

Introduction of bridging and hugging techniques in EAP Course

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ABSTRACT

The purpose of this paper is to examine whether a course on English for Academic Purposes (EAP) at a Japanese university could advance a group of third-year university students (N=14) who had recently completed a five-month study abroad programme. By introducing a series of bridging and hugging techniques in class activities over the academic year, it was conceived that their academic writing skills would improve in terms of lexical and syntactic complexity as they were encouraged to foster greater critical thinking and academic skills. With very little research into developing L2 skills post study-abroad, this paper aimed at improving English proficiency through EAP classes by contrasting two essays—one written at the end of the first term, the other at the end of the second term. The data showed a noticeable syntactic and lexical complexity improvement through quantitative analysis. The findings indicated that students were able to successfully alter syntactic complexity in terms of the length of the production unit, coordinate phrasing, the degree of phrasal sophistication, and the range of verb phrases. Progress was also observed in lexical complexity with positive alterations in verb sophistication, type-token ratio, and verb variation. Such improvement was most likely a result of directly prescribing bridging and hugging techniques into their EAP course. This paper, therefore, recommends both bridging and hugging techniques to develop the necessary skills for Japanese students to cope with EAP courses and further develop their proficiency in academic English.

key words; English for academic purposes, critical thinking, syntactical complexity, lexical complexity, hugging, bridging

1. Introduction

To prepare university students to participate in global academic activities effectively, EAP (English for Academic Purposes) courses have become readily available in Japanese universities. Such courses claim to aptly equip students with the necessary skills for writing various kinds of academic papers. Although sounding impressive, it is apparent that focusing on such skills will not necessarily ensure progress in each student's aptitude for research and writing at a suitable, consistent level for academia in other international universities. While EAP aims to help students with academic language skills develop academic study and research skills (Hyland & Hamp-Lyons, 2002; Hyland 2006), often such courses aim to enhance communicative skills in English by bridging the gap in English proficiency while concentrating on second language acquisition that enables students to achieve future academic success (Jordan, 1997) such as taking notes in lectures, delivering presentations, and engage actively in group discussions (Hyland & Hamp-Lyons, 2002). In reality, such courses are often through the adherence to academic textbooks, which claim to be academic due to their challenging reading content, authentic listening tasks, tailored language support with extensive incorporation of academic vocabulary and grammar (Hyland, 2006), and relevant task-based activities that claim to encourage improvement in the student's writing. However, all these aspects are either passively introduced into the classroom or focused on active learning that concentrates on the lower-order skills of Bloom's Taxonomy (Defianty & Wilson, 2019; Li, 2016). They do not encourage students with critical thinking and engage them in their own student-driven inquiry (Spack, 1988; Widdowson, 1984). This paper, therefore, is concerned about how to provide approaches to acquiring the necessary skills to write at an acceptable postgraduate level writing at an international university. Central to the goal of EAP courses should be that the skills learnt can be successfully applied in their necessary discipline without having a detrimental impact on their performance in discipline courses (Leki & Carson, 1997). Considerations of such aspects would require students to play a far greater active involvement in EAP (Skyrme, 2007). Students would, therefore, not only need to develop skills in EAP but successfully apply them in the classroom by stretching their abilities and driving real impetus into their English studies.

There has been a steady body of research regarding qualitative analysis via interview or self-reported perceptions into aspects of awareness learning transfer in the col-

lege writing context (for example, Barnett & Ceci, 2002; Bergmann & Zepernick, 2007; Fraizer, 2010; Green, 2015; James, 2010; Jwa, 2019; Wardle, 2007; Zarei & Rahimi, 2014). However, little research has been attempted to correlate how EAP courses could actually improve the academic capabilities of the students except through specific forms of rubrics without subjective evaluation. There needs to be more accountability for the students to strengthen their abilities at a higher level. This paper, therefore, looks at how a group of third-year university students could improve their writing skills in terms of lexical and syntactic complexity as they were encouraged to foster more significant critical thinking and academic skills through a series of in-class bridging and hugging techniques over the academic year.

2. Literature Review

EAP is a field of research and instruction that deals with the English needed by those who use the language to perform academic tasks such as publications in academic journals or/and conducting academic presentations in discipline courses (Charles, 2012). To be successful, it is not simply mastering English at a proficient level but having the means to transfer these skills to another context. However, such transfer often involves drawing the learners' attention to similarities between contexts in order to prompt them to transfer certain skills. Doing so would not result in an authentic transfer due to the level of prompting involved, and an authentic transfer without prompting would be difficult to achieve (Detterman, 1993). On the other hand, by providing clear opportunities for students to synthesize in classroom tasks and assignments, these students' knowledge of synthesizing may not be transferred and instead become inert (Larsen-Freeman, 2013; Shrestha, 2017; Yayli, 2011). To be more successful at transferring such inert knowledge without prompting, it is necessary to provide the following two techniques: bridging and hugging (see Table 1; Perkins and Salomon, 1992).

Bridging is a technique that involves learners transferring general knowledge and skills to contexts that may not share similar tasks or activities. Explicit bridging strategies focus largely on metacognition and inferential reasoning (Butterfield & Nelson, 1989), such as encouraging students to explicitly plan, monitor and reflect on their thinking in completing an assignment or helping them to identify analogies between what they have learnt and somewhat different applications. Learners engage in this transfer by abstracting their general knowledge and skills, making them applicable to diverse contexts (Ford,

Table 1: Hugging and bridging techniques to be employed in EAP classes (James, 2010).

Aspect	Hugging	Bridging
Definition	Instruction to students of the necessary English language and study skills to complete their academic studies and research.	Making connections between new and existing knowledge or experiences to facilitate understanding and transfer of learning.
Cognitive Process	Although lacks the effort to relate new information to existing knowledge; focuses solely on the surface-level understanding, it introduces key skills necessary for future academic learning.	Involves actively seeking similarities, analogies, or relationships between old and new information and applying them to new tasks.
Depth of Understanding	Often leads to shallow understanding as new information is not connected to prior knowledge or experiences unless applied in a more effective and purposeful manner.	Facilitates deeper comprehension and retention of new information by integrating it into existing cognitive frameworks.
Transfer of Learning	Limits transfer of learning as new information is not integrated into existing cognitive structures, making it difficult to apply knowledge in varied contexts unless the connections are made apparent to the learner.	Enhances transfer of learning to new contexts by building on existing knowledge and applying it to different situations.
Example	A student being taught strategies and key phrases in disagreeing with others in group discussion and analysing their effectiveness in seminar essay discussions.	A student learning about building counterargument sentences in a paragraph which is based on prior knowledge of writing, and applying to other paragraphs to understanding the process better.

2004; James, 2010, Yayli 2011). For example, discipline instructors may encourage students to apply a basic argument structure learnt in their EAP course to various types of writing tasks, such as report writing, case study analysis, or research paper composition across different disciplines. This exemplifies abstraction because it necessitates learners to transfer the argument structure from one writing task to another, even when the content or context varies. Coursebook tasks are suitable in such cases as they provide numerous examples of identifying particular knowledge content or skills and then applying them to post-reading/listening tasks.

Hugging, conversely, is a technique that involves learners engaging in activities akin to those they will perform in future contexts. These strategies aim to close the perceptual gap between the learning and the target domains, mainly by emphasising the similar features between the two by, for example, modelling, using role play and simulation (James, 2010), or simply alerting learners to opportunities to use their learning in new contexts (Fogarty, Perkins, & Barell, 1992). For instance, instructors within an EAP course might prompt students to develop the habit of referencing while writing essays, akin to what they will encounter in discipline-specific courses. Another example of a hugging technique is advocated by Johns (1988), wherein EAP students are encouraged to explore which EAP skills are applicable in their discipline courses. This could entail EAP instructors assigning students to observe approaches that enable them to apply their skills. For the purposes of this paper, hugging will refer to teaching methodologies that encourage student research on learning transfer in EAP education (Johns, 1988; Currie, 1999) through their own student-driven inquiry (Spack, 1988; Widdowson, 1984).

However, writing entails a complex set of skills, encompassing an understanding of processes, rhetorical techniques, organizational structure, and logical reasoning. These components can be challenging for casual observers to discern, as they may focus primarily on superficial aspects like grammar. Numerous studies have demonstrated that even when features appear similar or identical upon reflection, learning may not transfer effectively (Barrows & Tamblyn, 1980; Bransford, Franks, Vye, & Sherwood, 1986; Perkins & Salomon, 1988; Scribner & Cole, 1981). Some scholars (Detterman, 1993; Hirsch, 1987; Opfer & Thompson, 2008) attribute this failure to the domain-specific nature of learning in formal education settings, which limits its applicability to other contexts. Another explanation for this lack of transfer is that initial learning may be insufficient (Bransford & Schwartz, 1999), or observers might struggle to accurately recognize transfer due to the complexity inherent in the knowledge being conveyed, particularly in the writing process (Carroll, 2002). Perkins and Salomon (1988: 22) noted that “transfer does not occur automatically, and traditional schooling often overlooks this issue.”

As a result, while both bridging and hugging techniques are necessary when considering EAP courses so that students can stretch their learning, for this to have real purpose, it is also necessary to construct a transfer climate that provides support for learning transfer to the individual learner (Burke & Baldwin, 1999; Haskell, 2001). One study found a correlation between students’ perceived use of bridging and hugging techniques and their level of reported learning transfer (Green, 2015). A key factor was not solely fo-

cusing on instructional approaches to promote transfer within the learning context but also directing attention towards the transfer climate and its influence on EAP transfer. Techniques include peer support, which can establish a greater transfer of EAP skills learning. It also refers to providing sufficient opportunities for students to use new learning methodologies in their academic environment (Brinkerhoff & Montesino, 1995; Gaudine & Saks, 2004; Lim & Morris, 2006). By considering the transfer climate in the EAP context, one can appreciate and empathise with the complexity and challenges students face in their discipline courses.

This research carefully nurtured a suitable transfer climate and introduced key components to an EAP course that integrated hugging and bridging techniques into class activities. Such academic tasks are expected to improve EAP writing. For the purposes of this paper, such improvement would be observed through quantifiable computational analysis of automatic measurement of syntactic and lexical complexity.

3. Research focus

The main purpose of the present study is to observe any improvement in the level of L2 proficiency in terms of language complexity over four sets of essays—two written in the first term and the other two written in the second term. This paper is concerned with maintaining and developing academic writing skills in terms of lexical and syntactic complexity. As a result, attention will be placed on the following two research questions:

1. Is there a difference in the level of syntactical complexity as a result of the introduction of bridging and hugging techniques in EAP classes?
2. Is there a difference in the level of lexical complexity as a result of the introduction of bridging and hugging techniques in EAP classes?

4. Methodology

4.1 Participants

Fourteen third-year students (N=14) from a private university in Tokyo participated in the study. Their English proficiency was assessed as intermediate to advanced, reflecting their progress in L2 fluency during a five-month study abroad program in Australia. Prior to the program, their TOEIC scores ranged from 400 to 755, corresponding to CEFR

levels between lower B1 and upper A1. Upon returning, their TOEIC scores improved to a range of 570 to 835, indicative of CEFR levels between upper B2 and lower C1. The students demonstrated noticeable enhancements in spoken fluency and confidence in English, attributed to their daily interactions in conversational English and participation in general English skills courses at a university in Sydney. During impromptu discussions, it became apparent that the students were eager to further enhance their English proficiency by focusing on EAP skills. They expressed motivation to engage in this EAP project to elevate their English abilities to a more academic level. However, it remained uncertain whether they were inclined to pursue further studies abroad at the post-graduate level.

4.2 Lesson procedure

Students attended classes once a week for 90 minutes over the academic year in which courses were divided into three phases in each term (see Table 3) in order to take into account a suitable transfer climate. Phase 1 introduced simple academic tasks that focused on developing confidence in their academic skills; Phase 2 taught higher-level academic skills, and Phase 3 enabled students to apply their skills independently.

Classes were also divided into activities that encouraged both hugging and bridging techniques (see Table 3), but these altered over the academic year. Initial activities in the first phase aimed to enhance critical thinking skills through hugging techniques. Initially, students were introduced to hugging activities that resulted in limited transfer of learning as new information was not integrated into existing cognitive structures, making it difficult to apply knowledge in varied contexts unless the connections were made apparent to the learner. Students began with paired warm-up tasks on a current event, followed by reading a short article from the website *Breaking English*, focusing on its controversial aspects. Students were then introduced to bridging techniques by being asked to write for ten minutes on what was discussed in class without referring to notes. This was followed up with a 250-word opinion-based paragraph on a similar topic, which would be discussed at the beginning of the following class. This approach aimed at facilitating the acquisition of advanced vocabulary, improving reading comprehension, stimulating debates on contentious issues, and fostering critical thinking abilities. It was acknowledged that there is a limit to the transfer of learning as new information is not integrated into existing cognitive structures, making it difficult to apply knowledge in varied contexts. However, through such practice, it was hoped that students could begin to absorb new information and make possible connections between what was learnt in class with previous experi-

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Table 2: Phases of the syllabus of EAP course for two terms.

		Semester 1	
		Content	Aim
Phase 1	Week 1	Academic Discussion 1	Whaling should be banned.
	Week 2	Academic Discussion 2	Online shopping is better than shopping in malls.
Phase 2	Week 3	Academic Skills 1	Essay structure and the introductory paragraph.
	Week 4	Academic Skills 2	Body paragraphs, concluding paragraphs, and outlining.
	Week 5	Academic Discussion 3	What is the real age for society to accept people as adults?
	Week 6	Academic Discussion 4	All countries should drastically curb their reliance on plastics.
	Week 7	Academic Skills 3	Introduce common mistakes in essay writing, research and plan.
	Week 8	Academic Skills 4	Practising autonomous seminar skills to discuss essay prior to writing.
	Week 9	Academic Skills 5	Improving academic writing and peer review.
	Week 10	Academic Skills 6	Introduction to research and citation.
	Week 11	Academic Discussion 5	No one should have to work more than four days a week.
	Week 12	Academic Skills 7	Developing arguments.
Phase 3	Week 13	Role Play Conference	Defending current investment on SDG's of a country.
	Week 14	Seminar	Discuss essay
		Semester 2	
		Content	Aim
Phase 1	Week 1	Academic Discussion 1	Tourism and Mt. Fuji
	Week 2	Academic Discussion 2	Road tax should be introduced in central Tokyo to reduce congestion.
Phase 2	Week 3	Academic Skills 1	Summarising / Synthesising
	Week 4	Academic Skills 2	Academic Reading: Strategies for reading journal articles
	Week 5	Academic Discussion 3	Explain Active Learning with TED Talks
	Week 6	Academic Discussion 4	Critical Thinking with TED Talks
	Week 7	Academic Skills 3	Introduce researching and source reports
	Week 8	Academic Skills 4	Practising autonomous seminar skills to discuss essay prior to writing.
	Week 9	Academic Skills 5	Improving academic writing and peer review.
	Week 10	Academic Skills 6	Synthesising your sources
	Week 11	Academic Discussion 5	No one should have to work more than four days a week.
	Week 12	Academic Skills 7	Developing arguments.
Phase 3	Week 13	Role Play Conference	Discussing key issues at UN with developing countries' representatives
	Week 14	Seminar	Discuss essay

Table 3: Hugging and bridging techniques to be employed in this EAP class.

Aspect	Hugging	Bridging
Phase 1	Breaking English short article /discussions.	10-minute paragraph writing to improve fluency 250-word opinion-based paragraph which was discussed in the following class
Phase 2	Academic Skills based on Academic Writing Skills 2 but supplemented. Topics included, essay writing, peer reviewing, techniques in researching, purposeful reading, analysing evidence, and synthesising materials.	10-minute paragraph writing to improve fluency 250-word opinion-based paragraph which was discussed in the following class
Phase 3		Seminar work Source Report Research Peer-Reviewing of essays Presentation Role Play

ence,

The second phase concentrated on honing in on academic skills drawn from the coursebook: *Academic Writing Skills 2* (Chin et al., 2012) and other supplemented materials. Hugging techniques were incorporated into the classroom as students were introduced to structural and grammatical aspects of academic writing, engaging in tasks to enhance specific writing and research skills. Students had opportunities to develop greater autonomy in their learning by employing a “process” learning approach, including activities requiring higher-order thinking such as analysis, synthesis, and evaluation, as well as scaffolding to foster learner independence. This approach aimed to enhance students’ awareness of their academic writing abilities, bolstering their attitudes, self-efficacy, and practical skills.

Students continued bridging techniques by being asked to write for ten minutes on what was discussed without referring to notes at the end of class and to complete their 250-word assignment as homework. Again, while there might be a limit in the transfer of learning as new information due to the challenges of learning EAP materials, students naturally had the opportunity to develop key academic skills such as hedging, conceding, and counterargumentation, alongside cultivating a curious and inquisitive mindset.

However, it was noted that learning may not transfer effectively due to the domain-specific nature of learning in formal education settings (Detterman, 1993; Hirsch,

1987; Opfer & Thompson, 2008). As a result, bridging techniques were later introduced to the classroom in the third phase. Emphasis was placed on preparing students for active participation in seminars, crafting a research-based argumentative essay, and independently researching for a role-play conference. The importance was the opportunity to enhance the transfer of learning to new contexts by building on existing knowledge and applying it to different situations. While students seemed quite confident in applying their skills in the domain-specific nature of learning in formal education settings, it was felt that they needed to demonstrate how their skills could be transferred to situations outside of their typical academic setting. The seminars enabled students to take more responsibilities by taking the role of the chairperson while providing some performance evaluations of their peers in these seminar discussions. Students also had to support their argumentation with independently researched articles, which were also peer-reviewed. In the role play conferences, students had to make necessary preparations, fully participate in, and appropriately contribute to the discussion over the issues faced by developing countries. Such bridging activities enabled students to observe how far they had come since the beginning of the course as they acknowledged how they were able to apply their skills to other contexts not prepared by the lecturer.

4.3 Complexity measures

4.3.1 Syntactic Complexity Measures

Syntactic complexity is an important construct in second language evaluation, used to describe a learner's level of proficiency in a second language (e.g., Lu, 2011; Pipe & Tsushima, 2024). For example, syntactic complexity is reliable in describing grammatical competence in L2 assessment or changes in learners' proficiency over time.

Recent research on the automatic measurement of syntactic complexity would appear limited to analyzing cross-sectional studies (e.g., Lorenzo & Rodríguez, 2014) and comparing groups of writers (e.g., Lu & Ai, 2015; Mancilla, Polat & Akcay, 2017). However, to expediently determine the syntactic complexity of assignments produced, this paper incorporated the reliability of the L2 Syntactic Complexity Analyser (L2SCA; Lu 2010), a computational system for automatic measurement of syntactic complexity. Following the recommendations of Lu (2010) and Spring & Johnson (2022), the syntactic complexity measures selected for this paper consisted of five indices (see Table 4) that measured the length of the production unit, degree of subordination, amount of coordination, and degree of phrasal sophistication.

Table 4: Summary of the five measures of syntactic complexity (Mancilla et al., 2017).

Measure	Code	Formula
Type 1: Length of the production unit		
Mean length of T-unit	MLT	# of words / # of T-units
Type 2: Degree of Subordination		
T-unit complexity ratio	C/T	# of clauses / # of T-units
Type 3: Amount of Coordination		
Coordinate phrases per T-unit	CP/T	# of coordinate phrases / # of T-units
Type 4: Degree of phrasal sophistication		
Complex nominals per T-unit	CN/T	# of complex nominals / # of T-units
Verb phrases per T-unit	VP/T	# of verb phrases / # of T-units

To use L2SCA, the text was converted to a plain text format and uploaded to the program, after which these measures were analysed. To achieve this, the text had first to follow the preprocessing stage, in which the system L2SCA used a syntactic parser to analyse the syntactic structures of the sample text. The output was a parsed sample consisting of a sequence of parsed trees, with each parsed tree representing the analysis of the syntactic structure of a sentence. Next, the text was put through the syntactic complexity analysis stage, which entailed retrieving and counting the occurrences of all relevant production units and syntactic structures necessary for calculating one or more syntactic complexity indices.

4.3.2 Lexical Complexity Measures

To be lexically more competent, the learner has to be encouraged to apply the lexical resource to maintain their utterances and deepen their understanding of vocabulary from the perspectives of form, meaning, and use (Nation, 2013). To analyse the lexical complexity or lexical richness of a text, it is manifested at the observational level in L2 performance to encompass a broad range of aspects of vocabulary usage, specifically the percentage of meaningful words versus filler or grammatical words (lexical density), the ability to use non-standard words (lexical sophistication) and the range of vocabulary used by a speaker or writer (lexical variation or diversity; Lu, 2012). Analysis of lexical complexity was achieved by incorporating Lu's (2012) Lexical Complexity Analyzer (LCA) to automatically analyse text files to determine six different lexical measures of richness (see Table 5), as they were found to be significantly correlated with L2 learners'

Table 5: Summary of six measures of lexical complexity (Lu, 2012).

Measure	Code	Formula	Examples
Type 1: Lexical Sophistication:			
Lexical Sophistication-I	LS1	$N_{\text{slex}}/N_{\text{lex}}$	Linnarud (1986), Hyltenstam (1988)
Corrected Verb Sophistication-I	CVS1	$T_{\text{sverb}}/\sqrt{2N_{\text{verb}}}$	Wolfe-Quintero et al. (1998)
Type 2: Lexical Variation			
Number of Different words (expected random 50)	NDW-ER50	Mean T of 10 random 50-word samples	
Corrected Type Token Ratio	CTTR	$T/\sqrt{2N}$	
Lexical Word Variation	LV	$T_{\text{lex}}/N_{\text{lex}}$	
Corrected Verb Variation-I	CVV1	$T_{\text{verb}}/\sqrt{2N_{\text{verb}}}$	

proficiency levels (Spring & Johnson, 2022).

4.4 Data Elicitation

Data from four points were obtained during the academic year. The first and second essays were written in the first and second months of the first semester. The third and last essays were written in the first and last months of the second semester. The writing was semi-supervised by the teacher in a class by encouraging independent essay plans, seminar discussion, and peer review so that students could only rely on their L2 skills. These essays were written at home so students could spend as much time as they felt suitable. In a previous research paper (Pipe & Tsushima, 2024), students' writing was analysed under specific conditions of 10-minute post-lesson periods under teacher supervision. However, it became apparent that each piece of writing was short due to time restrictions and could not be analyzed individually. Data collected in this research was sufficiently long enough to be analysed individually through the automatic syntactical analyser, L2SCA, and the automatic lexical analyser, LCA.

5. Results

5.1 Syntactic Complexity

The first type of syntactic complexity measure gauged the length of production at the T-unit level, namely, the mean length of the T-unit (MLT). As is shown in Table 6,

Table 6: Syntactic measures as a function of written essays.

	Essay	1	2	3	4
MLT	<i>M</i>	14.81	13.52	16.43	19.18
	<i>SD</i>	3.06	2.52	3.80	2.24
C/T	<i>M</i>	1.74	1.66	1.43	1.53
	<i>SD</i>	0.28	0.20	0.16	0.14
CP/T	<i>M</i>	0.29	0.25	0.64	0.61
	<i>SD</i>	0.20	0.20	0.32	0.19
CN/T	<i>M</i>	1.08	0.94	1.69	1.78
	<i>SD</i>	0.30	0.21	0.60	0.29
VP/T	<i>M</i>	2.20	2.24	2.06	2.38
	<i>SD</i>	0.34	0.24	0.45	0.26

MLT increased substantially between the 3rd and last essays. The repeated-measures ANOVA revealed a highly significant improvement across the four essays, $F(3,39)=16.0$, $p<0.001$, $\eta^2=0.55$. The result indicated that the participants grew competent at maintaining lengthy sentences as they were able to provide longer T-units.

The second type examined the amount of subordination, namely, the T-unit complexity ratio (C/T). As is shown in Table 6, it showed a general decline across the essays, with the decline being statistically significant, $F(3,39)=8.3$, $p<0.001$, $\eta^2=0.39$. The result suggested that the participants used fewer proportions of sentence subordination (e.g., because-clauses), as they produced longer T-units.

The third type measured the amount of coordination, namely, coordinate phrases per T-unit (CP/T). Table 6 shows that CP/T increased substantially between the second and third essays. The overall improvement was highly significant, $F(3,39)=13.2$, $p<0.001$, $\eta^2=0.50$. The result indicated that the participants were able to improve their ability to use coordinate phrases within clauses.

The final type examined the relationship between particular syntactic structures and larger production units: complex nominals per T-unit (CN/T) and verb phrases per T-unit (VP/T). As shown in Table 6, CN/T revealed a substantial increase between the 2nd and 3rd essays. The overall improvement was highly significant, $F(3,39)=20.2$, $p<0.001$, $\eta^2=0.61$, indicating that the participants became able to produce structurally more complex nominal phrases. In contrast, VP/T showed a fluctuating pattern of changes, with a slight increase in the last essay compared to the 1st essay. The statistical analysis showed a marginally significant increase, $F(3,39)=2.6$, $p=0.06$, $\eta^2=0.17$. The results suggested that

the ability to use verb phrases (e.g., infinitives and gerunds) did not substantially change during the course.

5.2 Lexical Complexity

The first type of lexical measure is lexical sophistication or lexical rareness as it aims to determine the proportion of relatively unusual words to advanced words in a learner's L2 repertoire (Read, 2000). Due to the considerable variability in how sophisticated words are defined across previous studies, this paper concentrated on Lexical Sophistication-I (LSI) and Corrected Verb Sophistication-1 (CVS1) measures. As Table 7 shows, LSI substantially dropped between the 1st and 2nd essays, showing that the participants used less sophisticated lexical words (beyond the 2,000 most frequent English words). The repeated ANOVA showed significant changes, $F(3,39)=34.0, p<0.001, \eta^2=0.72$, across the essays. However, LSI was almost the same between the 1st and the last essay. In contrast, CVS1 substantially increased between the 3rd and the last essay. Across the essays, the improvement was significant, $F(3,39)=8.3, p<0.001, \eta^2=0.51$, indicating that the participants used a larger proportion of sophisticated verbs in the last essay.

The second type of lexical measure concentrates on lexical variation. This aspect of lexical complexity aims to discover the wide range and diversity of learners' vocabulary (e.g., Ishikawa, 2015). This paper concentrated on four measures of lexical variation in an effort to provide such by considering factors such as total vocabulary size, word frequency, text length, and statistical distributions of words. The first measure, NDW-ER50 (expected random 50), measured the expected number of different words in a random sequence of 50 words based on the overall vocabulary richness of the text. As Table 7 shows, NDW-ER50 did not change substantially across the essays ($p>0.10$), indicating that the participants' use of words in terms of its degree of variety did not improve during the course. In contrast, the type-token ratio (i.e., the ratio of unique words and the total number of tokens) corrected for text length, CTTR, showed a substantial increase between the 3rd and the last essay. The improvement across the essays was highly significant, $F(3,39)=89.2, p<0.001, \eta^2=0.89$, indicating that the participants used a greater variety of words.

The final two measures assessed lexical variation, or the variation and diversity of specific word categories within a text. First, lexical variation (LV) measures the overall variation and diversity of all lexical words (words that convey meaning) in a text. As shown in Table 7, LV showed a general decline, which was significantly significant,

Table 7: Lexical measures as a function of written essays across the course.

	Essay	1	2	3	4
LSI	<i>M</i>	0.30	0.16	0.31	0.27
	<i>SD</i>	0.08	0.05	0.06	0.06
CVS1	<i>M</i>	0.71	0.56	0.69	1.14
	<i>SD</i>	0.26	0.21	0.33	0.43
NDW-ER50	<i>M</i>	39.51	40.02	38.86	40.47
	<i>SD</i>	1.72	1.79	2.35	1.27
CTTR	<i>M</i>	5.93	5.76	6.01	7.98
	<i>SD</i>	0.52	0.36	0.88	0.77
LV	<i>M</i>	0.72	0.69	0.73	0.58
	<i>SD</i>	0.07	0.07	0.06	0.04
CVV1	<i>M</i>	3.33	3.31	3.40	5.19
	<i>SD</i>	0.35	0.32	0.62	0.64

$F(3,39)=28.2$, $p<0.001$, $\eta^2=0.28$. This indicated that the participants could not increase lexical (or content) word variation. In contrast, the verb variation, corrected for the text length (Corrected Verb Variation-1: CVV1), showed a substantial increase between the 3rd and last essays. The improvement was statistically highly significant, $F(3,39)=53.8$, $p<0.001$, $\eta^2=0.81$, indicating that the participants were able to use a greater variety of verbs in the last essay.

6. Discussion

1. Is there a difference in the level of syntactical complexity as a result of the introduction of bridging and hugging techniques in EAP classes?

Overall, syntactical complexity improved markedly over the academic year. The participants performed well in the length of the production unit (i.e., Mean length of T-unit: MLT), the amount of coordinate phrasing (i.e., Coordinate phrases per T-unit: CP/T), and the degree of phrasal sophistication (Complex nominals per T-unit: CN/T). However, the lengthier set of writing pieces in the second semester may have affected other aspects of syntactical complexity, which might have led to negative alterations in the overall sentence complexity (i.e., T-unit complexity ratio: C/T).

It could be suggested that bridging and hugging techniques through activities mentioned earlier (refer to section 4.2) may have encouraged independent and autonomous

learning. English often employs complex sentence structures with multiple clauses and various coordination strategies when compared to Japanese (Jaeger, 2010; Kishimoto, 1995; Kubozono, 2019; Martin & Okamoto, 1991; Radford, 2004; Stowell, 2006). Transitioning from one syntactical system to another requires significant adjustment and practice. Bridging and hugging techniques would seem to have provided the necessary motivation to stretch academic progress, thereby altering syntactical complexity in the essays written.

2. Is there a difference in the level of lexical complexity as a result of the introduction of bridging and hugging techniques in EAP classes?

Again, lexical complexity markedly improved over the academic year. First, although the overall lexical sophistication measure did not show substantial changes across the essays, there was a significant improvement in verb sophistication (i.e., Corrected VS1: CVS1) in the last essay. Second, although lexical word variation (i.e., LV) showed a marked drop across the essays, the verb variation corrected for the text length (i.e., CVV1) showed a highly significant improvement.

While there might have been challenges in acquiring additional academic vocabulary to complete the essays, bridging and hugging techniques might have naturally encouraged students to acquire academic lexical resources. This might have been encouraged through greater exposure to English outside of the classroom, by pushing for students to research through authentic English texts, and by holding them more accountable for their views through sufficient interactions in seminars, role-play conferences, and peer reviews. Without sufficient exposure and practice, it can be difficult to internalize and produce lexically (and syntactically) complex sentences naturally. As a consequence, bridging and hugging techniques also seemed to generally have a positive influence on lexical complexity in the essays written.

7. Conclusion

The aim of this research was to observe how to prepare university students to effectively participate in academic activities through an EAP (English for Academic Purposes) course. It became apparent that a group of third-year students could improve the level of syntactical and lexical complexity in their essays over the academic year. This progress

resulted from carefully catering to student needs.

Through class observations, students were orientated towards fostering greater critical thinking and academic skills as a direct result of the hugging and bridging techniques. However, it was first necessary to construct a transfer climate that provides support for learning transfer to the individual learner (Burke & Baldwin, 1999; Haskell, 2001). As a consequence, in the first two stages of the semester, lectures focused initially on applying important skills in academic writing, using hugging techniques to build confidence and fluency in their English abilities but more at a surface-level understanding. Previous research noted that initial learning of EAP skills may be insufficient (Bransford & Schwartz, 1999) or that students may struggle to accurately recognize transfer due to the complexity inherent in the knowledge being conveyed, particularly in the writing process (Carroll, 2002). As a result, these first two stages were important to nurture more autonomy in their academic learning.

As confidence and academic competency grew, students were then introduced to activities in the third stage that focused more on bridging techniques. These activities provided them with the opportunity to step away from a domain-specific nature of learning in formal education settings (Detterman, 1993; Hirsch, 1987; Opfer & Thompson, 2008) in an effort to discover the relationships between old and new information in EAP contents and apply them to new tasks outside typical formal settings. From informal observations, students seemed to successfully engage in debate in their seminar classes about their essays to strengthen their argumentation, research independently to support their claims further in their argumentation, and provide critical peer evaluation of their essays. It was also noted in the role-play activities that they could successfully transfer and apply the academic skills taught in the classroom. While this paper cannot directly claim that these students could foster greater critical thinking skills and develop their academic skills, each student seemed to demonstrate deeper comprehension and retention of new information in new contexts by building on existing knowledge and applying it to different situations. Although not qualitatively researched through interviews, often students would mention noticeable steps in their approach to strengthen their academic abilities in their writing and also their discussions. This can be clearly verified by improvement in their essay writing. One can, therefore, recommend the implementation of tasks that facilitate bridging and hugging techniques to strengthen EAP skills.

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Note _____

- 1) The first author was in charge of running the EAP course including the design and preparation of training materials and of writing the manuscript, while the second author focused on written data management, lexical and syntactical analyses, and the statistical analyses.