design, ultimately fostering improved vocabulary acquisition and enhanced learner autonomy. The SPS corpus, and similar learner corpora, hold immense potential for positively influencing language learning in university EAP contexts. We encourage teachers and researchers alike to engage with these valuable tools, confident in their ability to enhance instructional effectiveness and learner success.

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