L2 WRITERS REFERENCING CORPORA TO ADDRESS ACCURACY: A QUALITATIVE ANALYSIS OF LEARNERS' LEXICOGRAMMATICAL ERROR CORRECTIONS

by

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ABSTRACT

Since the advent of process writing, the role of language has been relegated to an arguably minor position in L2 writing pedagogy, despite L2 writers' ongoing linguistic needs. Corpus referencing has emerged as a promising approach to address these needs, though numerous challenges exist for both learners and teachers who struggle with the specialized skills necessary for corpus research. This classroom-based study addresses these issues by qualitatively examining the corpus-based error correction process in relation to three error types: preposition combinations, collocations, and phrases. Specifically, the study investigates (1) corpus referencing as an alternative to teacher direct correction; (2) the linguistic patterns that emerge through the correction process; and (3) factors that influenced the learners' ability to apply corpus data to their writing. Based on 965 error corrections, results indicate that learners were generally successful; however, the interpretative demands placed on them to address these errors played an important role in their degree of success. The findings further imply that learners tended to analyze the corpus data paradigmatically, searching for word substitutions rather than examining co-text, and that they had difficulties understanding the phraseology of the language in the corpus as well as the language of their own written production.

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*	indicates erroneous/incorrect word or expression
CBEC	corpus-based error correction
CR	corpus referencing
DDL	data-driven learning
EAP	English for academic purposes
EC	error correction
EFL	English as a foreign language (studying in non English-speaking country)
ESL	English as a second language (studying in English-speaking country)
ESP	English for specific purposes
IELTS	International English Language Testing System
L1	first (native) language
L2	second (foreign) language
SLA	second language acquisition
WCF	written corrective feedback

CHAPTER 1. INTRODUCTION AND OVERVIEW OF THE STUDY

1.1 Background

For years, the role of language in the writing classroom has held a tenuous position in L2 writing pedagogy. Early L2 writing classrooms were characterized by an emphasis on grammatical form and error avoidance, but dissatisfaction with this prescriptivist orientation led to the introduction of process writing, an approach imported directly from L1 composition studies (Silva & Leki, 2004). A practice that still remains widely prevalent today, process-based pedagogies place the writer at the center of a recursive planning-drafting-revising framework and aim to develop the learner's metacognitive awareness of the strategies important to skillful writing (Silva & Leki, 2004). Throughout this exploratory process, the teacher's role is to guide and support students as they focus primarily on generating and shaping their ideas into meaningful content (Hyland, 2016). With such an emphasis on idea development and the writer's discovery process, there is considerably less attention paid to language. Instead, language is attended to in the final editing stage through teacher intervention (i.e. explicit feedback), as it is advised that addressing language problems too early in the writing process will impede the learners' creativity and their self-expression.

While much has been gained from this approach in terms of understanding the complexity of the writing process and how writers manage it, a consequence of its widespread use has been the subordination of learners' linguistic needs (Hyland, 2011). As Hyland points out, process approaches represent a cognitive psychology view of writing rather than an applied linguistics perspective, and consequently, focus on "what people think about when they write rather than the language they need to do it" (2011:20). As a consequence of this pedagogical priority of

meaning over form, learners lack opportunities for developing the skills and knowledge they need to become linguistically proficient writers. In Turner's words, this "underestimates the extent to which students need to be able to manipulate different constructions, widen their lexical and collocational repertoire, develop a wider sensitivity to nuancing through language use, and structure an argument in order to enhance their academic performance and their academic voice in the wider community" (2004:107).

In more recent years, genre-based pedagogies have addressed this gap and introduced a much-needed focus on language to the writing classroom. With text viewed as a socially-mediated construct, language is an integral part of the conventions that define a particular genre, shaping the rhetorical organization of a text and communicating its ideas through language specific to its readership (Cheng, 2019). With an emphasis on appropriate language forms and the linguistic choices available to writers, genre-based pedagogies have played an important role in restoring the balance of language and content to L2 writing classrooms.

Despite the significant inroads genre has made, however, the central role of language "may remain hidden to those less familiar with the tenets of genre-based pedagogies" (Cheng, 2019:1). This insufficient attention to language is not limited to genre-oriented classrooms but is a much larger issue that involves how to address L2 learners' written accuracy within the overall writing process. In a recent discussion on the lack of adequate language instruction for L2 writers, Polio (2019) summarizes findings from numerous studies that assessed changes in written accuracy, reporting that most showed no gains in accuracy over varying lengths of time nor across various learner populations. Instead, the results show improvement in the amount of text produced by learners, leading to her conclusion that although the writing

practice students engaged in furthered their written fluency, it apparently did little to raise their linguistic accuracy.

Such negative outcomes in terms of improved language use recall the error correction debate of the 1990s, in which Truscott used similar empirical evidence to justify his argument against the practice of teachers correcting learners' written errors (1996, 1999). This debate has had major implications for the field of L2 writing, spurring two decades of research into the efficacy of error correction practices, seeking to justify the long-held tradition of teachers responding to student error. For the most part, it has produced conflicting results with various research methodologies employed by SLA researchers and by L2 writing specialists (Ferris, 2010), and despite the number of studies the debate has prompted, it has not provided concrete pedagogical approaches to accuracy that are effective for foreign language writers (Ferris, 2004; Geunette, 2007). Consequently, the debate is regarded by most practitioners as strictly academic, a discussion that centers around what they already know and understand: student writers need support in raising their linguistic accuracy (Ferris & Hedgcock, 2014).

It is well known that linguistic error can have a negative impact on readers and serious consequences for a writer. Numerous error gravity and writing assessment studies have documented these negative reactions, both in terms of the readers' perceptions of a text's quality and of the writers themselves, (e.g. Beason, 2001; Hamp-Lyons, 1995; Santos, 1988; Weigle, 2018). In particular, lexical problems can result in global errors that make a text difficult to read and can hinder comprehension (e.g. de la Fuente, 2002; Ellis, 1995; Ellis, Tanaka, & Yamakazi, 1994), leading them to be rated as more serious over other types of language problems (e.g. Dordick, 1996; Hughes & Lascaratou, 1982; Khalil, 1985; Santos,

1988; Sheory, 1986). The importance of lexical accuracy has been further reaffirmed through recent vocabulary research, which highlights the role of formulaic language in promoting efficient, successful communication. With language processing facilitated through the use and recognition of formulaic sequences (Ellis, 1996; Schmitt, 2013), learner writing that is not expressed through such conventionalized, idiomatic discourse places an additional burden on the reader to comprehend the text. This is illustrated, for example, through empirical studies on collocations that report readers requiring more time and effort to process texts that contain mismatched collocates or nonidiomatic language (e.g. Boers & Webb, 2018; Crossley, Salsbury & McNamara, 2015; Millar, 2011; Nesselhauf, 2005). Given the difficulties language learners have with acquiring multiword sequences, problematic language use in this area has been reported as extremely common in L2 writing (e.g. Conklin & Schmitt, 2012; Ellis, Simpson-Vlach & Maynard, 2008; Paquot & Granger, 2012).

Considering that L2 writers are still developing the language skills they need to communicate their ideas and to achieve an acceptable standard of English expression, linguistic accuracy is a major concern. Consequently, writing teachers spend large amounts of time providing feedback to learners in order to guide them towards more appropriate use of the foreign language. Indirect feedback, which is intended to facilitate learners' self-correction of their errors, has been shown to be more effective than teacher direct correction for a number of reasons: it increases error engagement that can lead learners to notice their error tendencies; it encourages active participation in the correction process as they seek out solutions to their language problems; and it can contribute to language acquisition through deep reflection of the linguistic information referenced -- all of which guide learners towards becoming

autonomous, resourceful writers who can address accuracy issues on their own (e.g. Ferris, 2006; Hyland, 2016; Reid, 1998).

Yet aside from giving such feedback to students on an individual basis, many teachers struggle to address their learners' linguistic needs at the curricular level and to incorporate other approaches to written accuracy. One major reason is the lack of time, considering the enormous challenge of adequately covering language, content, and composition instruction along with responding to individual writers' needs. Furthermore, as mentioned earlier, L2 writing curricula have traditionally been modeled after L1 novice writers, meaning that the emphasis tends to be on argument development and rhetorical concerns (Cortes, 2019; Polio 2019), and only basic writers believed to be in need of language instruction (Polio, 2019). Finally, given a choice, some teachers may just prefer to prioritize other issues, such as student engagement (Bunting, 2013). In light of these competing interests, Cortes (2019) emphasizes that a basic assumption in applied linguistics and in language for specific purposes is that academic writing courses are designed to meet L2 writers' specific needs. Cortes suggests that bearing this expectation in mind may help us better focus our attention on learners' actual language needs and guide us towards achieving a more balanced approach to L2 academic writing instruction.

1.2 The current study

The doctoral research reported in this thesis was undertaken to address the issues discussed above and to explore pedagogical approaches that could more effectively meet learners' individual language needs. To this end, the role of corpus referencing in the L2 writing classroom is investigated as a resource for student writers to resolve lexicogrammatical errors

in their texts. As a classroom-based study that employs qualitative research methods, the students' corpus-based error corrections are closely examined in terms of how the learners applied corpus research findings to their writing and what factors influenced their error correction decisions.

Originally conceived in 2013, this doctoral study emerged out of several years of preliminary research, including a two-year grant-supported learner perceptions study conducted in 2014-2015. The research reported in this thesis draws primarily on data collected in the author's 2016 semester-long writing course and focuses on the learners' texts: 72 sets of original and revised essays written by 24 Japanese learners of English. The learners' error corrections were analyzed item-by-item to examine the quality of their linguistic choices based on the corpus data. In this way, the researcher investigated to what degree learners could apply the corpus data accurately to their writing as well as what kinds of linguistic issues they faced during the corpus-based correction process.

With few corpus referencing studies systematically investigating the learner language that results from corpus-based error correction, this study contributes to the current body of research by offering a detailed descriptive account of how learners go about integrating corpus data into their own language production -- a critical juncture in the error correction process. Many corpus-based error correction studies have discussed the effectiveness of corpus referencing largely in terms of the learners' success rates, focusing more on correction outcome than on the correction process. As for qualitative studies conducted on corpus referencing, these have generally involved small groups of learners; in contrast, the current study tracks the correction choices made by a class of 24 students over 15 weeks and across

three writing assignments, enabling the researcher to identify recurring correction tendencies and create a more systematic linguistic composite of the learners' behavior.

At the same time, this research contributes to the L2 writing literature by offering a learner-centered approach to error correction in contrast to the extensively researched teacher-centered corrective feedback perspective. Through the application of corpus research methods, this study encourages discussion of other pedagogical approaches to error correction that can bring more responsibility to the learner and thereby create more opportunities for language learning in L2 writing classrooms.

Finally, by exploring what the learners' correction decisions suggest about their ability to make use of corpus data, this study may contribute to a better understanding of how corpora can be employed as a pedagogical resource, an issue for many teachers that has limited its widespread application to language learning classrooms (Chambers, 2019; Frankenberg-Garcia, 2012b). By combining research perspectives from both L2 writing and corpus linguistics, this research aims to increase interest in and broaden acceptance of corpus referencing beyond its current corpus linguist audience (Chambers, 2019), seeking to increase mutual understanding among corpus experts, writing specialists, and language teachers.

1.3 Overview of thesis

This doctoral thesis is divided across seven chapters. Following this introduction, chapters two and three review the relevant research literature. Chapter two traces the history of error correction research in the field of L2 writing, ending with a discussion of recent perspectives on approaches to linguistic accuracy and its role in L2 writing pedagogy. Chapter three

reviews error correction from a corpus linguistics perspective, starting with a brief discussion of data-driven learning and then reviewing ten studies that focus explicitly on teacher feedback-driven, corpus-based error correction. The latter part of chapter three synthesizes the L2 writing and corpus referencing literature reviews, identifying key issues that guide this doctoral research. Chapter three then concludes with the study's research questions.

Chapter four begins with an overview of the research methodology, discussing the principles of qualitative inquiry that underlie this teacher-grounded research. This is followed by a description of the three years of preliminary research conducted prior to this doctoral research in order to contextualize the current study as part of a longer research process. This description serves to clarify how the research goals evolved and how the data gathered during these early stages informed the current study. The rest of chapter four introduces the doctoral study's research context and methods; namely, the participants (i.e. students), classroom context, data collection process, data sources, preparation and coding of the data, and finally, the data analysis process.

Chapters five and six report on the findings from the error correction analysis. Chapter five begins by overviewing the lexicogrammatical error types coded during data analysis through a general discussion of error correction success rates. From here, the error types are narrowed to focus on four error categories, which are reviewed in-depth through the analyses presented in the rest of chapter five and in chapter six. Specifically, chapter five reviews the preposition error and preposition omission corrections, including a discussion of the major issues that emerged through their correction analysis. Chapter six then reports on the phrase and

collocation error corrections, also concluding with a discussion of important themes that emerged through the analysis.

Finally, chapter seven discusses the study's conclusions in relation to the initial three research questions outlined at the end of chapter three. After this, the study's overall implications are discussed as well as pedagogical implications for the writing classroom. Finally, the limitations of the study are raised and directions for future research are suggested.

CHAPTER 2. REVIEW OF THE LITERATURE ON ERROR CORRECTION IN L2 WRITING

This chapter discusses research on error correction in the L2 writing literature, tracing its development from L1 composition research to the well-known Truscott-Ferris error correction debate and to the influence of this debate on this area of research overall. The chapter concludes with implications that can be drawn from both the debate and more recent research, highlighting specific issues that are important to investigations conducted on learners' written accuracy and that reflect current perspectives on L2 writing pedagogy.

2.1 Perspectives on error

In L1 composition research, the 1977 publication of Shaughnessy's *Errors and Expectations* marked a shift from descriptions of error tendencies to discussions of what causes learners to make errors. Shaughnessy argued that written error could be evidence of developmental stages in the acquisition of language and academic literacy or of language variation -- not a consequence of low intelligence or other negative characterizations of the writer that had been asserted in the past. Her focus on understanding the nature of error promoted research in both L1 and L2 composition, such as applying error analyses to composition pedagogy, prompting studies into how error is perceived by readers outside the writing classroom (i.e. error gravity studies), as well as exploring strategies to help student writers address their written accuracy (Bitchener & Ferris, 2012).

Around this time, second language (L2) writing was emerging as a discipline of its own, growing out of composition studies and applied linguistics. As Silva and Leki (2004) discuss, this is reflected through the progression of approaches to teaching L2 writing: from controlled

composition to product-driven approaches (e.g. contrastive rhetoric), and then to the enormously influential process writing approach. In contrast to these earlier composition pedagogies, process approaches center on the writer and the creation of meaning rather than form, and writing is seen as a generative, recursive process that engages the student in complex composing processes. Revision in particular is viewed as central to this process as teachers guide learners through the drafting and re-drafting of their texts, collaborating in an ongoing effort to create and refine meaning (e.g. Raimes, 1991; Zamel, 1982, 1985, 1987).

Although the advent of process writing improved upon earlier pedagogies that focused solely on the end product, this shift was ultimately at the expense of supporting written accuracy. Language problems were reduced to a relatively minor issue and pushed to the side as writing teachers were advised to prioritize invention and arrangement over language (e.g. Zamel, 1985). With the process approach's emphasis on revision, it was assumed that language problems would eventually work themselves out as writers refined their ideas.

This assumption was not only a consequence of the process writing philosophy, but also based on second language acquisition (SLA) theory at the time, which claimed that by maintaining a focus on meaning, accuracy would improve over time much like it did in child L1 acquisition (Ferris, 2003; Krashen, 1984; Zamel, 1982, 1985). SLA researchers were advocating a hands-off approach to error as well, arguing that errors were evidence of L2 development (i.e. of learner interlanguage) and therefore a necessary stage in the process of language acquisition. Krashen in particular (Krashen 1984; Krashen & Terrell, 1983) claimed that error correction could hinder the learning process by raising the learner's affective filter

and therefore errors should not be viewed as language problems that warrant special treatment.

However, some researchers at the time (e.g. Horowitz, 1986; Silva, 1988) maintained that accuracy is an important concern for L2 writers who are still working to acquire a foreign language in addition to academic literacy skills, and on this point, L1 and L2 writing practices diverge They argued that L2 writers need greater linguistic support in comparison to L1 writers, as well as a different set of skills to cope with meeting the demands of a culturally different (and likely unfamiliar) discourse community, and consequently this requires a pedagogy that takes error treatment into account.

2.2 Perspectives on treating error

Not surprisingly, content-focused multiple drafting alone was not enough to compensate for L2 learners' linguistic difficulties. As a result, researchers began to focus on ways to address accuracy within the process writing paradigm, which brought about a renewed interest in error correction (EC) and spurred research on written corrective feedback (WCF) from the late 1980s (Ferris & Hedgcock, 2014). Overall, these research developments can be divided into three stages: (1) early research on error correction; (2) the Truscott-Ferris debate that questioned the necessity of error correction; and (3) debate-prompted research that sought to substantiate corrective feedback practices and better integrate it with L2 writing pedagogy. Each stage is discussed below in order to illustrate how perspectives on EC have progressed over the past three decades.

2.2.1 Early research on error correction

This section reviews error correction research that appeared between 1980 and 1996, prior to the Ferris-Truscott debate and debate-prompted publications. With many reviews of this early research already published in the field (e.g. Bitchener & Ferris, 2012; Ferris, 2003, 2004, 2010, 2011, 2012; Hyland & Hyland, 2006; Silva & Leki, 2004), this section draws from the studies included in Ferris' (2003) detailed review of ten studies and highlights issues that relate to the aims of this thesis. As a whole, the research focuses on types of teacher feedback and their impact on learners' written accuracy, as assessed through revised texts or posttests.

Considering the general lack of error feedback in the process writing approach at this time, these studies show an interest in exploring how teacher feedback practices could be maximized to support L2 writers' accuracy. Several examined the effects of direct versus indirect correction (i.e. teachers correcting errors for students versus teachers guiding learners to correct their own errors) and made use of error codes to indicate the type of language problem to students (Lalande, 1982; Robb, Ross & Shortreed, 1986; Semke, 1984; Sheppard, 1992), one study focused on direct correction (Frantzen, 1995), while others provided grammar-oriented feedback on a range of unspecified error types (Chastain, 1990; Fathman & Whalley, 1990; Frantzen & Rissell, 1987; Kepner, 1991). Among these, a variety of indirect feedback strategies were investigated, such as providing marginal error tallies (Robb et al., 1986), making clarification requests (Sheppard, 1992), conducting error-focused class instruction (Ferris, 1995; Frantzen, 1995), as well as student-centered approaches that included self-editing, peer feedback, and error logs (Ferris, 1995). Although this is a small group of studies, it illustrates the range of error feedback approaches being explored at this time, as researchers investigated the role of error feedback for student writers.

This interest in indirect correction has contributed to the still currently-held belief that this type of feedback contributes more to L2 language development and metalinguistic knowledge as opposed to direct correction since it involves the learner more deeply in language analysis (Ferris, 2014). One perspective on this assumption is offered by Reid (1998), who has described the value of such feedback in terms of "remediation" since it leads leaners to edit their writing for the purpose of correction, raising their awareness and engaging them in problem solving that not only improves the text at hand, but also develops their skill as writers. From the learner's perspective, it has also been shown that students themselves believe they can learn more through indirect teacher response (Ferris & Hedgcock, 2014).

In addition to research on the various forms of feedback, other studies suggest the importance of error type to successful error correction (e.g. Ferris, 1995; Frantzen & Rissell, 1987; Sheppard, 1992). Frantzen and Rissell (1987), for instance, found that the error type was a major factor in the learners' ability to self-correct teacher-designated errors based on their success with correcting articles. In Sheppard's (1992) study, learners were able to improve their accuracy over a 10-week term with verb forms, sentence boundary markers, and punctuation, while Ferris (1995) also found improved accuracy over the course of one semester with a focus on five error categories. At this early stage of EC research, the interaction of error type and error correction success was emerging as a potentially important factor to consider.

Overall, this group of studies reflects the growing concern at this time regarding the role of accuracy in writing classrooms dominated by the process writing approach. Importantly, it

introduced early attempts to explore error feedback that targeted L2 as opposed to L1 writers, aiming to incorporate language-focused practices that would better address the linguistic needs of foreign language learners.

2.2.2 Truscott-Ferris debate

Once this renewed interest in research on written accuracy for L2 writers was underway, Truscott (1996) published a controversial article that argued for the abandonment of error correction. The impact of this article on the field was significant in that it challenged researchers to prove that error correction was in fact necessary and ultimately steered much of the research activity in this direction. Many studies were conducted that assessed whether error correction could result in uptake of target structures in the short- or long-term in order to justify it as a worthwhile classroom practice. As a result, L2 writing research during this time concentrated largely on this issue rather than exploring other important aspects of written accuracy.

To briefly summarize his arguments, Truscott (1996, 1999) called for teachers to abandon the practice of error correction entirely, claiming that the research had demonstrated its ineffectiveness and that it was therefore "useless" and counterproductive for L2 learners. As support, Truscott refers to a number of L1 and L2 error correction studies that report no improvement in learners' language use, while he maintains that studies reporting positive effects did not directly test whether correction contributes to better writing or not and therefore could not support its practice. Truscott also claimed that EC was incompatible with SLA findings regarding how learners progress towards acquisition (i.e. through

developmental sequences) and that it did not address L2 writers' underlying learning processes.

In addition, Truscott drew attention to the “practical problems” that teachers and learners face with error correction, questioning the teacher's ability to accurately and consistently explain errors to learners and claiming that EC negatively affected students' attitudes toward writing. For students who resisted this stance and expected their teachers to correct their errors, they needed to be re-educated on the language learning process and the inherent uselessness of EC as a means to further linguistic development. Consequently, he urged teachers to stop correcting their students’ papers altogether and instead focus on content and other approaches to accuracy.

Ferris (1999) directly responded to Truscott's recommendation, claiming it to be “premature and overly strong” (Ferris 1999:2), particularly given the minimal amount of error correction research that had been conducted to date. In addition, she took issue with how Truscott represented this research base: despite his claim that the findings were negative, Ferris pointed out aspects of these studies that in fact showed improvements in written accuracy, revealing that they were not as consistently negative as Truscott maintained. In particular, she argued that the studies’ subjects, research methods, and instructional strategies were too varied and therefore not comparable. Further, she claimed that Truscott dismissed research results that contradicted his thesis and overstated negative support for corrective feedback.

On the other hand, Ferris agreed with Truscott's point that given differences in how syntax, morphology and lexis are acquired, no one single type of correction would suffice and

therefore various approaches are necessary to treat learners' errors. Ferris also acknowledged the truth in Truscott's discussion of “practical problems” related to teacher and student issues, though in her opinion, these problems are not as impossible to overcome as Truscott claims. Compared to Truscott's stance, Ferris places importance on teacher intuition and accumulated experience in addition to research findings, allowing a place for learners’ needs and preferences in her arguments.

Essentially, Truscott's argument to abandon error correction reflects the belief that research be primary in guiding classroom practice, overriding classroom-based intuitions that are not validated through systematic investigation. In contrast, Ferris’ argument is based on the assumption that at some level, corrective feedback is useful for students and that researchers need to identify effective techniques for raising learner accuracy. These opposing perspectives reflect a fundamental difference in how each author views error correction and learning: Truscott's stance is based on an SLA research tradition, which places a priority on controlled, experimental settings that investigate how corrective feedback can contribute to the long-term acquisition of specific linguistic items. Although Ferris supports an SLA approach to error correction as well, she values the insights gained through classroom experience, placing greater importance on factors relevant to L2 writing classrooms and views error correction as one strategy of many that helps L2 writers develop into skillful writers.

2.2.3 Debate-prompted research

Truscott's (1999) rebuttal that the field's "pro-correction bias" unfairly placed the burden of proof with the critics of error correction motivated many researchers to assess its effectiveness on student writing. Despite the volume of research that has responded to this

debate, relatively few studies have in fact been designed to directly compare the effects of error correction versus zero error feedback on written accuracy, due to teachers' concerns over the ethical consequences of ignoring learners' linguistic issues when they deliberately withhold feedback (Ferris, 2004). Instead, most research has explored EC in terms of how various forms of corrective feedback impact learner writing, comparing different types of indirect feedback to direct correction. While the following review may not be exhaustive, it discusses those studies most cited in several already published reviews on the issue (e.g. Bitchener & Ferris 2012; Bitchener & Storch 2016; Ferris 2003; Ferris 2011; Ferris & Hedgcock 2014). Central to these studies reviewed below is how the choice of error treatment impacts learner accuracy.

An early study by Lalande found that learners who received error-coded feedback produced more accurate, better quality writing, suggesting that "a combination of error awareness and problem-solving techniques had a significantly beneficial effect on the development of writing skills" (1982:145). Building on this research, Ferris (2006) demonstrated a similar outcome where underlined and coded errors were correctly edited by students 77% of the time, showing good success with learners improving their accuracy based on indirect feedback. Comparing three types of indirect feedback (unmarked errors, check-marked errors, and underlined errors), Lee (1997) reports that the underlined error group in her study was significantly more successful than the group that responded to errors that were only check-marked in the margin or left unmarked, suggesting that an important element of successful feedback is the teacher locating the error for the student. She concludes that the students' inability to successfully correct errors was largely a consequence of them not being able to identify errors in their own texts, rather than being unable to find suitable corrections.

Robb, Ross and Shortreed (1986) took a broader view on the effects of error correction by assessing whether more salient (i.e. more informative) feedback would result in significantly greater improvement in writing quality based on measures of fluency, complexity and accuracy. Results indicated no significant differences among four types of feedback (direct correction along with indirect coded, highlighted, and marginal error-tallied feedback), suggesting that for teachers, it is not worth spending the extra time and effort on detailed direct correction when less time-consuming indirect feedback methods that identify rather than correct errors give students enough guidance to revise their writing.

Other research that has shown the benefits of indirect feedback include Ashwell (2000), who demonstrated underlined feedback leading to more accuracy gains as opposed to zero feedback, and Fathman and Whalley's (1990) study, in which two indirect feedback groups (underlining and content commentary with underlining) outperformed a content commentary-only group as well as the control group. Likewise, Ferris and Roberts (2001) compared underlined feedback and error codes against a control group and found that the indirect strategies yielded greater accuracy.

In contrast, Chandler (2003) found support for direct correction. She divided students into four groups providing each with a different type of feedback: direct correction, underlining only, underlining with error descriptions (i.e. error code), and error description only (i.e. no location marked). She found that direct correction and simple underlining were the most effective as both resulted in significant improvements in accuracy and fluency. The error-coded feedback, however, was not significant and suggests that this additional information

may have made the correction task more complicated for students. In fact, when surveying students regarding how well they understood the four types of feedback, most students responded with “yes” related to their understanding of direct corrections, but the majority stated that they “mostly” understood how to make corrections based on coded feedback. Nonetheless, underlining with description (i.e. indirect feedback) was the second most favored feedback type by students, as they believed that they learned more through the correction process in this way.

Bitchener and Knoch’s research (2008, 2009) also makes a case for direct correction, but for students at lower language proficiency levels. After testing various combinations of direct corrective, written metalinguistic, and oral metalinguistic feedback on low intermediate-level learners, they found no difference in the three types on the learners' written accuracy. They did find, though, that all forms of feedback tested showed accuracy gains against the control group. Consequently, they suggest that whatever type of corrective feedback is given, it is capable of benefitting low proficiency learners, meaning that teachers correcting students’ errors was just as effective as giving more detailed written and oral metalinguistic feedback that explains errors to students. Thus, the time spent explaining language problems in the text may not be necessary and possibly too exhaustive for such learners. This recommendation is consistent with Ferris and Roberts (2001), who also suggest that direct corrective feedback is better suited for low proficiency writers who may not have enough linguistic knowledge to effectively self-edit.

Another study on direct correction is Sheen's (2007) which compared correction-only and direct metalinguistic feedback (i.e. error correction plus explanation of the correct form)

against a control group. By targeting feedback exclusively for English articles, Sheen found that while both treatment groups outperformed the control group in the immediate post-test, the direct metalinguistic group surpassed the correction-only group on the delayed post-test. Sheen attributes these findings in part to giving selective rather than comprehensive feedback, suggesting that focused feedback enabled learners to improve their accuracy. Overall, he concludes that focusing on particular errors may be an important aspect of successful corrective feedback.

Maintaining such a focus on error type was also reported as a factor that enabled the learners in Bitchener and Knoch's (2010) study to improve their accuracy. The researchers tested three types of feedback options on advanced-level learners (written metalinguistic explanations, circling only of errors, and written metalinguistic feedback with oral form-focused instruction) and found that all forms of feedback outperformed the control group in the short-term, but only the explanatory feedback (written metalinguistic explanations and written metalinguistic feedback with oral form-focused instruction) showed retention and greater accuracy in the students' writing after a 10-week period. According to the researchers, this shows that even advanced learners who are already competent language users can continue to benefit from corrective feedback, particularly if that feedback is descriptive about the type and nature of the error along with examples of accurate usage.

2.3 Bringing perspective to the error correction debate

Although the debate-centered research discussed above has investigated error correction at length, in hindsight, it has come to be seen as narrow and reductive, oversimplifying the role of feedback in learning a language and learning to write (Ferris, 2010; Ferris et al., 2013;

Hyland, 2016). Much of the SLA-oriented research on corrective feedback, for example, has sought to link error feedback on specific linguistic items to successful acquisition, despite the fact that learning is not necessarily a linear process and that it requires repeated exposure over a period of time to be noticed and incorporated into learner interlanguage (Doughty & Long, 2003; Hyland, 2016). From a compositionist perspective, error feedback is assumed to help learners produce more accurate texts through multiple cycles of revision, a process that develops their writing ability over time. This, too, cannot be demonstrated over the course of a few weeks or months (the duration of most studies), requiring not only more time but also other strategies in addition to corrective feedback to facilitate greater accuracy.

Furthermore, there are major inconsistencies in the research designs of these studies -- differences in learner populations, treatments and procedures -- which according to Ferris have rendered their findings "fundamentally incomparable" (2004:51). These include, for example, differences in the number and type of student participants (e.g. ESL students versus EFL students versus immigrant students), in the duration of the studies, in text genres (e.g. journal entries, narratives, opinion essays), in types of error feedback (e.g. feedback on content or form or both); in data collection and assessment (e.g. revised texts, unrevised texts, pre- and post-tests), as well as differences in classroom activities and instructional approaches (Ferris 2004; Geunette 2007). Essentially, there are major variances on almost every research parameter. Geunette (2007) further identifies important factors that are not accounted for in the studies, such as student proficiency level, in addition to confounding variables which make it difficult to isolate the effects of the corrective feedback from other intervening factors.

Consequently, for most L2 writing practitioners, the error correction debate has been largely regarded as academic, divorced from the reality of the writing classroom (Ferris & Hedgcock, 2014). Error correction continues to be viewed as a valuable and important practice: teachers feel negligent ignoring their learners' linguistic issues, while students have the expectation that teachers should respond to their errors (e.g. Ferris & Roberts, 2001; Hyland, 1998; Lee, 2004). Additionally, teachers know that L2 learners do not have the intuitions that L1 writers bring to the writing process due to their lack of L2 exposure and that learners' errors can interfere with reader comprehension or negatively affect their image as competent writers (Ferris & Hedgcock, 2014). Therefore, for L2 writing teachers, there is no question that error treatment is necessary; instead, the question is how can this best be accomplished?

2.4 Future perspectives: Implications for L2 writing research

Despite the problems inherent to the error correction research, there are some instructive findings, which are discussed below as they relate to the aims of this doctoral study. Specifically, this section discusses four areas: increased error engagement through indirect teacher feedback, the importance of error type in addressing written accuracy, alternative approaches for resolving "untreatable" errors, particularly lexical-oriented errors, and the need for more descriptive research in L2 writing.

2.4.1 The value of indirect feedback and error engagement

One finding that has emerged out of this body of research is that indirect feedback is believed to better support the long-term development of students' language and writing skills as opposed to direct correction. As Ferris (2006) has noted, indirect feedback strategies have an intuitive appeal in that they better engage the learner in problem solving of the error (Lalande,

1982), which enables learners to develop the independent self-editing skills they need to become proficient writers (Bates et al. 1993). Also, indirect correction elicits more effort from learners to process the feedback and allows them to notice discrepancies between their language and the target usage (Hyland, 2016), encouraging student reflection that benefits long-term acquisition (Reid, 1998). Most of these assumptions have derived from theories of SLA, such as Schmidt's Noticing Hypothesis (1990), which claims that the features learners recognize as significant in the target input are what drive language acquisition, as well as Swain's Output Hypothesis (1985), which places importance on language production to create opportunities for addressing gaps in learners' linguistic knowledge. Aside from such theoretical support, students themselves have reported that they feel they learn more by correcting errors on their own (Chandler, 2003).

Although the advantages of indirect feedback are widely cited and based on established SLA theories, it is important to keep in mind that these are only potential benefits: the provision of corrective feedback does not necessarily ensure it will be addressed by the writer. As Zhang and Hyland point out, much of the research on error correction has assumed that more accurate language use and improved writing skills will follow if the feedback "is delivered effectively rather than if it is received attentively" (2018:90). Whether and how error feedback is attended to by learners can vary greatly, making student engagement a key factor in the overall success of error correction. Cognitive factors, such as the depth of processing (Sachs & Polio, 2007; Storch & Wigglesworth, 2010) and the comparative analysis of correct and incorrect forms (Sheen, 2010) are only one aspect of engagement. In addition, research has highlighted the importance of affect. For example, Storch and Wigglesworth's (2010) case study showed that students' attitudes, beliefs, and goals were influenced by their engagement

and impacted how willing they were to accept the feedback. These findings are further supported by learners' positive and negative reactions to feedback reported in Han and Hyland (2015). Both of these studies show that cognitive engagement, specifically depth of processing, is not adequate to explain learner uptake and that the social aspects of error feedback are important to consider as well.

2.4.2 The importance of error type

Another finding based on the error correction research is error type-focused feedback as a contributing factor to successful treatment (e.g. Bitchener & Knoch, 2010; Bitchener et al., 2005; Ellis et al., 2008; Ferris 2006; Ferris & Roberts, 2001; Sheen, 2007). Bitchener and Knoch (2010), for instance, claim that learners can likely reduce their incidence of error through corrective feedback that is limited to certain types of rule-based errors. Ferris (1999, 2010) has coined such rule-governed errors as "treatable" (e.g. problems with subject-verb agreement, word form, article omissions, etc.) since in linguistic terms they can be defined, described, and taught, making them easier for learners to be able to correct on their own. "Untreatable" errors, on the other hand, are those that do not fall under defined grammatical principles and involve more problematic errors that interfere with meaning (e.g. word choice, collocations, phrase constructions, sentence structure problems).

Ferris (2006) assessed whether teachers themselves made this distinction between treatable and untreatable errors when responding to their students' writing, and she found that there were in fact statistically significant differences in the teachers' error treatments. Although teachers were instructed to provide indirect feedback in her study through error codes, they instead employed direct correction 65% of the time for untreatable errors and gave indirect

feedback 59% of the time overall. According to Ferris, these tendencies reflect the teachers' beliefs about what kinds of errors their students were capable of correcting and how these intuitions ultimately influenced their choice of corrective feedback. Unless a correction was believed to be within the learner's grasp, direct correction was viewed as necessary.

This assumption that certain errors are more responsive to corrective feedback than others has been investigated through several SLA-oriented studies, in which specific linguistic features, namely articles, prepositions, and verb tense, were isolated and tested (Bitchener & Knoch, 2008, 2009, 2010; Bitchener et al., 2005; Ellis et al., 2008; Sheen, 2007; Sheen et al., 2009). Storch & Wigglesworth's (2010) examined a greater range of errors in their study, in which feedback was focused on grammatical, lexical, and mechanical problems. Overall, this line of research has shown that learners are able to improve their accuracy over time when feedback is limited to specific error types (Ferris & Hedgcock, 2014), suggesting that the features of a given error are an important factor in error correction success.

However, most of these SLA-focused studies have narrowed their error treatments to only one or a few target errors (mostly articles), which offers a very limited perspective. L2 writers' error patterns commonly display great range and variability: Ferris' (2006) study mentioned above, for example, reports that out of 16 error categories that warranted treatment, numerous mechanical (e.g. spelling, punctuation), grammatical (e.g. subject-verb and pronoun agreement, verb tense, sentence fragments) and lexical errors (e.g. word choice, idioms, informal language) could be found in the learners' writing. Furthermore, it is understood that within each category, individual learners' error patterns will vary depending on their first

language and a range of other variables (Ferris & Hedgcock, 2014). Consequently, few teachers would consider it acceptable to limit their feedback to only one or two error types.

The fact that treatable errors are easily quantified and categorized in ways that allow for controlled study makes them more suitable for the type of experimental research common in SLA research. Another reason for this tendency to focus on treatable rule-governed errors may be the influence of error analysis and oral feedback on the field of second language writing, which has led to the application of oral feedback strategies to written response and a greater focus on grammatical (over lexical) error in learners' written production (Llach, 2011; Ene & Upton, 2014). As a result, much less attention has been given to the untreatable types of language problems, despite the prevalence of these errors in L2 learner writing (Ferris, 1999).

2.4.3 Identifying alternative correction approaches for untreatable lexical errors

A final area that is noteworthy in the error correction literature relates to how untreatable errors have been addressed. Although the advantages of indirect feedback for learners are evident in these studies, the research has generally advised teachers to respond to untreatable errors through direct correction. Although direct feedback has been shown to be effective in certain ways, such as for supporting low proficiency writers who may not have enough linguistic knowledge to self-edit (Bitchener & Knoch, 2008, 2009; Ferris & Roberts, 2001), it is nonetheless a limited approach. With direct correction, the student is entirely dependent on the teacher to both identify and correct their errors, and as a result, it offers little in the way of engaging learners with their errors. As discussed earlier, indirect feedback requires the learner to process the feedback through greater participation in the correction process, which can

facilitate the development of language problem-solving and self-editing skills to improve their linguistic accuracy and writing ability.

Given that research has indicated corrective feedback strategies should be selected in relation to the type of error being treated, identifying other strategies besides direct correction is necessary to address the range of errors that learners typically make. However, the research on corrective feedback has offered few alternative remediation strategies to date. In particular, lexical accuracy in learner writing has been largely neglected in the L2 writing literature, despite the fact that lexical problems are common untreatable errors. This is especially problematic given that vocabulary errors are regarded as more detrimental to communication than grammar problems, as they interfere with reader comprehension and can negatively impact a reader's impression of the writer (e.g. Beason, 2001; Dordick, 1996; Hughes & Lascaratou, 1982; Khalil, 1985; Santos, 1988; Sheory, 1986). At the same time, lexical proficiency has been identified as an important feature of successful writing (Engber, 1995; Ferris & Hedgcock, 2014; Santos, 1988), and a factor that can impact raters' judgments when assessing a text (Engber, 1995). All in all, the research has demonstrated that lexical accuracy is an important aspect of effective writing, and for this reason, more research is needed to explore how teachers can better support students in improving their lexical usage.

2.4.4 The need for descriptive studies in error correction research

Based on the above review, it is fair to say that the error correction research is largely comprised of experimental studies that assess the outcomes of various feedback approaches and correction strategies. In contrast, descriptive studies that explore the processes learners engage in as they make use of linguistic information to correct their errors can lend insight

into how learners adapt their written language to achieve greater accuracy. In particular, resolving untreatable lexical-oriented errors can be a complex task, given that such errors are less systematic and more idiosyncratic compared to grammatical problems. Often, there is more than one possible solution to a lexical problem, requiring the learner to explore various options and determine the best meaning and usage for their written context. Furthermore, correction outcomes for grammatical errors are generally right or wrong -- the learner's revision either follows the grammar rule or it does not. In contrast, lexical corrections can show improvement through greater clarity of meaning or more precise usage, but still not be regarded as fully accurate. Therefore, when assessing lexical accuracy, error counts alone are not capable of revealing the gravity of an error or illustrating how it affects comprehensibility (Polio, 2001). Given this variability in resolving lexical error, outcome-oriented experimental research designs are likely to mask important patterns and processes that occur as the learner proceeds through the error correction process. Consequently, qualitative research methodologies may be better suited to researching lexical error.

Recently, in fact, there has been a call for more qualitative research in the field of L2 writing that better reflects the complex, multifaceted nature of the writing process. Casanave (2012) highlights the limited value of research that is designed to facilitate replication and stresses the importance of embracing a much wider range of research approaches than what can currently be found in this area. In her view, studies that are contextually authentic and that elicit unique aspects of learners' writing practices have much to offer future inquiry, as they are "replete with the contextual and embedded details that bring both the writers and their writing to life, allowing for connections both to readers and to theory and other literature" (2012: 296). Similarly, Lee (2013) cites the lack of studies from a sociocultural perspective as

a reason for the gap that exists between L2 writing research and practice and specifically in the area of written corrective feedback, which has ultimately limited the practical implications that can be drawn from this body of work. In her opinion, addressing this gap requires approaches to research that investigate writing practices within their specific learning contexts and in terms of the teachers and learners specific needs in order to offer practical solutions and recommendations. For these reasons, both authors encourage more qualitative research on individual teachers and writers through ecological studies, ethnographic case studies, and longitudinal studies to expand upon the current research base as opposed to those designed for replication. By broadening how we conceive of "inquiry" through the application of qualitative-oriented methodologies, there is the potential for discovering a greater range of pedagogical approaches to addressing learners' written accuracy (Lee, 2013).

2.5 Conclusion

To conclude this review of error correction research, over the years it has come to be recognized that error correction is a valuable aspect of learning to write in a foreign language. The issues discussed above have brought corrective feedback research back to the central question of how can error feedback be employed to make it more effective for learners. This renewed outlook is consistent with the current post-methodology era, in which pedagogical decisions are localized in order to prioritize factors that are inherent and unique to specific learning contexts (Kumaravadivelu, 2001). The range of treatments investigated through the error correction studies imply that error feedback can be useful if we find the right combination of strategies to address written errors and if learners engage with the feedback in meaningful ways. Given that both L2 writing researchers and practitioners generally agree that some form of feedback is important to learners' writing development and linguistic self-

editing skill (Ferris, 2010), the focus of recent research has become less about the necessity of error correction and more about which approaches to error treatment are most effective for improving written accuracy -- a shift that better reflects issues relevant to L2 writing pedagogy (Bruton, 2009; Evans et al., 2010; Ferris et al., 2013).

CHAPTER 3. REVIEW OF THE LITERATURE ON CORPUS REFERENCING AND ERROR CORRECTION

To complement the previous chapter's review of the L2 writing error correction literature, this chapter discusses research relevant to pedagogical applications of corpus technology, specifically in terms of how corpora have been used to support error correction by L2 writers. First, the theory of data-driven learning (DDL) is introduced along with how it has been practiced with foreign language learners in general. Following this, research on the use of corpora as an an error correction resource with L2 writers is reviewed in detail.

3.1 Data-driven learning

One promising approach to error treatment is the practice of learners referencing language corpora. A corpus is a large, searchable database of authentic texts that has been compiled for a particular purpose and is intended to be representative of a language or to characterize a particular aspect of a language (Biber, Conrad & Reppen, 1998). The availability of electronic corpora and language analysis tools since the 1980s has led to an increase in descriptive studies on linguistic features, supporting research into English language use and language variation, developing the fields of English for specific and academic purposes (i.e. ESP and EAP), and contributing to the development of English language dictionaries (Biber & Reppen, 2015). For language learners, a typical corpus offers thousands of samples of naturally-occurring language from which they can observe linguistic behavior in context and gather information on lexical and grammatical usage. Specific to L2 writing is the fact that most corpora are based on written texts and therefore reveal patterns that are characteristic of written – as opposed to spoken – discourse (Flowerdew, 2010; Yoon & Hirvela, 2004),

allowing learners to research the specialized discourse of various academic disciplines and genres (e.g. Anthony, 2017; Chang, 2014; Charles, 2007; Lee & Swales, 2006; Poole, 2016).

The application of corpus linguistics to the language classroom has been promoted since the early 1990's through Johns' (1991, 1994) theory of data-driven learning (DDL), in which students directly examine the usage and patterning of specific language items through queried concordances. More recently, it has been defined by Gilquin and Granger (2010) in pedagogical terms as an activity that applies corpus analysis tools for language learning purposes. This stands in contrast to the deductive approach common to most foreign language classrooms, where the starting point is the rules that govern particular patterns rather than the language samples that illustrate them.

In its traditional sense, DDL implies that the learner employs the corpus as a research tool to achieve a particular language learning goal. A related application of DDL is the use of concordancers as reference tools, through which learners consult corpus data to help them make decisions about their language use. In contrast to the original aims of DDL, students do not necessarily consult the corpus to accomplish a specific language learning goal, but to address language problems throughout the writing process (Yoon, 2016). In this doctoral thesis, it is for this purpose that data-driven learning is being employed.

Over the years, DDL has come to be recognized as a valuable learner activity with studies citing a range of potential benefits for the language learner. For example, through DDL, learners gain exposure to rich and authentic linguistic input, while they are also able to explore lexicogrammatical patterns they cannot easily retrieve through dictionary searches. At

the same time, DDL fosters inductive learning, encouraging students to discover the rules and patterns that underlie the language use they encounter as opposed to memorizing and applying instructed grammar rules through a deductive approach. In these ways, DDL fosters learner autonomy and supports students in developing the skills they need to become independent, resourceful language learners (e.g. Bernardini, 2002; Boulton, 2009; Breyer, 2009; Chambers, 2007; Flowerdew, 2010; Gavioli & Aston, 2001; Granath, 2009; Römer, 2011).

From the learners' perspective, research has indicated that students generally have positive attitudes toward DDL, viewing it as a useful and productive approach to language learning (e.g. Charles, 2014; Cheng, Warren & Xun-feng, 2003; Geluso & Yamaguchi, 2014), and in some studies, as a valuable resource for writing (e,g, Chang, 2014; Yoon & Hirvela, 2004). Students also value the authenticity of the language in the corpus and the ability to access personally-relevant language samples (Bernardini, 2002; Chambers, 2007). Furthermore, it has been reported that learners find it useful to be able to reference collocations and phrases in addition to individual words (Lin, 2015; Yoon & Hirvela, 2004) and to confirm their linguistic usage and accuracy in the corpus (Chambers and O'Sullivan 2004), all of which support learners in building confidence about their language use overall (Yoon & Hirvela, 2004). In short, the learner perceptions research has highlighted several aspects of DDL that learners find appealing and advantageous.

On the other hand, a number of challenges has been raised that make DDL difficult to employ as a pedagogical resource. One area at issue is the technology itself: learners report struggling with the corpus interface to formulate queries, with sorting and comprehending the concordance output, and with managing the amount of time needed to research the corpus

data (Chang, 2014; Frankenberg-Garcia, 2012b; Gilmore, 2009; Liu & Jiang, 2009; Yoon & Hirvela, 2004; Yoon, 2011). In addition, data analysis has proven to be difficult for many learners, particularly in terms of their ability to identify which language samples are relevant to particular errors (Frankenberg-Garcia, 2012a; Gilmore, 2009; Mueller & Jacobson, 2015**;** O'Sullivan & Chambers, 2006) and to apply corpus research findings accurately to their own writing (Chang, 2014; Dolgova & Mueller, 2019; Park, 2012; Sun & Wang, 2003). Sun and Wang (2003) point out that skillful induction is not automatic for many learners and for those who are accustomed to deductive-style learning approaches, the inductive nature of corpus research is not instinctive. Consequently, DDL may necessitate an alternative view of language into which learners need to be initiated, compared to activities based on conventional learning materials (Gavioli, 2001).

This point is echoed in the teacher training literature as well. Most teachers are unfamiliar with corpora and require preparation and training to become proficient with the technology. As Frankenberg-Garcia (2012b) points out, novice corpus users often lack a basic understanding of how corpora differ from their familiar language resources, such as dictionaries, textbooks, and grammar references, since corpora are not designed for pedagogical purposes and they are not particularly user-friendly. Considering this, several researchers have called for the need to introduce teachers to corpora in their training programs or through professional development programs. For example, Frankenberg-Garcia (2012b) offers a series of consciousness-raising tasks that introduces teachers to the nature of corpus research and provides them with basic corpus search and data analysis skills. Breyer (2009) highlights the importance of exposing teachers to the learner's perspective in order to provide teachers with the appropriate insight and experience for bringing DDL into their classrooms.

Like these, a number of studies have addressed the need for teacher training in order to promote the pedagogical use of corpora (e.g. Amador-Moreno, O'Riordan & Chambers, 2006; Farr, 2008; Heather & Helt, 2012; Lenko-Szymanska, 2014, 2017; Römer, 2009). In addition, online language resources have recently been developed that facilitate DDL through more user-friendly means, such as *BAWE Quicklinks* (https://bawequicklinks.coventry.domains/), which allows teachers to insert error-relevant concordance links into students' texts as a form of feedback, and *ColloCaid* (http://www.collocaid.uk/), a text-editing tool that suggests collocates for learners' language choices as they write, supporting the use of natural collocations.

Despite these challenges, many researchers have continued to advocate corpus technology as a pedagogical resource due to the potential benefits it offers learners as a language resource. Meta-analyses of empirical studies (Boulton & Cobb, 2017; Cobb & Boulton, 2015) have provided support for the positive influence of DDL, while Chambers (2019) highlights the shared theoretical assumptions between DDL and contemporary paradigms in language learning, such as the SLA concept of "noticing" and the social constructivist orientation that underlies learning approaches such as discovery learning or language awareness. In addition, Chambers (2019) highlights the mutual developments that have occurred in corpus linguistics alongside the communicative language approach, both of which value authentic language and the importance of exposing learners to natural, not invented, language samples. Research findings and pedagogical rationales such as these have lent persuasive support for the potential of DDL in foreign language pedagogy.

3.2 Acceptance of data-driven learning as a mainstream classroom activity

On account of various interests in DDL, learner corpus use has become an active line of inquiry with studies exploring how corpus data can be effectively employed in classroom settings and what kind of support learners require to become independent corpus users. This accumulated body of research has contributed to our understanding of the issues surrounding DDL; however, it is primarily researchers, namely corpus linguists and DDL enthusiasts, who are driving the movement (Chambers, 2019). Consequently, researchers and practitioners are divided in terms of their interest in, and therefore uptake of, corpus activities in the language classroom. Chambers (2019) addresses this gap, noting that most of the empirical studies that investigate learners undertaking corpus research are conducted by a small number of researchers and involve a small number of participants. With these researchers already possessing a committed interest and high level of expertise in creating and using corpora, they are likely more willing to spend the time and effort needed to engage their learners in DDL. According to Chambers, this is at least one important reason why the gap between research and the language classroom persists.

With a limited group of researchers who are strong believers in DDL advocating the use of corpora for learners, it creates a bias in the literature that limits our understanding of the obstacles faced by students and teachers who are not corpus specialists. Identifying manageable solutions to these challenges is essential in order for corpora to become a widespread learning resource. To achieve this level of use, Chambers states that corpora need to be employed by learners on a regular basis and viewed as a "normal everyday part of the language learning environment" (2019: 2). To illustrate this, she refers to Bax's (2003, 2011) concept of "normalisation" which describes full integration of a given technology into

educational settings when it reaches the point of being used instinctively and not regarded as an out-of-the-ordinary practice, but as an essential part of the language learning process. Bax emphasizes that for "normalisation" to be possible, the learners' needs must be prioritized over the technology used to meet those needs. In other words, the technology should not be the focus of the learning activity, but secondary to its aims and purposes. As an example, *ColloCaid*, the text editor for L2 writers mentioned earlier, suggests collocates that learners may otherwise not be inclined to reference, but allows writers to stay on the page rather than having to stop and reference information elsewhere (Frankenberg-Garcia et al., 2019).

With these issues in mind, the following sections focus on research that investigates the use of corpora in the L2 writing classroom for error correction purposes. Chang (2014) identifies two strands of research in the corpus referencing literature on L2 writing: one involves learners using corpora autonomously without feedback on specific language from their teachers (e.g. Kennedy & Miceli, 2001, 2010; Lai & Chen, 2013; Park, 2012; Yoon, 2008; Yoon, 2016; Yoon & Hirvela, 2004), and the other engages student writers in error correction of their texts through corpus consultation. The rest of this chapter focuses specifically on this second strand, reviewing studies in which L2 writers are employing a corpus in response to error feedback. Aside from reviewing the studies conducted in this area, this chapter also considers the issues that may be sustaining the above-mentioned gap by Chambers and limiting the application of corpus tools beyond a corpus specialist audience.

3.3 Research on corpus-based error correction

According to Gilquin and Granger (2010), error correction is an important application of data-driven learning (DDL): learners can compare their linguistic production to the proficient

usage represented in the corpus and address aspects of their interlanguage to improve their writing. Likewise, Flowerdew (2010) highlights the suitability of corpus referencing to the revision stage of the writing process, when learners are more focused on linguistic issues after having arranged their ideas into a complete draft. One positive aspect of introducing corpora through error correction is the task-oriented nature of addressing individual learner errors, in which the student's corpus research efforts are narrowed to the specific linguistic context at hand. This helps to make the research task more manageable and emphasizes the direct applicability of the corpus to their own language use (Quinn, 2015). To explore the use of corpora for this purpose, ten corpus-based error correction studies are presented in Table 3.1 and reviewed below.

3.3.1. Overview of studies

As mentioned earlier, data-driven learning may involve taking on a new learning approach for many students, while it will also be necessary to employ a range of online referencing and language analysis skills. Considering this, the ten studies reviewed in this chapter investigate a range of factors that may be influential in the success of learners engaging in corpus-based error correction (CBEC). These studies are overviewed in Table 3.1, which is divided according to the type of error feedback provided to the learner: Table 3.1(a) summarizes four studies that employed selective error feedback, while Table 3.1(b) introduces six studies that involved comprehensive error feedback.

To overview these factors, several of the studies presented in Table 3.1 focus explicitly on error type, investigating which types of errors are most successfully corrected with the corpus and appear to lend themselves to learner-initiated corpus research (Bridle, 2019; Crosthwaite,

2017; Dolgova & Mueller, 2019; Tono et al., 2014). Todd (2001) focuses specifically on the induction stage of corpus research, assessing whether students are capable of applying data patterns to their writing. In addition to overall effectiveness, Tono et al. (2014) explore the interaction of proficiency level and corpus use and Bridle (2019) the impact of learning style preference on corpus use. Other factors taken into consideration include the learning strategies employed by participants as they reference a corpus (Yoon & Jo, 2014), the error correction patterns that emerge through this process (Yoon & Jo, 2014), and the impact of teacher feedback on error type decisions and accuracy (Crosthwaite, 2017).

With the exception of Mueller and Jacobsen's study (2016), the research tasks involve learners self-correcting teacher-designated errors as they work to revise their written drafts. Of the total ten studies under review, five are conducted within a natural classroom setting, where students complete course writing assignments and then reference the corpus to correct their errors (Bridle, 2019; Crosthwaite, 2017; Gaskell & Cobb, 2004; Gilmore, 2009; Todd, 2001). An advantage of this research design is that the use of the corpus is integrated into an established writing curriculum that would have explicitly stated learning goals, for which the corpus is being used to help learners reach those goals. In this way, academic writing goals are prioritized, making these studies an authentic representation of a corpus-integrated writing process. One exception may be Crosthwaite's (2017) study, which is conducted in a series of short intensive DDL courses; otherwise, the remaining four studies are reported to have taken place in EAP language support courses.

The five other studies are conducted in decontextualized settings (Dolgova & Mueller, 2019; Mueller & Jacobsen, 2016; O'Sullivan & Chambers, 2006; Tono, Sataki, & Miura, 2014;

Yoon & Jo, 2014): three involve one-time essay correction tasks, one a case study, and one a controlled experiment. Dolgova and Mueller (2019), O'Sullivan and Chambers (2006), and Tono et al. (2014) collected data from learners who first composed a text and then corrected it with corpus consultation based on researcher-designated errors. The participants received training on the corpus and completed the error correction tasks within a single meeting. Yoon and Jo's (2014) case study involved more time and more writing opportunities, encompassing 10 weeks of timed writings that went through the composition-feedback-revision cycle. On the other hand, Mueller and Jacobsen (2016) did not assess student-composed drafts but based their assessment on a 12-item gap-fill test that targeted specific error types. The errors were selected from a preliminary learner perceptions experiment based on two researcher-generated essays that were intended to represent a student text.

Of these five non classroom-based studies, Yoon and Jo's (2014) is the most pedagogically authentic in that it allows the students to engage in repeated corpus referencing attempts based on several pieces of writing. Although it is limited with only four participants, it provides a detailed account of the cognitive processes and strategies involved in the error correction process with corpora. In contrast, the one-time correction task studies (Dolgova & Mueller, 2019; O'Sullivan & Chambers, 2006; Tono et. al., 2014) are more outcome-oriented as they focus on whether the participants could accurately correct their errors with the corpus or not. While such one-time tasks allow researchers to complete the full revision cycle with participants, they do not allow learners to accumulate experience with the corpus. Consequently, these studies present a rather short-sighted view of CBEC, only demonstrating what students are capable of at the beginning stages of learning to reference a corpus. Arguably least pedagogically authentic is Mueller and Jacobsen's (2016) study, in which the

assessment tool is a gapped test. Here, the authors are essentially measuring the success of the learners' corpus referencing skill rather than the learners' ability to improve their written accuracy.

The number of participants in this group of studies range from four learners in Yoon and Jo's (2014) case study to 93 in Tono et al.'s (2014) study and are divided across undergraduate and postgraduate learner populations. For the most part, the participants are intermediate-level learners, aside from Dolgova and Mueller's (2019) study involving advanced postgraduates and Crosthwaite's (2017) study not reporting learner proficiency level. Intermediate proficiency students are likely good candidates for corpus referencing, as learners at this level tend to make many errors and could benefit from having additional language resources to draw from. Also, past research has tended to focus on advanced learners, assuming that a high level of language proficiency is necessary for successful corpus consultation (Boulton, 2017; Yoon & Hirvela, 2004). Finally, with half of the studies involving postgraduates, more research on mainstream learner populations would be beneficial. Postgraduates and undergraduates have very different language learning needs: postgraduates require the specialized discourse of their research areas, while undergraduates typically need to develop their general academic English knowledge. Aside from each type of learner's language needs, postgraduates tend to be more mature and more motivated; therefore, they may be more readily capable of managing corpus research compared to other students.

3.3.2 Error type

Whether explicitly stated as a research goal or not, error type and its impact on the success of corpus-referenced correction is an important issue raised in these studies. Like any language

learning resource, a corpus has specific applications and affordances, and its tools should be employed in ways that are appropriate to the learners' linguistic needs at hand (Charles, 2018). Considering this, the majority of the studies investigate which error types should learners be advised to research in a corpus. Except for Gilmore (2009) and Yoon & Jo (2014), the other eight studies report on specific error types that have been successfully corrected by learners. These error categories include the following: preposition errors (Mueller & Jacobsen, 2016; O'Sullivan & Chambers, 2006; Tono et al., 2014); word choice/lexical usage errors (Bridle, 2019; O'Sullivan & Chambers, 2006; Todd, 2001); collocation errors (Crosthwaite, 2017; Mueller & Jacobsen, 2016); register problems (Dolgova & Mueller, 2019); and grammatical errors (Gaskell & Cobb, 2004). These categorical outcomes are largely based on error corrections collected from learners' written texts that range from 50 corrections in Todd's (2001) study to 679 corrections in Crosthwaite's (2017) study.

As for common findings across these eight studies that report error type success, prepositions, word choice, and collocations are included in more than one study as error types that resulted in good corpus-based success rates. For instance, after assigning 188 errors into three categories, Tono et al. (2014) found that omission and addition errors were significantly more likely to be accurately corrected than misformations. The majority of these omissions and additions were comprised of preposition errors, although other dropped lexical items were included as well (but not reported in detail). In O'Sullivan & Chambers' (2006) study of 14 French learners' essays (and 166 corrections), both prepositions and word choice were reported as successful error types compared to other categories with success rates of 76% and 79%, respectively. Mueller & Jacobsen (2016) measured correction success with a 12-item post-test and found that errors in preposition and light verb combinations (i.e. collocations)

showed slightly more success through corpus referencing than dictionary referencing. Consistent with these findings, Crosthwaite (2017) reports success with addressing collocation problems. Based on 679 error corrections collected from 61 student texts, he found that 86% of the collocation errors could be accurately corrected with the corpus and that the learners were 2.5 times more likely to reference the corpus for this purpose than to not reference it. An important factor in this success, reports Crosthwaite, was the role of teacher feedback in encouraging students to use the corpus, which impacted the overall success with certain error types over others.

Similar to O'Sullivan & Chambers' (2006) results on word choice, Todd (2001) shows success with revising erroneous adjectives. Although an older study that is one of the first inquiries into corpus-based (or in this case, Internet-based) error correction, Todd's focus on the induction stage of the referencing process is instructive in that it highlights a key step in the learner's ability to make successful corrections: whether or not the learner is able to infer from relevant patterns in the corpus data and apply them to their own writing. Although based on a small set of data (50 error corrections in total), Todd found that intermediate EFL learners could induce the information they needed to self-correct lexical errors, particularly for adjectives (suggesting the influence of word class) and for items that had relatively few usage patterns or meanings. In a more recent study, Bridle (2019) reports that learners were able to successfully reference synonyms on the corpus to resolve problems with word choice: 92% were successfully revised through corpus referencing, which represented 73% of the total correction attempts. According to the author, these corrections largely involved straight lexical substitution that did not require the surrounding context to be rephrased. Overall, Bridle notes that the learners in his study used the corpus to address lexical errors in register

or in contextual appropriateness, identifying these as language problems that could be remedied through corpus referencing.

One issue in these studies is that error type tends to be broadly and variously defined, making it difficult to compare the categories across studies. For example, several studies have "word choice" or "wrong word" error types to indicate an inappropriately used lexical item (e.g. Bridle, 2019; Crosthwaite, 2017; Dolgova & Mueller, 2019; O'Sullivan & Chambers, 2006). Although these categories are defined to some degree in each study, it is difficult to understand exactly what lexical contexts these error types refer to or how the corpus is being employed to treat them. Similarly, Tono et al.'s (2014) study identifies omissions and additions as successfully corpus-referenced corrections, but it does not specify the types of linguistic items these error categories are made up of. On the other hand, Dolgova and Mueller (2019) group a range of language problems into a "local lexicogrammar" category that includes collocations, word choice, word inflection, and part of speech errors, and then compare this category with register problems and "global lexicogrammar" error types (e.g. phrasal/clausal-level chunks, connective choices, word order) that span more text than their "local" category. With errors as disparate as these being grouped together and compared, it is difficult to understand the nature of the language problems and how referencing a corpus can contribute to successful correction of these error types.

Cases such as these, where error type is defined broadly or where a range of error types is grouped together, limit the degree of practical insight that can be gained into what kind of problem is being addressed and in what way the corpus data is being used to address the correction. Realistically, various conceptions of lexical error are to be expected due to their

often diverse and idiosyncratic usage patterns, particularly in contrast to grammatical items that follow comparatively systematic rules of usage, and this does make it difficult to classify and group such errors consistently. However, such broadly conceived error types will ultimately limit the transparency needed to provide concrete findings that are instructive for other learning contexts. For this reason, further specifying the error types being investigated in a study can better facilitate practical application and future research.

In sum, although the amount of research on error type is limited, these findings indicate that corpus referencing appears to be most successful in addressing prepositions, collocations and word choice. This is not surprising, given that these error types require knowledge of specific lexicogrammatical patterns to be used appropriately in writing, while they can also be observed in concordance data. The outcomes reported in these studies are instructive in that they provide insight into the learners' corpus referencing tendencies across a range of error types, suggesting which errors appear to be manageable for student writers to correct with a corpus. Beyond this general categorical level, however, there is a need for research that explores error type in more depth and that shows more concretely the role that corpus referencing plays in the error correction process.

3.3.3 Selective versus comprehensive error feedback

Another issue to address in this research is what kind of error feedback the learners are given, since it is the feedback that guides the corpus referencing process. Overall, one of two feedback approaches is taken across the ten studies reported in Table 3.1: either selective or comprehensive. Selective feedback refers to studies where the researcher has decided in advance which error types will be the focus of the investigation. On the other hand, the

studies that employ comprehensive feedback involve the researcher providing feedback on all or a relatively wide range of errors, and then based on the learners' degree of error correction success, the study is narrowed to a discussion of particular error types. In L2 writing pedagogy, selective and comprehensive feedback are also referred to as focused and unfocused feedback, respectively.

To briefly revisit this L2 writing perspective, selective feedback is generally accepted as a more effective, efficient, and learner-supportive approach to error response. Issues surrounding the choice of selective versus comprehensive feedback are well documented in the literature. Based on this research, Ferris (2011, 2014) recommends giving selective feedback on specific error types, choosing error categories based on learners' individual needs and/or pre-selecting certain types for study in order to avoid the negative consequences typically associated with aimless feedback or heavily marked student writing. These negative consequences are in fact reportedly common with comprehensive error feedback, as it can be overwhelming, confusing and discouraging for student writers to respond to, and it does not help them learn to prioritize their language problems (e.g. Bitchener, 2008; Ferris & Hedgcock, 2014; Lee, 2019; Sheen, Wright & Moldawa, 2009). Not surprisingly, such unfocused feedback has been shown to negatively affect learner motivation and engagement (e.g. Ferris & Hedgcock, 2014; Lee 2017; 2019; Lee, Yu, & Liu, 2018; Zheng & Yu, 2018). In fact, according to Lee (2017), there are few writing studies that lend support to the practice of comprehensive feedback.

Aside from student-related consequences, a researcher's choice of error feedback can have a major impact on the design of a study and its subsequent outcomes. Of the ten CBEC studies

reviewed in this chapter, only four employ selective feedback, in which the researcher has focused the corrective feedback on target error types in line with pre-determined error selection principles (Gaskell & Cobb, 2004; Mueller & Jacobsen, 2016; Todd, 2001; Tono, Sataki & Miura, 2014). In these four studies, feedback is given on target errors chosen by the researchers according to a pedagogical rationale: three studies are based on error patterns evident in the learners' writing samples (Gaskell & Cobb, 2004; Todd, 2001, Tono et al., 2014), while Mueller & Jacobsen's study is based on learner data elicited from preliminary research. This is important because a selective feedback-based study not only represents learner needs-driven research, but also conforms with Bax's (2011) assertion mentioned earlier that the learners' linguistic issues should be prioritized over the technology, a necessary prerequisite for corpora to achieve normalization in foreign language classrooms.

In contrast, the remaining six studies are based on comprehensive feedback, in which the teacher/researcher first responds to whatever errors surface in the learners' writing and then report the learners' preferences for error type during the corpus referencing process (Bridle, 2019; Crosthwaite, 2017; Dolgova & Mueller, 2019; Gilmore, 2009; O'Sullivan & Chambers, 2006; Yoon & Jo, 2014). In other words, the researchers structure their error investigations in response to the learners' corpus referencing decisions, assessing the success of those error types most referenced by the learners.

A major problem with this approach is that the students themselves are responsible for narrowing the options and prioritizing their errors for referencing, which places a significant burden on the learner to determine which error types are appropriate for corpus referencing on top of the already challenging corpus research process. Considering the numerous difficulties

that have been cited in the DDL and corpus referencing literature, having to respond to a range of language problems within one piece of writing could further complicate these issues or at least discourage learners from using a corpus. Reported difficulties with time management, for instance, would be made even more problematic due the wide range of error types the learners must reference, while several of the other difficulties mentioned earlier as well, such as formulating appropriate queries and analyzing the corpus data, would not be alleviated either. Thus, rather than incorporating means to tackle these reported challenges into their research designs, studies that introduce CBEC to learners through comprehensive feedback are in fact making the corpus referencing process even more difficult for learners.

From another perspective, having students corpus-reference a wide range of errors could be viewed as an exploratory approach to researching the suitability of error type for corpus consultation. In fact, such an approach could be advantageous if the participants were skilled corpus users and had some experience to offer the study. However, the participants in these ten CBEC studies are beginning corpus users, as is the case in most studies since corpus use is not common in L2 writing classrooms, making the learners not a particularly appropriate population for such exploratory research aims. With these factors in mind, determining target error types based on inexperienced learners' preferences rather than on a research- or pedagogically-based rationale does not seem to provide a reasoned approach to research design or to classroom practice.

Lee (2019) points out that when teachers mark errors comprehensively in a piece of writing, it conveys to learners that they are not capable of identifying any of their own errors, which turns error treatment into a teacher-dominated practice that contradicts the aims of providing

corrective feedback in the first place. This contradiction between learning goals and actual practice is also relevant to corpus-based error correction. As with corrective feedback, a major purpose of introducing corpora to learners is to foster independent self-editing in order to help learners improve their writing skill (Chen & Flowerdew, 2018; Gilquin & Granger, 2010). However, if error types are not prioritized by the teacher, then the consequences are much the same as what has been reported in the L2 writing research: learners are likely to find corpus referencing overwhelming, confusing and discouraging -- not unlike what learners have already expressed through the corpus referencing literature. Thus, selective feedback on judiciously chosen error types may make corpus referencing more manageable for learners and reduce the frequently-reported barriers.

3.3.4 Process-oriented versus outcome-oriented corpus referencing research

For the most part, the corpus-based error correction studies reviewed in this chapter focus on outcome, investigating to what degree learners were able to reference the corpus to accurately revise language problems in their writing. Beyond comparing and discussing the outcomes of various error categories, some studies detail a few factors that influenced the learners' ability to make successful corrections. For example, corpus referencing was difficult for learners when items had several meanings or usage patterns (Todd, 2001) and when correcting the error required rephrasing of the learner's written context (Bridle, 2019; Crosthwaite, 2017; Dolgova & Mueller, 2019). Crosthwaite (2017) found that compared to the other error types investigated in his study, phrase errors were less likely to be successfully corrected in cases where the movement and addition of multiple items was necessary to accurately rephrase the error, speculating that this difficulty might be due to issues with teacher guidance (i.e. a lack of feedback or misinterpretation of it). Finally, Bridle (2019) observed that lexical

substitution, as opposed to language reformulation, was the more common means of correcting lexical problems, implying that although learners could apply the information they found through corpus referencing to their writing, they made use of this data in limited ways. Overall, these factors offer insight into how learners go about making use of corpus data and how well they can apply it to their own writing.

Discussion of factors such as these suggests that the quality of the learners' errors and their respective corrections also need to be explored in order to understand the issues learners must contend with through corpus-based error correction. Quantifying error corrections for the purpose of comparison offers only a limited perspective and does not do justice to the complexity of the error correction process. Of this group of CBEC studies, only Yoon and Jo (2014) provide an in-depth, systematic analysis of the learners' error correction processes. Comparing indirect (i.e. teacher-mediated) and direct corpus use, the researchers found that the four students in their study were able to revise their writing based on the linguistic input from the corpus data, but that the learners employed different learning strategies in relation to their corpus referencing techniques and their English proficiency levels.

Using a corpus effectively for pedagogical purposes is not only demonstrated through error correction outcome, but also through the correction strategies employed and the decisions learners make in light of their corpus research. By moving beyond correction outcome to focus more on process, it is possible to examine the interaction of error type and corpus referencing in greater depth, revealing how learners' referencing attempts influence their language choices and shape their writing.

Table 3.1(a). Overview of corpus-based error correction studies: selective error feedback

	Todd 2001	**Gaskell & Cobb 2004**	**Tono, Sataki & Miura 2014**	**Mueller & Jacobsen 2016 ("Experiment 2" only)**
Error feedback	Selective: Two content/lexical errors per student	Selective: Five grammatical errors per student per assignment Limited to ten grammatical error categories	Selective: Two lexical or grammatical errors per student (One error appropriate for corpus referencing; the other not requiring any resource)	Selective: Collocation, preposition, and register errors
Basis for selecting target error types	At researcher's discretion: error patterns in learners' drafts and viability for CR	At researcher's discretion: learner needs analysis based on writing sample	At researcher's discretion: error patterns in learners' drafts and viability for CR	At researcher's discretion: preliminary experiment and CR literature
Research task and context	Natural/classroom setting Student self-correction of course report in EFL course	Natural/classroom setting Student self-correction of writing assignments in EFL writing course	Research setting: One-time correction task Student self-correction of 20-minute timed essay	Controlled research setting Student completion of gap-fill test to assess correction accuracy
Participants	25 Thai postgraduate EFL learners Intermediate level	20 Chinese postgraduate EFL learners Intermediate level	93 Japanese undergraduate EFL learners Intermediate level	39 Japanese undergraduate EFL learners Basic to low-intermediate level
Number of error corrections collected	50 error corrections	400 error corrections	188 error corrections	12-item gap-fill tests (four items per each of the three targeted error types)
Successfully corrected error types	Adjectives	Word order Capitalization/ punctuation Pronouns	Omissions Additions	Prepositions Collocations (i.e. "light" verbs plus nouns)

Table 3.1(b). Overview of corpus-based error correction studies: comprehensive error feedback

	O'Sullivan & Chambers 2006	**Gilmore 2009**	**H. Yoon & Jo 2014**	**Crosthwaite 2017**	**Bridle 2019**	**Dolgova & Mueller 2019**
Error feedback	Comprehensive: Grammatical, lexical and stylistic errors	Comprehensive: Lexical and grammatical errors	Comprehensive	Comprehensive	Comprehensive	Comprehensive: Lexis, grammar, mechanics, register
Basis for selecting target error types	At learner's discretion: (i.e. learners chose which teacher-designated errors to correct with corpus) Word choice Prepositions Gender, agreement Capitalization	At learner's discretion: *Error types not specified*	Weeks 1-5: Researcher provided error-relevant concordances Weeks 6-10: At learners' discretion *Error types not specified*	At learner's discretion: Collocations Word choice Word form Phrasing	At learner's discretion: Wrong words Formal/informal errors	At learner's discretion: Local lexicogrammatical errors (includes word choice, collocation, word inflection, prepositions, part of speech)
Research task and context	One-time essay correction task: Student self-correction of essay (600 words) for participation in research study	Natural setting: Student self-correction of one report written in required English writing course	Case study: Student self-correction of weekly 30-minute timed writings for participation in 10-week study	Natural setting: Student self-correction of 400-600 word texts in 5-day summer intensive DDL courses	Natural setting: Student self-correction of four essays (300-400 words) written during 6-week pre-sessional postgraduate course	One-time essay correction task: Student self-correction of errors from papers drafted in EAP course (optional participation for extra credit)

Table 3.1(b) continued. Overview of corpus-based error correction studies: comprehensive error feedback

	O'Sullivan & Chambers 2006	**Gilmore 2009**	**H. Yoon & Jo 2014**	**Crosthwaite 2017**	**Bridle 2019**	**Dolgova & Mueller 2019**
Participants	14 English undergraduate and postgraduate French learners Mixed proficiency levels	45 Japanese undergraduate EFL learners Intermediate level	4 Korean undergraduate EFL learners Intermediate to advanced level	32 Chinese postgraduate EFL learners *Proficiency not reported*	12 Chinese postgraduate ESL learners High intermediate level	63 postgraduate ESL learners Advanced level *First language backgrounds not reported*
Number of error corrections collected	166 error corrections	350 error corrections	407 (direct corpus use) and 352 (indirect use) error corrections	679 error corrections	495 error corrections	304 error corrections
Successfully corrected error types	Prepositions Word choice	*Not specified*	Grammatical corrections	Collocations	Synonyms	Register errors

3.4 Conclusion: Summary of key issues and doctoral research rationale

The L2 writing and corpus referencing research reviewed in chapters two and three are synthesized in this section, highlighting the key issues that were raised. This summary is presented in order to clarify the rationale for this doctoral research and to contextualize the research questions that follow.

3.4.1 The importance of error type to successful error treatment

Both the L2 writing and corpus referencing literatures have highlighted the role that error type plays in helping learners successfully resolve their language problems and for teachers to convey useful corrective feedback. The L2 writing research recommends that teachers prioritize error type patterns in order to facilitate learners' understanding of the nature of their errors and to provide more focused feedback, drawing learners' attention to recurring problems while avoiding an overload of corrections. In the corpus-based error correction (CBEC) literature, focusing on error type helps learners use the corpus appropriately, such as formulating queries that produce error-relevant concordances and narrowing data analysis to the specific language problem at hand. Given that not all types of errors are suitable for corpus referencing, focusing on corpus-appropriate errors helps learners manage the challenges associated with data-driven learning in order to create a successful experience with corpus research. At the same time, such a focus can be instructive for learners by indicating which types of language problems are best addressed with a corpus as opposed to other reference resources.

For these reasons, this doctoral study will take a selective approach to learners' errors, focusing on specific types of lexical errors. In particular, problems with lexicogrammar are targeted, i.e. errors that involve the interdependence of lexis and grammar, since these types of errors are appropriate to the pattern-revealing nature of corpus research. Several of the corpus referencing studies reviewed in this chapter reported lexicogrammatical errors (e.g. lexical collocations and prepositional colligations) as being successfully resolved error types in their investigations (Crosthwaite, 2017; Mueller & Jacobsen, 2016; O'Sullivan & Chambers, 2006; Tono et al., 2014). Furthermore, as discussed earlier, such errors are likely to interfere with comprehensibility since lexis-related problems have been shown to be particularly detrimental to reader-writer communication, making them important errors to address in student writing. Considering the reported relevance of error type to corrective feedback and to corpus referencing, narrowing research investigations to specific errors is important to produce findings that can be pedagogically instructive for writing teachers.

3.4.2 Alternatives to direct correction of "untreatable" lexical errors

Even though error correction and corrective feedback have been researched at length in the L2 writing literature, investigations have focused largely on rule-based grammatical errors and have not addressed the less systematic error types described by Ferris (1999, 2010) as “untreatable.” Despite the fact that lexical problems are equally common in learner writing, strategies for teachers to support learners in this area have been largely neglected. For the most part, research has advised that these errors be treated through direct correction, a teacher-dominated practice that does not support learners in developing the self-editing skills they need to become independent proficient writers.

With a need for research to address learners' language use in this area, this study will focus on lexical-oriented errors that can be treated by learners on their own through the analysis and application of corpus data. As discussed earlier in this chapter, corpus referencing can be a useful resource for developing writers in that it raises their awareness of lexical patterning and provides language samples against which they can compare their own language use. Through the experience of corpus referencing, student writers can improve both their linguistic knowledge and editing strategies important to managing issues of accuracy beyond the classroom.

3.4.3 Outcome versus process-focused research on corpus-based error correction

Many of the studies reviewed in this chapter base their discussions of corpus-based error correction on success rates, comparing outcomes of the target error types Although success rates provide a useful overview of various error categories, it is a limited perspective, particularly in that linguistic errors are being quantified to facilitate comparison rather than being discussed as text. Such an approach to error correction may be acceptable for rule-governed grammatical errors that can be generally categorized as right or wrong, but lexical errors are far more interpretive, requiring consideration of the original context to be meaningfully evaluated and discussed.

To reach a more detailed and insightful understanding of how learners make use of corpus data to correct their errors, this doctoral research examines the learners' texts, specifically the error correction decisions learners make in light of the language they research in the corpus. Analysis of learner language can shed light on the error correction process as well as the choices students make when transferring their corpus research findings to their own writing.

Text-based analyses are therefore important for providing insight into the quality of learners' error corrections and for clarifying how the corpus data is being employed to treat the errors.

3.4.4 Practicality and depth in corpus-based error correction research

For the most part, CBEC research has tended to prioritize technology over text, focusing more on the learners' ability to reference a corpus and less on the linguistic changes effected through their referencing attempts. The broad error categories generated for comparative purposes in many of these studies limit our insight into the language problems learners are experiencing and how these problems are being treated through corpus research. Furthermore, with learner perceptions research demonstrating that students struggle with many aspects of data-driven learning, these challenges need to be factored into research designs and explicitly addressed in order for the findings to be useful for practitioners.

Therefore, this doctoral study employs research approaches that maintain a practical outlook by prioritizing the needs and circumstances of the L2 writing classroom. At the same time, the study examines the learners' error corrections in considerable depth and detail in order to provide greater insight into the role of corpus referencing for student writers. Through a systematic qualitative analysis of corpus-referenced error corrections, the linguistic factors that impact the learners' ability to employ corpora as a writing resource are investigated, particularly in relation to how learners apply corpus data to their writing and what linguistic difficulties they encounter through these correction attempts.

3.5 Research questions

With these key issues in mind, the current study is guided by the following research questions:

1. Is corpus referencing a viable alternative to teacher direct correction for lexicogrammatical errors?
2. What linguistic patterns and correction tendencies emerge through analysis of the learners' corpus-referenced error corrections?
3. What factors influence the learners' ability to correct their errors through corpus referencing? In other words, what do the findings from the correction analysis imply about how learners make use of corpus data in their writing?

CHAPTER 4. RESEARCH METHODS

4.1 Overview of research methodology

This research is designed as a classroom-based study and therefore aims to improve pedagogical practices through a situated understanding of the learning context. Classroom-based inquiry refers to a broad range of research approaches and methods, though it can be defined by its focus on issues that relate directly to the language classroom, which are typically investigated through data elicited from authentic classroom contexts (Nunan, 1992). Lightbown (2000) highlights the shared goals of those undertaking classroom-based research, which include: reaching a better understanding of the roles participants play in classroom interaction; exploring the influence of instruction on language learning; and identifying the variables which facilitate and/or impede learning. As a text-based study of learner language, this doctoral research addresses in particular the third goal stated by Lightbown, examining the impact of corpus referencing on learners' error corrections and the factors that influenced their correction decisions. In this way, the study foregrounds issues faced by teachers and learners and seeks a greater understanding of the pedagogical issues relevant to corpus referencing in the writing classroom.

As is common with classroom research (Brown, 2014), the study employs qualitative research tools and methods, particularly those characteristic of ethnography, where data is collected over a substantial period of time and within a natural classroom setting. As the teacher of the writing course from which the data was gathered, the researcher took on the role of both observer and participant in an effort to avoid a narrow one-sided view of the classroom situation and to incorporate the dual perspective (i.e. "insider" and "outsider") that is

important to ethnographic research (McKay, 2006; Richards, 2003), as well as, more broadly, to the tradition of social science field studies (Lofland & Lofland, 1995).

Within the scope of the study's overall aims introduced in the previous chapter, the research design was shaped by the classroom context (i.e. the learners' needs and classroom issues) as well as by the data collection and analysis. Overall, priority was placed on open-ended, flexible, and interpretive processes throughout the investigation, all of which are identified by Dornyei (2007) as core attributes of qualitative research. In this way, it was possible to generate a rich, detailed description of the learner data, capturing "meaning in the particular" (Dornyei, 2007:27) through examination of the learners' individual error correction cases. The decisions that shaped the study's research design are outlined in the sections below and clarified in terms of how they were carried out at each stage of the research process.

Overall, this study maintains a focus on learner language use and combines research traditions common to the fields of L2 writing and corpus linguistics. One relevant research area, error analysis, has a long history for the purpose of understanding how languages are learned. Traditionally, error analysis refers to "a set of procedures for identifying, describing, and explaining learner errors" (Ellis & Barkhuizen, 2005:51) and is closely associated with interlanguage theory (Selinker, 1972), as they both represent nativist interpretations of language learning and reflect the fluid and dynamic nature of language development (Ellis & Barkhuizen, 2005). The concept of interlanguage as a structured, evolving language system was also evident in Shaughnessy's (1977) classic study on L1 basic writers' error patterns, which essentially initiated error analysis research into the field of L2 writing, proposing that learner error occurred as a consequence of "internally consistent" but "misguided

interpretations" of language use (Kroll, 1990:142). In recent years, research based on learner corpora has advanced upon these error analysis traditions by applying corpus linguistics methods to the examination of error contrastively across languages and across learner populations (Barlow, 2005).

Although this doctoral research does not aim to explain learners' errors but rather learners' corrections to their errors, it does draw upon traditional error analysis procedures of error identification and description as well as corpus research methods. For example, the first stage of the correction analysis was to code (i.e. describe) and tag the original errors, which was modeled after learner corpus annotation procedures and made use of a computerized text-tagging system. The second stage, error correction annotation, needed to incorporate evaluation of the correction outcomes to convey degree of improvement upon the original error. This involved interpretation of each error correction to determine its acceptability, which was verified through the use of common corpus research tools and techniques in order to provide evidence for the appropriacy of the correction, such as analyzing concordances and word sketches for information on frequency, salience, and lexical context.

Furthermore, when preparing the teacher feedback for students, the researcher referenced the corpus to confirm potential corrections for the students' errors in order to determine whether or not a given error correction could in fact be retrieved from the corpus. At the same time, this process of confirming corrections in the corpus data helped the researcher provide instructional support to learners on their corpus referencing attempts, which was included in the teacher written feedback when necessary. Therefore, like the student, the researcher also referenced the corpus as an empirical method for linguistic description and analysis (Cheng,

2012), using language data samples as the basis for identifying appropriate error corrections as well as for preparing error feedback for learners. These aspects of the study's research design are explained in greater detail below.

4.2 Scope of the study

This doctoral research was conducted in the researcher's undergraduate English for General Academic Purposes (EGAP) writing course and was the fourth time the course had been taught with a corpus referencing component integrated into the writing curriculum. As a result, the corpus instruction and class materials have been revised and refined based on these years of experience prior to the study reported in this thesis. From the second year of this overall four-year process, the research was supported by a grant from the Japan Society for the Promotion of Science, which enabled the researcher to conduct a learner perceptions study on the students' experiences with corpus referencing and to create a corpus training module. Since the information collected during this time has greatly contributed to the current study, it is regarded as preliminary research and will be summarized in the following section to show how this doctoral research evolved out of these early experiences.

In contrast to the learners' perceptions study mentioned above, the research discussed in this doctoral thesis centers on the learners' texts, presenting a correction analysis of 965 corpus-referenced lexicogrammatical errors and examining factors that influenced the learners' ability to make use of the corpus data for improving their written accuracy. Through a case-by-case error correction analysis, the linguistic outcomes of the learners' corpus-referenced corrections are interpreted based on evidence in the learners' texts, though at the same time, the learner perspectives gained earlier through the preliminary research also played a role in

shaping the researcher's interpretations of the data. For this reason, the preliminary research is outlined in the following section to clarify the full scope of the research and to relate the background information that contributed to this study's error correction analysis-centered conclusions.

4.3 Preliminary research

The researcher first introduced corpus referencing to her EAP writing course in 2013 for the purpose of providing language instruction that could more effectively meet the writers' individual needs. With the majority of students enrolled in the course preparing for university study abroad in a variety of disciplines, the instructional focus was on conventions and language use appropriate for writing academic essays and reports. At this time, the researcher felt that communicating with students about their language use primarily through teacher intervention (i.e. teacher feedback) was not enough for them to improve their language use, and to this end, a corpus seemed to be a promising resource for introducing a more student-centered approach to complement the otherwise teacher-centered practice of essay feedback. In addition, the researcher hoped to find more productive ways for students to address their written accuracy on their own beyond the one-semester course and to introduce learners to a new type of English language resource.

During this first year, students expressed a positive attitude towards corpus research and felt it was useful; however, there were a number of challenges. The corpus used in the course, *The Corpus of Contemporary American English (COCA),* was free and readily accessible, but the learners found it difficult to navigate. Many students lacked adequate computer skills to formulate queries and to conduct the kinds of multi-layered searches necessary for language

research. In addition, students felt apprehensive about the all-English interface and the volume of concordance data to review in English, leading many to resort to Japanese-based online sources that had translations of example English sentences (such as *Weblio*). There were also issues to contend with from the researcher's perspective, such as preparing corpus training and practice materials in addition to responding to the students' difficulties with their corpus research, which was challenging to deal with on top of the students' writing needs.

Therefore, in the following year (2014), a research grant was secured to explore better approaches to managing classroom issues such as the ones above. This provided support for the researcher to develop the writing curriculum and to collect data from learners regarding their experiences with corpus research. For two years (2014-2015), information was collected from the students through the following sources: background surveys (N=72), transcriptions of one-to-one teacher-student consultations (N=52), course-final surveys (N=52), and a teacher research journal. In addition, the writing course was adapted to incorporate the corpus research activities more effectively and a corpus training module was developed. These findings were published as a learner perceptions study (Quinn, 2018) and as a corpus training guide (Quinn, 2015), and therefore are not reported in detail in this thesis. However, a brief summary of the findings is presented below to illustrate how the following doctoral study emerged out of this early stage of the research process.

The background survey (N = 72) gathered information on students' computer use and English writing reference habits, which contributed to planning the corpus component of the course, such as preparing appropriate training and practice materials. In short, it was found that the learners' computer use was in fact quite limited, as they had not been taught computer literacy

skills in high school and had little experience researching information online. Academic-related computer use was generally limited to word processing for written assignments in their classes with minimal need for conducting online research. As for referencing English language use, students primarily used bilingual dictionaries and the online Japanese translation-driven website *Weblio*, and no student had had experience with (or ever heard of) a language corpus. Thus, the survey results indicated that the students needed training in general computer research skills as well as language-related online research.

To gauge how well students were managing their corpus research throughout the semester, one-to-one teacher-student consultations were held three times with each student (N = 52) after each assignment cycle, which were recorded, transcribed, and analyzed as interview data. This provided a substantial amount of insight into the learners' referencing experiences and revealed many of the same issues raised in the data-driven learning literature discussed in Chapter 3.1, such as difficulties with formulating error-relevant corpus queries, managing and comprehending the concordance data, and interpreting data patterns, along with concerns over the time involved to research their errors. The information gathered through these student conferences helped to shape the course-final questionnaire, allowing the researcher to survey the students more systematically on these issues at the end of the writing course.

The course-final survey (N = 52) targeted the learners' perceptions of the corpus-integrated writing curriculum and their experience with the overall corpus referencing process. As mentioned above, the topics addressed in this survey were drawn from issues raised during the teacher-student consultations, covering the following areas: corpus training, corpus interface and navigation, approaches to corpus referencing, difficulties encountered, and

perceived value of corpus research. The survey results indicated positive impressions overall, particularly in that learners viewed the extra effort (in researching a corpus versus their dictionaries) to be worthwhile and that they could see the benefits of researching language use through corpus data. However, the majority of learners felt that corpus research was difficult and time-consuming, and for those reasons, cited their bilingual resources (e.g. dictionaries and *Weblio*) as their primary (and preferred) writing references due to the effort involved to reference an item on the corpus. This led the researcher to reconsider the scope of the corpus referencing tasks and to better define its role in the writing course.

Therefore, the research aims were narrowed to focus on using the corpus for error correction purposes. One reason for this decision was to make the corpus research process manageable for first-time users by having the learners address specific language problems in their texts as a series of focused research tasks. In addition, referencing for the purpose of error correction seemed to be a realistic expectation for using a corpus in a writing course, considering that a number of writing objectives also needed to be achieved. To accomplish this, roughly one-third of each class meeting was devoted to corpus referencing skills practice and data analysis, leaving the remaining two-thirds of the class for writing instruction. The time spent on corpus research involved working through a six-week corpus training module that showed learners how to reference the corpus, how to respond to teacher feedback, and how to address various language problems using corpus data. After the initial training sessions, students continued their research practice through regular pair and group exercises.

The corpus interface used in the course was also changed from that used for *COCA* by Mark Davies at Brigham Young University to *Sketch Engine*, a corpus management software that

provides access to many different corpora. The major reason for choosing *Sketch Engine* over *COCA* was that the interface was more user-friendly: the transparent search functions made it easier for students to formulate error correction-based queries and to designate search parameters based on the lexical contexts of their own sentences. In addition, it was useful to have access to a number of corpora in order to increase chances of finding error-relevant concordances and to be able to compare results.

Initially, the learners referenced a wide range of errors in the corpus, both grammatical and lexical, based on whatever problems surfaced in their writing, such as articles, prepositions, verb tense, word form, word choice, word upgrades, reporting verbs, collocations, and phrases, among others. However, it became clear from the student consultations that the error types needed to be more focused, since learners not only had difficulties resolving many of the errors, but also could not formulate corpus queries that were appropriate for such a variety of language problems. Such a comprehensive approach to corpus referencing was overwhelming for students, essentially sustaining the difficulties that have been reported (both in this research and other studies) rather than employing strategies to manage them.

Therefore, the researcher narrowed the scope of the target errors to focus on those that were particularly suited to corpus research and that could not be easily referenced through other resources. For example, noun article errors were not appropriate since accurate use depends more on referentiality and information flow than lexical patterning, while these searches also generated a huge number of concordances. Likewise, word form errors proved to be more efficiently addressed through dictionary referencing. It was clear that consideration of error type was an important factor in creating a successful experience for students with corpus

referencing, and over time, the researcher worked to narrow the range of target error types to a number that would be both manageable and productive for the students.

4.4 Research context and participants

From this point forward, the remaining sections of this chapter relate specifically to the research design of the doctoral research presented in this thesis. Research was conducted at a Japanese national university during the Spring semester of 2016 and data was collected in the researcher's EAP writing course. Being a highly ranked national university, entrance is competitive, and students typically have strong academic skills. The 24 Japanese students enrolled in the course were third- and fourth-year undergraduates, who were International Studies' majors enrolled for elective credit or education majors enrolled for credit towards obtaining their English teachers' licenses. With most of the students going overseas in the following Fall semester to participate in study abroad programs, the class was a group of motivated and engaged learners.

The learners' English language proficiency scores, measured by the IELTS test, ranged from 5.5 to 7.0, although 88% of the students fell within the 6.0 and 6.5 score bands. As for their English educational background, Japanese university students have learned English since junior high school by means of a deductive, grammar-translation approach, as defined by the standardized national curriculum. In contrast, corpus referencing necessitates a data-driven approach, and given that no student had any experience with a language corpus in the study, all were first-time users in this regard.

The course met once weekly for a 15-week semester or a total of 22.5 contact hours. All classes took place in a computer lab with Internet access where the computers could be lowered into the desks to create more workspace for offline instruction and group activities. For each 90-minute class meeting, about one-third of the time was spent on corpus-related activities. The remaining hour focused on writing skills. All course instruction was in English.

As mentioned earlier, the researcher was the teacher of the course in which the study was conducted. To provide information on the researcher's background, she holds an M.A. in Linguistics, has 21 years of university teaching experience (16 years in Japan and 5 years in the United States), and is a native speaker of English and intermediate speaker of Japanese (Level 2 on the Japanese Language Proficiency Test scale). She is also a full-time permanent faculty member of the international studies department in which the study was conducted.

Research ethics were maintained by gaining permission from the students to participate in the study and by completing the ethical guidelines documentation required by the researcher's home institution, which involves answering an annual online questionnaire. The students were informed of the research on the first day of class and were given the choice to accept or reject inclusion of their class work in the study by signing a permission statement, which is provided in Appendix H. All students in the course agreed to participate and submitted signed statements.

4.5 Corpus selection

The *Sketch Engine* corpus management system was used in this study. For novice corpus users, easy navigation is important, and *Sketch Engine* has a user-friendly interface that suited

the error correction-type corpus searches learners would be conducting. Search functions and terminology are transparent and accessible, and familiarity with basic grammar terminology in English is generally adequate for learners to be able to reference the corpus.

Sketch Engine includes a large number of readily available corpora, though the following four corpora were employed in the course: (1) *English Web 2013* (enTenTen13), a 19.6 billion-word English language Internet text-based corpus; (2) *Japanese Web 2011* (jpTenTen11), an 8.4 billion-word Japanese language Internet-based corpus; (3) *British National Corpus* (BNC), a 96 million-word British English corpus of written (90%) and spoken (10%) language; and (4) *British Academic Written English Corpus* (BAWE), a 7 million-word corpus of assessed student texts written at universities in the U.K.

The Japanese corpus (*jpTenTen11*) was used at the start of corpus training only to familiarize learners with corpus referencing through their native language. Otherwise, the remaining three corpora were used regularly throughout the course, and students were encouraged to query any of the three corpora to compare results. The only time students were directed to a specific corpus was when referencing word sketch summaries to research collocations; for this purpose, the *enTenTen2013* corpus recommended due to its large size.

4.6 Data collection

Data collection for this doctoral research centered on the Spring 2016 corpus-integrated writing course and included several student- and teacher/researcher-generated data sources. Before introducing these data sources (in section 4.7), this section first describes the instructional sequence of the writing course and explains the pedagogical decisions that were

made in order to facilitate the corpus referencing component of the course, which influenced the study's data sources. Specifically, five pedagogical aspects of the course design are discussed below: the corpus training module, the course writing assignments, the target error types, the teacher corrective feedback (through which the errors were designated for correction), and the corpus-based error correction task.

4.6.1 Overview of corpus-integrated writing course

At the outset of the course, students were introduced to corpus research through a basic training module. In addition, the reaction (i.e. response) essay was introduced through genre analysis of sample texts since none of the students had experience writing reading-based response essays in English. After this introductory work, preparation for the first of the three reaction essay assignments began.

Overall, each writing assignment proceeded through the following cycle. First, students read and annotated the class-assigned article at home and answered comprehension check questions. The article was reviewed in class to confirm the learners' understanding of both the content and vocabulary, and then students annotated the reading with their reactions, which were also shared in groups. The class worked together to transform their ideas and reactions to the article into viable essay topics, based on their annotations and group discussion. After this, students composed their reaction essay drafts at home and submitted them to the teacher via email attachment. Once the teacher received the students' drafts, she prepared written feedback. Essays were then returned to students for revision and error correction with the corpus. During this revision stage, learners responded to the teacher feedback (on a variety of issues) and corrected designated errors with the corpus along with tallying their corrections on

a correction log. When the draft was fully revised and corrected, students re-submitted their final drafts to the teacher again by email, along with their correction logs.

This writing assignment cycle took place three times, each with a different topic and class reading. Throughout the writing process, students also practiced correcting errors with the corpus. Each class typically started with a corpus research task, which ranged from practice with various search tools and approaches to identifying and analyzing patterns in the corpus data to completing error correction exercises. In this way, the researcher aimed to continue developing the learners' corpus research skills regularly throughout the course and within the thematic context of the individual writing assignments.

4.6.2 Corpus training module

The first few weeks of the course introduced students to the basics of corpus research through an introductory training module. As revealed through the background survey, the learners did not have much experience doing online research in general; therefore, they not only needed to be trained on how to conduct corpus searches, but also how to undertake data-driven, language-focused research, such as scanning concordances for relevant data, identifying recurring patterns, forming conclusions based on the data, and applying their findings to their own writing. Considering Japanese students' English language learning background is primarily deductive and translation driven, most had never practiced inductive-oriented language analysis skills such as these nor managed such large amounts of foreign language data. This became apparent through the surveys and student consultations conducted during the preliminary research stage and contributed to ongoing improvement of the corpus training and practice materials.

For these reasons, a training module was prepared to familiarize students with corpus research in concept and in practice. Once the learners understood how to search the corpus and analyze concordances, they continued practicing these skills through regular error correction-related exercises. This basic training was sequenced in the following manner: (1) introduction to corpora (e.g. where corpus data comes from, what concordances look like, how corpus information differs from dictionary information); (2) paper-based corpus analysis, for the purpose of reviewing concordances and conducting data analyses without the burden of managing the corpus interface; (3) online corpus searches (e.g. familiarizing students with the search interface, terminology, and query formulation); and (4) corpus referencing practice, based on errors extracted from individual student papers and adapted into class error correction exercises. Referencing practice then continued for the duration of the semester, with the materials designed to respond to the learners' needs as they worked on their corpus research skills.

As for corpus search functions and tools, students were taught how to use the basic concordancer query and word sketch collocation summaries, and how to conduct wild card searches, in which a placeholder can be inserted to represent a variable slot in a string of words. There are numerous other tools and functions available on *Sketch Engine*, but the researcher prioritized instruction on these three basic search types because they were considered adequate for the scope of the course, particularly given the limited amount of time that could be devoted to corpus referencing in the writing course. Figures 4.1, 4.2, and 4.3 below provide examples of each search type.

Figure 4.1. Sample queried concordances

're laid back as adults. </s><s> Girls tend to be a bit smaller more	discriminating	in their choices. </s><s> This is less noticeable in Ragdolls since
e FCC in December 2010, which bar broadband companies from	discriminating	against Internet content. </s><s> Republicans said the move wa:
s> This makes it clear that persons with disabilities should not be	discriminated	against when these conventions are applied. </s><s> Thus, the (
<s> Thus, the Convention not only clarifies that States should not	discriminate	against persons with disabilities, it also sets out the many steps t
for success in the workplace. </s><s> Title I makes it unlawful to	discriminate	against a qualified individual with a known disability who can perf
ing agents, protect tenants' deposits, and require landlords not to	discriminate	against people on benefits. </s><s> Caroline is co-sponsor of the
nsumers are supposed to be able to enroll in new plans that can't	discriminate	against them based on their health status. </s><s> Federal ... Re
ntribution is, in my opinion, stupid. </s><s> It does not appear to	discriminate	between the costs of living in various areas, nor does it take into
workplace. </s><s> The Pinellas County Sheriff's Office does not	discriminate	against qualified individuals with a disability in regard to the appli
action (pro-active rather than reactive) to make sure they are not	discriminating	against people from minority ethnic backgrounds, whether they a
of their gender identity. </s><s> More specifically, 47% had been	discriminated	against in hiring, promotion, or job retention. </s><s> A different s
<s> I know that cancer, diabetes, HIV, and other diseases do not	discriminate	by age, yet sometimes I wish they did. </s><s> I see too many hc
cken and egg problem. </s><s> On one hand as long as you are	discriminated	against you don't very often have the opportunity to develop gooc
ad bad habits (alcoholism, brawling etc.), they were very strongly	discriminated	against , and yet they somehow managed to pull themselves tog
extent as Upromise. </s><s> USERS/PARTICIPANTS We do not	discriminate	on the basis of age, race, national origin, gender, sexual orientati
of my immediate family, is void where prohibited and is does not	discriminate	on the basis of religion, gender or sexual orientation. </s><s> The
s><s> Study lead Lee M. Pachter asked the youths if they'd been	discriminated	against in 23 different ways, including being racially profiled while
t agencies and other employers with 15 or more employees from	discriminating	against disabled persons who can still perform the essential func
for group-level comparisons. </s><s> The longitudinal validity in	discriminating	between disease response states was similar between observed
'n = 276). </s><s> The relative efficiency of the change scores to	discriminate	between responder status was analyzed using one-way analysis
" and to ensure that a poor understanding of the former does not	discriminate	against the latter. </s><s> The Purpose of Open Standards </s>
ving population, at least until the age of 80. </s><s> "Rather than	discriminate	against older drivers by setting arbitrary age limits beyond which
ssed the historic bill that guarantee LGBT Americans couldn't be	discriminated	against in the workplace. </s><s> The Senate is doing things. </s
eatures can work, but if there's a numeric thing that allows you to	discriminate	between customer classes, such that the more value they get our
ntage in the job market. </s><s> I spoke about their legal rights if	discriminated	against and advised that there was legal protection. </s><s> But
years after childbirth. </s><s> The law also bars employers from	discriminating	against employees who exercise their right to breastfeed. </s><s
rk on non-English comments? </s><s> Yes, our system does not	discriminate	against non-English comments. </s><s> We have happy users fr

Figure 4.2. Sample word sketch collocation summary

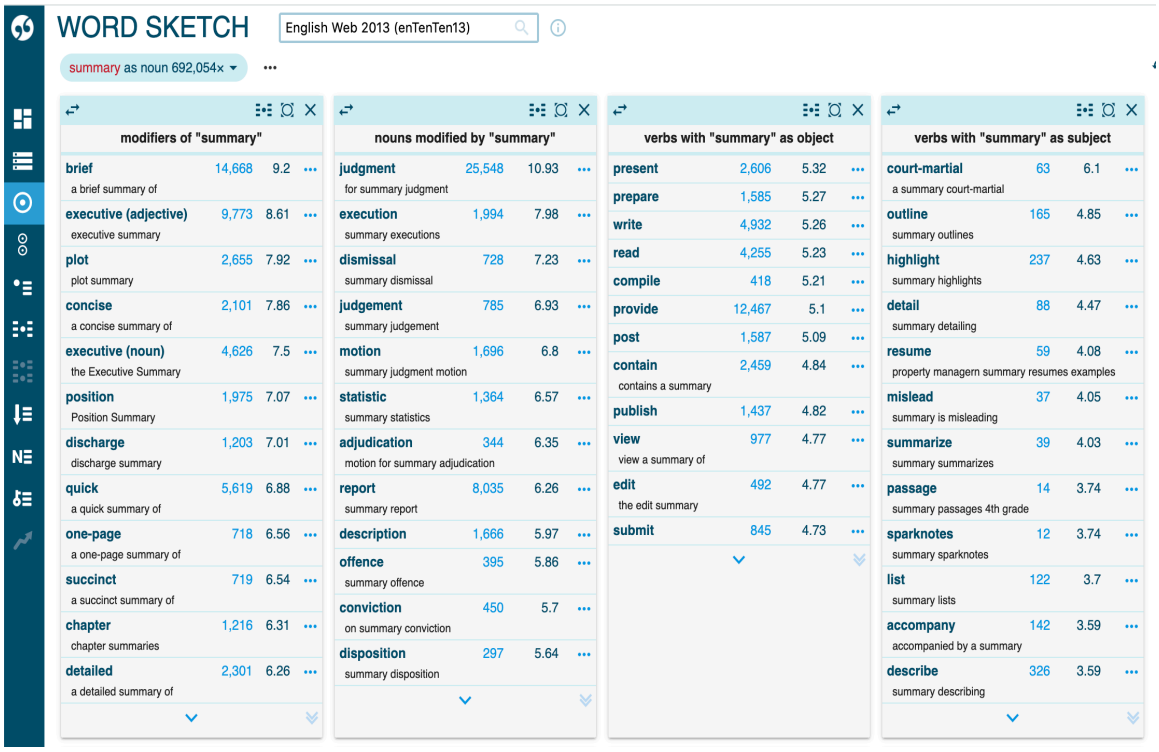
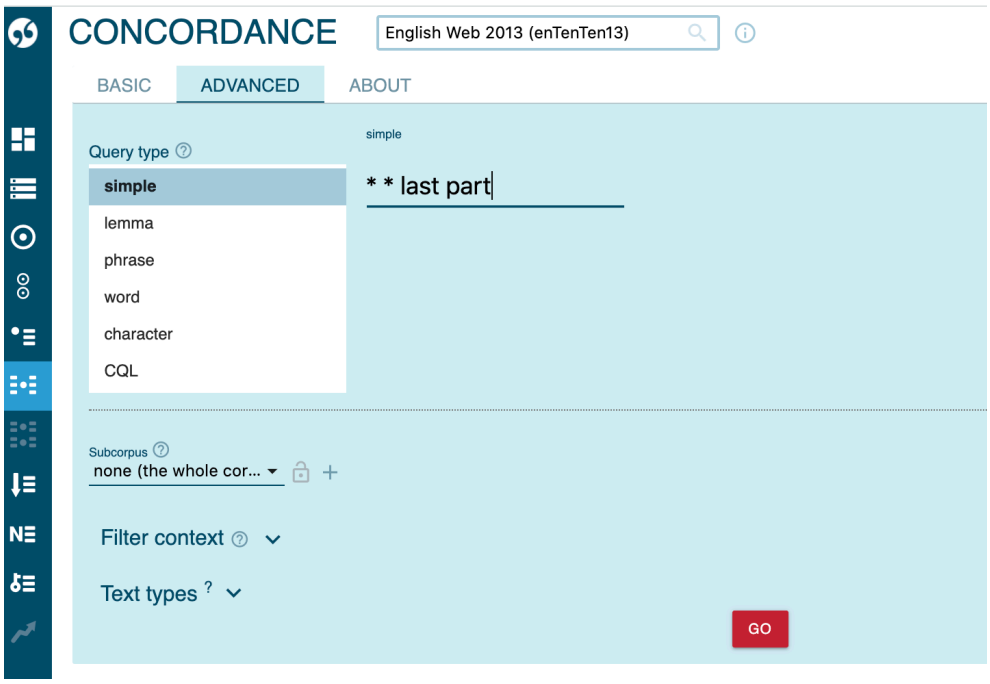


Figure 4.3. Sample wild card search



4.6.3 Course writing assignments

Each student completed three single source-based reaction essays in the course, and each essay involved corpus referencing to correct teacher-designated errors. The format of the essay was a topic introduction paragraph followed by a one-paragraph summary of the class-assigned article, followed by 2-3 pages of student response to the ideas and opinions expressed in the reading, which were supported by their own reasoning and personal examples.

The reaction essay genre was chosen because it required students to express their personal response to a specific reading, which would elicit a greater amount of original learner language than if the students had drawn ideas and borrowed language from multiple sources. In this way, students were encouraged to articulate their thinking at length and in their own words, challenging their linguistic expression and thereby prompting them to use a greater

range of vocabulary. The length of the assignment (3-4 pages) was also intended to stretch students linguistically, as most of them had little experience writing essays in English. These pedagogical decisions were made not only for the purpose of challenging learners in terms of their vocabulary use, but also to necessitate the use of vocabulary resources and to create opportunities for referencing the corpus.

The reaction essays were written on controlled themes, meaning that all students wrote their reaction essays in response to the same class-assigned article. As a result, instruction was consistent across all learners, while the students could also work together in class to prepare for the writing tasks. Specifically, students were taught how to annotate the readings with their own comments, feelings, and questions in order to generate ideas for their papers. In class, learners shared these annotations from the assigned readings and worked together to identify important themes and perspectives that could be used to develop their ideas into full essays.

The three assigned topics were as follows: (1) international relationships, (2) creativity in education, and (3) children and social media. These topics and readings were also used during the preliminary research and proved to be accessible topics for learners since they were able to generate several pages of text in response to the assigned readings. In addition, by using one class reading for each unit, the teacher could verify instances of plagiarism or cases where students were using language from the article rather than their own. In general, the only part of the essay in which expressions tended to be borrowed from the article was in the introductory article summary, which was strictly limited to one paragraph.

All essays were submitted by email and teacher feedback given through the *Microsoft Word* tracking function. Once an essay had been submitted and teacher feedback written, the drafts were returned to students and the revision process began.

4.6.4 Teacher corrective feedback

Corrective feedback played an important role in the study since the errors to be corpus-referenced were designated through these teacher comments. The type of feedback varied depending on what aspect of the text or what type of language problem was being addressed. Indirect feedback was given for the errors to be corpus-referenced by learners, which does not provide learners with a correction but is used to identify specific errors so they can correct them on their own, as discussed in chapter two (e.g. section 2.4.1). The errors targeted for corpus referencing were highlighted inside the learners' texts using Microsoft Word's tracking function, with the instructional feedback written in the margin inside comment boxes. A sample of this indirect error feedback can be found in Appendix A. On the other hand, direct feedback, or errors corrected by the teacher for the student, was given for grammatical errors and sentence structure problems, since these problems involved substantial rephrasing or required specific instruction or an alternative (non-corpus) reference resource.

Aside from designating the errors for corpus referencing, the indirect feedback also provided instructional support to guide the students' research. During the preliminary research stage, only basic error codes were used to indicate the type of language problem to students, but according to the surveys and student consultation data, these codes were not enough guidance for learners to understand their errors and to conduct appropriate corpus searches. For

example, students reportedly could not understand which word in their sentence was the node word that the corpus search should be based upon, while they also had trouble initiating searches for errors that had several correction possibilities. Therefore, teacher feedback was expanded for the current study to provide more guidance on the nature of the learners' language problems as well as the corpus referencing process by (1) identifying the error with basic error codes; (2) briefly describing the language problem; and (3) recommending which corpus search method to start with (e.g. basic query, word sketch, or wild card) or which words to enter into the search box. In this way, teacher feedback clarified the language problem and helped point students in the right direction to get a productive search underway.

This learner guidance was informed by the teacher's own corpus research as she composed the error feedback, validating her own search advice in an effort to minimize the anticipated challenges to corpus referencing that had been evidenced during the preliminary stages of this research, discussed earlier in section 4.3. This additional scaffolding was one way the teacher mediated the corpus referencing process on an individual basis and set out to define the error correction task so that it was manageable for learners, taking into account the difficulties that have been frequently reported with data-driven learning in the classroom (see chapter three, section 3.1).

This written instructional feedback not only helped facilitate the learner's referencing, but was also valuable to the researcher, as it enabled her to trace steps in the students' research process and locate where in the corpus they had found their corrections. Since the students referenced and corrected their errors primarily as homework outside of class, the teacher feedback provided important information on the learners' referencing process, allowing greater

transparency into how the learners came to their correction decisions. Thus, over time, the indirect error feedback was refined to reach an effective form that was useful to both researcher and student.

4.6.5 Error type and error selection priorities

This study focuses on lexicogrammatical error types, which were selected based on research findings relevant to the L2 writing and corpus referencing literature, while the preliminary research for this study also guided the researcher towards a focus on these types of language problems. As discussed in section 4.3 above, the research conducted prior to this doctoral study explored a variety of error types with the learners (e.g. articles, prepositions, verb tense, word form, word choice, word upgrades, reporting verbs, collocations, multiword units, etc.), but this range in error proved to make corpus research tasks difficult for learners, both in terms of searching the corpus and analyzing the data. Targeting lexicogrammatical errors enabled students to conduct their research with basic corpus tools and search functions (i.e. concordance queries, word sketch, and wild card searches), which helped them navigate the corpus and keep the search process relatively simple. Finally, the researcher also felt that students would be more motivated to use the corpus if the errors could not be recovered elsewhere; in other words, if the errors could only be corrected (or most efficiently corrected) by referencing a corpus.

Feedback on the students' errors was selective, prioritizing lexical problems that were most likely to negatively affect reader-writer communication. As discussed earlier in chapter three (section 3.3.3), L2 writing specialists generally advocate selective over comprehensive feedback, as it is “less overwhelming for the student writer to analyze, process and apply”

(Bitchener & Ferris, 2012:144) and that it can help learners achieve a better understanding of their written errors (Ferris, 1995). In addition, it allows the teacher to tailor feedback to individual students, highlighting the most serious or recurring problems for particular writers. This was especially important for this study since learners needed to respond to each feedback point by referencing the corpus to remedy the error.

In an effort to maintain motivation and to create a positive experience for learners with corpus referencing, error feedback was generally limited to 16 errors on average per essay, although this number could vary depending on the learner and the essay assignment. The decision to set a maximum for the number of errors to reference developed out of the preliminary research, as it became clear that most students were not willing or able to reference more than 16 errors in the corpus for one assignment (and for reasons that are essentially the same for learners responding to comprehensive corrective feedback). Recognizing this threshold was important for the researcher to anticipate factors that could negatively impact the students' motivation and to proactively address the issues identified by learners in the data-driven learning literature.

Decisions to target certain lexical errors over others were based primarily on two factors: (a) how detrimental the error was to the writer's communication, and (b) how correctable an item was with the corpus. As for the first factor, if a writer's meaning could not be recovered without revising the error, then that item would be highlighted as a "serious" error on the first reading. After designating these most problematic cases, other lexical errors would be highlighted on a second reading until approximately 16 errors were reached for the learners to corpus reference. For instance, the combination **organize classes* in the following sentence is

an example of an error that was not selected because the meaning is adequately transparent to support the writer's point related to problems with large classes:

> *I think most of elementary, junior high, and high schools in Japan* ****organize*** *classes of thirty to forty students.*

Instead, there were other more serious errors in the learner's essay that were designated for correction and that amounted to 16 errors for the student to reference in the corpus.

The second factor in prioritizing errors was how correctable a given language problem was with the corpus. To determine this, the researcher verified whether a correction for the student's error could in fact be recovered with the corpus while composing the teacher feedback for students. If no acceptable corrections surfaced in the corpus data, then that item was not designated for student correction. Basically, it was felt that if the teacher could not find a suitable error correction, then it was unreasonable to have the student conduct a corpus search. This was yet another measure taken to avoid the common barriers associated with learner-initiated corpus research. In the following sentence, for example,

> *I think Japanese schools have to change the* ****environment*** *to promote students' creativity*

the combination *change the* ****environment*** may appear easy to correct, but the educational context of the learner's expression considerably narrows the acceptable choices, making it difficult to retrieve an appropriate correction.

4.6.6 Corpus-based error correction task

For the purpose of clarifying which aspect of the error correction process this research focuses on, the following table summarizes the overall corpus-based error correction task. As shown in Table 4.1, the correction task can be segmented into five stages. First, the teacher designated the errors to be corpus referenced (Step 1) and gave error feedback and search guidance through the written feedback (Step 2). The student then used this feedback to begin their corpus research (Step 3) and analyzed the resulting data to identify an appropriate correction (Step 4). Finally, the student had to apply the linguistic patterning discovered through the corpus data to their own writing by incorporating the correction choices into their original sentences (Step 5).

Breaking down the error correction task in this way reveals the range of skills required to make a single correction. Given this scope, this research focuses on Step 5 in particular, data application, while also taking into consideration evidence of the learners' data analysis (Step 4) in order to better understand why students made the error correction choices they did and what this suggests about their ability to apply corpus research findings to their writing.

Table 4.1. Breakdown of corpus-based error correction task
** Indicates focus of the current study*

Stage	Task	Skills Required
1	Teacher designates error for corpus referencing	Identify language problem
2	Teacher provides error feedback and corpus search guidance	• Describe the nature of the error • Identify node word for initiating corpus query • Suggest error-appropriate corpus query
3	Student queries the corpus	Respond to teacher feedback o Comprehend the nature of the error o Conduct teacher-advised corpus query Formulate follow-up query and research further, if necessary
*4	Student analyzes data to find appropriate correction	• Review data to identify possible corrections • Assess relevance of possible corrections to learner's intended expression • Select suitable correction
*5	Student applies selected correction to their writing based on model patterns in corpus	• Analyze error correction's usage patterns • Revise original text to accommodate lexical patterning evidenced in corpus data

4.7 Data sources

This section describes the study's data sources, which were gathered over the duration of the full research process, starting with the preliminary research for some sources. Other sources were ongoing, while still others were collected during the most recent Spring 2016 course. Regardless of when the data was collected, all sources introduced in this section are important to the error correction analysis presented later in this thesis, as they provide various perspectives on the investigation, ensuring data triangulation (e.g. Miles, Huberman, & Saldana, 2014; Brown, 2014).

The primary data sources for this doctoral study are the extracted error corrections, students' essays, students' correction logs, and the teacher's written corrective feedback. These were gathered during the Spring 2016 writing course and serve as the basis for the correction analysis presented later in chapters five and six. Data collected prior to this 2016 course includes the student background surveys, course-final student surveys, and teacher-student consultations. As mentioned earlier, this data is analyzed and reported in separate publications (Quinn, 2015, 2018) and therefore is cited rather than fully reported in this thesis. Otherwise, the teacher's research journal was a source of information that was maintained for several years, starting in 2013 when the first year of this corpus-integrated writing course was taught.

4.7.1 Textual data sources: Student essays and extracted error corrections

As detailed in section 4.6.3, each student completed three essay assignments during the semester. Initially, 26 students were enrolled in the course, but two students did not complete all three assignments, leaving 24 students as participants in the study. This amounted to 144 texts: 24 students who completed three essay assignment cycles with each cycle including a draft and a revision. The essays were around 1000 words in length and with 14-17 errors on average targeted for error correction with the corpus. See Appendix B for further detail on the length and number of errors designated in the students' essays.

The learners' errors and respective corpus-referenced corrections were extracted from the students' essays, paired and aligned into spreadsheet columns. This organization facilitated pattern identification and comparison of the students' correction choices and tendencies, a process that is explained more fully in section 4.8, data preparation and analysis.

To complement this error correction data, the original essays allowed the researcher to view the full lexical context of the students' original errors, which was necessary to examine how the corrections were integrated into the learners' writing and to what degree their correction choices were accurate. Therefore, the extracted error corrections are considered to be a data source separate from the essays since they take a different form and offer a different perspective from what can be inferred through the learners' essays alone.

4.7.2 Student data sources: Correction logs, student surveys, and teacher-student consultations

After receiving their essay drafts with teacher feedback, students went about revising their writing and correcting their designated errors with the corpus. During this stage, learners kept a correction log to tally their error corrections and the resource they referenced for each correction (see sample correction log in Appendix C). On this log, students listed the error number (according to the *Microsoft Word* tracking system), the error code (designated by the teacher), their original error, their error correction, and the resource they referenced to correct the error (e.g. corpus, dictionary, the Japanese site *Weblio*, no resource, or some other reference identified by the student). Other studies have used similar self-reports as data sources in their research in order to collect information on the learners' referencing activities (e.g. Frankenberg-Garcia, 2005; Varantola, 1998).

The correction logs served as a record of which resources students referred to when correcting their errors, information that was later encoded into the error annotations for data analysis. For example, there were times when students chose to use a dictionary over the corpus or when they already knew how to correct an error on their own and did not need to reference

anything. With this correction log, the researcher could identify non-corpus referenced corrections and exclude those items from the analysis. In addition to confirming which error corrections were corpus-referenced, the correction logs also served as a useful back-up of the error corrections themselves, such as allowing the researcher to verify the specific language of a given correction. For example, there were sometimes cases where a student recorded a correction on the log but forgot to change the error in their essay or vice-versa.

As was introduced in section 4.3, student surveys and teacher-student consultations were conducted during the preliminary research for this doctoral study. The first survey, a background questionnaire (N = 72), was administered at the outset of the course to gather information on the students' degree of computer literacy and writing reference habits. The survey was divided into three sections: (a) students' computer use and online search approaches, such as on what devices they typically accessed the Internet, how often, and in which language they searched; (b) the students' use of writing reference tools when they wrote in English; and (c) their attitudes towards English study and writing, both in their L1 and L2. To ensure the learners' understanding, the survey was administered in their native language, Japanese. The second survey, a course-final questionnaire (N = 52), elicited information on students' perspectives and experiences with corpus referencing during the semester. The questionnaire consisted of 36 Likert-scale items and addressed topics drawn from the teacher-student conferences held during the semester. Specifically, the survey elicited information on the corpus training module, the *Sketch Engine* corpus system, corpus referencing strategies, difficulties with corpus research, and the students' perceived value of using a corpus overall. Both surveys are included in Appendices D and E.

Teacher-student consultations (N = 52) were also held prior to this doctoral research in 2014 and 2015. These involved 10-minute, one-to-one conferences held with students as part of each writing assignment cycle, which meant that the researcher met with each student three times during the course. The purpose of these student conferences was to provide individual writing support during the revision process and to allow for discussion of their particular writing issues within the context of their working drafts. Although the conferences focused on the learners' writing, corpus referencing was one item on the consultation agenda. This allowed the researcher to discuss the learners' corpus research concretely in terms of specific referencing attempts and to answer their questions regarding corpus use. Often, referencing difficulties that arose during these conferences were developed into practice exercises for the whole class in order to better support all learners in conducting effective corpus research.

As a data source, these consultations were audio recorded, but only the corpus-relevant comments were transcribed, as this was the only information from the discussions that was necessary to document for this study. These referencing-related comments were then reviewed, tagged by theme, and sorted to organize them into topic areas. These topic areas, in turn, were used to develop the course-final survey described above, so that both data sources reinforced each other through their common topics and created a fuller perspective of the issues raised by the learners.

Overall, this student data contributed not only to the writing curriculum, but also to this study's research design and correction analysis by providing insight into the learners' perspectives and preferences, such as their referencing tendencies and views on foreign language learning, which ultimately influenced the linguistic choices and textual revisions

they made to their essays. Although the surveys and consultation data are not reported in detail in this thesis, the main findings were briefly summarized earlier in section 4.3 (preliminary research), while a full overview of the results can be found in separate publications (Quinn 2015, 2018).

4.7.3 Teacher data sources: Teacher corrective feedback and teacher research journal

As discussed in section 4.6.4, the teacher's written corrective feedback communicated to learners which errors to reference and how to begin their corpus research. As a data source, the researcher was able to use this error feedback in two ways. First, through the search advice provided to the learner, the researcher could trace the students' referencing attempts in order to understand how they came to their correction decisions. Of course the learners may have conducted further queries that were not evident, but at a minimum, the first step in the corpus search process was recorded. Second, the corrective feedback enabled the researcher to recall the target (accurate) correction she had identified in the corpus when composing the feedback for students. This not only saved time during data interpretation by reducing the need for repeated verification of corrections in the corpus, but also clarified the conditions under which the feedback was originally composed. Consequently, the teacher feedback provided important information on the learners' referencing process, which otherwise could not have been easily documented without deliberate intervention since students completed their essay revisions and error corrections outside of class as homework.

From the early stages of this research in 2013, the researcher maintained a research journal, which is regarded as an essential aspect of conducting qualitative research to support the reflections, thought processes, justifications, and connections researchers make as they

proceed through their investigations (Richards, 2006). Overall, the research journal contributed to data analysis and interpretation by documenting tendencies observed in the data while it was being collected, coded, and analyzed. These ideas were routinely noted and reviewed to support a thorough and systematic qualitative description of the data - an activity that is identified by Duff as a means of "conceptualizing, noticing, articulating or testing out new hypotheses or ideas" (cited in Dornyei, 2007:161).

The research journal was kept in *Evernote*, a note-taking application, which allowed the researcher to enter and organize ideas on any device (see sample in Appendix F). Over the course of the study, theme-based files and folders were created, revised, and streamlined as notes were added. Folders were made for general topic areas, such as error types, error tagging, correction assessment, writing curriculum, teacher feedback, corpus training, research design, student issues, collocation analysis, among others. Within each of these folders, ideas were recorded and placed into subdivided notes files, such as researcher observations, (research) reading notes, student comments, research methods, data tendencies, data reflections, etc.

While a thematic organization suited the researcher's approach to maintaining her journal, resources by Dornyei (2007) and Silverman (2005) provided guidance to ensure that all aspects of the research process were being considered and systematically noted. For example, Silverman (2005) describes four categories in keeping a research journal: observation notes, methodological notes, theoretical notes, and personal notes, which was a useful framework to encourage thorough note-taking. Documentation of "descriptive sequences" (Altrichter & Holly, 2005) was also included that captured the details of teacher-student and student-student

interactions in class, helping the researcher bring the learners' perspectives into the data interpretation. Issues students voiced in class or in consultation with the teacher, specific errors or referencing tasks that students struggled with, descriptions of successful or unsuccessful referencing attempts, for example, were also recorded in the research journal. Personal agency is recognized as an important aspect of qualitative inquiry, making the "metadata" generated through this research journal a valuable resource in shaping the design of the study and its findings. (Dornyei, 2007:160)

4.8 Data preparation and analysis

This section outlines the data analysis activities that were carried out in relation to the labeling, categorizing, and interpreting of the learners' error corrections. First, the coding process for the learners' original errors and error corrections is described with examples of each target error type. This is followed by an explanation of how the error corrections were evaluated to determine whether they were accurate or not. Next, an overview of the essay annotation system is given, which involved tagging the errors and corresponding error corrections in the learners' texts. Finally, the process of extracting the errors and their respective corrections is explained, particular in terms of how these were organized to facilitate further analysis.

4.8.1 Error and error correction coding process

In contrast to some research methodologies that may view coding as "merely technical, preparatory work for higher level thinking about the study," Miles, Huberman and Saldana emphasize that in qualitative research "coding is analysis...[the] deep reflection about and, thus, deep analysis and interpretation of the data's meanings" (2014: 72). Although coding

refers to labeling data items for the purpose of assigning a descriptive meaning (Miles et al., 2014), it is a process that goes beyond this basic level to convey the retention of relevant data, bringing the pieces together in ways that allow for review until the data is fully understood and develops the researcher's thinking (Richards, 2015).

With this in mind, the first step was to create a descriptive inventory of error types based on the errors targeted for corpus referencing in the learners' essays. At this early stage, Dagneaux, Denness, and Granger's (1998) work on annotating learner corpora provided useful background for developing an error coding framework. According to their guidelines for annotating *FRIDA*, the *French Interlanguage Database* (reported in Granger, 2003), effective error coding systems use descriptions (i.e. tags) that are informative yet manageable, reusable across various languages (i.e. in this case, applied as usable beyond the original research context), flexible to use during annotation, and consistent across annotators. These recommendations were similarly adopted as guiding principles for this study. In addition, Dagneaux, Denness, and Granger's (1998) error codes offered a useful starting point for creating this study's coding system. With other corpus-based error correction studies being largely focused on success rates, there was little guidance in the way of frameworks for describing the quality of errors and the changes learners made to their texts.

However, there are important differences between this study and learner corpus annotation that needed to be taken into account and that therefore required Dagneaux et al.'s (1998) coding system to be adapted for this research. For example, compared to learner corpus annotation, this study does not seek to comprehensively code all errors produced by learners in their writing; instead, only the lexicogrammatical errors targeted for corpus referencing

were analyzed. Therefore, rather than the three levels of coding (error domain, error category, and word category) that were used to tag the *FRIDA* corpus in order to distinguish among the broad range of errors, this study only warranted two levels, error category and word category, since lexis was the only error domain being investigated. Furthermore, rather than coding for the purpose of describing learners' error patterns, this doctoral study is a correction analysis, and therefore focuses on how the learners revised their texts in light of their corpus research. Consequently, the error and respective error correction codes needed to be linked to allow for further data analysis, while evaluation of the students' degree of error correction success also needed to be conveyed through the annotations.

Therefore, in order to meet the goals and priorities of this research, error codes were generated from the bottom up, emerging as the researcher "learned" from the data (Richards, 2015:117). To accomplish this, the errors highlighted through teacher feedback were listed, sorted, and organized into general error categories in order to compile a list of representative error types, such as collocations, and then further segmented in sub-categories, such as verb-based collocation errors. Eventually, these two levels of error description, error type (e.g. collocation) and word class (e.g. verb), became the basic coding levels for the target errors and corresponding corrections.

In the process of categorizing the corpus-referenced errors in the learners' essays, of major concern was creating descriptions that were both accurate and consistently applied across all cases. To this end, the researcher worked together with two other coders (i.e. colleagues) to ensure a reliable coding system, particularly for consistency over time (Richards, 2015) since it took over a year to code the learners' errors and corrections and to achieve a finalized

coding system. Aside from aiming to create a reliable standard, developing the error coding system with colleagues allowed for fresh perspectives and greater insight into the data than what could have been accomplished by the researcher alone.

The two other coders (hereafter, colleagues) were both native English speakers who held language-related M.A. degrees and were experienced EFL writing teachers (more than 15 years) and who were therefore accustomed to describing and responding to learners' errors. This meant that each data record (the error and its correction) was evaluated by two independent coders (the researcher and one colleague) and sometimes also by a third coder (the second colleague) when discrepancies arose. Through close consultation, the error descriptions evolved into a uniform error coding system that was appropriate for the learner data collected in this study and that reflected the error annotation guidelines set out by Dagneaux, Denness, and Granger (1998). Both colleagues were paid for their work through the research grant that supported this study.

Consultation and error coding proceeded as follows. The researcher and a colleague first assigned codes independently to the teacher feedback-highlighted errors across three sets of essays. Assigning codes required reading of the students' original drafts together with their revised essays, as it was often necessary to take both the error and its error correction into consideration to determine an appropriate description. For example, the meaning of *a **simple** summary* in one student's draft becomes considerably clearer after confirming its correction in the revised text to *a **brief** summary,* which shows that the writer wanted to refer to the length of her summary, rather than describe it as basic or easy to understand. As a result, this would be coded as an error in collocation based on the study's error descriptions (discussed below),

rather than as a problem with general usage or as a lexical item to be upgraded, both of which were other categories that emerged through the coding process.

Once three sets of essays (i.e. original drafts and revisions for three students) had been separately error coded by the researcher and a colleague, the two met to compare and discuss their coding decisions. This was particularly valuable early on in the coding process, as it provided an opportunity to clarify conceptualizations of the errors and to refine the error descriptions while reviewing a set of student errors. When discrepancies arose in how particular errors had been categorized, they were resolved through discussion and referencing error-relevant resources, such as monolingual and bilingual dictionaries (Japanese and English), collocation dictionaries, grammar references, and the *Sketch Engine* corpora. Overall, 98.5% of the total 965 corpus-referenced errors included in this study could be agreed upon and coded through this two-person consultation process. For the remaining 1.5% of the errors that could not be agreed upon, the second colleague was consulted for another perspective, and through further discussion among the three coders, a decision could be made for assigning the item to an error category.

Aside from these 965 errors coded through colleague consultations, 21 errors were eliminated at the outset because the writer's intended meaning was unclear or the error had multiple problems that prevented it from being assigned to one particular error category. Beyond these writer-related problems, some errors were excluded due to teacher-student miscommunication, such as cases where the teacher feedback was incorrect or misleading or where the student appeared to misunderstand the teacher's comments.

This repeated cycle of independent coding followed by colleague consultations regarding the error and error correction code assignments allowed the researcher to verify the overall coding system (Ellis & Barkhuizen, 2005), while at the same time, engage with the data in depth and start forming early interpretations. Throughout this process, the list of error types was revised several times. For example, initially register was included as one of the error categories, but in the end, there were so few errors classified as register problems that this category was eliminated. On the other hand, an error category for reporting verbs was added at one point since these tended to be used incorrectly in the one-paragraph article summaries, but these were also discontinued due to an overall small number of cases in the data. Likewise, collocation coordinates (e.g. *height and weight*) were too few to become an independent category of their own and was therefore collapsed with the overall collocations category. This review and revision continued until all of the texts' teacher-designated errors were assigned to appropriate error categories.

4.8.2 Description of error categories

The following four sub-sections introduce the main error categories that emerged through the error coding process, defining them with examples. For a full list of the study's error codes, see Appendix G.

4.8.2.1 Collocation errors

The collocation category was coded based on which part of the collocation was incorrect. For example, if the verb was incorrect in a given collocation, such as **prepare (**__set__**) a time limit*, then it was coded as a verb-based collocation error and was tagged in the essay as [V_COLL]. Similarly, the collocation **wrong (**__inappropriate__**) behavior* would be coded as an adjective-

based collocation problem and assigned the error tag [ADJ_COLL]. The error and error correction tags are explained later in section 4.8.4 (essay annotation), but for now, the table below (Table 4.2) shows the collocation codes that make up this collocations category, which illustrates the range of possible patterns within a given error category.

Table 4.2. Distribution of collocation error codes and patterns.

Erroneous part of collocation	Incorrect adjective	Incorrect adverb	Incorrect noun	Incorrect verb
Error code	[ADJ_COLL]	[ADV_COLL]	[N_COLL]	[V_COLL]
Collocation patterns	[ADJ+N] [ADJ and/or ADJ]	[ADV+V] [V+ADV]	[N+V] [V+N] [PREP+N] [N and/or N]	[V+ADV] [ADV+V] [V+N] [N+V] [V and/or V]

Coding the collocation errors required consideration of both the error and its correction in the revised essay. As mentioned in the previous section, 4.8.1, referring to the learners' corrections during the error coding process not only clarified their intended meaning, but also allowed the researcher to verify that the erroneous combination was best classified as a collocation error rather than as a lexical usage error, the code for describing less predictable combinations (described in the following section, 4.8.2.2). Making this distinction at the outset was important in order to categorize the errors accurately, as well as to ensure that the researcher was understanding the text from the learner's perspective.

When coding the collocation errors, the target (i.e. accurate) collocate for a given written context had to be confirmed with either (a) the *Oxford Collocations Dictionary,* or (b) the *EnTenTen2013* corpus. If verified in the corpus, then the target collocate had to have a

LogDice score of at least 5.0, or it had to be elicited through a basic concordance query as adjacent or near-adjacent word pairs with a minimum of 700 hits. LogDice is the statistic measure used by Sketch Engine to identify collocations and is reported on the corpus system's word sketches. The *EnTenTen2013* corpus was used to validate these errors since this was the corpus students employed in the writing course for referencing collocation problems. As discussed earlier, the *EnTenTen2013* Internet-based corpus has far more data compared to the other corpora in *Sketch Engine*, which is important when referencing word sketches in order for the reported scores and rankings to be reliable.

For example, to take the error **a **simple** summary* discussed earlier, ***brief*** would be a more appropriate collocate for the writer's context, as the student is introducing the article on which the reaction essay is based through a short, one-paragraph overview. Referencing the *EnTenTen2013* corpus shows that ***brief*** *summary* is listed on the word sketch for *summary* with a LogDice score of 9.2; therefore, this error is coded as a collocation error. Alternatively, ***brief*** *summary* appears in the *Oxford Collocations Dictionary* as well, so this resource could also be used as justification for coding the inappropriate combination **a **simple** summary* as an error in collocation.

Sometimes, however, a collocation correction did not appear on a word sketch with a typicality (i.e. LogDice) score or in the collocations dictionary, but it was clearly the best choice for the student's written context. In these cases, if a corpus query for the combination could elicit more than 700 concordances of adjacent or near-adjacent pairs, then for the purposes of this study, it was defined as a collocation error. An example of this is the error ***harmful** content,* which is accurately expressed as ***inappropriate*** *content* since the learner is

referring to websites that are not suitable for children. Through a basic corpus query, the word pair ***inappropriate*** *content* elicits 1239 hits and was therefore classified as a collocation error since it clears the minimum of 700 hits and was deemed the most appropriate expression by the study's coders to convey the writer's meaning.

Although ***inappropriate*** *content* may not be considered a collocation based on strength of association measures that are often used to identify collocational sequences (Schmitt, 2010), the writer's context and reader expectations play an important role in determining the suitability of a given lexical combination. Extra-textual features that indicate discourse function or writer's stance, for example, were important to take into consideration, such as the pragmatic value of a lexical sequence (Read, 2000; Schmitt, 2010) or its semantic prosody (Hunston, 2007), which could necessarily limit the range of accurate correction choices available to a writer.

Considering these factors, the collocation error category in this study came to include both "strong" and "weak" collocations, with "strong" referring to those identified as collocations in the *Oxford Collocations Dictionary* or with LogDice scores above 5.0 in the *EnTenTen13* corpus, and "weak" collocations referring to those that produced more than 700 concordances through a basic concordance query. This distinction is also consistent with how the *Sketch Engine* corpus system assesses the strength of collocations, as described on their website (*Sketch Engine*, 2020): "strong" collocations are those that possess "typicality" (i.e. high LogDice scores) and are therefore included on word sketches. On the other hand, collocations that are frequent but not associated strongly enough to be described as "typical" are termed "weak" collocations (*Sketch Engine*, 2020). As long as these "weak" collocations produced a

frequency of at least 700 concordances in the *EnTenTen2013* corpus, they were assigned to the collocations category in this study. Weak collocations that did not meet this minimum standard were instead coded as lexical usage errors, which are discussed in the following section (4.8.2.2). Further examples are provided in Table 4.3, which shows sample errors coded as collocations along with their verification resources.

Table 4.3. Collocation errors: learner data samples

Word category	**Collocation error**	**Accurate collocation**	**Verification resource**
adjective-erred collocation	*other countries have* ***resemble** problems*	***similar** problems*	*EnTenTen2013* corpus, LogDice 6.94
adjective-erred collocation	***harmful** content on some websites*	***inappropriate** content*	*EnTenTen2013* corpus query, 1239 hits
adverb-erred collocation	*you have to come up with a* ***perfectly** new idea*	***completely** new idea*	*EnTenTen2013* corpus, LogDice 9.72 *Oxford Collocations Dictionary*
verb-erred collocation	***grow** academic skills*	***develop** academic skills*	*EnTenTen2013* corpus, LogDice 9.42 *Oxford Collocations Dictionary*
noun-erred collocation	*this complicated* ***condition**	*this complicated* ***situation***	*EnTenTen2013* corpus, LogDice 5.71

4.8.2.2 Lexical usage errors

Errors coded as lexical usage problems refer to word combinations in which there was typically more than one correction choice that could appropriately convey the writer's meaning. The possibilities for corrected word combinations proved to be acceptable based on concordance data, but the combinations did not meet the criteria for being categorized as collocations. Basically, lexical usage errors were distinguished from collocation errors in that

they could be corrected in a variety of ways, whereas collocation problems had a much narrower range of correction possibilities. In many collocation cases, there was only one acceptable correction: to return to the ***harmful** content* example discussed above, it would be difficult for a reader to come up with another solution besides replacing it with the collocate ***inappropriate***.

To illustrate the conditions for this lexical usage error category, the combination ***show** my opinion* (i.e. **I **show** my opinion in this essay*) could be corrected as ***introduce*** or ***share*** or ***express,*** for instance, among other choices. Perhaps some of these possible choices appear on a word sketch or in a collocations dictionary, but there is no one choice that clearly stands above the rest as the best option for the learner's written context. On account of the possible range of correction choices, such errors were viewed as usage problems that were more general than the formulaic nature of collocations. Put yet another way, the problem in the learner's text was forming an acceptable or appropriate word combination in English, rather than meeting the reader's expectation for a specific collocate. To clarify the nature of these lexical usage errors, Table 4.4 below provides data samples from this category.

Table 4.4. Lexical usage errors: learner data samples

Error category	**Lexical usage error**	**Correction possibilities**
Verb usage error	*I *__show__ my own opinion in this essay*	*introduce, share, express, state*
Adjective usage error	*I gave *__marvelous__ inventions by very smart researchers as examples*	*successful, well-known, important*
Noun usage error	*A different *__idea__ of gender roles*	*view, conception, understanding*

Some items in this lexical usage category were originally coded as what are termed lexical upgrades. Although not language errors *per se*, this code was assigned when the writer used a basic-level word that could be easily upgraded to a more precise language choice. As shown in Table 4.5 below, words such as ***big***, ***thing***, and ***get*** were common in some learners' texts and were therefore designated for an upgrade through the teacher feedback, challenging writers to improve their language use. Through the coding process, however, these upgrade "errors" were integrated into the general lexical usage category, since it was decided that there were relatively too few upgrade cases to justify a separate independent category.

Table 4.5. Lexical upgrades: learner data samples

Error category	**Lexical usage error**	**Corrections possibilities**
Adjective upgrade	*these problems are* ****big***	*serious, significant, widespread*
Noun upgrade	*creativity is an innate* ****thing***	*ability, quality, talent*
Verb upgrade	*to* ****get*** *knowledge*	*acquire, gain, increase*

4.8.2.3 Phrase errors

In this study, the learners' errors that were coded as phrases can be defined generally by Wray's (2002) often-cited description of formulaic sequences: items that are continuous or discontinuous, include words as well as other elements, and are (or appear to be) prefabricated. A more specific definition is Nattinger and DeCarrico's (1992) description of lexical phrases (cited in Read, 2000:22): "a group of words that looks like a grammatical structure but operates as a unit with a particular function." They identify four types of lexical phrases: "polywords" (e.g. *for the most part*), "phrasal constraints" (e.g. *a long time ago*), "institutionalized expressions" (e.g. *once upon a time*), and "sentence builders" (e.g. *I think*

that). The first two types in particular, polywords and phrasal constraints, characterize many of the phrases that were evident in the learner data for this study.

Phrases differed from those coded as collocations in that they were made up of more than two items and often had multiple errors, which made it difficult to assign the phrase to one particular error category. Also, phrases could have both grammatical and lexical problems, whereas the collocation and lexical usage categories involved only lexical errors.

Table 4.6 below shows some data samples to illustrate the nature of these phrasal errors, such as ***at** last part* for the transitional phrase ***in the** last part* that has an incorrect preposition (*at)* and omitted article (*the)*. The second sample, **for these **points***, is also intended to be a transitional phrase (*for these **reasons***), but the lexical rather than the grammatical component is incorrect. In the third sample, *writing **letters***, the learner uses the literal term for handwriting characters (i.e. *letters,* as in alphabetic letters or Japanese *Kanji* ideograms), rather than expressing it as *writing **by hand***. Finally, the fourth sample is an incomplete expression of the full phrase *to be conscious of the fact that*, which actually takes on a different meaning when only **to be conscious of* is used.

Table 4.6: Phrase errors: learner data samples

Phrase error	**Accurate phrase**
***At** last part, the writer...*	***In the** last part*
*for these **points**, the writer opposes...*	*for these **reasons***
*these days students neglect writing **letters***	*writing **by hand***
*be conscious * of the strangers*	*be conscious of **the fact that** there are strangers*

4.8.2.4 Preposition omissions and preposition errors

With preposition problems being common across a range of lexical sequence types, error categories were created for those in which the only problem was a prepositional one: for incorrect prepositions and for omitted prepositions. Specifically, if a preposition was lacking after a noun, verb, or adjective it collocates with, then it was assigned to the preposition omissions category. If a preposition collocate was incorrect, then it was coded as a preposition error. Compared to the more lexical-oriented error categories discussed above, this group of errors was relatively straightforward to code. Tables 4.7 and 4.8 below shows learner data samples from both of these preposition categories.

Table 4.7. Preposition omissions: learner data samples

Type of preposition omission	**Preposition omission**	**Preposition omission correction**
Noun-dependent preposition omission	*age limit *__ 13 years old*	*age limit **of** 13 years old*
Verb-dependent preposition omission	*mixed-race children were discriminated *___*	*mixed-race children were discriminated **against***
Adjective-dependent preposition omission	*different *___ person to person*	*different **from** person to person*

Table 4.8. Preposition errors: learner data samples

Type of preposition error	**Preposition error**	**Preposition error correction**
Noun-dependent preposition error	*controversies ***in** the process*	*controversies **over** the process*
Verb-dependent preposition error	*create accounts ***with** lying*	*create accounts **by** lying*
Adjective-dependent preposition error	*bored ***to** these classes*	*bored **with / of** these classes*

4.8.3 Error correction evaluation

This section explains how error corrections made by students in the revised essays were assessed and coded. The error correction annotations included evaluative codes that described both accuracy and degree of improvement relative to the original error. This was necessary given that the learners' lexical errors could often be revised in a variety of ways, giving the writer latitude in how they wanted to rephrase their original idea. Consequently, it could sometimes be difficult to assess a correction as strictly right or wrong, particularly in comparison to coding the grammatical aspects of the learners' errors. Considering these factors, it seemed worthwhile to include a "moderate" category to the evaluation process that could convey improved lexical usage, though still not fully accurate usage. As a result, the error corrections were coded for one of three possible outcomes: successful, moderate, or unsuccessful.

The success of the corrected errors was determined through the same referencing and consultation process conducted for coding of the original errors described earlier: independent assessment and referencing of relevant resources followed by consultation with the two research colleagues. The *enTenTen2013* corpus and the *Oxford Dictionary of Collocations* were frequently referenced to confirm acceptability of the students' language choices and phrasings. Referencing standards were set for each correction outcome, which are detailed below.

The consultation process was particularly important to assigning evaluative outcomes for the students' error corrections. Referencing alone was not enough to accurately assess the corrections, as the researcher and colleagues had to interpret the referenced information in

relation to both the learner's original error and their written context so that the student's intended meaning and usage were appropriately conveyed. In addition, evaluation of the corrections could involve considerable referencing and information gathering to come to a decision due to the interpretive nature of this stage of the coding process. Therefore, through the process of independent evaluation followed by consultation with colleagues, the researcher was able to verify the error correction decisions and increase reliability of the evaluative process overall (Ellis and Barkhuizen, 2005). In a few cases (N=12) the student's correction could not be mediated through this process, and so these items were eliminated from the study.

The following three sub-sections clarify the referencing guidelines that supported these error correction assessments and provide data samples for each of the three correction outcomes (i.e. successful, moderate, unsuccessful).

4.8.3.1 Successful corrections

To qualify as "successful," the student's correction had to be deemed an appropriate revision for the written context in addition to meeting at least one of the following referencing requirements: (a) the word combination elicited at least 500 concordances in the *enTenTen2013* corpus; and/or (b) the combination was listed in the *Oxford Dictionary of Collocations* as an acceptable word pair. For the concordance results standard, the minimum of 500 evolved out the coding process, as it became clear after working through numerous error corrections in the learner data that those identified as successful were consistently producing at least 500 hits in the corpus. Therefore, 500 was set as the minimum threshold. Table 4.9 shows data samples of successful corrections across various error types.

Table 4.9. Successful error corrections: learner data samples

Error type	**Error**	**Successful correction**
Collocation (adjective error)	***high** technology*	***advanced** technology*
Collocation (adjective coordinates)	***broad and flexible** viewpoints*	***broad and diverse** viewpoints*
Collocation (adverb error)	*we **deeply** rely on*	*we **heavily** rely on*
Lexical usage (adjective error)	***not-reached-age** children*	***underage** children*
Lexical usage (verb error)	*After **breaking** their relationship*	*After **severing** their relationship*
Lexical usage (noun upgrade)	*I'm going to consider the psychological **ones***	*I'm going to consider the psychological **factors***

4.8.3.2 Unsuccessful corrections

In these cases, the student's correction did not show improved usage and was still inappropriate for their written context. Furthermore, unsuccessful corrections did not meet the minimum requirements for supporting evidence in the corpus or the collocations dictionary, as stated above for the successful revisions. In other words, a correction was coded as unsuccessful when (a) the word combination elicited fewer than 500 hits in the *enTenTen2013* corpus; and/or (b) the combination was not listed in the *Oxford Dictionary of Collocations* as an acceptable word pair. Table 4.10 shows samples of error corrections that were assessed as unsuccessful.

Table 4.10. Unsuccessful error corrections: learner data samples

Error type	**Error**	**Unsuccessful correction**
Phrase	*children can use parent's account* ****under the superintendence of*** *parents*	***under the auspices of*** *parents*
Preposition omission (verb-dependent)	*they have tried to* ****assimilate*** *local America*	***assimilate with*** *local America*
Collocation (adjective error)	*Smartphones offer us three* ****comfortable*** *misconceptions*	***understandable*** *misconceptions*
Lexical usage (verb error)	*In this essay, I* ****pick up*** *the article about interracial marriage*	*I* ***check*** *the article*

4.8.3.3 Moderate corrections

These corrections showed improved usage from the original error but were still not considered accurate. As with the unsuccessful corrections, "accuracy" was defined in terms of the coders' evaluation of how suitable the correction was for its written context along with acceptability checks through the corpus or collocations dictionary. The same referencing requirements used for the unsuccessful corrections reported above were applied to these moderate corrections as well: word combinations that elicited fewer than 500 hits in the *enTenTen2013* corpus or did not appear in the *Oxford Dictionary of Collocations* were not considered acceptable usage.

However, unlike the unsuccessful corrections, improved usage was evident through the correction attempt when a learner managed to clarify the meaning or employ a more acceptable usage compared to the original error. Such improvements could occurr in the following ways, for example:

(a) the correct word/phrase replaced the error, but its lexical patterning was not accurately applied to the learner's writing
(b) the meaning was expressed more clearly, but the correction choice could still not be regarded as fully accurate for the written context
(c) the usage was accurate, but the meaning as expressed in the original essay had been changed, thus sacrificing meaning for usage

Table 4.11 below illustrates these improvements more concretely through samples from the learner data.

Table 4.11. Moderate error corrections: learner data samples

Improvement area	**Error type**	**Error**	**Moderate correction**
(a) accurate word choice but misapplied lexical patterning	Collocation (verb error)	*students don't have chance to let creativity* ****grow***	*...to let creativity* ***exercise*** (Correct: *to exercise creativity*)
(b) clarified meaning but not fully accurate	Lexical usage (adjective error)	*Some people use the Internet* ****with fake***	*...use the Internet* ***improperly*** (Correct: *inappropriately*)
(c) improved usage but altered original meaning	Lexical usage (adjective error)	*Popovich has had a* ****special*** *career which developed such aspects in him.*	*...has had a* ***professional*** *career* (Correct: *unique*)

4.8.4 Essay annotation

Once the coding system was finalized, the students' essays were annotated with text editing software. At this point, the errors and error correction codes had been labeled on paper versions of the essays; deliberating and discussing the data proved to be easier to do on paper considering that it involved three people referring to numerous documents and online resources at the same time. Since the error and error correction codes had already been

determined in advance, the online annotation task could focus on entering the text tags accurately, rather than on interpretation.

With regard to the annotation process, the error tags had to allow for the student's original draft to correspond with the revised essay, so that the original error and its corresponding correction could be later extracted from the essay as a pair. The basic tag was the same for both the error and its error correction, aside from two additional pieces of information encoded into the error correction tag: the outcome (i.e. evaluation of its success) and the resource referenced by the student to correct the error. These text tags are explained in more detail with examples in the following two sections.

Text annotation was done with *Sublime Text 2*, a text editing software. The researcher and one colleague marked up the texts together to share the workload and to check each other's work for accuracy. Even though the error and error correction codes had been determined in advance, it was still a labor-intensive, time-consuming process to annotate the texts. This was somewhat facilitated by creating macros for the text tags, which were then manually edited to tailor them to the features of each individual error. The error codes were also saved on pull-down menus and dropped into each tag to increase accuracy by minimizing the amount of manual editing necessary and so they could be inserted more quickly.

4.8.4.1 Error tags

Error tags were used in the analysis of the learners' original texts and they contained three levels of annotation: (1) file number, (2) error number, and (3) error type, as shown below:

<err file="1601a1" n="01" type=" ">...</err>

The file number encoded four pieces of information: the year of data collection ("16" referring to 2016); the student number (01, 02, 03, etc.); the essay assignment (a, b, or c, denoting the first, second, or third essay assignment written by each student); and the essay version (1 = original essay; 2 = revised essay). Error number ("n") refers to the errors in each essay that were counted sequentially.

The error type ("type") refers to the codes assigned to each error/error correction pair, developed by the researcher through deliberation with colleagues, as explained in section 4.8.1. These codes were expressed through the text tags in terms of error category and word class. As explained in section 4.8.2, four error categories were formed, which were tagged as follows: [PREP] for preposition-related problems, [COLL] for collocations, [USE] for lexical usage, and [PHS] for phrase errors. The word class indicates which part of the combination was incorrect; for example, an incorrect noun in a collocation is expressed as [N_COLL], an incorrect adjective in a word combination is expressed as [ADJ_USE], and an omitted verb-dependent preposition is expressed as [+PREP_COLLV]. Figure 4.4 below shows an excerpt from one of the students' original essays to show a fully-annotated text.

Figure 4.4. Sample annotated text: Original essay with three errors

Today, I would like to consider what creativity is, and how we can encourage our creativity in school. Recently, more and more people have been <err file="1601b1" n="01" type="V_USE">**paying attention to**</err> how to encourage their creativity, because creativity is quite effective in <err file="1601b1" n="02" type="V_USE">**leading**</err> to our success. However, it has been said that school curriculums currently may make our creativity <err file="1601b1" n="03" type="V_COLL">**fall off**</err>. I would like to think about this problem later. First of all, I will summarize the article, "To encourage creativity, Mr. Gove, you must understand what it is" by Ken Robinson. Then I will tell my opinion.

4.8.4.2 Error correction tags

Error correction tags were applied in the analysis of the revised essays. These tags included the same information as the original error tags and added two more pieces of information: the reference used by the student ("resource") and the error correction's evaluative outcome ("out").

<rev file="1601a2" n="01" type=" " resource="C|D|W|X|NC|DEL" out="SUC|UNS|MOD">...</rev>

The resources referenced by students to correct their errors were self-reported on the correction logs (as discussed in section 4.7.2), which were submitted along with the students' revised essays for each assignment. Reference resources reported and encoded into the error tags included the corpus [C], dictionary [D], the online Japanese language-based resource *Weblio* [W], or no resource [X] for cases when the student already knew how to correct the error. If an error was ignored or deleted instead of being corrected, this was annotated as [NC] for no change and [DEL] for deleted items. Figure 4.5 below shows an excerpt from the above student's revised essay with error annotations.

Figure 4.5. Sample annotated text: Revised essay with three error corrections

Today, I would like to consider what creativity is, and how we can encourage our creativity in school. Recently, more and more people have been <rev file="1601b2" n="01" type="V_USE" resource="C" out="SUC">**considering**</rev> how to encourage creativity, because creativity is quite effective in <rev file="1601b2" n="02" type="V_USE" resource="C" out="SUC">**achieving**</rev> success. However, it has been said that school curriculums currently may make our creativity <rev file="1601b2" n="03" type="V_COLL" resource="C" out="MOD">**stifle**</rev>. I would like to think about this problem later. First of all, I will summarize the article, "To encourage creativity, Mr. Gove, you must understand what it is" by Ken Robinson. Then I will tell my opinion.

4.8.5 Error correction data analysis

This section describes the various ways the error correction data was managed in order to accomplish a systematic analysis. The approach undertaken can be referred to in general terms as qualitative content analysis, in which categories are derived inductively and through an iterative process until data saturation is reached, where further analysis does not yield any new perspectives (Dornyei, 2007). Such an interpretive "latent level" analysis aims to go beyond a descriptive surface-level account to one that examines "the underlying deeper meaning of the data" (Dornyei, 2007:246). To accomplish this degree of analysis, the error corrections were organized and reviewed in various formats (i.e. data displays) to enable the researcher to identify important patterns, make interpretations, and draw conclusions on the learners' corpus-based error correction tendencies.

Specifically, once all of the students' essays had been annotated, a text analysis program that allows for the linking of tagged data across files was used to export the paired error/error correction tags into spreadsheet form. These extracted errors and error corrections were listed side by side along with the other annotated information encoded into the text tags, namely the file names (participant number and writing assignment), error types, correction assessment outcomes, and sources referenced.

In addition to this tag-encoded data, further information was added by the researcher into each data record. For example, the lexical context for the error was retrieved from the student's essay in order to increase efficiency. This step greatly reduced the amount of cross-referencing between the spreadsheet data and the learners' essays and enabled the researcher to focus on analysis and note-taking rather than repeatedly accessing the essay files. In

addition to supplementing the spreadsheet with the lexical context, potential accurate corrections for each error were entered into each data record as well. These "expected" corrections had been documented by the researcher in her research journal when preparing feedback for the students' essays, and by including them in the data record, it facilitated interpretation of the learners' error correction patterns.

Once each data record was compiled, the entries were sorted and filtered across numerous spreadsheets to organize, label, and arrange the data as the researcher proceeded with analysis. One spreadsheet file was created for each error category, and the corrections in that category were sorted by correction outcome (successful, unsuccessful, or moderate) into separate spreadsheets within each file. With the data organized in this way, the researcher started searching for patterns within and across categories. Working through this stage involved a considerable amount of information gathering and note-taking while reviewing the data, such as referencing the corpus to investigate students' correction choices, hypothesizing on the learners' correction strategies, or returning to the original texts to take even more of the learner's text into consideration.

Ideas generated during this stage were recorded as "jottings" (Emerson, Fretz & Shaw, 2011) that were inserted directly into each data record, collecting comments, reflections, and tentative conclusions that emerged throughout the correction analysis. These ideas were constantly revisited and revised, and as the data analysis progressed, patterns were streamlined in order to reduce the data into manageable categories, allowing for more refined interpretation and explanation (Ellis & Barkhuizen, 2005).

One data record is provided below (Figure 4.6) as an example of how these various types of information were displayed. It shows from left to right: (1) error category (collocation); (2) file name; (3) error type (adjective-erred collocation); (4) source referenced by student (corpus); (5) correction outcome (unsuccessful); (6) student's original error; (7) student's error correction; (8) researcher's accurate (i.e. expected) correction choices; (9) student's lexical context, and then the final two columns, (10) and (11), show jottings of researcher interpretations.

Figure 4.6. Sample data record with jottings

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
C O L L	1 6 2 4 b 2	A D J_ C O L L	C	**U N S**	*decided curricu-lum*	*designed curricu-lum*	National standard -ized	*Secondly, I think we shouldn't treat every child in the same way. In Japanese schools, there are usually one* ***designed curriculum*** *that every student should follow*	Looks like S took verb "design" (top choice from Word Sketch) and inserted it as ADJ in sentence	NOT a COLL correction not function-ing as word pair

Once each category was analyzed and overall patterns had been identified, these pattern descriptions were tallied and displayed in various tables where they could be overviewed in comparison to other error categories. Ellis and Barkhuizen (2005) emphasize the value of creating data displays as a means of clarifying and communicating researcher interpretations, and in this way, these visual overviews allowed greater insight and led to some reinterpretation of the data, such as error codes being regrouped, new patterns emerging, and provisional conclusions about the data being refined.

Once it was felt that review of the data had reached saturation and would not produce any new themes or patterns (Ellis & Barkhuizen, 2005), the analysis was prepared for reporting. These analyses are presented in the following chapters five and six.

CHAPTER 5. ANALYSIS OF PREPOSITION CORRECTIONS

This chapter begins with an introduction to the error correction analysis discussed in chapters five and six, overviewing all error categories before focusing on analysis of the preposition errors and preposition omissions in the rest of this chapter. The preposition analysis is then followed by a discussion of the findings. The following chapter six moves on to the phrase and collocation corrections with analysis and discussion of these error types as well. The findings from these two analysis chapters are then brought together in chapter seven, conclusions and implications, to address the study's research questions.

5.1 Introduction to error correction analysis

This section provides a general overview of all five error types. As discussed in the previous chapter (four), these error categories evolved out of the process of coding the lexicogrammatical errors designated for correction through teacher feedback. Below, the students' success rates across the five error types are first compared and discussed. This is then followed by a breakdown of the errors referenced in the corpus versus those corrected through alternative resources. After briefly reviewing these alternative resource-referenced errors, the remainder of the thesis will focus only on errors that were corrected by students through corpus referencing.

Table 5.1 below shows success rates for the five corpus-referenced error types, ranked from most to least successful. With an overall success rate of 73.9% (N = 713) across the five categories, students were able to correct the designated errors in the majority of cases. For each individual error category, success ranged from 69.6% (N = 295) at the low end for lexical usage errors to 84.6% (N = 88) at the high end for preposition omissions, with phrases

and collocations in between at 76.2% (N = 64) and 72.7% (N = 173), respectively. These findings are similar to what has been reported in the corpus-based error correction research (see chapter three), which has indicated that, based on success rates, learners are able to make productive use of corpus data to correct preposition, collocation, and word choice errors.

Table 5.1. Corpus-based error correction success rates ranked by error type

Rank	Error Type	Total Corrections (N)	Successful Corrections (N)	Success Rate	*more fixed/formulaic less interpretive narrower corpus searches* ↕ *less fixed/formulaic more interpretive broader, multi-layered corpus searches*
1	Preposition omissions	104	88	84.6%	
2	Preposition errors	115	93	80.9%	
3	Phrases	84	64	76.2%	
4	Collocations	238	173	72.7 %	
5	Lexical usage	424	295	69.6%	
TOTALS		**965**	**713**	**73.9%**	

Based on this general categorical ranking, a clear pattern can be seen: the more fixed or formulaic the item, the greater the success with error correction; on the other hand, the less formulaic, the less successful. Prepositions, for example, have a generally fixed patterning, which makes it easy for learners to formulate corpus queries and to identify suitable corrections. Furthermore, for a given preposition query, there are relatively few correction options to choose from compared to an error in lexical usage, for instance, which may involve selecting from any number of alternative word choices. The fixed nature of preposition combinations makes the lexical patterning more salient in the corpus data and facilitates data

analysis for the learner. To a lesser degree, this is generally true for the phrases and collocations as well, given that these error categories are made up of formulaic sequences that also display systematic usage patterns.

On the other hand, as mentioned above, lexical usage errors could be remedied in a number of ways, given that errors in this category had several correction options. As with any error correction, the writer must analyze the corpus data for each correction possibility in order to come to a good decision. Given the greater range of choices for addressing lexical usage problems, selecting an appropriate correction would require greater skill with corpus referencing than the other more formulaic error types: the writer must weigh various alternatives against their original context while exploring the meanings and usage patterns specific to each word choice. For these reasons, it is not surprising that success rates are lowest for the lexical usage errors.

Table 5.2 shows the proportion of corpus referenced versus non-corpus referenced errors for all error corrections collected in the study. Students were most likely to reference the corpus for correcting collocation (93%, N = 238) and phrase errors (91.3%, N = 84), which reflects the appropriacy of corpus research for exploring lexical patterning. In comparison, dictionaries and the online Japanese-based site *Weblio* (resources commonly employed by Japanese learners during the writing process) can vary greatly in terms of the usage information they provide for a given entry, making them less reliable for finding common phrases and collocations associated with a word. This preference for the corpus with collocations and phrases was also reinforced by the student feedback collected (i.e. course-final surveys, teacher-student consultations, and research journal), in which the learners

consistently reported that they found the corpus most useful for referencing collocations, particularly with word sketch collocation summaries.

Table 5.2. Proportion of corpus-referenced versus non-corpus referenced errors

Error Type	**Corpus-referenced errors**		**Non-corpus referenced errors**		**Total errors**
	N	**% of total**	**N**	**% of total**	
Preposition omissions	104	80.0%	26	20.0%	130
Preposition errors	115	85.2%	20	14.8%	135
Phrases	84	91.3%	8	8.7%	92
Collocation	238	93.0%	18	7.0%	256
Lexical usage	424	80%	106	20%	530
TOTALS	**965**	**84.4%**	**178**	**15.6%**	**1143**

On the other hand, categories that showed the highest proportion of errors not referenced in the corpus were the preposition omissions (20%) and lexical usage errors (20%). Further detail regarding these non-corpus referenced errors is provided in Table 5.3 below, which lists the alternative correction strategies learners employed to remedy these errors.

Table 5.3. Errors resolved through alternative (non-corpus) correction strategies

Error Type	**No resource**	**Diction-ary**	**Other resources**	**Text rephrased (*rather than corrected*)**	**Total non-corpus referenced errors**
Preposition omissions	24	2	0	0	**26**
Preposition errors	14	4	2	0	**20**
Phrases	4	4	0	0	**8**
Collocation	11	3	4	0	**18**
Lexical usage	28	35	14	29	**106**
TOTALS	**81**	**48**	**20**	**29**	**178**

As shown in Table 5.3, the first column, "no resource," accounts for nearly half (N= 81, 45.5%) of the total non-corpus referenced errors. In these cases, students reported that they realized their mistakes and knew how to correct the items without the need for any referencing. This is the primary reason why 20% of the preposition omissions overall were not referenced in the corpus (N = 26 of 130 omissions total), since almost all (92%, N = 24) were self-corrected by the learners independently. However, for the lexical usage errors, the 20% that were not corpus-referenced (N = 106 of 530 total lexical usage errors) were resolved by the students through alternative resources or correction strategies. In particular, students referenced dictionaries 33% of the time (N = 35) or rephrased their text instead of correcting the error for 27% of the items (N = 29). This suggests that perhaps clarifying the meaning was a greater priority than correcting usage in these cases.

As defined in the error coding section in chapter four (section 4.8.2.2), the lexical usage category was made up of word combinations that were unacceptable in English or inappropriate for the learner's written context. The range of correction options that learners had to choose from distinguished these lexical usage errors from the collocations, which would have been corrected with specific, reader-anticipated collocates. A basic analysis of the lexical usage corrections reveals that of the 424 errors in this category, 42.5% (N = 180) were corrected for meaning and 16.7% (N = 71) were upgraded to more meaningful, precise language for conveying the writers' ideas. The remaining 40.8% (N = 173) of the corrections were made for acceptability, or for the purpose of forming natural word combinations. Thus, it appears that the majority of errors in this lexical usage category were corrected more often for meaning-related purposes and less often for usage.

With these errors comprised of vocabulary items that were less formulaic than the other error types, lexical usage essentially became a residual category for those that did not meet the criteria to be assigned to the collocation, phrase, preposition error or omission categories. The variability of this lexical usage category became particularly evident during the error correction coding process, and for this reason, the researcher decided to exclude this error type from further analysis. Instead, it proved to be more worthwhile to continue data analysis with the other error categories that were more internally consistent as well as more successful with corpus referencing.

This decision reflects the ongoing need to assess the usefulness of a study's data throughout the qualitative research process. Data reduction enables the researcher to manage the quantity of data that has been accumulated and to conduct a focused analysis based on patterns that are

most relevant to the study's aims (Ellis & Barkhuizen, 2005; Richards, 2015). Ongoing data analysis revealed that the other error types in this study were substantial enough to yield meaningful conclusions, while they were also more central to the pattern-hunting nature of corpus referencing. Therefore, the lexical usage category was permanently set aside, and further data analysis continued with the remaining four error types: prepositions errors, preposition omissions, phrases, and collocations.

5.2 Overview of preposition corrections: errors and omissions

Table 5.4 below shows proportionate outcomes for the preposition categories' correction attempts. As with all error types, the corrections are distributed across three correction outcomes: successful, moderate and unsuccessful. For the preposition categories, however, the revisions tended to be either correct or incorrect and were rarely assessed as moderate, which reflects their more grammatical than lexical nature. In contrast, moderate improvements were common with the collocation and phrase error types.

The preposition category largely consists of noun- and verb-dependent preposition problems (N = 101 and 99, respectively) across both the omissions and errors, with far fewer adjective-dependent prepositions in the data (N = 19). Therefore, the analysis of this preposition category will focus mainly on the noun- and verb-dependent prepositions and their respective degrees of correction success.

As discussed in chapter four, research methods, the learners' errors were designated through written teacher feedback. With preposition-related errors, both the lexical item and its associated preposition were highlighted as a unit via the *Microsoft Word* tracking function

along with the code “PREP” in the margin. For the most part, little description beyond this was necessary to clarify the nature of the error to learners and for them to understand which word should be queried in the corpus.

Although correcting both types of preposition problems was largely successful through corpus referencing, it appears that it was easier to correct the omissions than the errors. Both the noun- and verb-dependent omissions success rates are higher than the rates for the errors: 91.7% and 80.3% versus 80.5% and 75%, respectively. As mentioned in the previous section (5.1) regarding the non-corpus referenced errors, preposition omission corrections were often oversights rather than genuine errors that revealed a lack of linguistic knowledge, judging from the fact that learners rarely needed to use any reference resources to correct them. Even though the omissions discussed in this section were actually referenced in the corpus, it is possible that the students had some idea of what the correction should be and therefore referenced the corpus to confirm their thinking. This could contribute to the higher success rate for preposition omissions as opposed to preposition errors: students were more often conducting confirmation checks than engaging in extensive corpus data analysis. Otherwise, there were many more prepositions omitted after verbs than nouns, perhaps reflecting difficulties with phrasal verbs, a commonly problem area for language learners.

Table 5.4. Number and percentage of corpus-based preposition correction attempts distributed across outcome

	N of corpus-referenced error corrections	Error correction rates					
		Successful		Moderate		Unsuccessful	
		N	%	N	%	N	%
Preposition omissions							
Omitted adjective-dependent prepositions	9	9	100%	0	---	0	---
Omitted noun-dependent prepositions	24	22	91.7%	1	---	1	---
Omitted verb-dependent prepositions	71	57	80.3%	0	---	14	19.7%
Total preposition omission correction rates	**104**	**88**	**84.6%**	**1**	**---**	**15**	**14.4%**
Preposition errors							
Incorrect adjective-dependent preposition	10	10	100%	0	---	0	---
Incorrect noun-dependent preposition	77	62	80.5%	1	---	14	18.2%
Incorrect verb-dependent preposition	28	21	75.0%	0	---	7	25.0%
Total preposition error correction rates	**115**	**93**	**80.9%**	**1**	**---**	**21**	**18.3%**

5.3 Successful preposition corrections

This section expands on the data presented in Table 5.4 above for the successful preposition corrections, first focusing on noun-dependent preposition corrections and then verb-dependent prepositions. Specific error correction cases are highlighted and discussed to clarify the analysis.

On the whole, the successful corrections involved high frequency, highly typical preposition combinations, such as the following:

the development __ the Internet ***(of)***	*__ a study tour* ***(on)***
the issue __ mixed children ***(of)***	*a decline __ the number* ***(in)***
****in*** *the Internet* ***(on)***	****on*** *the article* ***(in)***
****on*** *an intersection* ***(at)***	****in*** *this time* ***(at)***
****in*** *weekends* ***(on)***	****among*** *the family* ***(in)***
controversies ****in*** *the process* ***(over)***	*talk with people* ****over*** *borders* ***(across)***
people ****over*** *the world* ***(around)***	*judgments* ****to*** *your work* ***(about)***

Additionally, most combinations followed a [prep NP] or [NP prep NP] grammatical pattern, which highlights the limited and fixed nature of these language combinations. Prepositional phrases such as these are easily retrieved through a part of speech (PoS) query since it is possible to set parameters for very specific lexical contexts. This helps to narrow the results to relevant concordances, facilitating the student's data analysis. Given that the longer the phrase queried in the corpus, the easier it could be to identify the appropriate preposition associated with it, students were generally advised to begin their corpus searches in this way.

Furthermore, in most of these successful cases, there were few alternative prepositions to choose from in the corpus data, which provided the students with a very limited number of correction options. Still, however, the student needed sort through the correction options and distinguish among the various usages, such as ruling out *of, over,* and *from* in order to correct ****on*** *the article* to ***in*** *the article* or eliminating *around* and *during* as options in order to correct ****in*** *this time* to ***at*** *this time*. Nonetheless, the accurate preposition choices could be found relatively easily for the most part.

Likewise, the verb-dependent corrections consisted of many high-frequency, highly typical combinations as well. Of the 78 successful corrections made, 66.7% (N = 52) were both the

highest frequency and most typical preposition combination for the given verb based on Word Sketch. Below are a few samples from this data set:

admit __ the problem ***(to)***	*related* ****with*** *sites* ***(to)***
lead __ an increase ***(to)***	*should fit* ****to*** *it* ***(into)***

These high frequency combinations are more prevalent in the data with preposition omissions than errors, with 70.2% (N = 40) of the omission corrections being top-ranked combinations in Word Sketch as opposed to 57.1% (N = 12) of the error corrections. This omissions percentage is even higher if second-ranked preposition combinations in their respective word sketches are taken into consideration, raising it further to 84.2% (N = 48) being highly salient preposition combinations. Thus, these rates show that for the most part, it was not difficult for learners to self-correct preposition problems in their writing with corpus data, particularly with preposition combinations as common as these.

Otherwise, some corrected combinations did not entail high frequency items, particularly among the verb-dependent preposition errors. Often these were combinations that were not expressing their primary meaning, such as the following:

the process of working ****by*** *their original ideas* ***(with)***

The combination *work* ***with*** *an idea* is not very apparent in the corpus data because *idea* is not a common object of *work* ***with***, which makes it difficult to identify this verb phrase as a good correction option. Instead, *work* ***with*** typically occurs with people or organizations, such as clients, teams, children, companies, or schools, for instance. In a similar case,

fall ****for*** *a smoking habit* ***(into)***

the student's error *fall **for*** expresses a very different meaning from what was intended: usually we unwittingly fall for some kind of scam or ploy or fall for a person we're attracted to. Based on the corpus data, *fall **into*** can take a broad range of objects besides *fall **into** a habit* (e.g. something *falls **into*** a hole, ***into*** a category, or ***into*** disrepair; someone *falls **into*** a trap or into a group; things *fall **into*** place, etc.), so close examination of the corpus data was necessary to recognize these distinctions.

One more example illustrates the potential difficulty a learner might have in recognizing phrase boundaries and how these relate to word relationships. In the following case,

*creativity can be cultivated ***in** the process (**through**)*

the student may have used the preposition ***in*** believing it collocated with *process* to form the phrase ****in** the process*, when instead, the preposition is a collocate of *cultivate*. In such cases, the teacher feedback was useful beyond indicating error type to guide students to the accurate phraseology.

As a whole, the successful preposition corrections data shows that high-frequency combinations and the limited patterning of prepositional phrases contributed to successful correction of most omissions and errors, demonstrating that the correction of such preposition problems is relatively straightforward through corpus referencing. In addition, the majority of the learners' preposition problems were with high frequency language, not with specialized language or infrequent combinations, suggesting that for intermediate-proficiency language learners, the corpus is a good resource for helping them achieve greater accuracy in their use of such common preposition combinations.

5.4 Unsuccessful preposition corrections

Overall, the proportion of unsuccessful preposition corrections is fairly similar across the error and omission types, although the percentage is somewhat higher for the errors (18.3%, N = 21 versus 14.4%, N = 15 for omissions). Between the noun- and verb-dependent preposition categories, the verb-related problems seemed to be more difficult for students to resolve (verb-dependent omissions at 19.7%, N=14 and errors at 25%, N=7), while the unsuccessful noun-dependent error corrections came to 18.2% (N=14), and there were very few issues correcting the noun-dependent omissions with only one unsuccessful and one moderate attempt.

Examining the unsuccessful noun-dependent corrections more closely reveals that eight of the 14 attempts (57%) are in fact easily retrieved through a corpus search. As described in chapter four, research methods, the student was provided with corpus search guidance through the teacher's error feedback, which enabled the researcher to trace the learner's initial corpus search. Based on this search advice for the first eight cases, the accurate correction is not only evident on the first page of concordances, but is also the most frequent preposition choice or considerably more frequent than the one selected by the student. Based on frequency alone, the learner should have been able to locate the correct preposition. Considering this, what are some reasons why the corrections were unsuccessful?

In one error correction attempt,

*development of the Internet is also a reason for an increase ***for** intermarriage (***of**) (**in**)*

skimming the concordances for the writer's incorrect choice of *increase **for*** reveals that the object of the preposition is usually a person or a group of people, indicating who receives the

increase, e.g. employees, staff, teachers, or households, for instance. Sometimes, but less often, the object is what is being increased, such as food, fuel, or projects, although this pattern usually has an adjective preceding the noun *increase* (e.g. ***price*** *increases* ***for*** *food*; *a* ***funding*** *increase* ***for*** *projects*). *Increase* occurring with an animate object is the prominent pattern in the corpus data, however, and is clearly different from the object in the writer's original sentence, *intermarriage*.

A similar correction attempt in terms of learners distinguishing among preposition objects is the following omissions correction attempt:

*There are some cases of success ___ (***for)** the age limit (**with**)*

In this case, the student was instructed to conduct a PoS search for prepositions that occur with *success*. There are a few results (7 hits) in the corpus for *success* ***for***, in which the data shows prepositional phrases that are full noun phrases similar to the student's correction above, such as *success* ***for*** *the industry*, ***for*** *our students*, ***for*** *the group*, ***for*** *your website*, or ***for*** *the 3rd quarter*. Based on these data samples, the objects that typically occur with ***for*** are similar to the student's text; however, the meaning is different. In the concordance samples, the ***for*** prepositional phrase conveys who or what receives the benefit (i.e. achieves success), but in the student's sentence, *the age limit* is the means by which success is sought. Furthermore, we do not know whether success was actually achieved or not. Thus, these two unsuccessful correction cases highlight instances where learners needed to examine the surrounding lexical context carefully in order to accurately understand the items' usage.

Other correction cases suggest students having difficulties with phraseology. For example, misinterpreting phrase boundaries appeared to negatively affect the learners' correction attempts in the following two cases. In the first,

*schools are an important factor ___ (***of**) encouraging creativity (**in**)*

if the combination *factor **of*** is queried on the corpus, noun objects such as *a factor **of** time*, ***of** success*, ***of** inequality* or ***of** modern life* can be found. In contrast, when *factor **in*** is queried, a wide range of preposition objects result. With much effort at concordance analysis, the patterning for these two preposition choices can be distinguished. However, a more effective approach is to extend the phrase boundary to include the full noun phrase [*an important factor* + PREP] in the corpus query, which leads to multiple concordances of the preposition ***in*** followed by a verb phrase, consistent with the usage in the student's original text.

Likewise, in another correction attempt,

*[This] is one of the reasons ___ (***in**) lying (**for**)*

conducting a preposition search based on the full noun phrase [*one of the reasons* + PREP] instead of only the noun [*reason* + PREP] makes the correct choice *one of the reasons **for*** clearly evident in the resulting concordances. As these examples highlight, students need to explore phrase boundaries when correcting their writing so they can formulate error-relevant corpus queries and uncover the various usage patterns associated with a particular combination.

At other times, students were misled by frequency, choosing corrections because they were frequent rather than appropriate to their written context. In the following unsuccessful correction,

*couples are concerned with each other ___ (*in) their lives (**throughout**)*

the student's incorrect preposition choice ****in*** appeared with much greater frequency than did the accurate preposition for the writers' context ***throughout***, likely making it appear to be a good correction choice. On closer analysis, however, reviewing the comparatively few instances of ***throughout*** in the data reveals that the concordance samples are in fact structurally and semantically similar to the student's original expression:

*kittens retain their personalities **throughout** their lives*
*[this] remains unknown to many people **throughout** their lives*
*you will never stop worrying about your children's well-being **throughout** their lives*
*these artists draw on skills they have been taught by others **throughout** their lives*
*most children who struggle at first continue to struggle **throughout** their lives*

Thus, if the student had compared her writing to the few concordances for ***throughout***, then she should have been able to recognize the similarities between her expression and the corpus samples to make an accurate correction.

At other times, however, it was just difficult to determine which preposition in the data would be an appropriate correction. For example, in the following correction attempt,

*When it comes to dating, we might go with someone who doesn't understand our values...Is sharing values the key point ___ (*for) our decision to marry? (**in**)*

distinguishing usage patterns between the student's incorrect preposition choice **the key point **for*** and the accurate choice *the key point **in*** is possible, but it is challenging to dissect the patterning and the usage contexts. For example, *key point **for*** tends to take an animate object (*me, you, employers*) or a single noun (*success*). In addition, it appears to occur before an action is taken, to express that this key point must be kept in mind in order for the situation to play out successfully, particularly when used with the indefinite article. This is shown in the extracted concordances below:

*A key point **for** me and potentially others in my situation is...*
*Remember a few key points **for** success.*
*Key points **for** you to address during the divorce process are...*
*A key point **for** employers and managers to remember is...*

On the other hand, as shown in the concordance samples below for [*key point **in***], a noun phrase or a participle form of a verb often follows. In addition, it could be said that [*key point **in***] is used to make reference to events or situations from the past, emphasizing that based on this experience, the point is "key" to the current matter at hand.

*the key point **in** my life with HIV/Aids has been the access to care*
*provide critical support at key points **in** the development of a project*
*this is a key point **in** helping me and my students decide how to activate the extended team at key points **in** the project.*

Returning to the original written context, the student is speculating on how important or "key" it is to have shared values in a marriage. Although *key point **in*** seems to be the better choice based on review of the concordances, the corpus evidence for this preposition problem is not particularly clear one way or the other. Furthermore, beyond considering the objects that tend to follow these preposition combinations, which article precedes *key point* (i.e. ***the** key point* or ***a** key point*) could also be a factor in its usage and warrant examination. Thus, even for

those experienced with language analysis, such linguistic and semantic differences can be difficult to discern.

Overall, half of the unsuccessful noun-dependent preposition corrections could have been easily resolved through corpus referencing since the accurate patterning was frequent and therefore prominent in the data. The remaining cases were comparatively more difficult, requiring more skill to identify an appropriate correction and likely more experience with corpus data analysis.

As for the verb-dependent preposition corrections, there were 21 unsuccessful cases total: 14 errors and seven omissions. Examining these 21 attempts more closely shows three miscorrection tendencies made by the learners that clarify why they were unable to resolve these prepositions problems. These are listed in Table 5.5 below and then discussed through learner data samples for each tendency.

Table 5.5. Unsuccessful correction tendencies with verb-dependent prepositions

Reasons for unsuccessful corrections of verb-dependent prepositions (N = 21)		**N**	**% of all verb-dependent prepositions**
5.4.1	Inadequate analysis of preposition objects	11	52.3%
5.4.2	Frequency prioritized over concordance analysis	6	28.6%
5.4.3	Lack of improvement	4	19.0%

5.4.1 Inadequate analysis of preposition objects

In several cases, students chose prepositions from the corpus data that were incompatible with the lexical context of their own writing, specifically in terms of the preposition objects. In

other words, the incorrect preposition chosen by students took a different type of object than the one used in their original sentence, such as selecting a preposition that took an object of a different grammar class or of a different semantic category.

For example, in the following correction attempt, the learner revised the original error **struggling **for*** to **struggling **to***:

> *I had not known how to make critical judgment before entering ABC University, and so I am struggling ***for** this because this ability is needed for all of my studies. (***to**) (**with**)*

However, the preposition ***to*** should be followed by a simple verb to form the infinitive (e.g. *struggling **to** concentrate, **to** decide,* etc.) rather than the demonstrative pronoun *this*, as the student chose to do and which made the correction unsuccessful. Instead, *struggling **with*** would have been the accurate choice for this context.

Sometimes learners chose prepositions that occurred with objects of different semantic distinctions than what was used in their original sentence. For example, the student's correction below mistakenly uses **provide **with*** followed by the animate object *teenager*, although **provide **with*** should be followed by inanimate objects and particularly those that offer support or services (e.g. aid, information, child care, functionality, etc.).

> *Some restaurants verify the age of their guests in order not to provide alcohol ___ **(*with)** teenagers, but many restaurants don't do so **(to)***

Another similar case is the following,

> *Interracial marriage rates have grown ___ **(*at)** an all-time high **(to)***

in which the student's choice of **have grown **at*** would be used to describe the pace or speed of some change that is in progress, whereas the correct choice, *have grown **to***, indicates the state of something at a particular point in time (*have grown **to** an all-time high*), as is expressed in the writer's context. In fact, reviewing the concordances for the incorrect combination **grown **at*** shows many instances where the object is *rate* (e.g. *has grown **at** a rate of 10%*) as well as *pace* or *speed*. From the student's perspective, *high* may have seemed similar to these noun objects in that it is describing a development.

One final example illustrates these difficulties students had in recognizing the differences in prepositional objects.

> *I believe the teaching of social media in school and watching ___ **(*for)***
> *young children are important **(over)***

Here, the student's incorrect choice **watch **for*** is used with objects such as *signs, symptoms*, *reactions*, or *clues*. In contrast, the accurate correction, *watch **over**,* takes animate objects, such as *children, families,* or *babies,* demonstrating that ***over*** would have been the appropriate correction choice. It is possible that the student might have viewed **watch **for*** as semantically relevant since their context deals with the dangers children face through social media, while the concordance data also suggests the anticipation of some problem. However, reviewing the preposition's objects shows many concordances that are very similar, if not the same, as the student's own usage pattern.

Overall, this group of unsuccessful corrections suggests that if students had focused more on the prepositional objects in the corpus data, then they might have been able to conduct more accurate analyses and make better correction decisions.

5.4.2 Frequency prioritized over concordance analysis

In these cases, prepositions appeared to have been corrected based on frequency, rather than data analysis to apply the correct usage pattern. In the following attempt, the student erroneously corrected an omitted preposition to **think **of***,

> *It is about how we think ____ **(*of)** something logically and thoroughly with all the knowledge we have (**through**)*

which is the highest frequency preposition combination according to the word sketch for *think*. There is a number of other prepositions that commonly occur with this verb listed on the same word sketch, one of which is the appropriate correction, *think **through***. Reviewing the concordances for *think **through*** shows many samples where it is used to express the active consideration that would match the writer's intended usage above. In contrast, concordances for the writer's incorrect choice of **think **of*** show a range of very different semantic contexts from those of *think **through.***

Similarly, the correction of another preposition omission below to **fix **in*** illustrates a similar tendency to focus more on frequency than usage analysis:

> *they should not be bound by the program or already fixed ___ **(*in)** something...*
> *in order to foster the creativity of students and teachers (**on**)*

The student's incorrect revision of **fix **in*** is the highest frequency preposition combination according to the word sketch for *fix*, but the usage displayed in the concordance data does not convey the particular focus expressed by the learner's original sentence. Instead, *fix **on***, which is actually the second-highest frequency combination on the same word sketch, is much more

consistent with the learner's usage, showing concordances that express a narrow mental focus on some thing or idea.

Overall, these cases illustrate the importance for students to move beyond frequency data in the corpus to take the lexical patterning into consideration that can be discovered through the concordances. In this way, learners need to be guided away from relying too much on frequency data to come to a solution for an error.

5.4.3 Lack of improvement

These four corrections did not improve upon the original errors in any way, neither in terms of meaning nor usage, as is illustrated by the following attempted correction:

> *If they [children] knew ____ **(*as)** netiquette and could use it properly and politely, then they would enjoy using the Internet **(about)***

Originally, the preposition was omitted in this sentence, which actually reads more clearly than it does with the incorrect revision **knew **as** netiquette*. The combination **know **as*** is top-ranked in the word sketch for *know*, but if the student had checked the corresponding concordances, she would have seen that virtually all cases of *known **as*** are followed by a name or term (e.g. *known **as** Spock*, ***as** rheumatism*), so the correct usage does not suit the writer's context at all. The remaining three "lack of improvement" cases similarly suggest that the learners likely needed to devote more time to their corpus data analysis.

5.5 Discussion of preposition corrections

This section expands on the correction analysis presented above, exploring the implications of this analysis in terms of the learners' success (or lack of success) with referencing preposition

usage in the corpus. In doing so, the discussion contributes to answering the study's research questions as they relate to the preposition corrections.

The majority of the learners' preposition problems consisted of high-frequency combinations, which proved to be well-suited to corpus referencing. Common phrasal verbs and prepositional phrases are prominent in the corpus data and therefore fairly easy for students to identify relevant data samples. In addition, high-frequency combinations produce enough data to be included in word sketch collocation summaries, making it possible for learners to get a quick overview of relevant word relationships and to grasp the kinds of situations in which a combination is commonly used. These factors facilitate the error correction process, and as a result, students could achieve a high corpus referencing success rate through their correction attempts, as demonstrated by the 84.6% and 80.9% success rates in revising the preposition errors and omissions.

Even though students were largely successful in their preposition corrections, there is some evidence of the difficulties they faced through their unsuccessful attempts, revealing their lack of skill with corpus data analysis. It appears that learners did not know how or where to focus their attention on the concordance data, as shown by the reported preposition object oversights. When determining which preposition to use, the type of object it takes is an important factor to consider, as this noun object is a core part of its basic lexical pattern. For this reason, when referencing a corpus to research preposition usage, learners should be instructed to identify both the preposition and its corresponding object as they skim through the concordances, so that they are attending to the full prepositional pattern. Alternatively and even more efficiently, learners should make use of the word sketches for individual

preposition combinations to overview a preposition's common noun objects. These are basic features of any corpus system and do not require much instruction to be employed effectively by language learners.

As discussed earlier in chapter two's error correction literature review (section 2.4.2), for many years, prepositions have been described as “untreatable” errors in learner writing, a term originally coined by Ferris (1999) for language problems that are unresponsive to written corrective feedback. Error correction research has focused on a variety of error types as well as teacher feedback types, but perhaps partially due to this still widely-held belief, few studies have focused on learners’ difficulties with prepositions and investigated approaches to addressing such errors in learner writing. Bitchener’s et al. (2005) study is maybe the only investigation that is substantial enough to draw any conclusions on preposition accuracy in response to corrective feedback. The researchers investigated various types of corrective feedback and their impact on the accuracy of learners’ newly composed texts, and they found that although the accuracy of both the definite article and the past tense were positively (and significantly) impacted by the feedback on the learner texts, prepositions were not. The authors attribute this finding to Ferris’s (1999, 2011) argument on treatability of errors, in which prepositions are less correctable because they are item-based rather than rule-governed language problems. With these findings, the authors lend further support to the currently-held belief that learner uptake on prepositions cannot be achieved through teacher feedback, or more precisely, that teacher feedback alone is not effective in contributing to preposition accuracy.

Considering these limitations with corrective feedback, the findings from the current study suggest that a corpus should be employed by learners, as it enables them to gather the linguistic data they need to make informed decisions about their preposition usage. Based on analysis of the learners' corrections, researching preposition usage on a corpus is not difficult: prepositional phrases constitute a limited range of patterns, which would make it relatively easy for students to formulate preposition error-based queries and to focus their data analysis efforts to take on such research independently.

Another implication that can be drawn from this analysis relates to error engagement and its contribution to learners' language development, especially in comparison to the widely practiced teacher-centered direct correction of preposition errors. As discussed in chapter two (section 2.4.1), engagement improves a learner's chances of language acquisition by encouraging them to notice the error and explore aspects of the language that they may not otherwise experience through teacher-directed forms of correction. One example is Storch and Wigglesworth's (2010) case study of learner uptake and retention, which demonstrates the importance of error engagement through indirect (i.e. editing symbol-based) teacher feedback. As the students composed and corrected their texts in pairs, the authors found that on account of the indirect coded feedback provided, learners engaged more deeply with each error and ultimately higher levels of uptake were achieved. This feedback approach is similar to the current study, in which students were prompted to address certain errors through error codes, but rather than process those errors through the combined knowledge of peers as they did in Storch and Wiggleworth's research, the corpus served as the source of information that prompted the learners to interact with their errors in meaningful ways. From this perspective, corpus referencing can be viewed as a tool to encourage learner engagement, in that it creates

the opportunity for learners to respond more thoughtfully to their errors and to actively process their language choices. Although the current study does not assess learner uptake of error over time to determine whether these gains were lasting, by interacting with their errors through corpus referencing, the learning potential may be analogous to the learner experiences reported by Storch and Wiggleworth and other researchers who highlight the value of engagement through the error problem-solving process.

Along with this increase in learner engagement through the corpus-based error correction process, there are also implications for teachers. Much of the error correction research advises teachers on how to shape their corrective feedback, but while teacher feedback will always be an important part of the writing process, it is a time-consuming, labor-intensive aspect of teaching writing. One possible advantage of students using corpus data, then, could be its potential to alleviate this burden for teachers by shifting the responsibility from teacher to student. With corpus referencing, more "labor" or effort is undertaken by the student, which is an important shift not only because it allows learners to better engage with their errors as discussed earlier, but it also creates a means for teachers to individualize their instruction as learners address their particular error patterns under the guidance of the teacher. Online tools such as *BAWE Quicklinks* can further reduce the preparation of written feedback by allowing teachers to provide direct links to error-relevant concordances in the learners' texts. This eliminates the need for teachers to explain linguistic issues through their feedback and instead convey accurate usage through the linked concordances (Vincent & Nesi, 2018). In these ways, corpus referencing can be advantageous for teachers, enabling them to respond to preposition errors more efficiently in writing courses.

A final implication of the above correction analysis is the fact that overall it was easier for learners to correct preposition omissions with the corpus than it was preposition errors (84.6% versus 80.9%, respectively). Considering this higher average correction rate for omissions with the corpus as well as omission corrections made without any referencing (20.0%), it is possible that many of these dropped prepositions are evidence of learner interlanguage (Selinker, 1972), rather than errors that represent a gap in the learner's linguistic knowledge. According to Ortega (2009), cross-linguistic research has revealed that there are clear differences in the frequency of use for specific L2 items, suggesting that overuse or underuse can be indicators of various L2 developmental stages. A case in point is Cobb's (2003) learner corpus-based study, which in describing advanced learners' interlanguage tendencies, reports that their verb-dependent preposition usage involved a narrower range of combinations compared to native speakers and showed greater frequency among those limited preposition combinations.

Given that the students in this study could correct the majority of these omissions through their corpus research and in several cases correct them without referencing any resource, omissions in learner writing could be considered as a case of preposition underuse, in which referencing a corpus helps to remind learners of vocabulary they have been exposed to but cannot elicit automatically. In student interviews on corpus referencing conducted during the preliminary research for this doctoral study, many learners commented on how advantageous corpus research could be in order to prompt their memory of familiar language. Through corpus referencing, students felt that they had a better chance of achieving improved accuracy and lexical variety, as expressed in the following interview comments (Quinn, 2018:327):

> "I often forget which preposition to use, but when I use corpus, I can understand which one is correct. There are so many prepositions in English. To know which one is best is really difficult."

> "Before I am always using the same word, such as expand, but now by searching the corpus I can use many words in my sentences, for example, improve, progress, advance, develop, etc. ... I know all those words, but I couldn't use all of them when I like. They don't come out of my head easily."

Thus, corpus referencing may be able to provide learners with opportunities to address specific learner language issues, such as eliciting language that is not fully acquired yet but is part of their developing interlanguage.

CHAPTER 6. ANALYSIS OF PHRASE AND COLLOCATION CORRECTIONS

This chapter reports on a correction analysis of the phrase and collocation error types, and builds on the previous chapter's analysis of prepositions to contribute to the study's research questions. Consistent with the other error types investigated, success rates are reported across three correction outcomes: successful, moderate, and unsuccessful. However, different from the preposition analysis, several phrase and collocation corrections were assessed as moderate, so this intermediate category will be factored into the discussion as well.

As discussed in chapter four, research methods, the collocation error category consisted of word pairs that could be either strong or weak collocations, as verified through the *Oxford Collocations Dictionary* and/or the *EnTenTen2013* corpus (see section 4.8.2.1). "Strong" collocations had a minimum LogDice score of 5.0 in *Sketch Engine* or appeared in the collocations dictionary, such as the combinations *basic skills* or *make a comment*. On the other hand, "weak" collocations did not meet these minimum requirements but elicited at least 700 instances in the corpus and were identified by the coders as the target correction for the writer's context, such as the combination *fully acquire* (i.e. a language).

The lexical phrases (Nattinger & DeCerrico, 1992) in the phrase error category were longer sequences made up of more than two words and of multiple or various types of errors, as described in section 4.8.2.3 of the research methods chapter. These phrases encompassed transitional phrases (e.g., *from my point of view, due to this trend, as shown by these examples*), idiomatic expressions (e.g. *to crack down on*), and fixed or semi-fixed language chunks (e.g. *in any case, as I see it, to tell the truth*). Typically, there was more than one

problem within the phrase, grammatical and/or lexical, that needed to be corrected by the student.

6.1 Overview

Table 6.1 below introduces success rates for the phrase and collocation error corrections across the individual word classes. As can be seen, for both error types, roughly 75% of the errors were successfully corrected. Of the remaining 25% that were unsuccessful, slightly more collocations (12.9%) were moderately improved through the students' correction attempts compared to phrases at 9.5%.

Reviewing the differences across word class shows that about half of all the collocation problems had incorrect verbs (48.7%, N=116). This is consistent with the literature on collocation learning that has also shown verbs to be a common source of error in collocational pairings (e.g. Chan & Liou, 2005; Nesselhauf, 2003). These are followed by collocations with incorrect adjectives (24.8%, N=59) and incorrect nouns (17.2%, N=41), while problematic adverbs make up a smaller number (9.2%, N=22). For the most part, these proportions are maintained across the outcome categories within each word class as well, although within the moderately-assessed corrections (50.0%, N=15), noun-based collocations appeared to be slightly more problematic than the adjectives (20.0%, N=6). It is possible that for word pairs with incorrect nouns, it may be difficult for the writer to preserve their original meaning without replacing the entire collocation, since revising nouns can alter the main idea or topic of the sentence.

Table 6.1. Proportion of phrase and collocation error correction attempts distributed across outcome

	N of corpus-referenced corrections	Correction rates					
		Successful		Moderate		Unsuccessful	
		N	%	N	%	N	%
Phrase error correction rates	**84**	**64**	**76.2%**	**8**	**9.5%**	**12**	**14.3%**
Word class:							
Incorrect adjective in collocation	59	45	76.3%	5	8.5%	9	15.3%
Incorrect adverb in collocation	22	14	63.6%	4	---	4	---
Incorrect noun in collocation	41	30	73.2%	6	14.6%	5	12.2%
Incorrect verb in collocation	116	84	72.4%	15	12.9%	17	14.7%
Collocation error correction rates	**238**	**173**	**72.7%**	**30**	**12.6%**	**35**	**14.7%**

The following sections describe the learners' correction tendencies according to outcome category. First the successful corrections are reviewed separately for the phrase errors and the collocation errors, then the moderate and unsuccessful corrections are reviewed for each category. The chapter concludes with a discussion of the patterns that emerged through the analysis and their implications.

6.2 Successful corrections: Phrase errors

Behind prepositions, phrase errors were the second most successfully corrected error type (76.2%, N=64), although the total number of phrase errors collected for analysis (N=84) was considerably less than either the preposition problems (N=219) or the collocation errors (N=238). The phrase errors were corrected by students in one of three ways:

(1) by substituting erroneous words to make the entire phrase accurate;

(2) by inserting words to make the phrase complete; and

(3) by rewording the phrase overall, replacing and rearranging several words.

Analysis of the successfully corrected phrase errors are discussed in the following sub-sections in terms of these correction strategies, which are overviewed in Table 6.2.

Table 6.2. Successful phrase error correction strategies by proportion

Successful phrase error correction strategies (N = 64 of 84 total phrase errors)		**N**	**% of successful phrase corrections (Total N = 84)**
6.2.1	Substitution	32	50.0%
6.2.2	Insertion	25	39.1%
6.2.3	Overall rephrasing	7	10.9%

6.2.1 Substitution

In 50% of the successful phrase corrections, students substituted one or more items in their original expression to produce an accurate phrase. The items substituted included prepositions, nouns or noun phrases, verbs, or *as* conjunctions, as shown in these learner data samples:

*thanks ***for** the Internet **(to)***
*conscious of the ***case** that **(fact)***
take the creative idea into practice **(put)*
*the same background ***with** me **(as)***

6.2.2 Insertion

Inserting omitted items to correct a phrase was also a common correction strategy. As with the substitution-type corrections described above, nouns, verbs, prepositions and conjunctions were added to complete these phrases:

*as I see __ **(it)***	*to the full __ **(extent)***
*__ tell the truth **(to)***	*work outside __ **(the home)***
*after some trial __ **(and error)***	*nothing __ with **(to do)***

Together, substitutions and insertions make up the great majority of the successful phrase corrections (89.1%, N = 57). To correct phrases with omitted or erroneous components such as these, students were instructed on how to conduct corpus wild card searches. With the correction samples cited above, for instance, querying [*thanks * the Internet]* or [*nothing * * with]* can elicit the omitted or erroneous word(s). Sometimes even entering a fragment of the phrase can point learners in the right direction for recovering it fully, such as querying *after some trial* to see that ***and error*** should follow or entering *work outside* into the corpus search box to find the full phrase *work outside* ***the home***.

6.2.3 Overall rephrasing

The few remaining corrections required the writer to largely rephrase their expression, as illustrated below.

think with our own head → think **by ourselves*
study their own speed → study **at their own pace*
it is need doing so → it is **necessary to do so*

Cases such as these could be more difficult to recover with the corpus, as most of the student's language was incorrect. However, sometimes the phrase sequence could be found by researching one of the key words in the phrase or by conducting various PoS searches to

explore possible expressions. With any of these cases, a correction would likely require multiple searches – as well as some creativity – to locate the accurate phrase.

6.3 Successful corrections: Collocation errors

The collocations were also generally successful with a slightly lower success rate compared to the phrase corrections of 72.7%; however, the collocations were much greater in number: 238 collocation corrections versus 84 phrase corrections. As shown in Table 6.1 above, comparing the collocation errors across word class (i.e. incorrect adjectives, adverbs, nouns and verbs) shows that the incorrect adjectives were the most successfully revised (76.3% , N = 45 of 59 corrected), while adverbs were the least successful (63.6% , N = 14 of 22 corrected). Verbs and nouns were successfully corrected in similar proportions (72.4% and 73.2%, respectively), although there were many more verb errors than noun errors in the collocations category: 116 verb-based collocation errors versus 41 noun-based collocation errors.

In the following two sub-sections, the nature of the collocation error corrections is discussed as well as the learners' correction strategies; specifically, section 6.3.1 shows the proportion of strong versus weak collocations, highlighting that the learners were mostly referencing strong collocations in the corpus and section 6.3.2 discusses the learners' tendency to correct the majority of their collocation errors through lexical collocate substitution.

6.3.1 Strong versus weak collocations

As discussed at the outset of this chapter and in chapter four, research methods (section 4.8.2.1), the collocations error category was made up of strong and weak collocations, which depended on whether the collocation could be verified or not by a minimum 5.0 LogDice

score in the *EnTenTen13* corpus or through a collocations dictionary. Among these successful corrections, nearly 90% were strong collocations, whereas the remaining 10% were classified as weak collocations. This proportion not only indicates the nature of the students' collocation errors, particularly in that most errors were strongly associated word pairs that students need to learn, but also that they could be efficiently referenced on a corpus through word sketches, alleviating the burden of conducting more time-consuming concordance queries. Table 6.3 below shows how these strong and weak collocation errors are distributed across word class.

Table 6.3. Proportion of successful strong and weak collocation corrections

Successful collocation corrections	**Strong collocations**		**Weak collocations**		**Totals**	
	N	**% of word class**	**N**	**% of word class**	**N**	**% of successful collocations N = 173**
Incorrect verb in collocation	81	96.4%	3	3.6%	84	48.6%
Incorrect adjective in collocation	29	64.4%	16	35.6%	45	26.1%
Incorrect noun in collocation	28	93.3%	2	6.7%	30	17.3%
Incorrect adverb in collocation	14	100%	0	---	14	80.9%
Total	**152**	**87.9%**	**21**	**12.1%**	**173**	**100%**

For example, there were multiple cases in the learner data of the strong collocations listed below, which illustrate common lexical combinations that learners could not produce on their own but could easily reference in the corpus through word sketches:

***grow** skills (**develop**)*
***make** new ideas (**generate**)*
*a ***simple** summary (**brief**)*
***make/do** an age restriction (**impose**)*
***reach** inappropriate web sites (**access**)*
*the international ***world** (**community**)*

Besides these repeated cases above, below are other strong collocations referenced by learners that appeared in the data:

***make** an image (**create**)*	*this complicated ***condition** (**situation**)*
*the ***top** aim (**primary**)*	***activate** the economy (**boost**)*
***always** high rates (**consistently**)*	*children's ***wrong** behavior (**inappropriate**)*

As several of these samples show, learners often used basic verbs, such as ***make*** or ***do*** and ***grow*** when discussing skills (important to the theme of the second essay, creativity) since they were not familiar with the appropriate collocations. Not knowing which collocates form acceptable word pairs, they resorted to familiar, common vocabulary to express their intended meaning instead.

Other data samples show the learners' ability to raise the level of their language by using familiar, highly typical collocations improved the naturalness of their writing:

*higher ***school** (**education**)*	***pure** interest (**genuine**)*
***break** the age restriction (**violate**)*	***keep** the culture (**preserve**)*
*a temporary ***expedient** (**solution**)*	***denies** myths about creativity (**dispels**)*

One type of collocation that appeared to particularly benefit from referencing corpus word sketches was the coordinate collocates such as *win or lose* or *work and play*. Although the number of these types of corrections is few (N=22), students were able to accurately correct 100% of these coordinated items, as in the following:

*broad and ***flexible** viewpoints (broad and **diverse**)*
***appetite** and passion are essential (**enthusiasm** and passion)*
*benefits and ***harms** (benefits and **risks**)*
*what we ***get** and what we lose (**gain** and lose)*

On the other hand, weak collocations consisted of word pairs that did not reach a LogDice of 5.0 and were not included in the collocations dictionary, yet there were more than 700 instances of the combination in the corpus and they were deemed the most suitable correction for the student's error during the error coding process. The majority of these weak collocations involved adjective errors (35.6%, N=16), while the number of verb, noun, and adverb-based weak collocation errors was very few (N = 3, N = 2, N = 0, respectively). For the most part, these weak collocations reflect topic-related language important to discussing the themes of the student's essay assignments; namely, language related to children and online activity, creativity in education, and internationalization:

***harmful** content (**inappropriate**)*
*creativity is a ***loose** term (**ambiguous**)*
*acquire the language ***perfectly (fully)***

6.3.2 Collocate substitution

Among the successfully corrected collocation errors, students primarily approached the error correction process through straight substitution with 89.0% of their collocation errors (N =154 of 173 successful corrections) resolved by replacing an incorrect collocate with another different collocate found in the corpus. This means that in these successful cases, simple substitution was enough to remedy the problem in their texts, indicating that these errors were an issue of word pair acceptability and required little or no sentence rephrasing to incorporate the correction. By substituting the appropriate item for the incorrect collocate, the word pair became a recognizable collocation. The data samples below illustrate the nature of these corrections:

***plural** accounts **(multiple)**	*the international ***world (community)**
*have changed ***highly (significantly)**	****make** an age restriction **(impose)**

Through these collocate substitutions, students were often able to clarify and/or refine their meaning, conveying a more accurate or more specific meaning from the original error, such as the following:

*people with ***some** backgrounds **(diverse)***
****see** their child's activity **(monitor)***
*stimulate their ***senses** **(interests)***
*a new ***combined** idea **(original)***
****apply to** the tendency or not **(display)***

For example, *people with ***some** backgrounds* expresses very little, if anything, while the revision of ***diverse** backgrounds* makes the writer's description more precise and natural. In addition, *parents ***see** their child's activity* only expresses that a parent is watching what their children are doing online, whereas correcting ***see*** to ***monitor*** incorporates the meaning of evaluation to make sure a child's online usage is safe and age-appropriate. The students' corrections also sometimes managed to remedy incorrect or unclear meanings in addition to forming acceptable collocations. *Stimulate their ***senses*** infers a different meaning from the corrected *stimulate their **interests***, whereas *a new ***combined** idea* suggests that the new idea came from multiple sources, when in fact the point is that the new idea is fresh or unique, as expressed by *a new **original** idea*. Unclear expressions as well, such as ****apply to** the tendency or not*, could be greatly improved through the writers' collocation research, as shown by replacing ****apply to*** with ***display** the tendency or not*.

Although the majority of the learners' collocations were corrected through basic lexical substitution, in the remaining 11% of the successful corrections (N=19), there are a few cases

where the learners did do some rephrasing and revising of their writing in response to what they found through their corpus research. For example, there were instances where corpus referencing prompted learners to revise more than a single collocate to improve their written usage overall, such as several cases of ***makes bad** consequences* corrected to ***creates negative** consequences* as well as ***resemble** problems* corrected to ***similar issues***, which better reflects the writer's context – the decisions and policies surrounding a country's education system.

Otherwise, there is some evidence in the learner data of more substantial revision that integrates corpus research findings, such as the extracts 1-5 below. These samples show skillful application of the corpus data researched by the learners, demonstrating that by reviewing the concordances, they were able to identify and apply the collocations' usage patterns.

Original$_1$: *We need to learn to ***get along with** smartphones.*
Correction$_1$: *We need to learn to **use** smartphone **properly.***

Original$_2$: *I feel their ***imagination is abundant** and often beyond adults' expectation.*
Correction$_2$: *I feel they **have a fertile imagination** and this is beyond...*

Original$_3$: *They [children] tend to show their personal information easily [on social media] and ***say inappropriate words** which hurt someone.*
Correction$_3$: *...and **make an inappropriate comment that** hurt someone.*

Original$_4$: *If I want my children to be active in his or her work, I should ***make some opportunities for them**.*
Correction$_4$: *...I should **provide them with some opportunities***

Original$_5$: *They can make mistakes because they are developing* *
Corrections$_5$: *...because they are developing* ***their skill in Japanese****.*

There are few successful collocation corrections that display the degree of textual revision illustrated above, but overall, considering the number (N = 173) of collocation errors that were accurately corrected, it suggests that many of the learners' collocation problems were easily resolved through corpus referencing. On the whole, the students were able to revise their unacceptable word combinations into recognizable and appropriate collocations. The fact that this was largely accomplished through single collocate substitution reveals more about the type of collocation errors learners made and less about their ability to integrate corpus-researched linguistic information into their writing. However, it does show that the learners were able to identify relevant information in the corpus and to distinguish among various collocate options in order to improve their linguistic expression.

In order to better understand the issues that prevented the learners from accurately resolving erroneous collocations, the following sections report on patterns that emerged through the learners' unsuccessful correction attempts. Phrase error corrections are discussed first, followed by collocations.

6.4 Unsuccessful and moderate corrections: Phrase errors

This section reviews the phrase corrections that were assessed as either moderate or unsuccessful. As discussed in the chapter four (research methods), moderate assessments indicate corrections that show improvement in terms of meaning clarification or natural usage, though they are not corrected to the degree that they would be considered accurate. On the other hand, unsuccessful errors showed little improvement, in which the writer did not

achieve any greater degree of accuracy through the correction process. Both of these correction outcomes are discussed together in this section.

Table 6.4 below overviews the difficulties learners encountered when correcting their phrase errors along with the corresponding number of cases. There were only 20 moderate and unsuccessful cases overall, and most of them (N=12) were a consequence of the learner choosing the wrong item from a set of corpus data to correct the phrase. Otherwise, three moderate corrections were only partially revised, while five unsuccessful corrections failed to show any improvement at all. Each of these areas is discussed more fully with samples from the learner data to illustrate the miscorrections.

Table 6.4. Phrase error correction difficulties: Moderate and unsuccessful

Correction Difficulty		Moderate (N)	Unsuccessful (N)	Total (N)
6.4.1	Wrong word selection	5	7	12
6.4.2	Incomplete correction	3	0	3
6.4.3	Lack of improvement	0	5	5
	Total	**8**	**12**	**20**

6.4.1 Wrong word selection

For over half of the twenty unsuccessful corrections (60%, N = 12), students chose the wrong item from the corpus data to correct their phrase. In all cases, both the accurate correction and the student's incorrect choice appear on the same page of concordances (based on the teacher-advised search approach), suggesting that the student was unable to analyze the data well enough to make a good correction. For instance, in the following extract from the learner data,

Original phrase error:	*the education systems are similar in some* ****points***
Student's unsuccessful correction:	*...are similar in some* ****parts***
Appropriate correction:	*... are similar in some* ***ways***

the writer chose a correction that was equally unclear or inappropriate to their original error, so it was assessed as unsuccessful. The wild card search advised through the teacher feedback, [*in some* *], yields many suitable choices, such as ***ways***, ***aspects*** or even *in some* ***areas*** that would be acceptable. In order to choose the correct item, the student needed to consider these nouns in terms of the sentence's subject, *education system*, but the student's choice of ****parts*** relates to a mechanical system, rather than the educational program that is being discussed. Or, from another perspective, the learner's correction choice of ****parts*** may have stood out among the other concordance choices due to its phonetic similarity to ****points***.

In fact, there were several instances where graphemic (or phonetic) similarities seemed to draw the learners' attention. In another sample,

Original phrase error:	*under the* ****superintendence*** *of parents*
Student's unsuccessful correction:	*under the* ****auspices*** *of parents*
Appropriate correction:	*under the* ***supervision*** *of parents*

the learner's original error of ****superintendence*** is very similar to what the correction should be – ***supervision***. Different from the previous example (****parts*** versus ****points***), however, the learner did not choose the similar grapheme ***supervision***, which would have been the accurate correction, even though it appeared in the queried concordances. Instead, the writer chose **under the* ***auspices***, which is not at all suitable for the writer's context, in which the writer is discussing being under the watchful eye of a parent. Similarly, in the following correction,

Original phrase error:	*build our* ***stroke** of knowledge*
Student's unsuccessful correction:	*build* ***vast amounts** of knowledge*
Appropriate correction:	*build our* ***store** of knowledge*

the writer's original error, ***stroke** of knowledge,* recalls the correct phrase ***store** of knowledge*. Perhaps the learner initially misremembered the phrase's components, but even though ***store*** surfaces through the suggested corpus wild card search, it is not enough for the writer to recognize it as the correct choice, and the writer ends up choosing ***vast amounts*** instead. One final sample that suggests visual/sound association interference is the following:

Original phrase error:	*creative people act on their own* ***intimate***
Student's moderate correction:	*...act on their own* ***ideas***
Appropriate correction:	*...act on their own* ***initiative***

Perhaps the only explanation for the original error ***intimate*** is phonetic similarity, given that it is completely unrelated to the written context. As for the writer's correction choice ***ideas***, it is possible that the learner found and misunderstood the phrase *act on an idea*, which refers to the decision to put an idea into practice, a meaning that is different from a person acting *on their own initiative*.

The relationship between phraseology and error correction is also raised through some of these unsuccessful corrections, as in the following learner data extract:

Original phrase error:	*parents are not the* ***perfect** choice [for protecting children from Internet crime]*
Student's unsuccessful correction:	*parents are not the* ***ideal** choice*
Appropriate correction:	*parents are not the* ***best** choice*

Whether adjectives that collocate with *choice* are queried or a wild card search for [*the * choice]* is conducted, several options surface: *the* ***right** choice*, *the* ***first** choice*, *the* ***real** choice*, *the* ***correct** choice*, as well as the learner's incorrect choice of **the* ***ideal** choice* and

the most suitable correction for the writer's context, *the **best** choice*. This range of options in the corpus data makes it difficult to identify the most appropriate item. However, if the phrase is negated as it is used in the student's essay and [*not the * choice*] is queried, then the accurate correction of *not the **best** choice* is immediately clear; in fact, it is practically the only option in the resulting concordances.

Similarly, the following case also requires inclusion of the negative particle *not* in the corpus query in order to elicit an appropriate correction:

Original phrase error:	*not want to be left **
Student's unsuccessful correction:	*not want to be left ***alone***
Appropriate correction:	*not want to be left **out***

Based on the learner's partial phrase, *not want to be left*, three possible patterns can be researched in the corpus, each of which results in different findings. If only the infinitive portion is queried, *[to be left]*, then results show 37 concordances for *left ***alone*** and 16 concordances for *left **out*** (out of 150 lines total). Extending the phrase to include *[want to be left]* in the corpus query elicits 73 concordance for *left ***alone*** and 24 concordances for *left **out***. Thus, with both of these searches, *left ***alone*** is more frequent in the corpus data and therefore may appear to the student as the best correction. However, if the query is further extended to the left to include the negative particle *not*, as expressed in the writer's original sentence **not want to be left*, then the corpus results are in fact the opposite of the previous two searches and the appropriate correction, *not want to be left **out**,* becomes clearly evident: 47 concordances for *left **out*** and only 10 concordances for *left ***alone.*** As this demonstrates, identifying phrase boundaries can have a major impact on a learner's correction success with corpus referencing.

Aside from this phraseological perspective, another interpretation of the learner's correction choice of *left* ****alone*** is a semantic one. Possibly, the learner misinterpreted *left* ***alone*** and *left* ***out*** as having the same meaning and were therefore interchangeable. To be *left* ***alone*** and to be *left* ***out*** imply basically the same idea: being on your own or solitary. However, it is the semantic implication that distinguishes them: while *left* ***alone*** suggests that a person wants to spend time alone and does not want to be bothered, *left* ***out*** implies the opposite – someone wants to engage with others but cannot because another person or group has prevented them from joining. In this situation, the student may not have found it necessary to investigate the corpus data in great detail to distinguish between these two choices and instead chose one or the other possibly based on its frequency.

6.4.2 Incomplete corrections

Incomplete corrections (N = 3) refers to cases where students found relevant information through their corpus research, but the patterns evidenced in the corpus data were not applied with full accuracy to their writing, as in the learner data samples below:

> Original phrase error: *the rate of interracial couples has doubled* ****30 years ago***
> Student's moderate correction: *... has doubled* ****over the last 30 years ago***
> Appropriate correction: *... has doubled* ***over the last 30 years***

A corpus query for *has doubled* produces several relevant concordances, such as *over the last 12 months*, *over the last 9 years*, *over the past year*, *since 2007*, *in 7 years*. Although the writer correctly chose *over the last 30 years*, they failed to delete ***ago*** from the original phrase to make the correction fully accurate. Similarly, in the next sample,

Original phrase error: *creativity* ***has interests in*** *various areas such as student achievement*
Student's moderate correction: *creativity* ***effects on*** *various areas...*
Appropriate correction: *creativity* ***has an effect on*** *various areas...*

the writer also did not fully correct the phrase. Although the learner managed to correct the noun and preposition ***interests in*** to ***effects on***, the auxiliary verb ***has*** was dropped and the article ***an*** was not incorporated, which resulted in an incomplete correction.

6.4.3 Lack of improvement

There were a few cases (N = 5) in which the learners' phrase corrections showed no improvement. In these correction attempts, the data was misinterpreted, overlooking important cues in the patterning, such as in the following:

Original phrase error: *as these examples*
Student's unsuccessful correction: ***as thinking about** these examples*
Appropriate correction: ***as shown by** these examples*

By choosing a verb phrase that cannot occur after the conjunction *as*, it appears that the student chose ***thinking about*** without taking the grammatical context into consideration. Despite this, the teacher-advised wild card search (*as * * these examples*) produces several good corrections, such as ***as shown by***, ***as illustrated by***, or ***as evident from***. In another correction attempt,

Original phrase error: *parents have to try to* ***take some measures for** it*
Student's unsuccessful correction: *... to* ***take some measures** it*
Appropriate correction: *... to* ***take some measures against** it*

the student corrected the phrase by dropping the preposition ***for***, when they should have replaced it with ***against***. The student was instructed to search the corpus for prepositions that follow [*take measures*], which produces many concordances with the accurate choice ***against***.

However, it is possible that the student might have been misled by an incorrect understanding of the phrase. Taking more of the writer's original context into consideration,

> *To prevent children from being involved in [social media-related] incidents,...parents have to try to take some measures* ***for*** *it.*

we can see that the writer intended for *it* to refer to parents protecting children from criminal incidents as underage users of social media. When using the phrase ***take measures against***, however, the object should be negative, namely the risks faced by children (e.g. *take measures against the risk of...*), rather than positive strategies for improving child safety. Based on how the student has constructed their sentence above, it appears that the learner's interpretation of this phrase is for parents to take measures to help their children avoid such risks, as opposed to taking measures against the risk itself. Since the learner cannot reconceptualize their sentence to consider a contrary notion of *measures* ***against*** some dangerous activity, they are unable to make an appropriate correction. This illustrates how writers may sometimes be misled by assumptions they hold regarding language use or by a fixed notion of how they intend to express an idea, either of which can misdirect their correction efforts and limit their exploration of alternative expressions.

6.5 Unsuccessful and moderate corrections: Collocation errors

This section reports on analysis of both the moderate and unsuccessful collocation corrections. As with the unsuccessful phrases discussed earlier, correction attempts are

grouped into categories that describe the difficulties and problems learners encountered as they attempted to correct their errors. The numbers and percentages for each category are presented in Table 6.5 below.

Table 6.5. Correction difficulties encountered with collocation errors

	Correction Difficulty	**Moderate (N)**	**Unsuccessful (N)**	**Total N**	**%**
6.5.1	Wrong collocation selected from corpus data	17	19	36	55.4%
6.5.2	Unacceptable word combination formed	3	11	14	21.5%
6.5.3	Lack of attention to corpus language patterns	10	5	15	23.1%
	Total	**30**	**35**	**65**	

6.5.1 Wrong collocation selected from corpus data

Correction attempts included in this category involve wrong decisions made among collocate choices. In other words, the student's incorrect choice and what would have been the accurate choice both appeared in the corpus data (usually within the same word sketch), but the item chosen by the student did not form the expected collocation for their written context.

Based on analysis of the learners' correction attempts, there were two main factors that prevented learners from successfully correcting these types of errors: (1) not understanding the meaning of their collocation choices well enough to make a good correction decision; and (2) not analyzing the corpus data well enough to identify which collocation was appropriate

for their written context. These two factors are discussed in the next two sub-sections and illustrated through samples from the learner data.

6.5.1.1 Misunderstanding collocational meaning

In these cases, students considerably changed their meaning through the correction process, indicating that they did not fully comprehend the collocate they had selected or the collocational pair as a whole. Sometimes, the collocate chosen by the learner expressed a semantically related but ultimately different meaning from the original error, such as in the following two cases.

Original collocation error:	*All motivation why they study is to enter a better university, not to have ***pure** interest [i.e. not based on a pure interest]*
Student's unsuccessful correction:	*...not to have ***keen** interest*
Appropriate correction:	*...not to have **genuine** interest*

Original collocation error:	*I recommend real communication when children are young and letting them find the joy of talking face to face [vs. social media], but some children are ashamed of talking and do not chat ***actively***
Student's unsuccessful correction:	*...do not chat ***amicably***
Appropriate correction:	*...do not chat **easily***

In both correction attempts above, the original errors and the appropriate corrections are similar in meaning. The accurate choice ***genuine*** *interest* expresses basically the same idea as ****pure*** *interest* but is a more context-appropriate collocation. Likewise, **chat* ***actively*** conveys the idea of being able to *chat* ***freely*** or *chat* ***easily***, or to speak without inhibition. However, the learners' corrections – ****keen*** *interest* and *chat* ****amicably*** – take the expressions in a

different direction. A *keen interest* describes an enthusiastic interest in something, while *chat amicably* is closer to the idea of being friendly and courteous in conversation. Thus, in these cases, it appears that the learners did not understand the meaning of their correction choices nor of the accurate choices, since these could also be found within the same set of corpus concordance results.

In other cases, students were perhaps familiar with the individual word they substituted, but they did not understand the newly combined meaning when it was used together with a given collocate. This seems to be the case in the following learner data samples, where the two collocates take on a somewhat different meaning as a unified collocation in contrast to the meaning of each individual collocate.

Original collocation error:	*Smartphones appeal to us and are changing our behavior because they offer us three* ****comfortable*** *misconceptions.*
Student's unsuccessful correction:	*...three* ****understandable*** *misconceptions*
Appropriate correction:	*...three* ***common*** *misconceptions*

In the above learner sample, the student's original error ****comfortable*** and correction to ****understandable*** are both conveying the idea that something is familiar and therefore readily accepted, so semantically, the writer's choice of ****understandable*** makes sense. The expected collocation for this context, however, is ***common*** *misconception*. With ***common*** generally meaning frequent or widespread, perhaps from the learner's perspective this word seemed inconsistent with what they wanted to express. As for salience in the corpus data, ***common*** *misconception* is a top-ranked (i.e. highly typical) collocation in the word sketch for *misconception* and would therefore have been easily spotted in the data. Based on the learner's correction to ****understandable*** *misconception,* it appears that the learner sought a collocate

that matched her idea of easily falling into a familiar (i.e. comfortable) habit rather than realizing that ***common*** *misconception* describes a similar tendency of assuming something without much thought, as the unified collocation conveys.

Likewise, in the following correction attempt,

Original collocation error:	*Most of us feel that we won't get involved in* ****significant*** *incidents. However...1652 people aged under 18 in Japan fell victim to sex crimes and other offenses through social media.*
Student's unsuccessful correction:	*... we won't get involved in* ****critical*** *incidents*
Appropriate correction:	*... we won't get involved in* ***serious*** *incidents*

both ****significant*** and ****critical*** convey importance and therefore may have seemed to express the same meaning when combined with *incidents*. As a collocation however, *critical incident* refers to a specific and important event that has impacted someone's life or it refers to having a major influence on the way something is done, so the situational context should include consequences that lead to major changes. Considering this, ****critical*** *incident* does not suit the writer's context, which deals with the potential risks faced by underage social media users. Instead, we might discuss the risks in terms of being involved in ***serious*** *incidents*, or even ***unfortunate*** or ***traumatic*** *incidents*, all of which are options within the same word sketch for *incident*, where ****critical*** can also be found. Thus, like the previous learner sample, the student seems to be focused on conveying a similar meaning to their erroneous collocate, rather than comprehending the collocation as a unified whole.

In still other cases, students inadvertently changed their meaning in the process of correcting their errors, moving away from their original meaning conveyed through the initial

collocation error. The first two learner samples below show instances where the student ended up choosing collocates with nearly opposite meanings from their original expressions.

Original collocation error: *Web sites and federal officials reported that it is hard to* ****penetrate*** *the regulations and stop young children to use social media.*
Student's unsuccessful correction: *... it is hard to* ****violate*** *the regulations*
Appropriate correction: *... it is hard to* ***enforce*** *the regulations*

The meaning of the original expression, ****penetrate*** *the regulations*, is not immediately clear as a collocation alone, but with the help of the surrounding context we can understand that the writer means ***enforce***. The learner corrects this error with ***violate***, which is in fact contrary to what the sentence is aiming to express, making it appear that the student did not understand the meaning of ***violate***, let alone the collocation ****violate*** *regulations.* Given that the verb ***violate*** appears prominently on the word sketch for *regulation* as a particularly salient collocation (as does ***enforce***), this correction decision suggests that the learner did not verify the meanings of the unfamiliar collocates during their corpus research.

The following learner sample is similar in that the learner seems to have unintentionally changed their meaning:

Original collocation error: *Parents allow their young children to have smartphones. Children can play with them and use the Internet without parental* ****observation.***
Student's unsuccessful correction: *... use the Internet without parental* ****permission***
Appropriate correction: *... use the Internet without parental* ***supervision***

The student's correction, *without parental* ****permission***, is clearly incorrect since the writer states that parents have already allowed their children to use a smartphone, so *parental*

permission is not necessary. Instead, the student wants to address problems that arise out of a lack of adult guidance, making *parental* ***supervision*** the appropriate collocation choice. Based on the corpus word sketch for *parental*, both *parental* ***permission*** and *parental* ***supervision*** are highly-ranked collocations, and therefore, as prominent collocations in the corpus data, both were readily available to the learner as correction options.

One other case demonstrates a correction attempt in which a learner took the collocational meaning in a different direction from what had been originally intended:

Original collocation error:	*Teaching skills is essential because [children] may* ***find** an ability which even they don't know after learning skills.*
Student's unsuccessful correction:	*...children may* ***acquire** an ability*
Appropriate correction:	*... children may* ***discover** an ability*

In this sample, the appropriate correction ***discover*** *an ability* is more consistent with the meaning expressed through the learner's original choice of ***find*** *an ability*, in which we realize that we are good at something through the process of some new learning experience. In contrast, the learner's correction, ***acquire*** *an ability*, expresses the very different idea of gaining a new ability, which would come after repeated practice and effort, and therefore does not convey the unexpected discovery of a new talent.

In contrast, the correction sample below shows the learner making some progress towards more accurate collocation use between the student's error and subsequent correction, even though the collocation choice is still not appropriate for the written context.

Original collocation error: *Facebook claims, it is impossible job to confirm the age of young people online...However, some say these companies don't **see** the facts*

Student's moderate correction: *...these companies don't **state** the facts*

Appropriate correction: *... these companies don't **acknowledge** the facts*

In this case, ***see** the facts* could be taken to mean social media organizations are not comprehending the problem of underage users misrepresenting themselves online (i.e. *the facts*), but by choosing ***state** the facts* as the correction, the student moves closer to the correct meaning of ***acknowledge** the facts* in that ***state** expresses a verbal admission. With both collocate choices provided through the word sketch for *facts*, it is possible that the learner did not know the meaning of ***acknowledge*** and chose ***state*** because it was a familiar word, or the student did not realize the difference in meaning between ***acknowledge*** and ****state***. Either way, the distinction between ***state** the facts* and ***acknowledge** the facts* can be recovered through concordance analysis, with ***state** the facts* being used in situations where a person is simply asserting something, but not necessarily admitting to some negative situation, or even easier, the meaning of ***acknowledge*** could have been confirmed in a dictionary to facilitate the learner's corpus referencing. Nonetheless, this correction attempt shows the learner progressing to a more accurate understanding of their collocational use, even though it is not far enough to be considered an appropriate collocation.

6.5.1.2 Mis-analyzing collocational usage

Other times the learners' incorrect collocation choices suggested that their corpus data analysis was limited and that they overlooked important features in the data. In particular, these unsuccessful correction attempts show that it was difficult for students to notice specific grammatical features or contextual factors, such as semantic or situational ones, in which a

particular collocation tended to be used. Consequently, the learners were not able to relate the lexical or semantic contexts of their own writing with those presented through the concordances, which prevented them from making accurate corrections.

To illustrate this, the following data sample reviews a correction attempt where the learner chose a collocation (the coordinates ***desire** and passion*) that belongs to a different vocabulary set (i.e. romance) from what the writer is discussing: learning environments in which students can discover their personal interests.

Original collocation error:	*[Schools] should create environment where students can explore their ***appetite** and passion.*
Student's unsuccessful correction:	*...students can explore their ***desire** and passion*
Appropriate correction:	*... students can explore their **dreams** and passions*

On the word sketch for *passion* there are many noun coordinates for *passion* that are similar to *desire* and that collocate with *passion*, such as *love*, *lust*, *intimacy, romance*, and *emotion*. However, at least half of the options in the noun coordinate section of the word sketch are not romantically-inclined and would have been relevant to the writer's context, such as ***dreams**, talents*, *inspirations, curiosities, creativity*. Just by overviewing the range of collocates in the word sketch, it becomes evident that *passion* is generally used generally in two semantic areas: romantic contexts and learning contexts.

The next two correction attempts show learners selecting inappropriate collocations to describe online activities.

Original collocation error: *I think parents and children need to build good relationships so as not grow so much reliance on Internet...After building this connection, children can* ***politely*** *use [the Internet] and enjoy it.*
Student's moderate correction: *...children can* ***correctly*** *use*
Appropriate correction: *...children can* ***appropriately*** *use*

In this first sample, the learner incorrectly refers to appropriate use of the Internet as ***politely** use*, trying to convey that children should use the Internet in moderation and their lives should not be centered on online communication but personal relationships. In the second sample,

Original collocation error: *[Years ago] the internet was one of the contemporary thing and [parents] must learn to use it* ***smoothly***
Student's unsuccessful correction: *... learn to use it* ***efficiently***
Appropriate correction: *... learn to use it* ***effectively***

the learner is discussing the gap in online technology skills between parents and their children and that older generations need to learn how to *use it* ***smoothly***. However, in reference to both of the correction attempts above, use of the Internet cannot be described as ***correct** or ***efficient**: referencing the corpus shows that a system or process is employed *efficiently* and that a machine or equipment is used *correctly*. Consequently, neither correction choice can be considered accurate, as the usage contexts are not the same as the students' written contexts. This suggests that the writers needed to better interpret the correction possibilities in the corpus data in terms of their own written contexts in order to select an appropriate collocation.

Another learner sample demonstrates not only the importance of careful corpus data analysis, but also the necessity for students to understand the grammar of their own language production.

Original collocation error: *Science suddenly turned to a boring subject for me because in that class I only studied atomic structures or something in* ***very*** *detail for a few months.*
Student's unsuccessful correction: *...in* ***more*** *detail for a few months*
Appropriate correction: *...in* ***great*** *detail for a few months*

Both the student's correction, *in* ***more*** *detail*, and the appropriate correction, *in* ***great*** *detail*, are collocate choices in the word sketch for *detail*, so they could be easily retrieved. The student's correction *in* ***more*** *detail* conveys basically the correct meaning, but it is grammatically incorrect because there is no comparison being made in the student's sentence, which is at least one reason why *in* ***great*** *detail* is a more appropriate correction. In addition to identifying this grammatical distinction through concordance analysis, the student also needs to be able to parse the grammar of their own sentence and recognize that when using comparative language, it requires at least an implied counterpart.

One final correction attempt related to the mis-analysis of collocational usage suggests L1 interference as a reason for the unsuccessful correction.

Original collocation error: *I think studying for examination is the main problem. There is a* ***hard*** *entrance examination battle in Japan...*
Student's unsuccessful correction: *...a* ***hard-fought*** *entrance examination battle*
Appropriate correction: *...a* ***tough*** */* ***intense*** *entrance examination battle*

The word pair ***hard*** *battle* is an acceptable (though not typical) word combination in specific contexts, but when inserting *entrance examination* into the noun phrase, ***hard*** *entrance examination battle* becomes even less natural. In response to the teacher feedback, the student corrects ***hard*** with ***hard-fought***, a change that is not that different from the writer's original word choice. In Japanese, *kibishii*, which is often translated as *hard* or *harsh*, can occur with

tatakai[1] (*kibishii tatakai*, or literally *hard battle* or *hard fight*), and is an expression that is often used in Japanese to describe the intense competition that students experience in order to secure entrance to university. Therefore, this L1-based expectation might be a reason why the writer wanted to keep the word ****hard*** in her expression, illustrating how L1 interference can misguide a learner's language choices due to preconceived notions of how they want to convey their ideas. In fact, ****hard-fought*** is listed as a collocate on the word sketch for *battle*, but a brief overview of its corresponding concordances shows that it is most often used in the contexts of war, politics, government, or business -- not exams or one's studies. As alternatives, the same word sketch offers other collocates that relate to a range of other topic areas and that would be much more appropriate for the writer's context, such as ***tough***, ***intense,*** or ***fierce.***

To conclude this section, the basic problem with the learner's correction attempts discussed above is that more contextual analysis of the corpus data was required to apply the information to the learners' writing. The unsuccessful correction attempts discussed in this section illustrate the kinds of linguistic and semantic features learners tended to overlook in the corpus data when correcting their collocation errors, demonstrating specific difficulties learners may face in their corpus-based error correction efforts.

[1] As evidenced in Tono, Yamazaki & Maekawa (2013), entry 1633: 彼にとって厳しい戦いになるだろう / It will be a hard fight for him.

6.5.2 Unacceptable word combination formed

This section discusses corrections (N = 14) in which the learners created word combinations that were unacceptable in English. When reviewing these correction attempts, either the student's correction could not be retrieved at all through a corpus search (i.e. resulted in zero hits) or a search yielded extremely few relevant hits. Furthermore, the meaning of the correction is unclear, often making it even more obscured than its original error. A few corrections showed moderate improvement in terms of clarity in meaning, but still, the word pairs are unnatural and generally unacceptable lexical combinations.

Considering the unacceptable nature of these corrections, how did the learners come to choose these word combinations for their collocation errors? In a few cases, students substituted a synonym for the wrong word instead of referencing it as a collocation, suggesting that they did a single-item search rather than a collocation search. There was also evidence of the students not recognizing the grammatical function of their lexical choices when making corrections. Other cases suggest L1 transfer from Japanese.

The following samples illustrate cases where the writer simply replaced the erroneous collocate, irrespective of its relationship to its partner collocate:

> Original collocation error: *in a society where people have ***alike** identity, like Japan*
> Student's unsuccessful correction: *...people have [a] ***similar** identity*
> Appropriate correction: *...people have [a] **collective / national** identity*

> Original collocation error: *we say hateful ***speeches** because we don't need to fear being identified*
> Student's unsuccessful correction: *we say hateful ***expressions***
> Appropriate correction: *we [make] hateful **comments / remarks***

In cases like these, it appears that the learner is not treating the language problem as an error in collocation but as a discrete item that functions independently: in the first extract, ***alike*** and ***similar*** are close synonyms, while in the second extract, the student uses ***speeches*** to mean *language* and revises it with ***expressions,*** as in a common expression that someone might say. Thus, neither of these cases indicate that the student is viewing the two words as collocates that work together in the sentence.

In other cases, students mistook the grammar of the target items:

Original collocation error:	*It is necessary to understand foreign people and build a society where we can live a* ***diversified*** *life.*
Student's unsuccessful correction:	*...where we can live an* ***individual*** *life*
Appropriate correction:	*... where we can live a* ***full*** *life*

Original collocation error:	*In Japanese school, there is usually one* ***decided*** *curriculum that every student should follow*
Student's unsuccessful correction:	*... there is one* ***designed*** *curriculum*
Appropriate correction:	*... there is one* ***standardized / national*** *curriculum*

Both inaccurate corrections appear on word sketches for *life* and *curriculum (****individual*** *and* ****designed)***, though the writers appeared to select their choices without confirming the grammatical function through the word sketch-filtered concordances. Specifically, ***individual*** collocates with *life* as a possessive adjective, as in an *individual's life*, while ***designed*** occurs with *curriculum* as a verb, as in a *specially designed* or *poorly designed* curriculum, and cannot occur alone as an attributive adjective. Furthermore, these correction attempts suggest that learners are slotting single-word replacements into what should be

collocational sequences, similar to the other two correction cases discussed above (i.e. ***similar** identity* and *hateful **expressions***).

One more cause for these unacceptable word combinations might be due to L1 transfer, as illustrated through the three learner data samples below:

Original collocation error:	*opportunities to **meet** other cultures*
Student's unsuccessful correction:	*opportunities to **touch** other cultures*
Japanese source:	*他の文化に触れる (hoka no bunka ni fureru)*
Appropriate correction:	*opportunities to **experience** other cultures*

Original collocation error:	*Asians have a strong **consciousness** of gender roles*
Student's unsuccessful correction:	*... a strong **ideology** of gender roles*
Japanese source:	*強いイデオロギー (tsuyoi ideorogi)*
Appropriate correction:	*... a* strong **awareness** *of gender roles*

Original collocation error:	*I feel that they **feel** their identity in the situation in which they can share their culture with those who have similar cultural background.*
Student's unsuccessful correction:	*... they **recognize** their identity*
Japanese source:	*[自分の]アイデンティティを認識する (jibun no aidentiti wo ninshiki suru)*
Appropriate correction:	*... they **discover** their identity*

In all of the above cases, the student's correction is a literal translation of the Japanese expression[2]. In the first example, 触れる (*fureru*) means to touch or feel, and within the entry

[2] Resources used to confirm translations included: *Weblio*, *Google Translation*, *Imiwa?* v4.1.2, and Tono, Yamazaki & Maekawa's (2013) *A Frequency Dictionary of Japanese*. Both *Weblio* and *Google Translation* were common resources for learners.

for *fureru* on *Weblio* (a common online Japanese-English resource used by students), the first example sentence is much like the learner's correction: *I was able to touch upon foreign cultures* (an expression that, incidentally, elicits zero concordances from the corpus). The second case, *strong* ***ideology***, is straight substitution from *強いイデオロギー (tsuyoi ideorogi)*, in which *tsuyoi* means *strong* and *ideorogi* is a phonetic transcription of *ideology*, borrowed into Japanese. In the last example, *認識する* (*ninshiki suru*) is translated as ***recognize** in all four of the Japanese to English resources referenced by the researcher[2]. One point common to all of the referencing problems discussed in this section is the tendency for learners to regard their errors as individual words rather than as word pairs. Regardless of the approach – substituting synonyms, mistaking grammatical function, or basing decision on their L1 – the students did not view their errors as part of a linguistic sequence of interdependent components.

6.5.3 Lack of attention to corpus language patterns

Of the 15 collocation corrections that comprise this category, all were addressed by learners through lexical substitution, despite the fact that each case required a certain degree of textual revision or sentence reformulation. The three samples below are representative of the correction attempts in this category.

Original collocation error:	*In each country, people have different way of thinking about the roles of households, and sometimes the different views towards households between couples* ***make** some **conflicts.***
Student's moderate correction:	*... *different views...between couples **arise** some **conflicts***
Appropriate correction:	*... sometimes **conflicts arise** between couples because of different views of household roles.*

In the first case, ***make*** *conflicts* was simply corrected by substituting ***make*** with ***arise*** to form ***arise*** *conflicts*, without taking into consideration the grammatical role of the noun *conflict*, which functions as a subject, not object, when used with ***arise*** as its collocate. However, if the student had made a different choice, such as ***create*** or ***cause*** instead of ***arise*** -- all of which express basically the same meaning when paired with *conflict* -- a simple collocate substitution would in fact have been enough to resolve the error. By choosing ***arise***, the learner made the correction task more difficult because this choice requires more text revision and rephrasing than these other two correction options.

Considering this, it appears that the learner did not reference the usage of the collocation, but only searched for an acceptable combination in the word sketch for *conflict* that conveyed the writer's intended meaning. This lack of attention to collocational patterning in the corpus data is similarly highlighted through the correction attempt below, in which the concordances clearly illustrate that *creativity* primarily functions as the object of ***stifle***, not the subject:

> *Recently, more and more people have been considering how to encourage creativity because creativity is quite effective in achieving success. However, it has been said that school curriculums may* ****make our creativity stifle***

Original collocation error:	*it has been said that school curriculums may make our creativity* ****fall off***
Student's moderate correction:	*...may *make our creativity* ***stifle***
Appropriate correction:	*...may* ***stifle*** *our creativity*

In this case, the student chose an appropriate collocation to convey the negative influence a rigid, test-driven curriculum may have on students, but one more step to verify the grammatical patterning of the collocates would have provided the information necessary to

make a fully accurate correction. The frequency of the [V + N] pattern in the concordances for ***stifle*** *creativity* clearly shows the appropriate usage for the collocation and therefore should have prompted the learner to re-order the verb and its object in their sentence.

A similar tendency is evident in the following data sample as well.

Original collocation error:	*I think parents and children need to build good relationships so as not to* ****pay*** *so much reliance on Internet*
Student's moderate correction:	*...so as not to* ***grow*** *so much reliance on Internet*
Appropriate correction:	*...in order to avoid a* ***growing*** *reliance on the Internet*

Accessing the word sketch for *reliance* and reviewing concordances for the collocate ****grow*** clearly show that *a* ***growing*** *reliance* is by far the most common way to employ this collocate, suggesting that the learner made this correction decision without checking the concordance data. Alternatively, the learner could have selected ***place*** or ***increase*** as corrections, both of which are prominent in the word sketch data, and been able to easily resolve the error through lexical substitution. Thus, even though collocation choices were available that better suited the phrasing of the writers' original lexical contexts, the learners ended up choosing corrections that were comparatively more difficult to employ since they did not take the time to confirm the collocation's patterning.

It could be assumed that these correction attempts involve learners who did not take the time to verify usage and go beyond the minimal level of selecting acceptable word pairs. Although the learners were able to find text-appropriate collocations in the corpus, they did not make use of the concordance data to improve their writing. At the same time, this evidence suggests that there were some learners who paid very little, if any, attention to lexical context in their

corpus research, judging from the fact that they simply substituted another collocate for their error and did not revise their language in a way that reflected concordance-based research. In other words, lexical context did not even factor into the corpus research process, and instead, word pair acceptability and collocation meaning were prioritized over usage.

6.6 Discussion: Phrase and collocation corrections

This section further develops the preceding correction analysis with a discussion of the major factors that influenced the learners' corpus-based error correction efforts with phrases and collocations in particular. The discussion highlights the major patterns that emerged through the analysis and what these findings suggest about the issues learners faced as they referenced the corpus to resolve these types of errors.

6.6.1 Phrase errors and corrections

As discussed earlier in this chapter, the phrase errors tended to be partially-formed multiword sequences that could have more than one error and/or omitted item. Typically, the phrases did not require substantial rephrasing, as most were resolved through lexical substitution or lexical insertion. Based on the parts of the phrase that learners could remember, there was enough language to initiate a search in the corpus.

Errors within these lexical sequences were various, including problems with both content words and function words in almost equal proportion across the 84 phrase errors. This variability in phrase errors offers a perspective on the acquisition of formulaic sequences. Wray (2013: 318) questions whether formulaic language is learned from the top down (i.e. a "filling in the gaps" approach where multiword units are learned incrementally) or from the

bottom up (discrete items developing into unified strings), and based on L1 learner data, has suggested that the unstressed items in a phrase (i.e. “function words”) appear to be acquired later. This supports a top-down approach to acquisition; however, the learner data from this study – although limited – is not consistent with Wray's speculation, given that function word-type errors were not prevalent, and in many cases, the key content word in the phrase was the sole error. Thus, the errors collected for this study suggest that other factors besides phonological influence (i.e. unstressed items) are important to consider in order to identify developmental tendencies, such as orthographical influence or other aspects of multiword unit compositionality. When it comes to correcting these phrases, a corpus can be useful to address such variability since it allows learners to explore multiword sequences in their various forms and contexts and supports them in identifying the phrase patterns and boundaries that define particular sequences.

6.6.2 Collocation errors and corrections

As for collocations, there was a comparatively larger number of verb-based collocation errors (48.7%, N=116), which is nearly double that of the other word classes (nouns, adjectives, or adverbs). This is similar to other studies on collocation usage that demonstrate L2 learners' difficulties with verbs (Chan & Liou, 2005; Liu, 1999; Nesselhauf, 2003). For instance, Nesselhauf found through an analysis of texts produced by advanced German EFL learners that the most common miscollocations were those with incorrect verbs, which she maintains is a consequence of the verb’s narrower, more restricted sense when functioning as a collocate. Liu reports that 87% of the lexical miscollocations in his study were attributed to [V+N] miscollocations and that 93% of these were due to the misuse of verb collocates. Considering the prevalence of collocations with verb problems, the error correction success

rate of 72.4% (N=173) in this study with miscollocated verbs indicates the value of corpus referencing as a tool for addressing verb collocate errors. This degree of success was greatly facilitated by the word sketch collocation summaries in the corpus, which allowed learners to save time and efficiently overview a large number of collocations and explore various correction options. Based on results from the course-final survey, word sketches proved to be the learners' most frequently referenced corpus tool and was recognized by them as a valuable error correction and vocabulary resource (Quinn, 2018).

However, it is possible that the ease of referencing word sketches contributed to the learners' overuse of lexical substitution as an error correction strategy. Of course there were many cases in which replacing one word with another was enough to remedy the error, which is evidenced by the high proportion of collocations that were successfully corrected in this way: specifically, 89% of the 173 successful corrections (as well as 50% of the 84 successful phrase corrections) required little or no text revision. On the other hand, lexical substitution was insufficient for several of the moderate and unsuccessful correction attempts. At times, it appeared that learners were more focused on forming acceptable collocations or phrases than consistently verifying the grammatical or semantic usage of these items through the concordances. To take one of the examples presented earlier in the collocation correction analysis, the student's original expression, ***appetite and passion***, was corrected to *Schools should create an environment where students can explore their* ***desire and passion***, which comes off as too romantic for a discussion of educational curricula. However, this collocation can be used to express great enthusiasm if employed in the following ways, as shown through the corpus concordance samples below (*EnTenTen2013*):

*Describing himself as "web-head", Joe, engages the internet with a **passion and desire** to bring change and new opportunities to his clients*

*After graduating from Kent Institute of Art and Design with a BA Hons Degree, my **passion and desire** to produce images of depth and significance has only increased.*

*These young people are driven by **passion and the desire** to do meaningful work with tangible outcomes.*

*New business owners have **the desire and the passion** to be successful.*

If the learner had noticed the similarities between her intended meaning and the ideas expressed in these concordances, then she could have modeled the structure of her own sentence after these corpus samples in order to use the collocation appropriately for her written context, such as in the following possible text revisions:

*Schools should create an environment where students are driven by **passion and the desire** to do meaningful work.*

*Schools should create an environment where students can develop **the desire and the passion** to be successful.*

Although statistical data-based corpus tools have a wide range of useful applications, when it comes to composing accurate and skillful sentences, learners need to be able to analyze the language of the concordances -- as well as their own language production -- in order to benefit from the contextual features they reveal. As raised in the literature review in chapter three (section 3.3), an important skill for L2 writers engaging in corpus-based error correction is relating the language use displayed in corpus concordances to their own language production in order to notice discrepancies and further their linguistic understanding.

6.6.3 Moderately assessed corrections

Nearly half (44.7%, N=38) of the unsuccessful phrase and collocation corrections showed some improvement through the corpus referencing process and were assessed as moderate corrections, while the remaining correction attempts (55.3%, N=47) were unsuccessful. This stands in contrast to the preposition corrections discussed in chapter five, where the learners' correction attempts were either correct or incorrect. The greater proportion of moderate phrase and collocation error corrections highlights the more complex nature of resolving these types of errors compared to prepositions. With collocations in particular, there is more room for interpretation as there can be multiple options to choose from, each of which may alter the writer's meaning in certain ways. Given the fact that lexical phrases and collocations can take on unified meanings that are different from their individual components, learners must carefully sort through these choices in the corpus data and confirm their understanding.

For the most part, learners were able to make moderate improvements by revising these errors from unacceptable to acceptable combinations, and through the process, they were sometimes able to clarify their meaning from the original error. What prevented these correction attempts from being fully successful was that the learner's collocation choice did not convey an accurate meaning for their written context. It is possible that the learner could not find an appropriate collocation in the corpus and therefore settled for a different meaning for the sake of more accurate usage, or perhaps they could not grasp the unified meaning expressed by the collocation. Although these errors were not corrected to the degree that they would be considered accurate, they do show that referencing a corpus helped learners raise their written accuracy to some extent.

Other cases, however, highlight the learners' lack of skill with corpus referencing, despite more clearly expressing their meaning. For example, there were cases where learners did not manage to form acceptable word pairs, suggesting that they could not find ways to resolve their errors with the corpus and resorted to alternative resources or created their own expressions. In addition, there were instances where a phrase was corrected to the point that it was more complete and recognizable from the original error, but it was still not a fully accurate word sequence.

6.6.4 Learner difficulties and issues

Specific challenges faced by the learners became apparent particularly through analysis of the unsuccessful correction attempts. Overall, regardless of whether the item was a phrase or a collocation, learners made unsuccessful corrections by selecting the wrong word from the corpus data, even though the accurate choice was evident within the same set of corpus data (i.e. the same queried concordances or word sketch). The following three sub-sections explore issues that emerged out of the correction analysis, discussing the factors that led learners to make these incorrect collocate choices.

6.6.4.1 Issues with orthographic mapping

One factor common to both the collocation and phrase corrections that perhaps led learners to select the wrong item from a set of corpus data was orthographical mis-mapping. In some cases, there were orthographical similarities between the learner's original error and the correction, such as revising *****decided*** *curriculum* to *****designed*** when the accurate choice would have been ***standardized*** *curriculum* or revising *chat ****actively*** to *****amicably*** instead of

chat ***easily***. With the correction attempts, the learners seem misled by orthographical or phonological similarities, causing them to select a word based on similar sounds or shapes rather than similar meaning.

Other cases show similarities between the learner's original error and the accurate item that should have been selected, such as the learner correcting *under the* ****superintendence*** to ****auspices*** when the accurate choice would have been *under the* ***supervision***. Here, the original error (i.e. ****superintendence***) is graphically similar to the accurate correction (***supervision***), but when correcting the error the learner went in a different direction and opted for a completely different grapheme, ****auspices***. Other phrase corrections showed similar tendencies in relation to letter patterns, such as *build our* ****stroke*** *of knowledge* instead of ***store*** *of knowledge* or *act on their own* ****intimate*** instead of *their own* ***initiative***, suggesting that the learner perhaps had a mental image of the correct word but identified it incorrectly in the corpus data by confusing it with another similarly spelled word.

This tendency may reflect a developmental stage in orthographical mapping, such as what Ehri (2014) refers to in her "phase theory" to explain the acquisition of sight words in young L1 readers. Orthographical mapping, according to Ehri, is the process of forming letter-sound connections that allow for word spellings, pronunciations and meanings to be bound to memory and "explains how children learn to read words by sight, to spell words from memory, and to acquire vocabulary words from print" (2014:5). Of the four phases Ehri describes (nonalphabetic to partial, to full, to consolidated orthographic connections), the examples above illustrate characteristics commonly found in the second phase, partial alphabetic, where learners link the more salient letters to sounds and use these to help them

read the word. This incomplete rendering of a word is due to limited phonemic awareness and/or grapheme-phoneme knowledge, and confusion of words with similar spellings is reportedly common.

6.6.4.2 Issues with phraseology

Understanding phraseology is not only important for effective corpus referencing, but also important to the error correction process. If learners cannot identify the phrase boundaries of a sequence, then they cannot formulate corpus queries that elicit error-relevant concordances and cannot revise their text appropriately to accommodate the correction. This is precisely the case with the phrase corrections involving negation discussed above, where including the negative particle *not* in the query had a major impact on the search results (i.e. querying *want to be* ***left*** versus *not want to be* ***left***, in which the negated query leads to the accurate correction, *not want to be* ***left alone***). Phraseological understanding is equally important for identifying the collocate(s) of a word and the text it spans, so that in the sentence, *We need to* ***bring*** *a broader* ***perspective*** *to young people,* the student recognizes that ***bring*** and ***perspective*** are collocates and therefore changing one of these words will likely require the learner to change its partner collocate as well. *ColloCaid* (http://www.collocaid.uk/), the text-editing tool mentioned earlier, can support L2 writers in this area, as it not only enables learners to verify the collocates of their language choices, but can also further their understanding of such lexical relationships.

Thus, much the same as identifying which words "belong" to a node word when analyzing concordances (Hunston and Francis, 2000), an important skill in error correction is the interpretation of phraseological patterns so that learners are able to accurately identify which

words are “members” of a particular phrase or sequence. This is equally important for learners to be able to analyze their own language production, enabling them to comprehend their errors and associated lexicogrammatical contexts. As emphasized by Hunston and Francis (2000), learners involved in making observations about such patterning raises their awareness of grammar and suits a consciousness-raising approach to teaching grammar, which in turn encourages the noticing that is essential to the language acquisition process. This suggests that an awareness and understanding of phraseology has implications for the L2 writing classroom, particularly with issues relevant to written accuracy, approaches to error correction, and teacher written feedback.

6.6.4.3 Issues with collocation appropriacy

Often by selecting an incorrect collocate from the corpus data, the learner created a word pair that conveyed a meaning or usage that was inconsistent with their written context. In the majority of these unsuccessful correction attempts, the learner changed a word combination into a recognizable collocation, but the collocation they chose was not suitable, such as revising the miscollocation ***speedy** understanding* to ***immediate** understanding* where ***full*** or ***thorough** understanding* would have been the appropriate choice. In other cases, the learner improved an unacceptable word combination to become an acceptable one, however the correction did not reflect the reader-anticipated collocation for the learner's written context, making it an inappropriate choice, such as correcting ***getting** creativity* to ***boosting** creativity* when the appropriate choice was ***developing** creativity*.

A similar outcome has been reported in other collocation studies as well, where learners have produced collocations that are not appropriate and do not match reader (or listener)

expectations, resulting in language production that sounds “non-native” (e.g. Nesselhauf 2003; Oppenheim, 2000). Most relevant is Nesselhauf’s (2003) study which describes EFL writers’ difficulties using collocations in their writing. She found that the learners’ collocation errors were not a consequence of incorrect word combinations, but of using acceptable word combinations inappropriately, which illustrates the same difficulty demonstrated by the learners in this study. Nesselhauf concludes that to become proficient with collocations, learners not only need to know which words go together but also how to use familiar combinations accurately and naturally in context. This is certainly true of the unsuccessful correction attempts in this study in which learners err not only once in their collocation constructions (i.e. with their original errors), but a second time as well when they are unable to revise the erroneous combination to become both an acceptable and appropriate collocation .

The general success with correcting collocation errors (72.7%) highlights the advantage of corpus referencing as a resource for learners to produce acceptable combinations and natural word sequences in their writing. As for producing collocations that are context-appropriate, perhaps learners require a certain degree of linguistic proficiency and skill with data analysis in order to make productive use of the information a corpus has to offer. For example, revising ***pure** interest* to ***keen** interest* instead of the correct collocation ***genuine** interest* shows a problem with meaning, and although the dictionary defines ***keen*** as eager and enthusiastic, it is possible that the learner still could not comprehend ***keen** interest* well enough to realize that it is not the same as having a ***genuine** interest* in something. Thus, in cases like these, lower proficiency learners are disadvantaged by their lack of linguistic

knowledge, making it more difficult for them to distinguish shades of meaning that will affect how they correct their errors.

Likewise, good data analysis skills are valuable as well. In one unsuccessful case, the student chose the wrong adverb collocate, incorrectly revising the original error ***politely** use* the Internet to ***correctly** use*, despite the fact that ***correctly*** typically indicates proper usage of equipment or implementation of a process rather than online usage or behavior. In order to identify ***appropriately** use* as the suitable collocation choice, the learner would need to conduct a fairly detailed analysis. In cases like these, it is possible that students could not work through the corpus concordances skillfully enough to identify the most appropriate collocation for their context. Considering these factors, at a minimum, a corpus can be a reliable reference for learners to identify natural word combinations, while it also offers rich information on appropriate usage of collocations for those who are linguistically ready to take advantage of such data.

Collocation research has also demonstrated that when it comes to production, L2 learners show a preference for high-frequency combinations over salient ones, whereas the opposite is true for L1 users (Durrant & Schmitt, 2009; Ellis, Simpson-Vlach & Maynard, 2008; Granger, 1998; Siyanova & Schmitt, 2008). This indicates that L2 learners are more likely to employ collocations based on frequency than typicality (i.e. LogDice score) as a factor in determining whether a collocation is suitable or not. In contrast, native L1 users are more attuned to typicality, a factor that distinguishes native from non-native language use and can cause L2 speech or text to sound "non-native." Considering this tendency, a major advantage of referencing a corpus is that it provides learners with data on collocational strength,

particularly through word sketch summaries, enabling them to make decisions about their collocation use based on both salience and frequency. In fact, as reported in the preceding analysis, most of the successful corrections made in this study were selected from top-ranked collocates on word sketches, which summarize and prioritize collocations based on their LogDice scores. With this information readily accessible, word sketches can be an especially useful resource for L2 writers: they allow learners to consider typicality as well as frequency in their collocation decisions, guiding them to make more appropriate choices in their written production.

Inappropriate collocation choices also resulted from the learners' tendency to view a word pair's collocates independently as opposed to a unified chunk of language. Evidence of this occurred in cases where one word in a pair was substituted with a synonym irrespective of its collocate (e.g. ***alike** identity* corrected to ***similar** identity* instead of ***national*** or ***collective** identity*) or in cases where the revised collocation took on a new unified meaning that was left unrecognized by the student (e.g. ***critical** incident* and ***common** misconception* discussed earlier). These unsuccessful cases suggest a translation-based view of error correction, which is at least in part due to Japanese learners' years of experience with the grammar translation approach to foreign language learning. Such an approach places emphasis on discrete items rather than multiword units that can possess their own meanings and patterns. Consequently, Japanese learners are not accustomed to exploring language in terms of lexical sequences and relationships, but instead depend heavily on bilingual dictionaries to deduce meaning (Hirata, 2017).

At the same time, this view of language can lead learners to transfer assumptions regarding lexical usage from Japanese to English. Beckner et al. (2009) discuss the various ways our well-established knowledge of L1 patterns can interfere cross-linguistically, citing evidence of how L1 beliefs can limit our ability to comprehend differences in the L2 and overlook important features. In the current study, this tendency to rely on first language expectations appears to have misled learners to resolve collocation errors with inappropriate word combinations and to choose L1-based substitutes for erroneous collocates, such as correcting ***meet** other cultures* to ***touch** instead of **experience** other cultures*, as well as revising ***feel** their identity* to ***recognize** instead of **discover** their identity*. In these two cases, both the original error and the correction attempt display L1 influence, particularly expectations related to congruency since the combinations are acceptable in Japanese. The mapping of L1 collocations onto the L2 is well documented in the literature, suggesting varying degrees of first language influence on learners' use of collocations as well as the impact of congruency on miscollocations (e.g. Chan Liao 2005; Hemchua Schmitt 2006; Nesselhauf 2003; Laufer Waldman 2011; Liu 1999; Peters 2016). This perspective stands in contrast to an L2-centered orientation in which the learner seeks out collocations that naturally occur in the foreign language, as is done through the referencing of a corpus.

CHAPTER 7. CONCLUSIONS AND IMPLICATIONS

This study explored the role of corpus referencing as an error correction resource for L2 writers and its contribution to improved accuracy in the foreign language writing classroom. By analyzing how learners applied corpus data to their writing in order to resolve their lexicogrammatical errors, factors that facilitated and hindered the success of these corrections were evaluated. Overall, results indicate that although the rates of success in correcting preposition, phrase, and collocation errors were good, further examination of the quality of these corrections reveals that the learners employed a narrow range of correction strategies to address the errors and engaged in a limited degree of corpus data analysis.

Still, the corpus proved to be an effective resource overall for solving these target error types, even though the learners' depth of engagement with the corpus was limited. This implies that even basic corpus use is beneficial for learners and that with clearly defined pedagogical goals, its applications can reach a broader audience than its current "specialist" users. The findings suggest that guiding learners to consult a corpus for the purpose of addressing specific types of language problems helps to make it a practical writing resource for learners, minimizing the significant hurdles that have been reported in the corpus referencing literature.

Based on the error correction analysis conducted, the study reveals several aspects of corpus-based error correction that were challenging for learners and that lend insight into specific linguistic issues L2 writers face in improving their linguistic accuracy. Specifically, the analysis showed that learners had difficulties:

- comprehending the nature of their errors
- parsing the language of the concordances as well as of their own texts, and
- revising their writing based on the patterns discovered in the concordance data.

Importantly, these are factors that are not only necessary to reference a corpus, but also essential for learners to successfully correct their errors, as they both require a good degree of linguistic awareness and critical analysis. Consequently, the linguistic challenges reported in this study offer implications for improving L2 writing pedagogy, particularly in terms of providing learners with better language support throughout the writing process. In order for learners to acquire the self-editing skills they need to address their error tendencies in the long-run, the study's findings highlight the importance of understanding and analyzing lexicogrammatical relations for developing L2 writers.

Based on the research questions posed at the end of chapter three, the study's findings are outlined below and discussed in terms of the implications that can be drawn.

7.1 Research question 1: Corpus referencing versus teacher direct correction

Is corpus referencing a viable alternative to teacher direct correction for lexicogrammatical error types?

At the most general level, ranking success rates for the error types investigated in this study indicates that the more fixed or formulaic the error, the more likely the corpus is to be a useful resource. In other words, the more interpretation that was required to correct an error, the more difficult it was to resolve it through corpus referencing. While this may seem true of error correction overall -- that corrections involving more interpretation are also more difficult to revise -- second language learners tend to make a range of errors in their writing from

relatively "simple" errors in form or structure to problems with meaning that hinder comprehensibility. Less formulaic "interpretive" errors often display problems with meaning as opposed to (or in addition to) problems with usage, and therefore, depending on the nature of the error, may require dictionary referencing to refine or reconceptualize the writer's intended meaning before considering its usage patterns.

As for the lexicogrammatical errors addressed in this study (prepositions, phrases, and collocations), overall success rates are high enough to warrant recommending corpus referencing over teacher direct correction. A further reason relates to learner engagement: researching language problems in a corpus increases learners' involvement with their errors and requires greater participation in the error correction process. With a lack of alternative approaches offered in the L2 writing literature for responding to such "untreatable" errors (particularly preposition errors), corpus referencing appears to be a better option, when appropriate, than teacher-centered direct correction for item-based language problems.

In particular, the more responsibility students can assume, the more likely it is that they can benefit from corrective feedback, given that a major goal of such feedback is to develop the learners' ability to manage issues with linguistic accuracy beyond the classroom. At the same time, transferring greater responsibility to students promotes a learner-centered view of error treatment, indicating that the learner, rather than the teacher, is primarily accountable for correcting errors in the students' texts. Therefore, rather than continuing to focus on teacher feedback as the primary means to convey accurate usage of untreatable errors to learners, the success rates suggest that corpus data may be a better learning resource than corrective feedback, at least for the error types investigated in this study.

7.2 Research question 2: Correction analysis patterns per error type

What linguistic patterns and correction tendencies emerge through analysis of the learners' corpus-referenced error corrections?

7.2.1 Preposition omission and error corrections

Of the three error categories investigated in this study, the prepositions were most successfully corrected. This success is in part due to the corrections involving many high frequency preposition combinations, as their patterns were prominent in the corpus data. Often there was only one appropriate preposition choice for a given lexical context which could be directly substituted into the learner's original sentence without rephrasing, making it a simple correction task compared to the other error types. The fact that the preposition corrections were clearly successful or unsuccessful with almost none assessed as moderate highlights the straightforward nature of resolving this error type through corpus referencing.

Frequency alone, however, does not imply that a preposition is "correctable" with a corpus; other factors contributed to learners' success in this area as well. For example, the relatively limited patterning of prepositional phrases helped learners identify relevant concordances. In addition, the specific lexical context of a given preposition problem could be queried through a PoS (part of speech) corpus search, meaning that in many cases the learner could enter their exact language into the corpus and find appropriate solutions to their incorrect prepositions, a feature that proved to be very useful. Overall, the preposition corrections analysis demonstrates that resolving omissions and errors is generally effective through corpus research, and at the same time, not difficult for learners to undertake.

7.2.2 Collocation error corrections

With collocation errors, the greatest advantage of referencing the corpus was that it enabled learners to revise unacceptable word pairs into acceptable collocations. This was largely accomplished through the use of word sketches, which summarize a given word's collocates according to grammatical function and provide information on collocation frequency and typicality (i.e. strength of association). With this corpus tool, accurate collocations could be quickly identified, greatly reducing the time needed for research compared to analyzing the unfiltered concordances generated by basic queries. Furthermore, word sketches not only offered students a set of acceptable collocations to draw from when making a correction, but also proved useful for supporting the discovery of more precise lexical choices, enabling learners to refine their meaning through the error correction process. These successes highlight the advantage of corpus referencing for supporting learners' use of acceptable word combinations in their writing, as a corpus is capable of illustrating which words can and cannot combine to form natural sequences.

The majority of these successful collocation corrections were accomplished through straight lexical substitution and with minimal rephrasing, meaning that the learner's correction task was focused on finding a collocate that expressed their intended meaning more naturally and appropriately than the original error. Taking all of the successful collocation corrections into consideration (N=173), learners could find accurate substitutes for 70% (N=121) of these errors through word sketches. This rate highlights the effectiveness of this corpus tool for learners, while it also reveals how basic many of their collocation errors tended to be. For the most part, students were simply not aware of the collocates for their language choices. This

finding shows that if provided with collocation-specific language resources such as word sketches, many collocation problems can be easily remedied by learners independently.

On the other hand, nearly half of the unsuccessful collocation and phrase corrections were assessed as moderate improvements, which demonstrates the increased difficulty in resolving these error types compared to prepositions. Although not fully successful, moderately assessed corrections were revealing as an outcome category in that they showed concrete evidence of the learners' linguistic limits, illustrating in what ways learners were capable of improving upon their language use and which aspects of the correction process remained problematic.

Specifically, the correction analysis conducted indicates that learners were able to improve their collocation use in two main ways: (1) by correcting unacceptable word pairs to acceptable collocations; and (2) by clarifying the meaning of their expressions through revised collocate choices. Based on the study's data, both of these improvements enabled learners to communicate their ideas more clearly compared to the original errors. However, despite being able to form recognizable collocations, these moderate corrections did not reflect the learners' originally intended meaning with full accuracy. This suggests that, in these cases, they could not find a collocation that was appropriate for their written context and therefore had to sacrifice meaning for accurate usage, or they possibly misunderstood the unified meaning of the collocation, leading them to choose an inappropriate word pair. These issues are discussed in more detail below, but for the time being, they demonstrate how the analysis of partially corrected errors provides insight into the complexity of learner language and the range of factors affecting their correction choices.

7.2.3 Phrase error corrections

Although fewer in number than either the preposition or collocation error types, phrases also showed a good rate of success with error correction. With many of the errors caused by incorrect or omitted phrase components, learners needed to substitute, insert, and/or rephrase the sequences to create accurate expressions. Half of the error corrections were made through lexical substitution (50%, N=32), indicating that many phrase errors were partially-formed sequences that did not require substantial rephrasing.

With the basic structure of the phrase in place, learners were able to formulate corpus queries through PoS and wild card searches. In most cases, they could recover the erroneous or omitted parts of a given phrase based on the items they were able to recall. This ability to formulate searches based on partial expressions proved to be a major advantage of corpus referencing, as it is difficult to locate partially-remembered phrases in other types of reference resources.

On the other hand, if the phrase was not a frequent, recognizable sequence, it could be difficult to retrieve the full phrase from the corpus due to a lack of relevant data illustrating the patterning of the phrase. This highlights the importance of using large corpora for error correction purposes so that there is enough data readily available to support the range and diversity of language that learners need to reference.

7.3 Research question 3: Learners' application of corpus data to their writing

What factors influence the learners' ability to correct their errors through corpus referencing? In other words, what do the findings from the correction analysis imply about how learners make use of corpus data in their writing?

Across the three error types (prepositions, collocations and phrases), the primary reason for an inaccurate correction was the learner choosing the wrong item from the corpus data, even though the correct choice was available on the same page or within the same set of data. This points to difficulties with corpus data analysis, and there were specific factors that impeded the success of the error corrections and that can be traced to learner misconceptions regarding language use and lexical relationships.

With collocation corrections, for example, learners often selected acceptable but inappropriate word combinations that did not suit their original context, revealing that they did not understand the meaning of the collocational unit. This outcome is also reported in the literature on collocation learning (e.g. Nesselhauf, 2003), which shows that learners can have difficulties understanding collocational pairs and sequences. Based on the analysis in this study, some of the corrections in the unsuccessful cases would have been difficult to elicit the meaning through concordance review. Therefore, for cases such as these, learners should supplement their corpus research with other resources that instruct more explicitly on collocational meaning in order to confirm their understanding.

There was also evidence of learners treating collocations as independent words rather than as lexical units, such as when students substituted the erroneous collocate with a synonym (e.g. ***alike** identity* to ***similar** identity* instead of ***national** identity*) or when they mistakenly chose a collocation based on the meaning of its individual parts, not recognizing that its unified

meaning was different (e.g. ***critical*** *incident*). Considering word combinations as two discrete items rather than as unified sequences is consistent with Japanese learners' translation-driven approach to learning English, reflecting a transfer of their L1 views and assumptions (see Beckner et al., 2009). In a few cases, this influence of first language was evident to the extent that learners made corrections that were not only inappropriate in terms of meaning, but also unacceptable combinations (e.g. revising ***meet** other cultures* to ***touch***). Despite how easy it would have been to verify the acceptability of these word combination with the corpus, the learners nonetheless resorted to creating their own expressions based on their L1 expectations.

With lexical phrase corrections, some of the erroneous sequences were negatively influenced by orthographical factors, such as cases where the writer was misled by graphemic (or phonological) similarities between their error and its incorrect revision (e.g. selecting the correction *act on their own* ***intimate*** instead of ****initiative***). These are interesting in that they reveal aspects of the learner's developing interlanguage, demonstrating at what level the learner is processing the expression (e.g. non-alphabetic, partial alphabetic, consolidated, etc. as outlined by Ehri, 2014), and what kind of compensatory strategies are being employed to make up for their lack of linguistic knowledge.

In addition, there was evidence that a lack of phraseological awareness could limit the learners' success with their corrections. For instance, revising phrase errors could be problematic because learners misinterpreted the boundaries of a lexical sequence, a tendency that has been cited elsewhere (e.g. Bishop, 2004; Osborne, 2008). This, in turn, can lead to broadly-defined corpus queries that elicit irrelevant concordances and result in large amounts of data to review. As an example, the noun ****points*** in the phrase *in some* ****points*** cannot be

easily corrected without extending the phrase boundary to the left to include *similar in some [+ **N**],* which allows the learner to recover the accurate correction *similar in some **ways**.* With collocations as well -- particularly non-adjacent pairs -- learners could find it difficult to identify an erroneous word's collocate: a consequence of not recognizing the parameters of a phrasal unit or of not understanding how the words in the immediate context fit together. In the following sentence, for example,

> *The author believes that when students are given some tasks and they just ***obey** them, they cannot be creative*

the verb ****obey*** is incorrect, but if the student cannot identify *task* as its collocate, then he cannot formulate a query that will elicit error-relevant concordances. This difficulty in analyzing lexicogrammatical relationships is also addressed by Tono et al. (2014), who advise that for certain errors learners need more support to understand the cause of the language problem in order to identify which word in the sentence should be used to search the corpus. Likewise, Vannestal, and Lindquist (2007) identify query formulation as an aspect of corpus referencing that students found particularly challenging and that therefore require teacher guidance and support.

Such difficulties highlight the importance of phraseological awareness not only for successful corpus referencing, but also for successful error correction. In order for learners to accurately revise their writing, they must be able to analyze their own language production as well as the language samples supplied by the corpus. As Hunston and Francis (2000) point out, identifying a node word's lexical relationships when analyzing concordances is much the same as interpreting phraseological patterns when correcting errors: both require learners to identify which words are relevant to the construction of that phrasal component and which are

not. Thus, accurately identifying phrase boundaries and relevant collocates are language analysis skills that impact both the corpus referencing and error correction process. When correcting an error, for instance, the learner must consider the phrasing of their original context to formulate a corpus query, analyze the resulting data in terms of what patterns they find, assess whether these patterns are consistent or not with their original expression, and then finally, determine whether they need to adapt their original text or not. As writers moves back and forth between their text and the corpus, phraseological matters become explicit as they observe how a lexical item's patterning changes in response to the various correction options they are considering.

With such difficulties shown in interpreting lexical relations, it is not surprising that it was challenging for learners to apply the data patterns found in the concordances to their writing. Many studies and discussions on corpus referencing have made mention of this issue, particularly in relation to the inductive abilities required for learners to extract linguistic information from the concordances and apply it to their writing (e.g. Frankenberg-Garcia, 2012b; Gavioli, 2001; Sun, 2003; Vannestal & Lindquist, 2007). In the current study, this challenge was evident through the partial correction of phrase errors, in which the original error was improved upon through corpus research but not fully corrected since the writer did not apply certain aspects of the phrase's patterning accurately. For example, the erroneous sentence **creativity* ***has interests in*** *various areas* was corrected by the learner to ****effects on*** although the phrase should have been revised to *creativity* ***has an effect on*** *various areas.* Even though the omitted ***has*** was present in the original (erroneous) expression, it was dropped during the correction, while other aspects of the phrase were also not accurately transferred. In another case, the sequence **30 years ago* should have been expressed as ***over***

the last *30 years,* but instead was revised to ****over last*** *30 years* ***ago****,* mistakenly omitting the article ***the*** and retaining ***ago*** as part of the corrected phrase. As this last example shows, both data analysis and data application are complex issues that can easily complicate the error correction process and cause learners to overlook apparently simple revisions to their texts. Thus, considering the language analysis skills that are common to both corpus referencing and error correction, phraseological competence is a key factor for success in both areas.

Beyond the specific difficulties encountered by the learners in this study, even if students cannot successfully correct their errors, the experience they accumulate through corpus referencing affords them the opportunity to redefine their views on language and to reach a better understanding of lexicogrammatical relationships. As shown in Yoon and Jo's 10-week case study, learners were able to address their misconceptions through corpus research, making it an effective approach for "restructuring learners' errant knowledge about language use" (2014: 96). With results from the current study illustrating that the learners' narrow view of language sometimes interfered with their correction attempts, long-term experience with corpus referencing has the potential to extend beyond the correction of individual errors to educating learners more broadly on the patterned nature of language. In this way, corpus-based error correction offers an alternative approach to addressing language use in the writing classroom (Gilmore, 2009; Sun, 2003; Yoon & Jo, 2014), and in particular, promotes a phraseological perspective on the lexical choices that learners make, illustrating how the lexical relationships that underlie these choices impact their writing.

7.4 Overall conclusions

By examining the learners' error corrections both quantitatively in terms of outcome category and qualitatively in terms of individual process, this study provides detailed insight into the nature of corpus-informed learner language use. This dual research perspective reveals aspects of the error correction process that are not evident in other research in this area, which for the most part, has focused on the success rates of various error types. While the current study reinforces the general assumption that error type is an important factor to successful corpus referencing, the findings further imply that the degree of interpretation necessary to resolve a particular error also impacts the learner's success.

Specifically, the more fixed the patterning of an error, the more successfully it could be addressed by the learners. This outcome is a consequence of factors related to the corpus referencing process, where researching more formulaic language involves more straightforward search methods, produces more salient patterns in the corpus data, and results in fewer correction options overall. In contrast, when researching corrections that display greater variability in patterning, the process becomes more interpretive, and therefore more demanding, as the learner must distinguish the usage of various correction options. This research outcome highlights the fact that error types which tend to be less fixed will involve more interpretation overall, from data analysis to data application, thus requiring more skill from the learner. Therefore, the interpretative demands placed on the learner for a given type of error are an important factor to consider in corpus-based error correction tasks.

The study also revealed that the successful corrections tended to be local errors corrected through lexical substitution and word combinations that did not entail much rephrasing of the

learners' original written context. On the other hand, unsuccessful correction attempts involved less predictable language and were therefore more complex to correct, requiring learners to notice a number of linguistic features in the corpus data and apply these features accurately to their writing. Through the study's correction analysis, it became apparent that learners tended to analyze the corpus data vertically, looking for words that could replace their erroneous items, which demonstrates a paradigmatic approach to data analysis. In contrast, corpus linguists are primarily concerned with syntagmatic relations, reviewing concordances horizontally to explore the phraseology and preferences of specific lexical items (Flowerdew, 2009). As language examples to support learners' production, corpus data highlights collocational and colligational behavior, providing input that raises the learners' awareness of morphosyntactic and distributional properties, helping them to achieve accurate usage (Frankenberg-Garcia, 2014). However, in this study, rather than examining the co-text of the error corrections in order to identify alternative means of expression, the learners' approach was more like a writer referencing a thesaurus to find alternative word choices.

This outcome reveals the limits of the learners' data analysis skills, illustrating to what degree they were able to explore the language of their correction options, while also revealing the demands placed on their linguistic abilities. Phraseological analysis is known to be extremely challenging for foreign language learners (Lenko-Szymanska, 2014; Wray, 2002), making the application of such patterning to the learners' own language production at least equally as difficult. A case in point is the test-based assessments in Jones and Haywood's (2004) study that showed learners could improve their awareness of formulaic sequences and their ability to produce such phrases in controlled situations, but when it came to using these phrases in their own writing, no overall improvement was shown. In another study, Frankenberg-Garcia

(2012a, 2014) assessed how well students could make use of corpus-based examples, and to do so, distinguished between learning purposes: referencing examples for decoding the meaning of an unfamiliar word versus producing (i.e. encoding) the usage patterns of a familiar word. When it came to production, the availability of multiple corpus examples helped learners correct the use of words that they understood but often misused, thus reinforcing the value of data-driven learning. However, as the author notes, this success was partly facilitated by the error-relevant data provided to the learners by the researcher. This highlights the fact that for learners referencing corpus examples on their own, a critical juncture is their ability to isolate error-appropriate examples that will enable them to make use of the language data.

Despite the learners' apparently narrow use of the corpus in the study, they do in fact engage a number of important skills -- skills that are fundamental not only to corpus research, but also to their growth as writers. Students learn to formulate queries based on their individual errors, to sort data in terms of its relevance to their errors, and to make linguistic decisions that are appropriate to their texts. Such skills are important for using most any reference tool or technology, as they require learners to understand the linguistic features of their written context well enough to be able to make use of the language resource. At the same time, developing learners' language analysis skills challenges them to critically assess their own writing and to reflect on their linguistic choices, both of which are essential to successful writing.

To develop these skills, the results of the current study highlight the importance of narrowing correction tasks to specific error types and contexts in order to make corpus-based error

correction manageable for learners. The intermediate learners in this study were not familiar with many high-frequency, salient word combinations, and with the corpus they could efficiently research potential corrections, allowing them to test their linguistic hypotheses (Gilquin & Granger, 2010). For these learners first experiencing corpus referencing, researching high-frequency vocabulary benefitted them the most in terms of their efforts. A similar conclusion has been reported by Liu and Jiang (2009), who found that their learners particularly benefitted from exploring high-frequency lexicogrammatical items that have multiple meanings or functions as opposed to single-definition items that are less common. For these reasons, advising learners to consult a corpus for confirming appropriate language use can contribute to a positive and successful first experience, demonstrating that even basic corpus research has much to offer learners.

Moving beyond this basic level of corpus research to examine syntagmatic relationships encourages learners to view their lexical choices as members of fuller phraseological units and to identify their associated meanings and usage patterns. In the current study, the difficulty of this type of analysis was particularly evident with the moderate phrase corrections, to which learners could make some improvements on their errors but were not able to transfer the patterns from the data to their own text with full accuracy. Even though they were able to identify the error-relevant data, the learners were not able to manage the layers of correction necessary to completely resolve the problem. These partial corrections illustrate the challenges of attending to several aspects of a particular pattern for learners in order to make accurate use of it in their writing, demonstrating that error correction at the phraseological level quickly becomes difficult.

Considering the widely reported challenges of corpus research, placing inappropriate demands on learners who are new to corpus research will only increase these difficulties, effectively discouraging long-term use of corpora beyond the initial classroom experience. In all likelihood, this is at least one reason why corpus technology has not been adopted by teachers or learners on a broader scale: requiring learners to take on substantial data analysis without adequate scaffolding or referencing experience does little to build confidence and sustain motivation. Certainly, the medium itself is an issue to contend with, considering that corpus systems are typically designed by researchers for researchers. However, regardless of what improvements are made in the technology to create more accessible resources for learners, the data interpretation and application skills that are central to data-driven learning do not change: learners must be able to make use of instructive examples in order to improve their written accuracy. With the corpus's main advantage being a phraseologically instructive one, learners need to be able to make use of language samples in order to exploit its unique capabilities for the benefit of their written accuracy.

To this end, providing focused feedback on specific, corpus-appropriate error types is essential to making the referencing process manageable for learners. Providing error feedback in a selective, principled manner can be a useful means for addressing the reported challenges associated with DDL, as it guides learners towards more effective corpus use and thereby creates more opportunities for successful referencing. With many of the corpus-based error correction studies involving comprehensive error feedback (or at least a wide range of errors), the learners essentially become responsible for narrowing the error correction task themselves, which requires them to interpret search results across various lexical contexts. In contrast, teachers who judiciously select errors through focused feedback are supporting

learners in taking advantage of the benefits corpus referencing has to offer. In this way, corpus-based error correction may be a useful first step into corpus research, particularly for learners who bring little experience with an analytical approach to language study. The results of this study underscore the basic skills necessary for conducting more extensive data analyses, while at the same time, these skills are fundamental to a range of aims and purposes across language use, writing development, and referencing capabilities.

7.5 Pedagogical implications

For student writers, learning to analyze language use and apply language examples to their own production is an essential part of becoming a good writer in a foreign language. For this reason, further discussion in the L2 writing literature regarding student-centered approaches to language instruction is important to move pedagogy in a direction that better supports the language needs of developing L2 writers.

As a starting point, phraseology needs to be explicitly addressed in the writing classroom, bringing more attention to language use overall as well as more individual support to L2 writers. Coxhead and Byrd (2007) discuss the often tenuous role that language instruction has played in L2 writing classrooms as teachers who are primarily responsible for teaching composition must also somehow raise their learners' linguistic competence to the level necessary for carrying out academic writing tasks -- an arguably common learning situation. The phraseological analysis that underpins corpus research enables teachers to present data patterns as input to learners in order to raise their awareness of language patterning, which as Hunston and Francis (2000) point out, is most effectively accomplished when it is driven by the learners' own observations. Corpus-based error correction encourages such self-reflection

of linguistic behavior since it requires learners to have a clear understanding of the interdependence among individual words that bind sequences together and to recognize how revision will necessarily alter these lexical relationships. Therefore, writing instruction that makes it a priority to explore the phraseological aspects of class readings, model texts, and learner writing can make strides towards heightening awareness and guiding students to analyze their own language choices in terms of their phraseological patterns and constraints.

Although an understanding of phraseology is critically important to skillful writing, foreign language learners have great difficulties recognizing and incorporating these insights into their own language production, as discussed earlier. To tackle such difficulties, Liu and Jiang (2009) make a number of concrete suggestions. Based on their study that integrates corpus-based lexicogrammar into ESL and EFL teaching contexts, one recommendation is to first engage students in deductive-oriented analysis tasks, in which learners might find evidence for a familiar grammar rule. This addresses the first stage of corpus data analysis, identifying rule-relevant examples in the data, and supports the more challenging inductive analysis to come as learners move from the discovery of familiar to unfamiliar areas of language use. They also found that plenty of instructor modeling of corpus searches combined with student hands-on experience was important, as well as opportunities to conduct research together in groups and share perspectives on their data. Activities such as these bridge the gap between deductive and inductive approaches to language analysis and help to "acculturate students into the corpus way of looking at language from a phraseological perspective" (Flowerdew, 2010:452).

To address the methodological challenges of integrating corpus research into learner contexts, Braun (2007) discusses the necessity of combining typical corpus-linguist exploratory techniques with other methods that are appropriate for language learners in order to maintain a focus on practicality. One of these "other methods" could be envisaged as corpus-based error correction: referencing individual errors enables learners to conduct purposeful research as they work within a specific lexical context, focusing their efforts and delimiting the research task. Furthermore, as was done in the current study, teachers are able to grade the correction task for the learner through their written feedback by designating which errors are suitable for corpus referencing or by providing learners with linguistic support to guide their corpus research.

For learners, the corpus-based error correction process draws their attention to differences between the language samples of the concordances and of their own writing, encouraging them to act on these discrepancies by conducting more extensive research. An example of this kind of prompting is illustrated through one student's correction, as noted in the research journal kept for this study, who wrote:

> *To comply with the Children's Online Privacy Protection Act, social media companies set up rules against under-age users. However, it is not realistic that the rules are* ****obeyed.***

In trying to correct the collocation ****obey*** *rules*, the writer deliberated between ***enforce*** *rules* and ***follow*** *rules*. Reviewing the concordances showed that *enforce* often occurs in the passive voice, as expressed in his original sentence, while *follow*, like *obey*, often occurs in the active voice with animate subjects. The student further noted that *enforce* tended to occur with subjects like *department*, *court*, or *law*, similar to the usage in his own context, all of which

helped him to make an accurate correction. In this way, narrowly-defined error correction tasks can prompt learners to identify what information they need to resolve an error by encouraging them to act on their doubts or self-evident gaps in linguistic knowledge.

7.6 Limitations of the study

Generally speaking, the strength of a study lies with the strength of its researcher, and this is especially true with qualitative research. The findings generated through qualitative analysis depend on the researcher's interpretive skills and are inevitably influenced by that person's beliefs, assumptions, biases and personal idiosyncrasies (Dornyei, 2007). As Dornyei (2007) further describes it, the researcher is essentially the instrument, with data analysis a product of his or her subjective sensitivity, experience, and training. In this study, although various sources and approaches to data analysis were employed to address these issues, the findings are based on the views and experiences of one teacher/researcher and one class of learners.

More specifically, interpretations of the learners' difficulties with corpus referencing were informed by student self-reported correction logs, the teacher's corrective feedback, and her own corpus research to trace the learners' referencing paths. Bringing this information together to interpret the learners' challenges engaged the researcher's experience with essay feedback practices and with corpus research, required an understanding of the students' L1 and English language learning backgrounds, and involved consideration of the course instruction, among other sources of knowledge and experience. In contrast to direct observation, the researcher had to make assumptions based on these various indirect sources and drew conclusions that reflected her experiences and personal views.

Likewise, as is typical of classroom-based research, the findings may be viewed as limited in that they cannot be transferred to other contexts because they represent a specific group of students. McKay (2006) discusses this issue of generalizability as a continuum of control and structure in research, suggesting that in comparison to quantitative research, less controlled, less structured qualitative studies leave the readers responsible for determining how relevant or applicable the results are to other contexts. In other words, whatever a researcher has gained from conducting an authentic classroom investigation, this increased understanding also provides insights for others as well (Allwright & Bailey, 1991). In the current study, for instance, although the limited degree of corpus concordance analysis and difficulties with phraseology were issues for this particular group of learners, these findings may resonate with other teachers in different learning contexts who will find them relevant. With the aim of qualitative research to describe "the aspects that make up the idiosyncratic experience rather than determining the most likely or mean experience within a group" (Polkinghorne, 2005), local research contexts are intended to be instructive rather than representative.

7.7 Directions for future research

As raised above in the research limitations, this study does not involve direct observation of students correcting their errors with the corpus since it aimed to maintain the integrity of the classroom and to avoid deliberate intervention. However, research that can capture L2 writers' referencing of corpora to address their language problems would add a valuable perspective to how learners engage in corpus referencing, how they treat their errors with corpus data, and what these approaches reveal about their understanding of language use. More generally, this could contribute to an understanding of how learners develop their writing skills through the

error correction process and what leads developing writers to revise their language use in certain ways.

With error correction having been addressed in the field of L2 writing largely in terms of error feedback practices and their degree of effectiveness, research on learners' written accuracy can move forward by devoting more attention to learners' language needs as opposed to teachers' corrective concerns. In many writing classrooms, learners have been given relatively little responsibility regarding written accuracy, which does not support development of the language skills that are needed to write well. By investigating the use of resources that instruct learners on language use and create opportunities for them to explore their own language choices, the L2 writing classroom can move towards better meeting the language needs of individual student writers. In particular, incorporating lexical issues into discussions of error and written accuracy, such as lexical patterning and phraseology, would elevate the role of language in L2 writing classrooms and highlight its importance to the writing process, thus addressing the current imbalance reported in the literature (e.g. Cortes, 2019; Polio, 2019; Turner, 2004).

Individual writers could also be better supported by research into the use of corpora to prevent error or at least to anticipate error, aside from using it in response to teacher-designated language problems. For example, investigating the use of corpora for learners referencing concordance data during the composing process to confirm their language choices with corpus data would expand the role of corpus referencing for student writers, making it a more useful resource beyond the classroom.

As for the corpus referencing literature, corpus-based error correction research could be investigated more broadly as a means of developing learners' language analysis skills and phraseological competence, rather than whether the use of corpus technology results in accurate error corrections, as quantitative assessments have tended to do. Instead, a complementary research approach might be to question in what ways does corpus referencing support learners in developing the critical language analysis skills to make them more accurate, linguistically effective writers. Although previous research has illustrated the potential of corpus referencing, how to develop these skills through the productive use of the technology has been less examined.

Finally, a major issue in the field has been the reluctance of practitioners to adopt corpora as pedagogical resources for their students. Given the complexity of corpus research and the challenges to incorporate it into a language skills curriculum, better defining the role of corpus referencing in the classroom is essential in order to encourage the participation of non-corpus specialists. To this end, corpus researchers need to respond to the questions that teachers have and the pedagogical issues they face in order to narrow this reported gap (Chambers, 2019). As in this study, corpus referencing was only one task out of many that had to be attended to during the writing process, and research that takes the various factors and objectives of the writing classroom into consideration would be particularly useful, demonstrating ways to introduce corpora that are manageable for both teachers and learners.

For these reasons, applied research that aims to address the classroom issues practitioners face and that takes place within authentic classroom contexts would contribute to providing more directly relevant guidance to teachers. For example, research conducted by practitioners who

have introduced corpus referencing to their learners can offer insight into the practical, hands-on use of corpora for student writers, particularly in conjunction with other reference resources that help learners meet the linguistic demands of their writing tasks. Such an increased attention to classroom-focused research could generate more interest in the area, encouraging its use, both as a practical and feasible learner resource. In these ways, research that supports practitioners to use corpora wisely in the classroom can help them cope with the reported barriers and make progress towards developing corpus referencing into a mainstream pedagogical activity.

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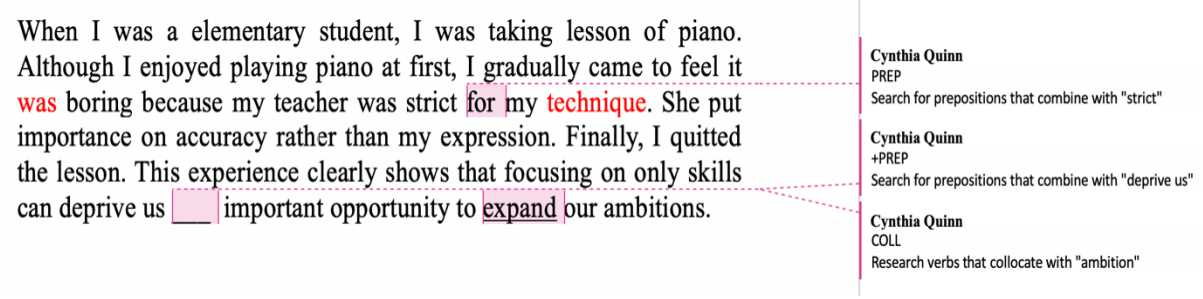
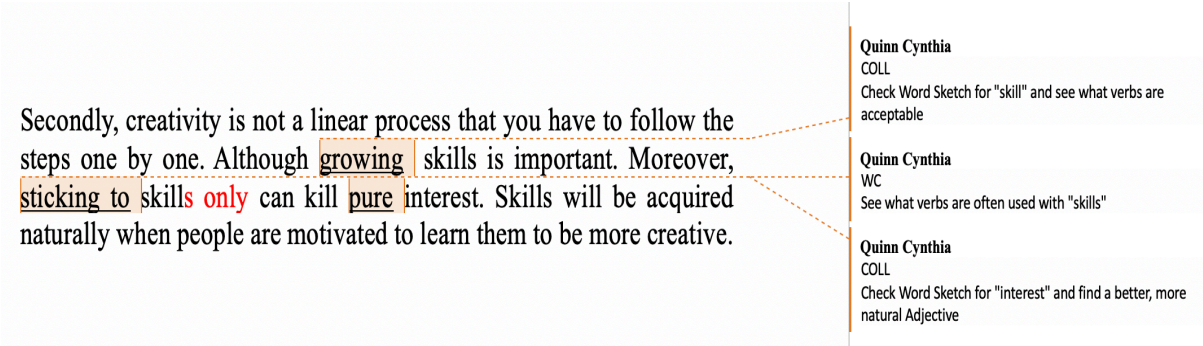
APPENDICES

Appendix A. Sample teacher error feedback





Appendix B1. Student essay data: Number of errors collected and text lengths (overall)

	Essay 1		Essay 2		Essay 3	
	Errors	**Word count**	**Errors**	**Word count**	**Errors**	**Word count**
Total	335	25530	406	26852	402	25507
Average	14	1064	17	1119	17	1063
Minimum	10	826	12	626	12	714
Maximum	18	1346	20	1424	20	1442

Total errors (Essays 123)	**Total word count (Essays 123)**
1143	105,682

Appendix B2. Student essay data: Number of errors collected and text lengths (per student)

	Essay 1: International Relationships		**Essay 2:** Creativity		**Essay 3:** Children and Social Media	
Student number	**N of errors**	**Text length (original):** word count	**N of errors**	**Text length (original):** word count	**N of errors**	**Text length (original):** word count
1601	16	1170	15	1241	14	1201
1602	16	922	19	1156	12	1100
1603	13	1197	18	1050	18	945
1604	12	826	17	960	16	735
*1605	12	984	19	845	15	748
1607	15	1157	20	1151	18	1033
1608	12	976	12	1210	15	1232
1609	13	1346	16	1310	19	1200
1610	15	1218	17	1336	16	1161
1611	14	957	17	946	19	933
1612	11	878	14	1083	16	944
1613	15	1075	16	1166	12	1096
1614	13	1194	18	1135	18	1108
1615	14	1256	16	1424	20	1442
1616	17	943	12	626	16	714
1617	12	1253	18	1125	19	1116
1618	16	1058	19	1352	20	1351
1619	16	954	18	979	16	987
1620	10	905	15	918	12	863
1621	14	1159	20	1251	20	1324
1622	12	1027	16	1140	13	920
1623	18	928	19	913	19	1030
1624	14	1001	16	1282	19	1244
*1625	15	1146	19	1253	20	1080

* Student data for 1606 and 1626 were eliminated from the study due to incomplete assignments.

Appendix C: Sample student correction log

Student Name: _____

Please report which reference tool you used to help you correct the highlighted errors in your paper.

Comment Number	Error Code	Essay Error (*highlighted in paper*)	Your Correction	Which resource helped you correct this error? Please circle.
1				Corpus Dictionary No resource Other resource: _____
2				Corpus Dictionary No resource Other resource: _____
3				Corpus Dictionary No resource Other resource: _____
4				Corpus Dictionary No resource Other resource: _____
5				Corpus Dictionary No resource Other resource: _____
6				Corpus Dictionary No resource Other resource: _____
7				Corpus Dictionary No resource Other resource: _____
8				Corpus Dictionary No resource Other resource: _____

Appendix D. Student background survey
(translated from the Japanese version administered)

English Writing and Reference Tools Questionnaire

Thank you very much for your participation in this study. This questionnaire gathers information on your computer use as well as what English resources you use and how you use them when writing in English.

Background Information

Age:

Gender:

Native language

Grade: Undergraduate 1 2 3 4

Graduate

Major:

Computer Usage

1. Overall, do you like to use a computer? Yes / somewhat / no
2. Do you have Internet access at home? Yes No
3. How often are you online via your cell phone/smartphone?

   almost every day (5) / 3-4 times per week (4) / once a week (3) / once a month (2) / rarely (1)
4. How often do you use a computer for school work? (e.g. writing an essay, doing homework)

   almost every day (5) / 3-4 times per week (4) / once a week (3) / once a month (2) / rarely (1)
5. How often do you use a computer for personal purposes? (e.g. emailing)

   almost every day (5) / 3-4 times per week (4) / once a week (3) / once a month (2) / rarely (1)
6. About what percentage of your online access is conducted in English?

   almost none (1) / 10-30% (2) / about half (3) / 60-80% (4) / over 80% (5)

Writing Reference Tools

Think about how you write in English. This includes written homework as well as personal written communication. When you are unsure about English vocabulary or grammar to express your ideas, what do you do?

1. If you are unsure about English vocabulary or grammar, how often do you use Internet search engines (e.g. *Google* or *Yahoo*)?

   never (1) / rarely (2) / occasionally (3) / sometimes (4) / frequently (5) / always, usually (6)

   1.1 Do you do these Internet searches in English or Japanese?

   English (1) / Japanese (2) / both (3)

2. How often do you use online translation sites (e.g. *Google*, *Weblio*) to help you write in English?

   never (1) / rarely (2) / occasionally (3) / sometimes (4) / frequently (5) / always, usually (6)

   2.1. Which site(s) do you use? _____

3. When writing in English, how often do you use a portable electronic dictionary?

   never (1) / rarely (2) / occasionally (3) / sometimes (4) / frequently (5) / always, usually (6)

4. How often do you use online dictionaries?

   never (1) / rarely (2) / occasionally (3) / sometimes (4) / frequently (5) / always, usually (6)

   4.1. Which site(s) do you use? _____

5. How often do you use English-English monolingual dictionaries?

   never (1) / rarely (2) / occasionally (3) / sometimes (4) / frequently (5) / always, usually (6)

6. How often do you access smartphone apps for English referencing purposes?

   never (1) / rarely (2) / occasionally (3) / sometimes (4) / frequently (5) / always, usually (6)

   6.1. Which apps do you use? _____

7. How often do you use Microsoft Word's spellchecker or grammar checker?

   never (1) / rarely (2) / occasionally (3) / sometimes (4) / frequently (5) / always, usually (6)

8. How often do you use a thesaurus to help you with English vocabulary? (online or paper)

   never (1) / rarely (2) / occasionally (3) / sometimes (4) / frequently (5) / always, usually (6)

9. When you are unsure about grammar, do you use a grammar book or online grammar reference?

   never (1) / rarely (2) / occasionally (3) / sometimes (4) / frequently (5) / always, usually (6)

   9.1. Which grammar reference(s) do you use? _____

10. How often do you use an English language corpus to check vocabulary or grammar?

    never (1) / rarely (2) / occasionally (3) / sometimes (4) / frequently (5) / always, usually (6)

    10.1. Have you ever heard of a corpus? Yes (1) / No (1)

11. Aside from the reference resources mentioned above, what other resources have you used to help you write in English? _____

12. How often do you reference words or grammar points while you are writing?

    never (1) / rarely (2) / occasionally (3) / sometimes (4) / frequently (5) / always, usually (6)

13. When you are unsure about some language point, how often do you guess instead of confirming your grammar or vocabulary choice with a reference resource?

    never (1) / rarely (2) / occasionally (3) / sometimes (4) / frequently (5) / always, usually (6)

14. Suppose that in the sentence, "I disagree ____ this idea," you are not sure if you need to write "disagree about," "disagree with," or if no preposition is necessary at all. What would you do?

guess (1) / look in my dictionary (2) / check a grammar book (3) / search online in English (4) / search online in Japanese (5)

15. Suppose that you want to translate 円高 and use it in the following sentence: “Because of the _____, I can buy a lot of things on my trip to America.” However, you are not sure whether you should write “the high yen,” “the tall yen” or “the strong yen”. What would you do?

guess (1) / look in my dictionary (2) / check a grammar book (3) / search online in English (4) / search online in Japanese (5)

Appendix E. Student course-final survey
(translated from the Japanese version administered)

END of COURSE SURVEY

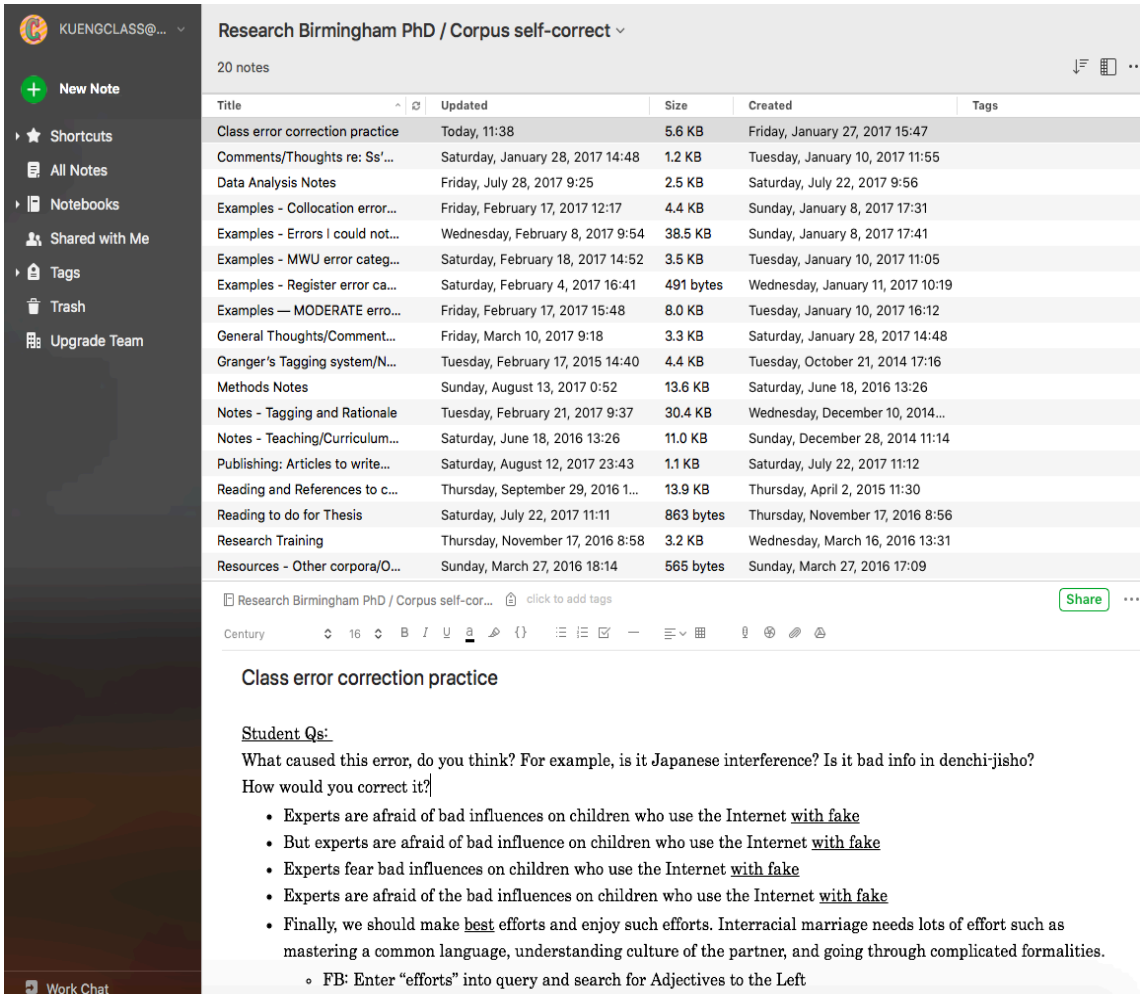
TOEFL score: _____ IELTS score: _____ TOEIC score: _____

Circle the responses that most closely match your feelings regarding your use of the corpus.

		strongly disagree	disagree	somewhat disagree	somewhat agree	agree	strongly agree
1	Learning about a corpus in this course was interesting.	1	2	3	4	5	6
2	Learning to use a corpus has helped me improve my writing skill.	1	2	3	4	5	6
3	I could understand the teacher's correction codes on my essay so I knew how to research my errors on the corpus.	1	2	3	4	5	6
4	Correcting my own writing based on the teacher's correction codes was a good exercise for me to improve my writing.	1	2	3	4	5	6
5	The class practice exercises (in class and for homework) helped me learn to use the corpus.	1	2	3	4	5	6
6	I enjoyed using the corpus to help me correct errors in my essays.	1	2	3	4	5	6
7	I want to use a corpus more in the future.	1	2	3	4	5	6
8	Using a corpus is helpful for researching vocabulary.	1	2	3	4	5	6
9	Using a corpus is helpful for researching phrases and expressions.	1	2	3	4	5	6
10	Using a corpus helps me use English more naturally.	1	2	3	4	5	6
11	When I faced a language problem in my writing, I primarily referenced the corpus.	1	2	3	4	5	6
12	Whenever I searched the corpus, I usually found the answer I was looking for.	1	2	3	4	5	6
13	By the end of the course, I felt well prepared to use a corpus.	1	2	3	4	5	6
14	Deciding how to search the corpus to make a correction was difficult.	1	2	3	4	5	6
15	I used *Word Sketch* the most of all the corpus search functions.	1	2	3	4	5	6
16	I used *Sketch Diff* the most of all the corpus search functions.	1	2	3	4	5	6

17	I used the *Thesaurus* function the most of all the corpus search functions.	1	2	3	4	5	6
18	I used the *Concordance* function the most of all the corpus search functions.	1	2	3	4	5	6
19	When correcting my essays, I primarily used a dictionary instead of the corpus.	1	2	3	4	5	6
20	Using a corpus takes too much time and effort.	1	2	3	4	5	6
21	I couldn't understand the corpus data (concordances) very well.	1	2	3	4	5	6
22	There were too many unfamiliar words in the corpus data.	1	2	3	4	5	6
23	Finding language patterns in the corpus data was difficult.	1	2	3	4	5	6
24	Making conclusions based on the corpus data was difficult.	1	2	3	4	5	6
25	There is too much data to read through and analyze in the corpus.	1	2	3	4	5	6
26	When correcting my English essays, I prefer to use my dictionary rather than the corpus.	1	2	3	4	5	6
27	I can correct the mistakes my teacher points out, but I don't think I can find the errors on my own.	1	2	3	4	5	6
28	When I searched the corpus to correct my essays, I usually found the information I needed.	1	2	3	4	5	6
29	In this course, I learned a lot about using a corpus.	1	2	3	4	5	6
30	Referencing a corpus has helped me improve my confidence using English.	1	2	3	4	5	6
31	I enjoy analyzing corpus data as a way to improve my writing.	1	2	3	4	5	6
32	Using a corpus data-based approach to language learning is worth the effort.	1	2	3	4	5	6
33	I can improve my written accuracy more by referencing a corpus than a dictionary.	1	2	3	4	5	6
34	By the end of the course, I was able to use the corpus well.	1	2	3	4	5	6
35	This semester, I used the corpus in other courses besides this *English Writing and Expression* course.	1	2	3	4	5	6
36	I recommend that a corpus be used in future writing courses at Kobe University.	1	2	3	4	5	6

Appendix F. Research journal excerpt



Appendix G. List of error codes and descriptions

Basic tag format

Original essay drafts:

<err file="1601a1" n="01" type=" ">...</err>

Revised essays:

<rev file="1601a2" n="01" type=" " resource="C|D|X|NC|DEL"out="SUC|UNS|MOD">...</rev>

Abbreviations

C = Corpus
D = Dictionary
X = No resource referenced
NC = No change made by student
DEL = Student deleted the item
SUC = Successful correction
UNS = Unsuccessful correction
MOD = Moderately-improved correction

Error codes

Noun (N) errors

N_COLL	Noun-based collocation error
N_COLLPAIR	Noun-based collocation error with coordinate collocates (and/or)
N_USE	Noun-based usage error
N_UP	Noun designated for upgrading the language choice

Verb (V) errors

V_COLL	Verb-based collocation error
V_COLLPAIR	Verb-based collocation error with coordinate collocates (and/or)
V_USE	Verb-based usage error
V_UP	Verb designated for upgrading the language choice
V_RPT	Reporting verb error

Adjective (ADJ) errors

ADJ_COLL	Adjective-based collocation error
ADJ_COLLPAIR	Adjective-based collocation error with coordinate collocates (and/or)
ADJ_USE	Adjective-based usage error
ADJ_UP	Adjective designated for upgrading the language choice

Adverb (ADV) errors

ADV_COLL	Adverb-based collocation error
ADV_COLLPAIR	Adverb-based collocation error with coordinate collocates (and/or)
ADV_USE	Adverb-based usage error
ADV_UP	Adverb designated for upgrading the language choice

Preposition (PREP) errors

+PREP_ …	Preposition omission
PREP_COLLV	Verb-dependent preposition error
PREP_COLLN	Noun-dependent preposition error
PREP_COLLADJ	Adjective-dependent preposition error

Phrase (PHS) errors

PHS	Phrase error

Appendix H. Research participant consent form

Research Participant Consent Form
英語文章表現

In this course, we will use an online corpus system called Sketch Engine. This is not a free resource but requires a subscription fee for each user. Access is funded by a research grant from the Japan Society for the Promotion of Science（科学研究費助成事業）.

The aim of this research is to investigate whether referencing an online corpus can help Japanese learners of English write more accurately and more naturally. To achieve this aim, some of the student work completed in our course will be used for research purposes. All work and student information will be kept strictly confidential and will be reported anonymously.

If you understand and accept these conditions, then please print and sign your name below.

Thank you very much for your consideration to participate.

PRINTED NAME: _____

SIGNATURE: _____

DATE: _____