

**The Impact of an Online Collaboration Tool on First-Year Community  
College Students' Learning of Expository Writing**

by

Lillian Mak

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# THESIS EXAMINATION INFORMATION

Submitted by: **Lillian Mak**

**Master of Arts in Education**

Thesis title: The Impact of an Online Collaboration Tool on First-Year Community College Students' Learning of Expository Writing
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An oral defense of this thesis took place on February 12, 2021 in front of the following examining committee:

**Examining Committee:**

Chair of Examining Committee	Dr. Allyson Eamer
Research Supervisor	Dr. Jia Li
Examining Committee Member	Dr. Bill Hunter
Thesis Examiner	Dr. Todd Cunningham, Ontario Institute for Studies in Education, the University of Toronto

The above committee determined that the thesis is acceptable in form and content and that a satisfactory knowledge of the field covered by the thesis was demonstrated by the candidate during an oral examination. A signed copy of the Certificate of Approval is available from the School of Graduate and Postdoctoral Studies.

## **ABSTRACT**

This exploratory study examined the reading-writing connection and the effects of online collaboration through the use of OneNote on improving the expository writing performance of first-year community college students. The intervention was a 10-week integrated reading and writing instructional program focused on systematically developing discrete expository writing skills each week. Peer collaboration and technology were used to support students in developing higher-order cognitive skills characteristic of source-based writing. Data were collected from 70 students enrolled in four sections of a communications course in a large community college, with sections assigned to either a control or treatment group. Pre- and post-writing tests and standardized reading tests measuring three different reading attributes were analyzed to examine correlations and performance of the control and treatment groups. The findings included a significant difference in the treatment lower-proficiency sub-group's writing performance, indicating that the instructional framework with the technology-supported collaborative setting had a positive effect.

**Keywords:** expository writing; integrated reading-writing; technology; collaboration; community college

## **AUTHOR'S DECLARATION**

I hereby declare that this thesis consists of original work of which I have authored. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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The research work in this thesis that was performed in compliance with the regulations of Research Ethics Board Committee under **REB #14592**.

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Lillian Mak

## STATEMENT OF CONTRIBUTIONS

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## **DEDICATION**

To my dad,

I celebrate you for the sacrifices you made, for the curiosity and grace you inspire, and  
for the love you represent. This is dedicated to you.

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## **Chapter 1. Introduction**

Students in community college need effective reading and writing skills for academic success (Cho & Schunn, 2005; Taraban et al., 2000). The reading demands required of students often go beyond course textbooks to include supplementary reading material that expands concepts, presents concepts differently, or offers dissimilar views (Taraban et al., 2000; Tomasek, 2009). Post-secondary students are often faced not only with a greater volume of reading, but also with reading from materials that are more dense on subject-matter that is less familiar than those read in secondary school (Taraban et al., 2000; Williamson, 2008). Assigned writing tasks often require students to summarize or critique readings, report on a theory or experience, or synthesize data from multiple sources (Cumming et al., 2016; Horowitz, 1986). Writing in response to textual material or writing from sources requires that students write in “their own words” (Doolan & Fitzsimmons-Doolan, 2016, p. 717); however, in order to do so, students must first be able to accurately read across a range of source material to make connections (Brockman et al., 2011; Doolan & Fitzsimmons-Doolan, 2016; Tomasek, 2009). Tasks like these have been referred to as “reading-to-write tasks” (Doolan & Fitzsimmons-Doolan, 2016, p. 718) or “discourse synthesis” (Spivey & King, 1989, p. 7). Spivey and King (1989) define discourse synthesis as follows:

Some hybrid reading-to-write tasks involve discourse synthesis, a process in which readers (writers) read multiple texts on a topic and synthesize them. They select content from the composite offered by the sources—content that varies in its importance. They organize the content, often having to supply a new

organizational structure. And they connect it by providing links between related ideas that may have been drawn from multiple sources. (p. 11)

Another definition of writing from sources from Grabe and Zhang (2013) is

Learning to write from textual sources (e.g., integrating complementary sources of information, interpreting conceptually difficult information) is a challenging skill that even native speaking students have to work hard to master...Tasks that require reading/writing integration, such as summarizing, synthesizing information, critically responding to text input, or writing a research paper, require a great deal of practice. (p.9)

The synthesis in reading comprehension followed by the decision-making for response writing engages the use of metacognitive strategies (Chevalier et al., 2017; Flower & Hayes, 1981) – the higher-order strategies that readers and writers use to plan, interpret, and evaluate their progress towards a task. Students skilled in selecting and applying appropriate strategies in their coursework perform better academically, achieving higher GPAs (Chevalier et al., 2017; MacArthur & Philippakos, 2013; Taraban et al., 2000).

Several studies have suggested that many students do not have the reading and writing skills to function well academically or professionally (Beck, 2009; Falk-Ross, 2001). Research at a Canadian university on the difficulties that first- and second-year post-secondary students experience indicates that there are problems in reading with basic comprehension, main idea recognition, and critical reading (Huang, 2010). In addition, 63.8% of undergraduate instructors identified that students needed help developing the ability to organize writing to convey major and supporting ideas and noted that

synthesizing information was particularly difficult for first- and second-year students (Huang, 2010). Dion and Maldonado (2013) examined the literacy rates among Ontario's community college and university students and found that during the period 2002 to 2012, about 40% of students entering community college scored below the required level of language proficiency on the community colleges' post-admission assessment; for one community college, almost 60% of first-year students scored below the required proficiency level over a four-year period. In a focus group study conducted by Dunn & Carfagnini (2010) on the transition experiences of first-year students at an Ontario university, students reported they were not prepared academically for university; specifically, they were not ready for the amount of note-taking or the level of writing required. Finally, community college students are diverse culturally, economically, and educationally; therefore, these students may have unique literacy challenges since they may be entering community college as non-native English speakers or after an absence from formal education (Pascal, 1990).

The immediate consequence of low literacy proficiency means that students will face difficulty keeping up with their course loads and may drop out of school. Results from an eight-year study on the persistence of Canadian post-secondary students indicated that the dropout rate for first-year community college students was 15.4%, more than half the cumulative rate (24.3%) of students leaving community college without graduating; thus, the first year is critical for students (Childs et al., 2017). Although low level literacy affects student academic achievement in the short term, the social implications are significant. Changes in labour market skills are changing rapidly. In 2006, the Canadian Council on Learning estimated that 70% of new jobs by 2013 would

require post-secondary education, but Canada has not been producing enough graduates for these jobs; in fact, figures for 2003 showed only 44% of Canadians having acquired the necessary education to meet these job requirements. Recent employer surveys indicate that literacy skills remain essential, but employers are now seeking higher-order cognitive skills related to reasoning and synthesizing information (Finnie et al., 2018).

Furthermore, there is a cost to the economy when individuals drop out of school or have inadequate education to find employment. Canadians with a university degree make up 22% of the population, use 14% of government social benefits, and contribute 41% of the taxes whereas Canadians with less than a high school degree make up 14% of the population, use 23% of government social benefits, and contribute 6% of the taxes (Berger et al., 2009). Between 1990 and 2012, the employment rate for individuals who had achieved some post-secondary education dropped from 58% to 48%; if these individuals had attained the necessary higher education for employment, the contribution to GDP has been estimated to be as high as \$24.3 billion, producing a potential increase of \$4.4 billion and \$3.7 billion annually in federal and provincial tax revenues, respectively (Stuckey and Munro, 2013). Students without the literacy skills to manage their post-secondary studies face a greater risk of not completing their studies, being less employable, and becoming dependent on social services rather than contributing productively.

With the pace of the environmental trends taking place, it becomes vital to identify supports to minimize the expository reading comprehension and writing skills gap that exists for many students. The aim of this study was to examine the relationship between reading and writing performance to better understand the strategies effective in

developing the higher cognitive skills characteristic of integrated academic writing and to assist instructors with teaching them. It is hoped that an instructional design incorporating cloud technology for supporting students' academic language skills development will add to the growing body of research on online collaboration and its effects on student writing performance.

## **Chapter 2. Literature Review**

Academic language proficiency is essential for students to achieve success in post-secondary education, yet students may not be adequately prepared for the complexities of reading and writing tasks at post-secondary levels (MacArthur & Philippakos, 2013; Gruenbaum, 2012). In addition to addressing gaps in English language academic skills between students' high school studies and the levels necessary to succeed in post-secondary studies, educators face other challenges from current trends. Student demographics are more diverse; there are increasing numbers of foreign students, part-time students, and single-parent students. The demand for technology-enabled learning and accessibility is evolving quickly and many teachers may find it difficult to adapt to the pace, and decreasing government budgets often mean fewer resources available to maintain existing needs (Government of Ontario, 2012).

In Canada, post-secondary institutions fall under two educational structures: community colleges and universities. Universities are degree-granting institutions with a strong research mandate. Community colleges were created to respond to labour market needs and provide job-training and technical skills. In Ontario, legislative developments since 2000 began blurring the roles between these two structures; subsequently, community colleges now have limited power to grant degrees and universities are under pressure to align their academic programs with the economy and labour market (Trotter & Mitchell, 2018). Although these institutions are distinct and the academic demands for each are different, first-year students often have similar reading and writing experiences with varying degrees. It became clear during this literature review that research

pertaining to Canadian community college students is sparse; thus, there is a need for more research for the community college environment.

This review of the literature examines the connection between reading and writing, collaboration in writing, collaboration in an online environment, and writing performance.

### **2.1. Challenges in Reading and Writing Skill Development**

Many students face challenges when developing their reading and writing skills to the level expected in post-secondary studies; students may be entering post-secondary education with one or more of the following: weak reading comprehension skills, a limited knowledge of different types of writing, limited knowledge of linguistic structures, or undeveloped learning strategies. Understanding how these conditions are challenging for students begins with understanding the nature of assignments and the expectations of professors in the post-secondary environment.

Reading and writing tasks in post-secondary studies are cognitively demanding because of the quantity and multiplicity of assignments and topics (Doolan & Fitzsimmons-Doolan, 2016; Granado-Peinado et al., 2019; Kuhn & Udell, 2003; Sole et al., 2013; Taraban et al., 2000). Students are often asked to write responses to multiple readings to elicit deeper thinking and make more sophisticated arguments, to demonstrate their comprehension, and to integrate their learning of a subject-matter (Bartolomeo-Maida, 2016; Brockman et al., 2011; Maaka & Ward, 2000). Thus, students need to have adequate skills for reading and understanding individual texts as well as higher-order skills for evaluating, summarizing, and synthesizing information across texts (Afflerbach et al., 2015; Maaka & Ward, 2000; Perin et al., 2017). Based on a focus group of 14

faculty representing various disciplines throughout a university, Brockman et al. (2011) reported that critical analysis and research-based writing predominated the types of assignments given to students. These types of summary or expository assignments require students to accurately read and interpret an author's main idea and objectively convey information in a written product.

Yet many post-secondary students have weak reading comprehension skills, particularly with understanding the main or central theme explained in textbooks (Wang, 2009). In Wang's (2009) study examining factors affecting first-year university students' comprehension of main ideas, 55% of participants correctly identified explicit main ideas of individual paragraphs and 11% of participants correctly stated main ideas of a multiple-paragraph expository text. Further complicating the situation is that many adult readers may be unaware that they are not understanding texts clearly. Pressley et al. (1990) studied 34 first-year undergraduates to understand what led students to reread passages when answering comprehension questions. In this study, participants read passages between 205 and 487 words in length taken from practice tests for the Scholastic Aptitude Test (SAT) and responded to short-answer and multiple-choice questions based on the passage. Results showed that participants were highly confident, although their answers were incorrect, when answering reading comprehension questions on main or thematic ideas; thus, they rarely reread the passage to confirm their understanding. Because participants were more likely to reread passages when responding to questions asking about factual details, researchers concluded that factual questions contain cues that trigger readers to recognize a gap in their memory whereas inferential questions lack informational cues that would help them to evaluate the correctness in their thinking. If

students do not fully comprehend what they have read, it would be challenging for them to exhibit the critical thinking and accurate writing necessary to fulfil their post-secondary assignments.

Aside from the reading difficulties students may have, a lack of knowledge about the writing conventions associated with different types of writing can create challenges with writing clearly and managing source material. The two most predominant types of writing used in post-secondary assignments are summary and expository writing. Summary writing requires students to be able to distill information to create a condensed version of a text (Perin et al., 2017); consequently, students need to be able to decide on the important ideas in a text to include and the extraneous ideas to exclude. Many students have difficulty with the decision-making required for summarization. Perin et al. (2017) analyzed summary writing of 211 community college students to identify the number of important ideas captured; they found that about 24% of the important ideas were included when participants summarized a newspaper article. The second predominant type of writing, expository, requires students to submit a position clearly with well-developed supporting evidence from multiple sources (Beck et al., 2013; Perin et al., 2017). While summarizing is used in expository writing, expository writing is more complex because students need to be able to synthesize and analyze information from multiple texts (Perin et al., 2003). If students are not aware of the differences between summarizing and expository writing and the associated conventions, they may not be able to respond correctly or completely to their writing task. In Beck et al.'s study (2013) describing the challenges that English Language Learner (ELL) and non-English Language Learner (non-ELL) high school students have with expository writing, more

than half of participants produced a genre different from what was required. For instance, when asked to make a case for the quality of a film, the majority of participants wrote a narrative of the plot of the film or a blend of a conventional thesis with a narrative of the plot that Beck et al. (2013) referred to as “narrgments” (p.368). In both summary and expository writing, reading comprehension is essential; the relationship between reading and writing will be discussed later.

Apart from the content and form decisions that have to be made, students must also contend with selecting the vocabulary and linguistic structures appropriate for a particular writing task; thus, students need grammar skills that help them establish their knowledge and objectivity (Schleppegrell, 2001). Schleppegrell (2001) uses the term “language of schooling” (p. 434) to refer to the language and grammatical features associated with the different types of academic writing and observes that less experienced writers use informal grammatical structures rather than the formal structures expected in school-based tasks. Beck et al. (2013) reported that articulating ideas in academic writing was difficult for both English-language learners and non-English-language learners. Acquiring proficiency in academic language may take longer for some students. Cummins (1980) used the terms “basic interpersonal communicative skills” (BICS) (p. 177) and “cognitive academic language proficiency” (CALP) (p. 177) to differentiate between conversational and academic language. He explained that language learners may display well-developed communicative skills because of the strong contextual supports (gestures, facial expressions) found in face-to-face conversation, yet they perform poorly academically when they have to rely primarily on linguistic supports.

Finally, students may find developing reading and writing skills challenging because they have not developed effective strategies to use for learning these skills or they are unaware that a weakness exists. According to Ertmer and Newby (1996), expert learners are aware of areas where they possess or lack knowledge and are able to select an appropriate strategy to manage difficulties. To do so, expert learners monitor their learning progress. In contrast, novice learners are less likely to reflect on their learning and as a result, they may be unaware they have weak skills let alone the strategies that would help them resolve their difficulties.

Research on strategies to improve reading and writing skills includes acquiring academic language (Craig et al., 2017; Schleppegrell, 2001), engaging students (Bartolomeo-Maida, 2016; Maaka & Ward, 2000), and differentiating skilled and novice behaviours (Negretti, 2012; Taraban et al., 2000), yet most of the research on reading and writing explore these two language skills separately, although acknowledging that a connection between them exists; for instance, some studies have investigated how writing can be a useful strategy for improving reading comprehension (Hebert et al., 2013) and others have argued that reading is necessary for improving writing (Krashen, 1993).

## **2.2. Reading-Writing Connection**

However, there is growing attention to integrated literacy tasks. First writing tasks in post-secondary environments are primarily based on readings, but also in recent years, with the proliferation of digital media and tools, students have more opportunities to interact through reading and writing from text messages to social media blogs (Warschauer, Zheng & Park, 2013), and as a result there is emerging research focusing on the relationship between reading and writing. Elaborated below are studies that have

examined the characteristics of writing in integrated tasks (Beck, 2009; Cumming et al., 2005), explored the processes of reading and writing (Fitzgerald & Shanahan, 2000; Plakans et al., 2019), and evaluated the correlations between the two (Allen et al., 2014; Schoonen, 2019; Shanahan, 1984).

Integrated writing tasks require students to form their arguments in an expository essay by synthesizing information from one or more source materials. In contrast to integrated tasks, independent writing tasks do not require references to source materials; students may use personal experiences and knowledge to develop their argument (Cumming et al., 2005). Cumming et al. attributed some of the differences in writing quality between integrated and independent writing to the differences of each task, that is the use of source material or personal knowledge as evidence for students' arguments. However, some differences observed were credited to language proficiency rather than to task type. For instance, compositions of more proficient writers tended to be longer, used a broader range of vocabulary, included more complex sentence forms, and presented a more developed argument. Proficient writers were more likely to summarize and capture most of the main ideas from their source material, including adequate supporting ideas that were organized coherently. In contrast, less proficient writers tended to use an informal tone when presenting their evidence, and they tended to use more verbatim phrases or personal experiences when writing from source. As the proficiency level of writers declined, the use of verbatim or patchy phrases from the source materials and the inability to coherently summarize or paraphrase ideas increased, reflecting weak comprehension skills (Cumming et al., 2005).

To better understand the complexities of integrated writing tasks, Beck (2009) described integrated writing tasks as an interplay between cognitive, textual, and social domains. In the cognitive domain, students analyze source material to identify themes before transforming the knowledge into “original” writing. According to Beck, it is not easy for students to sustain the level of thinking needed to first interpret knowledge, and then to plan and organize the information to write a clear argument. The textual domain refers to the academic language (grammar and vocabulary) associated with different writing genres. Recognizing text features such as the structure or vocabulary of a text genre when reading helps students understand the context of a source text and to make predictions about the meaning of the content. Students use these textual cues in writing to elaborate their ideas appropriately in a particular genre (narrative, comparison, or cause and effect, for instance). As students proceed through school, their language proficiency is expected to evolve as they learn the different writing genres and associated textual features. Beck explains the connection between the cognitive and textual domains by pointing out that correcting flaws in students’ grammar and vocabulary is not enough to produce more analytical compositions. The third domain that Beck mentions is the social domain which refers to the reader-writer relationship. As readers, students may find it challenging to interpret a text accurately if they lack certain sociocultural knowledge. As writers, students need to consider both the context and the purpose for writing as they develop an awareness of their reader’s needs; students have expressed that understanding the features of writing for different disciplines or readers is a challenge (Beck et al., 2013; Llosa et al., 2011). In reading, these three domains work together to help students understand and interpret readings accurately, and in writing, students draw knowledge

from these three domains to generate a written response. However, as Beck explains, skill in one area may not translate to skill in another area, so while a student may recognize language cues enough to understand a reading, the student may not be able to recall or employ the same cues in writing. A weakness in any one of these domains may render a result similar to Cumming et al.'s (2005) findings where students wrote verbatim or developed ideas unevenly.

Researchers examining the relationship between reading and writing have also attempted to understand the similarities between the two. Fitzgerald and Shanahan (2000) examined background knowledge and identified four areas of shared knowledge that both readers and writers use, including Metaknowledge, Domain knowledge, Universal text knowledge, and Procedural knowledge. Metaknowledge refers to knowledge about the purposes of reading and writing, the interaction between readers and writers, and the self-monitoring of reading comprehension and writing strategies. Domain knowledge refers to prior knowledge or the knowledge learned from reading or writing. Knowledge about universal text attributes comprises understanding the formation of letters and words, sentences, and larger texts such as narrative or expository text structures. The final area of shared knowledge is procedural knowledge which refers to knowing how to create meaning from reading and writing text. While reading and writing may share these types of knowledge, the cognitive processes in each task develop at a different rate based on the learning that occurs at different ages which may contribute to a lag in some skills.

Similarities in the shared processes among reading and writing have also been explored. Plakans et al. (2019) used a think-aloud protocol and an iterative integrated

task consisting of reading passages, comprehension questions, informal writing, and source-based writing to examine the processes students use. Based on their analysis, the researchers categorized results into five shared processes: focusing on words, using background knowledge, monitoring metacognition for comprehension, rereading, and summarizing. While these processes were commonly used in both reading and writing, they were not used in equal proportions. The researchers found that metacognitive processing was used the most frequently, reinforcing that comprehension was essential in both reading and writing. The extent to which these processes occurred in a particular activity also varied; background knowledge occurred most frequently in the reading activity (46.8%) compared to its occurrence in the source-based writing (8.8%). With the source-based writing task, rereading and summarizing processes occurred to a similar degree (43% and 45.7%, respectively).

In addition to understanding the types of knowledge and processes common to both reading and writing, researchers have evaluated correlations between reading and writing. Parodi (2007) aimed to measure correlations between reading and writing performance scores in three skill segments (words to organizational structure). Results from reading comprehension and argumentative writing tests showed a significant and positive correlation between reading and writing overall (.72). Reading and writing performance was highest at the segment for words and sentences and progressively declined approaching the segment for argumentative writing structure; the reverse was true for the correlations which were lowest at the word and sentence segment, progressively increasing at the argumentative writing segment. Consequently, Parodi considered that students may have a wider variety of strategies that they could use to

compensate weaknesses in reading or writing to achieve higher performance (e.g., they could choose more familiar words for writing), but students had a narrower set of strategies for comprehending and producing argumentative text because students either found it more complex or they did not have adequate experience with it, thus the lower achievement but larger correlation.

Schoonen (2019) examined the relationship between reading and writing and the extent that linguistic knowledge and fluency sub-skills might explain the reading and writing connection. Beginning in Grade 8, participants were tested over three consecutive years (Grades 8 to 10) with separate tests in participants' native language (Dutch) and in English as a foreign language. Results from the Grade 10 reading and writing tasks showed a large positive correlation between reading and writing (.66). Schoonen found that the knowledge sub-skills (vocabulary, grammar, and metacognitive) had strong correlations with both reading and writing while spelling had a moderate correlation with reading yet a strong correlation with writing. Fluency sub-skills (word recognition, lexical retrieval, sentence verification, and sentence construction) had negative correlations with both reading and writing. According to Schoonen, fluency sub-skills may contribute less to the reading and writing relationship because fluency may be skill specific; for instance, words are recalled quickly for reading but not for writing or weak fluency in one sub-skill may render fluency in another sub-skill ineffective. Schoonen found that correlations for reading and writing in Dutch remained stable over the three years. However, the reading and writing correlations applicable to English were higher than Dutch in the first two years but fell into range with the Dutch results in the last year. Schoonen reasoned that these results reflected a heavy reliance on linguistic knowledge in

the early years of English language learning, but as participants grew more proficient in English, they had more experience and knowledge from which to draw on.

In the third study, Allen et al. (2014) studied the correlation between reading, writing, and six different knowledge-based measures, including vocabulary, working memory, and access to prior knowledge. Results from their study showed that reading comprehension and writing had a significant and large correlation (.57). Knowledge-based cognitive skills were strongly correlated with reading comprehension but moderately correlated with writing performance. For example, the correlation was larger between vocabulary and reading (.79) than between vocabulary and writing (.55). Because some skills (e.g., vocabulary and access to prior knowledge) were found to be more correlated with reading than with writing, Allen et al. concluded that other knowledge or processes such as writing strategies or writing genre may influence writing proficiency. That other factors besides reading skill may influence writing proficiency was corroborated in Perin et al.'s (2017) study of low-proficiency community college students, which found that general reading and writing skills had different relationships with summary and persuasive writing—general reading skills were more correlated with summary writing (.31) than with persuasive writing (.16) whereas general writing skills were more correlated with persuasive writing (.28) than with summary writing (.14).

Given the similarities between reading and writing and the effect of weak comprehension on writing from sources (Cumming et al., 2005), enhancing reading skills may indirectly improve writing. Graham et al. (2018) conducted a meta-analysis of research on the effect of reading interventions on writing performance to determine whether evidence supported this presumption. After reviewing 52 experimental studies

encompassing approximately 5,000 elementary and secondary school students, Graham et al. reported that 94% of the studies showed positive results at post-test, and all of the studies with a focus on reading comprehension instructional treatments (12 studies) showed a statistically significant, positive result in writing, further substantiating the connection between reading and writing.

These studies indicate that a relationship exists between reading and writing. Both skills share similar knowledge domains and cognitive processes although the extent of the overlap and the pace of development of these skills may not be equal or occur at the same time. The evidence suggests that a weakness in reading may be a challenge in developing writing, yet a weakness in writing does not necessarily translate to a weakness in reading. These studies are relevant to understanding the challenges of expository writing and providing guidance on instructional strategies for improving these skills though the research remains very limited on simultaneously developing expository reading and writing skills among students transitioning from high school to post-secondary education.

### **2.3. Collaborative Learning and Writing**

Besides teaching specific reading skills to improve writing, employing scaffolded learning such as peer collaboration may be effective. Collaborative learning can be a means for students to better understand a topic taught in class. Scholars generally agree that knowledge building, critical thinking, autonomous learning, supportive environment, and student motivation are inherent benefits that flow from collaboration (Hirvela, 1999; Storch, 2005; Zheng, Lawrence, Warschauer, & Lin, 2015). When two or more individuals work towards a common understanding, they build on prior knowledge

(Matthew et al., 2009) and become co-creators of new knowledge (Matthew et al., 2009; Ruth & Houghton, 2009). Critical thinking and reflection are fostered as individuals share ideas and negotiate meaning to reach consensus within a group (Dillenbourg et al., 1996; Kolloffel et al., 2011; Sotillo, 2002). Through their conversation, students can check their understanding of what they have learned and reinforce their learning through practice with their peers (Hirvela, 1999).

An effective social system can cultivate confidence and self-regulation in learning. According to Kessler (2009), students demonstrated autonomy and a willingness to participate in peer and self-editing with feedback or explanation from only their immediate peers when they worked on a collaborative writing task. Collaborative learning with peers builds a sense of community, enabling members to turn to each other for emotional or cognitive support. Falk-Ross (2001) found that as students became comfortable with their peer group, they demonstrated receptivity to feedback and willingness to share their frustrations. In essence, the group members become allies (Guthrie et al., 2007). A supportive social alliance developed through group discussion or sharing has been shown to increase motivation (Guthrie et al., 2007; McMullen, 2013) which, as an attribute of student engagement (Guthrie et al., 2007), is considered a good predictor of academic achievement (Conway, 2010). According to Conway (2010), learning outcomes are enhanced when students are active in their learning, interact with their teacher and peers, and are surrounded by academic and social supports, and collaborative learning can create these opportunities.

### **2.3.1. Theoretical Framework: Sociocultural Theory**

Collaborative learning is rooted in Lev Vygotsky's theory of cognitive development. There are three main aspects to Vygotsky's sociocultural theory: social interaction is fundamental to cognitive development, internalization occurs for independent learning, and learning takes place in a zone of proximal development (Vygotsky, Cole, John-Steiner, Scribner, & Souberman, 1978). Vygotsky et al. (1978) argued that learning occurs as a result of social interaction and that development initially relies heavily on external means but eventually transforms to self-reliance when learning is internalized, or there is "internal reconstruction of an external operation" (Vygotsky et al., 1978, p.56). With guidance, individuals learn to solve problems independently. Some research likened this problem-solving assistance to modelling or imitation; however, Bruner (2006) countered that it was more nuanced and used the term "scaffolding" (p. 5) to describe how more knowledgeable individuals (parents, teachers, peers) gradually lessened the controlled environment until learners gained sufficient competency to manage on their own. The "scaffolding" or supports assist learners to go beyond their own initial capability to their potential capability; this range is the zone of proximal development where learning transpires (Vygotsky et al., 1978). While scaffolding was first regarded as interactions between adults and children or between experts and novices, it has become more widely associated with peer collaboration in classroom language tasks.

### **2.3.2. Collaboration in the Writing Process**

Extending collaborative learning to the writing environment is a logical next step. Furthermore, collaboration in writing adds another element to the knowledge-building and critical thinking that can occur during group work. According to Bruffee (1984), the

conversation that students engage in during collaboration can reflect the sharing of information and persuasiveness desired in academic writing; thus, students' expository writing may be positively influenced through their collaborative conversation, and opportunities for student conversation should be encouraged.

Writing instruction has evolved from a product-oriented approach to a process-oriented approach (Hayes & Flower, 1986; Hirvela, 1999; Hunter & Begoray, 1990; Storch, 2005). When writing is treated as a product, collaboration generally occurs upon completion of individual writing where feedback is focused on improving the product or correcting errors (Hayes & Flower, 1986; Hirvela, 1999; Storch, 2005). However, treating writing as a process allows specific writing skills to be taught in stages, thereby increasing the opportunities for peers to engage in information sharing and persuasive conversations. Furthermore, many process-oriented writing models describe the writing process as separate stages comprising unique actions that interconnect with each other (Hunter & Begoray, 1990); thus, the information sharing, conversation, and skill may evolve in each stage. For instance, small group discussions that take place in the initial stages of the writing process to brainstorm or generate ideas (Hirvela, 1999; Storch, 2005) may be quite different from the discussions that take place during the composing stage where writers translate ideas into words and sentences (Hunter & Begoray, 1990).

Furthermore, students with lower language proficiency seem to prefer to use more social strategies than their peers with higher language proficiency such as discussion (Li, 2009, 2010). Studies on group discussion to brainstorm or generate ideas have shown to have a dual effect of enhancing both reading comprehension and writing quality (Shen, 2013; Yeh, 2014). Although these studies showed positive results, researchers have questioned

whether the benefits of collaborative learning are fully utilized since students ultimately compose their work individually; thus, recent research has examined collaboration in the context of multiple students producing a single written product (Hirvela, 1999; Storch, 2005). Working jointly throughout the writing process would address some limitations raised by researchers about individual writing. First, studies on student perceptions of peer review and collaborative writing revealed that students were often uneasy giving feedback on work produced individually (Hirvela, 1999; Loretto et al., 2016; Storch, 2005; Vorobel & Kim, 2017); however, feedback directed at a group rather than an individual would avoid singling out one person and create a more comfortable setting (Hirvela, 1999). Furthermore, when students work collaboratively, they exchange and merge their knowledge to resolve errors which they may not have been able to do individually (Wigglesworth & Storch, 2012).

Second, previous research has shown that peer feedback tended to focus on lower-level (words and sentences) rather than on higher-level revisions (idea development and organization) necessary for developing expository writing skills (Bradley & Thouesny, 2017; Chao & Lo, 2011; Hong et al., 2011; Zheng et al., 2015). In contrast to the many studies that reported similar outcomes from peer review, whether as part of individual or collaborative writing, Kessler et al. (2012) found that students who wrote jointly made more corrections that affected the meaning of a text rather than the grammar. In their study of how students engaged in collaborative writing, Kessler et al. (2012) reported that 75% of students made accurate corrections to grammatical errors, many of which they overlooked, leading to the conclusion that students could correct grammar when asked, but they tolerated errors as long as meaning was not impeded. According to Loretto et al.

(2016), peer review is most effective when students shift their attention from sentence-level revisions to writers' ideas and when students are able to develop metacognitive awareness and self-regulation; thus, more research guiding students to focus on higher-level edits is needed.

Finally, it has been argued that individual writing limits the opportunities for students to engage with each other in dialogue thereby limiting the opportunities to deepen their knowledge-sharing and reflection (Hirvela, 1999; Loretto et al., 2016; Wigglesworth & Storch, 2012). Although studies investigating the effects and processes of collaborative writing are limited, there is evidence that groups generate higher-quality writing than individuals. Comparing writing produced by pairs and individuals, Storch (2005) found that pair writing contained more complex sentences, greater grammatical accuracy, and fewer extraneous details or repetition although results were not significant. Similarly, Yeh (2014) observed that the higher the groups collaborated, the better their fluency and accuracy in their writing, and the differences found between the highly and less collaborative groups were statistically significant.

Collaboration during writing creates an environment for students to better understand the writing process, overcome the difficulties faced with integrated writing tasks, and build on the elements of argumentation characteristic of expository writing. Despite the benefits of collaboration to enhance academic writing, classroom instructors often find that in-class writing tasks take up a great deal of time (Alsubaie & Ashuraidah, 2017; Doolan & Fitzsimmons-Doolan, 2016; Loretto et al., 2016); consequently, further research is necessary in order to understand strategies and behaviours that yield efficient results for both students and teachers.

#### **2.4. Collaboration with Technology Scaffolding**

Collaboration in the classroom is often chaotic and time-consuming, yet there is a general view that collaboration holds benefits. Technology has created an opportunity to see if and how it can be used to develop student writing skills.

The advent of the internet and personal computers launched interest in research towards studying technology in the classroom and the growing variety of tools to support learning. Since many of these tools (discussion boards, blogs, wikis, Google Docs, digital notebooks) facilitate collaboration, many studies have explored the benefits of technology-supported collaboration tools and contrasted them with face-to-face collaboration without technology support (Passig & Maidel-Kravetsky, 2016; Suwantarathip & Wichadee, 2014; Vorobel & Kim, 2017; Yang, 2016). The main advantage that online collaboration has over face-to-face collaboration is the capability for students to see the thoughts and actions of their peers. Both Passig & Maidel-Kravetsky (2016) and Yang (2016) noted in their studies comparing student collaborative summary writing in online and face-to-face contexts that students collaborating online benefitted from seeing their peers' summaries and concomitantly discussing the inclusion or exclusion of ideas; therefore, scaffolding was less complicated in an online environment.

Parallel to research on collaboration with and without the use of technology is research on the benefits between writing with technology compared to writing with traditional pen and paper (Alsubaie & Ashuraidah, 2017; Hosseinpour et al., 2019; Kashani et al., 2013; Nobles & Paganucci, 2015; Passig & Maidel-Kravetsky, 2016). The primary benefit for using digital tools for writing is the ease for editing and revision

(Alsubaie & Ashuraidah, 2017) and the increased opportunities for feedback throughout the writing process (Nobles & Paganucci, 2015; Passig & Maidel-Kravetsky, 2016). Passig & Maidel-Kravetsky (2016) go further to suggest that feedback is more readily given and received because the online environment creates a social distance that removes reservations students may have when giving feedback in a pen and paper or face-to-face environment.

#### **2.4.1. Fostering Learning**

Beyond comparing online and traditional settings in collaboration and writing, researchers have found that digital tools may aid in fostering a constructive learning environment. Since many of the digital tools feature a mechanism to track writing revisions, these tools have made it easier to understand how students interact online when writing collaboratively and to analyze the edits and revisions students make (Bradley & Thouesny, 2017; Elola & Oskoz, 2010; Kessler et al., 2012; Li & Zhu, 2013) which can help to detect gaps in writing knowledge or skills. Identifying areas where knowledge is being constructed and the collaborative writing environment most conducive to learning can positively influence students' educational experience.

Some studies have broadened their research from understanding student online collaboration to how it may effect changes in student behaviours or attitudes. Research on online collaborative writing indicates that students tend to take responsibility for how a task is completed—that is, they are more invested in the writing task, and they gradually become more self-reliant in their learning (Chao & Lo, 2011; Elola & Oskoz, 2010; Kessler, 2009; Matthew et al., 2009; Sotillo, 2002). Sotillo (2002) found that over a 16-week period, graduate students developed more autonomy and control over their writing

process when collaborating synchronously online. To achieve this control, students need to be able to recognize the steps in writing, and online collaborative writing may help with this recognition; in fact, several researchers have noted that the online writing environment has helped students gain an awareness of the different stages in the writing process (Chao & Lo, 2011; Hong et al., 2011; Kessler et al., 2012). Hunter and Begoray (1990) posit that using technology to create this awareness would enable teachers to help students visualize the interconnections between the writing stages, the initial stage of brainstorming could be represented in one file or window and an essay outline in another file or window. Since a digital environment makes editing easier, students tend to be more motivated to participate in peer review, investing more time in revising their writing and deepening their understanding of information (Kessler et al., 2012; Matthew et al., 2009; Reynolds & Anderson, 2015; Strobl, 2014; Suwantarathip & Wichadee, 2014; Yang, 2016; Yeh, 2014). Sobko et al. (2020) suggest that a digital environment is dynamic and evolving based on interactions between human (students, instructors) and non-human agents (digital tools). They found that as participants collaborated writing their ideas on advertisements using Zoom and a digital Whiteboard, their individual learning experiences were shaped by the way of their collaboration using different digital tools; in turn it seemed to guide their knowledge construction, leading to incremental learning.

#### **2.4.2. Evaluating Writing Performance**

Collaboration supported by technology offers many benefits for enhancing the academic writing of students, yet the question is whether these benefits render a measurable effect

on students' writing. Research on the effect of technology-supported collaboration on writing performance varies widely in research design and how performance is measured.

Two studies explored a particular feature or function of a collaborative online tool to determine the effect on writing performance (Kolloffel et al., 2011; Liu et al., 2018). Liu et al. (2018) examined the use of a group awareness feature in an online collaborative writing tool to compare performance scores on a writing assignment. Aimed at improving group participation, the group awareness function enables participants to compare their own engagement in a writing task with their group members' since the feature allows each member to identify the writing contributions of the other members. In Liu et al.'s study, the experimental group used the tool with the group awareness feature and the control group used the tool without the feature to write collaboratively on a project, comprising three written sub-tasks. The researchers found that the experimental group earned higher scores than the control group on the assignment although results were not significant in two of the sub-tasks; in the third sub-task, considered more difficult by the researchers, the experimental group outperformed the control group significantly ( $p < .05$ ). The researchers found that the experimental group tended to stay on task, be more engaged, and collaborate more on difficult task components although the researchers acknowledged that the small groups of three participants may have been a contributing factor to engagement. Kolloffel et al. (2011) examined the use of representational tools such as graphic organizers in conceptual, arithmetic, and textual formats to support collaborative learning. This study compared individual and group performance on pre- and post-knowledge-based tests, and while the study did not evaluate writing, graphic organizers are often used to support students in planning and organizing ideas in the pre-

writing stage. Since using the tool was not mandatory, individual tool-use and no-tool-use was compared with collaborative tool-use and no-tool-use. Overall, collaborators working with or without the tool scored higher on the post-tests ( $p < .001$ ) than individuals; however, individuals using the tool outperformed individuals who did not, scoring almost as high as the collaborators ( $p < .05$ ). These studies looked at tools used from different perspectives to examine the effect on writing performance; Liu et al. (2018) used a student participation monitoring tool and Kolloffel et al. (2011) used a brain-storming and organizational tool with positive performance results.

The studies described next evaluated the effects of online writing collaboration on writing performance; the first group of studies examined writing quality based on specific writing aspects or elements such as content, organization, and grammar and the second group of studies used overall test or assignment scores. Passig and Maidel-Kravetsky (2016) and Tai (2016) used writing elements to compare participant compositions. These studies found that writing improved significantly in some, but not all, elements. Tai (2016) used a single group design to study collaborative writing in an asynchronous online forum and compared the group's pre- and post-test writing results. Significant positive results from pre- to post-tests were found in two of the six performance elements: content and holistic (style, use of language, objectivity, and succinctness). Although nonsignificant, one element, diction, showed a decrease in scores from pre- to post-test. Passig and Maidel-Kravetsky (2016) compared summary writing scores of students who read and wrote collaboratively in an online environment with those of students who read and hand-wrote collaboratively in a face-to-face environment. They found that the summaries written in the online environment were statistically significant in most of the

performance indicators; however, the group who read and wrote face-to-face had significant positive results in two of the indicators (faithfulness to source and efficacy of content and language).

The second group of studies used overall scores or grades assigned to writing tasks, and have been divided into studies analyzing general writing tasks (technical reports, articles, correspondence) and those analyzing expository writing. The studies analyzing more general writing tasks had mixed performance results. The first study, Neumann and Hood (2009) compared results of jointly written reports using a wiki with peer review throughout the writing process against individually written reports using word-processing software with peer review at the end of the process; although the results were not statistically significant, the wiki group scored higher on their research reports. The next two studies compared writing between online and traditional environments. Kashani et al. (2013) compared writing pre- and post-tests for a pen-and-paper group with the pre- and post-tests for a blogging group. While it is not clear whether there was explicit collaboration among participants during the treatment, the researchers indicated the public nature of blogs would allow students to enhance their writing skills since their peers' essay writing and feedback received would be visible to the rest of the group. The improved writing results from pre- to post-test for both the pen-and-paper group and the blogging group were statistically significant (both had  $p < .001$ ); the overall post-test mean for the blogging group was higher than the post-test mean for the pen-and-paper group although the result was statistically nonsignificant. Novakovich and Long (2013) compared writing results on a single project between a control group that used word processing and paper with an experimental group that used a blog to submit project

components. In this study, the experimental group outperformed the control group in their assignment grades; results were statistically significant ( $p < .05$ ). The last two studies evaluating general writing tasks studied the effect of using Google Docs on writing. Lin et al. (2014) used Google Docs to support students in self-editing as well as peer editing in a face-to-face environment. This single group study required participants to collaborate and engage in peer feedback on six individual writing tasks, culminating in a group project. The researchers found that mean scores of the individual writing tasks improved over the six tasks from 75.5% to 78.4%; however, the statistical significance of the increase was not reported. Results of the group project were also not reported. Zheng et al. (2015) investigated the use of Google Docs for writing, revising, peer editing, and reviewing by middle school students. Collaborative writing with two or more students was found to occur in almost 30% of the writing while most of the collaboration on Google Docs was a single author with feedback from peers. The researchers did not use control and experimental groups in their study; instead, they compared students' results from annual statewide literacy assessments year over year and found no statistically significant difference in writing performance from using Google Docs. These studies using general writing tasks found that online collaborative writing and peer review can improve writing performance but results are mixed on whether the differences are statistically significant.

The following group of studies examined writing resembling the more common academic writing tasks expected in post-secondary studies. The writing tasks reported by Suwantarathip and Wichadee (2014), Shehadeh (2011), and Alsubaie and Ashuraidah (2017) were similar to independent essay writing where personal experiences and

knowledge could be used for supporting arguments. Suwantarathip and Wichadee (2014) compared collaborative writing outside of class using Google Docs to collaborative writing in a face-to-face classroom setting. They found that writing scores for both groups increased from pre- to post-test, but the statistical significance was not reported. When post-test scores between the groups were compared, the researchers found that the Google Docs group's results were significantly higher ( $p = .03$ ). One inconsistency identified in this study was that the mean test scores reported were greater than the rubric scoring; if raw scores were adjusted, the rationale should be presented. Shehadeh's (2011) study compared students in a control group who wrote individually with students in an experimental group who wrote collaboratively in pairs; technology support was not integrated in this study, but the instructional design was structured so that over one 16-week semester, students wrote 12 narrative and descriptive paragraphs approximately 100 words in length. The results showed that collaborative writing had a statistically significant positive effect on the quality of writing in content, organization, and vocabulary but a nonsignificant effect in grammar and mechanics. Alsubaie and Ashuraidah (2017) explored the use of Google Docs for individual and pair writing. Instead of using control and experimental groups, Alsubaie and Ashuraidah had a single group complete individual and pair pre-writing tasks without the use of Google Docs; individual and pair post-writing tasks with Google Docs were completed one month later. Results showed that both the individual and pair writing experienced statistically significant improvement in their writing from pre- to post-test. When the researchers compared the individuals' Google Docs writing results with the pairs' Google Docs writing results, they reported that Google Docs had more influence on the individuals'

writing than on the pairs' writing; the Wilcoxon signed rank for the individuals' test scores was 11.18 and 6.00 for the pairs' test scores though the statistical significance was not included. Since it was unclear whether students completed the tasks outside of class and if time allotments for individual and pair writing differed, results should be viewed with caution.

One study reviewed clearly used integrated writing tasks when measuring writing performance. Weston (2015) studied the effects on source-based writing of reading and writing strategy instruction delivered through two computer-based tutorial systems to individual participants. Participants were divided into four instructional settings: no strategy instruction, reading strategy instruction only (iSTART system), writing strategy instruction only (Writing Pal system), and blended reading and writing strategy instruction (iSTART alternated with Writing Pal). Her findings indicated that blended instruction of reading and writing strategies yielded statistically significant results in participants' source-based essay scores compared to reading only, writing only, or no strategy instruction settings.

## **2.5. Student Adoption of Technology-supported Collaboration**

While collaborating and writing online may improve writing, researchers have also sought to understand how technology is perceived as a tool for writing instruction to determine students' willingness to adopt these technologies. The majority of studies reported that students were more motivated and engaged when collaboration and technology were used (Chao & Lo, 2011; Hosseinpour et al., 2019; Matthew et al., 2009; Neumann & Hood, 2009). In many cases, students believed their writing improved in

areas from idea development to grammar correction (Alsubaie & Ashuraidah, 2017; Chao & Lo, 2011; Ducate et al., 2011; Hong et al., 2011; Miyazoe & Anderson, 2010).

Although online collaboration offers several opportunities for learning in the classroom, it also comes with some difficulties. Student perceptions of collaboration are positive overall, yet a proportion of students still prefer writing individually (Alsubaie & Ashuraidah, 2017; Ducate et al., 2011; Elola & Oskoz, 2010); in the case of Strobl (2014), almost 66% of her study participants voiced a preference for writing individually despite their positive attitudes towards collaboration. Sometimes the difficulties are related to familiarity or connectivity associated with technology (Chao & Lo, 2011; Li & Zhu, 2013; Liu et al., 2018; Matthew et al., 2009). A study by Neumann and Hood (2009) also revealed that students' positive or negative experiences are also often dependent on how the technology facilitates the completion of a task. For example, some online tools such as wikis enable collaborative writing asynchronously but synchronized editing by multiple people would not be possible (Passig & Maidel-Kravetsky, 2016). Based on the literature, the use of digital tools hold two main benefits—facilitating social interaction for sharing and constructing knowledge and enhancing the process of peer review. Choosing a digital tool that has the functionality for accomplishing both with ease and convenience may serve as an effective scaffold to writing development.

Studies have shown that online collaborative writing has the potential to make a difference in students' writing; however, assessment of writing quality generally has focused on lower-order skills such as grammar and vocabulary, with few studies focusing on higher-order skills of content and organization important in expository writing. Many students are entering post-secondary education with weak comprehension skills, a lack of

knowledge of writing conventions, or both, and many may be unaware of these weaknesses or the reading and writing demands of post-secondary education. This study aimed to build on research on online collaborative writing with the use of a digital tool, OneNote, that combines the organizational features of a notebook with synchronous or asynchronous writing by exploring (1) the connection between the reading comprehension and writing skills expected of first-year community college students, and (2) how collaborative technology might be used to support students' reading and writing skill development. Although there are many online collaborative writing tools such as Google Docs, Draft, or Dropbox Paper, OneNote was selected because the study was conducted at a school that includes Microsoft and its software applications as part of its network of services. Using software that was free and available to students would minimize student concerns about access or registering for accounts. The research questions addressed include the following:

1. Are there correlations between the reading skills and the expository writing performance of first-year community college students?
2. What is the effect, if any, of the use of OneNote to enhance students' reading and writing skills?
3. What are students' perspectives on using OneNote to enhance their reading and writing skills?

## **Chapter 3. Methods**

### **3.1. Overview**

This study was designed to explore how an online collaborative tool might aid in reducing the gap in academic language skills with which many first-year community college students contend. It sought to understand the problem from various perspectives, and it took a practical approach to knowledge by looking for “what works” and using research methods suitable to the situation or problem being researched (Cresswell, 2014). Since pragmatic researchers look at a problem from multiple viewpoints, they collect both quantitative and qualitative data (Cresswell, 2014).

A richer understanding of a problem can be achieved by collecting and analyzing both quantitative and qualitative data (Cresswell, 2014); therefore, this study employed multiple data collection tools to investigate the interaction between reading and writing, the impact that the online tool had on performance, and the viewpoints of students towards using the tool.

Both quantitative and qualitative data were collected for this study, using performance tests and interviews. Performance tests provided quantitative data about participants’ writing, reading, vocabulary, and spelling skills. Qualitative data collected through open-ended questions during interviews provided additional information about students’ perceptions of using an online collaborative tool to support the development of their skills.

### **3.2. Research Context**

This study took place at a large urban community college. The neighbourhood in which the community college is situated is culturally diverse: 56.3% of residents are immigrants, 37.4% speak a language other than English at home, and 38% have high school as the highest level of education. For perspective, in the all-city demographic, 51.2% of residents are immigrants, 29.2% speak a language other than English at home, and 30% have high school as the highest level of education (City of Toronto, 2018). The average household income in the area is \$78,432, about 23.6% lower than the all-city average.

The community college comprises 25,000 full-time and 20,000 part-time students; it is one of the most culturally diverse community colleges in the province, with over 11,000 international students from more than 130 countries, speaking more than 90 languages. Based on data from 2015-2016, international students comprised 35.41% of full-time students. The majority of students come from immigrant families and low-income families; the geographical area served by the community college includes 23% of the neighbourhoods identified by the city as “at risk” (City of Toronto, 2018). Among the students attending the community college, 51.5% are first-generation students, 93.5% of eligible students receive government educational assistance, 59% work while attending school, 32% are over the age 26, 33.2% have a university degree, 59% were born outside of Canada, and 46% are English as a Second Language students.

Before beginning the study, the researcher and her supervisor submitted and received approval for the research study from the Research Ethics Boards (REB) of Ontario Tech University and the community college where the study occurred. Following the guidelines set by the REBs, a faculty member not involved in the research visited four

English classes during the first week of the semester to explain the purpose of the study, its importance, and to invite students to participate. Students were provided with a letter of invitation and consent for data collection (see Appendix A) that described the data to be collected, the risks and benefits of participating, the voluntary nature of participating, and the confidentiality of personal information. Students were advised that their consent could be withdrawn at any time without ramification, and contact information was provided.

### **3.3. Participants**

Participants in the study were enrolled in the first-year English course based on their selected program and their post-admission English placement test. The 94 students registered in four sections of the course were invited to participate in the study, with 69 volunteering. The 69 participants in the study ranged in age, with most between the ages 18 – 24. Males and females were evenly represented: 33 males and 36 females. However, the division of the course sections into control and treatment groups resulted in an unequal gender distribution; the control group had 12 males and 22 females, and the treatment group had 21 males and 14 females. The majority of participants entered community college directly from high school although approximately 10% of students were returning to school after an absence. Sixty percent of the participants lived within 15 km of the community college in the surrounding neighbourhoods, and the ethnic, economic, and educational diversity among the participants mirrored the demographics in the neighbourhoods. Although students were identified as native English speakers, there was a likelihood that another language besides English was spoken at home for some

students. Over the course of the study, nine students from the treatment group and one student from the control group withdrew from the course.

An intervention took place over one 14-week semester with four sections of the first-year English course that aims to develop students' skills in academic writing. In this course, students learn to write structured paragraphs and essays containing a clear thesis and supporting arguments in response to readings. The course is lecture-based, meeting once per week for three hours. The instructor of the course, also the researcher, has three years of experience teaching the course and had used the online tool in limited classroom activities prior to the intervention. Students had some knowledge of computers and online tools; however, many were unfamiliar with cloud-based collaborative tools.

The community college where this study was conducted uses Accuplacer as a post-admission English placement test to assess listening, reading, and essay-writing competence. Developed by the College Board, which also developed the SAT, the Accuplacer test is used by two- and four-year colleges and universities and other educational systems globally to aid student transition to post-secondary studies (College Board, 2020). Since a minimum level of proficiency in basic language skills is necessary for success in community college studies, cut-off scores are used to determine a suitable level English course for students. The cut-off scores used at the community college were mapped to the Canadian Language Benchmarks (CLB), the officially recognized standard for assessing the language proficiency of adult immigrants in Canada. CLB incorporates 12 proficiency levels into three stages: basic, intermediate, and advanced (CCLB, 2019). The benchmarks for the first-year English course are aligned to CLB Stage II Intermediate Language Ability, specifically CLB 5; the anticipated outcomes at the end of

the course are CLB 6/low CLB 7. The CLB competency level descriptions are displayed in Table 1.

Table 1

*CLB Intermediate Competency Level Descriptors (CCLB, 2019)*

CLB level	Listening	Speaking	Reading	Writing
CLB 5	<ul style="list-style-type: none"> <li>– Understand the gist and some details in moderately complex common and predictable social exchanges and communication intended to influence or persuade; simple to moderately complex directions and instructions for generally familiar and relevant procedures; and descriptive or narrative monologues or presentations related to everyday, personally relevant topics or situations.</li> </ul>	<ul style="list-style-type: none"> <li>– Participate in basic social conversations.</li> <li>– Give instructions and directions for everyday activities and processes.</li> <li>– Give and respond to informal requests, permission, suggestions, and advice.</li> <li>– Ask for and give information related to routine daily activities.</li> <li>– Describe sequences of events; incidents in the past, present or future; or describe scenes, pictures, or daily routines.</li> </ul>	<ul style="list-style-type: none"> <li>– Understand simple to moderately complex personal and public social messages, step-by-step instructions and for multistep procedures related to everyday situations and descriptive or narrative texts on familiar topics.</li> <li>– Interpret information contained in formatted texts.</li> <li>– Locate and use one or two pieces of information from moderately complex formatted text.</li> </ul>	<ul style="list-style-type: none"> <li>– Convey personal messages in short formal and informal correspondence.</li> <li>– Reduce short, factual, oral discourse to notes; and an information page to a list of details.</li> <li>– Write short correspondence for routine personal needs.</li> <li>– Complete forms with detailed personal information.</li> <li>– Write a paragraph about a familiar sequence of events or a description.</li> </ul>
CLB 6	<ul style="list-style-type: none"> <li>– Understand common social exchanges; moderately complex directions and instructions for technical or non-technical tasks; moderately complex communication intended to influence or persuade in everyday personally relevant situations; short</li> </ul>	<ul style="list-style-type: none"> <li>– Participate in routine social conversations.</li> <li>– Give sequential instructions and directions.</li> <li>– Give/respond to informal/somewhat formal suggestions and indirect requests.</li> <li>– Ask for and give somewhat detailed information; express opinions, feelings, obligation, and ability.</li> </ul>	<ul style="list-style-type: none"> <li>– Understand moderately complex social messages related to a familiar context; instructions and instructional texts for multistep procedures related to everyday situations, where the sequence is inferred; and descriptive or narrative texts on familiar topics.</li> </ul>	<ul style="list-style-type: none"> <li>– Convey personal messages in short formal and informal correspondence.</li> <li>– Reduce short, factual oral discourse to notes; and information page to an outline or summary.</li> <li>– Write short service correspondence for routine purposes. Complete extended forms.</li> </ul>

	group interactions and discussions on familiar topics; and descriptive or narrative monologues or presentations on generally familiar and relevant topics.	<ul style="list-style-type: none"> <li>– Give detailed, sequenced descriptions of incidents in the past, present or future, or of simple processes.</li> <li>– Describe or compare people, places.</li> </ul>	<ul style="list-style-type: none"> <li>– Locate and use two or three pieces of information.</li> <li>– Get information from moderately complex business/service texts.</li> </ul>	<ul style="list-style-type: none"> <li>– Write one or two connected paragraphs to relate a familiar sequence of events, describe or compare.</li> </ul>
CLB 7	<ul style="list-style-type: none"> <li>– Understand moderately complex social exchanges and communication intended to influence or persuade related to personal or general experiences; moderately complex, but slightly longer, directions and instructions for technical or non-technical tasks; and sometimes unsequenced extended descriptive, narrative monologues or presentations about personal experiences, general knowledge or familiar work-related topics.</li> </ul>	<ul style="list-style-type: none"> <li>– Participate in less routine social conversations for many everyday purposes.</li> <li>– Give instructions and directions for technical and non-technical tasks, procedures, and processes; extended warnings, suggestions, recommendations, or advice; and detailed information.</li> <li>– Express and qualify opinions and feelings, reservations, approval, disapproval, possibilities, and probabilities.</li> </ul>	<ul style="list-style-type: none"> <li>– Understand moderately complex personal and public social messages; instructional texts for multistep procedures related to familiar tasks; and extended descriptions, reports, and narrations on familiar topics.</li> <li>– Locate and use three or four pieces of information.</li> <li>– Get information from and interpret moderately in moderately complex formatted texts.</li> </ul>	<ul style="list-style-type: none"> <li>– Convey personal messages in formal and informal correspondence.</li> <li>– Reduce short oral discourse to notes; and text of two pages to a summary.</li> <li>– Write service correspondence for less routine purposes.</li> <li>– Complete an expanded range of forms.</li> <li>– Write two or three connected paragraphs to sequence events, to describe or compare in depth.</li> </ul>

### 3.4. Research Procedure

Data were collected during the Winter 2018 semester. The pre-writing test was administered during Week 1 of the semester, one week prior to the intervention. The standardized pretests for reading, vocabulary, and spelling were administered at the beginning of class during Week 2. The ten interventions occurred between Weeks 2 and 12, except during Week 9 due to a statutory holiday. The standardized post-tests were

administered one week after the intervention in Week 13, with the writing post-test completed in Week 14, the last week of the semester.

The four course sections were divided so that two sections formed the control group, and the other two sections formed the treatment group. Students in the treatment group were introduced to the online tool in Week 2. The instructor provided a brief overview and short tasks to help familiarize students with the tool; links to the online tutorials developed by the software vendor and other resources were also provided for reference. During class, students were taught an element essential to developing expository writing skills, including paraphrasing, topic sentences, and idea organization. The skill was modelled by the instructor, with the entire class participating, before students were divided into small groups of three to four to collaboratively practice the skill. Both groups received the same instruction; however, the treatment group used OneNote synchronously to complete the collaborative writing while the control group used traditional pen and paper. The writing task could be completed in 150 words or less. Approximately 30 minutes was allotted for students to complete the task. The teacher/researcher provided guided instruction and formative feedback for the groups as needed.

All tests were administered by the instructor during regular class time in the classroom. Since the four course sections met at different times and days of the week, participants in the control and treatment groups completed the tests at different times although at the same point in the semester. The pre-writing test was administered during week 1 class and the post-writing test was administered during the week 14 class. The time allowed for the test was 1 hour 30 minutes.

The reading, vocabulary, and spelling pre- and post-tests were administered in Week 2 and Week 13 of the semester, respectively. The standardized test guidelines were followed when these tests were administered. The spelling test was delivered first and took about 20 minutes. The instructor said the word, used the word in a sentence, and repeated the word before students wrote the word. The vocabulary and reading tests were conducted after the spelling test. Students were given 15 minutes for the vocabulary test and 20 minutes for the reading comprehension test. Form G of the Nelson-Denny Reading and Vocabulary Test was used for the pre-test and Form H was used for the post-test.

### **3.5. Intervention**

The study was undertaken to determine whether an online collaborative tool such as OneNote would be beneficial in narrowing the skill gap in writing, and to a lesser extent in reading, for students transitioning from high school to post-secondary education. OneNote was selected since it is part of the community college's network services to which all registered students at the community college automatically have access. OneNote combines the functionality of a notebook with synchronous or asynchronous collaboration among multiple students. The initial screen that students see when opening the notebook is shown in Figure 1. Navigational aids are pre-loaded by Microsoft and preliminary notebook tabs for organization are automatically created; some of these tabs or sections, such as the collaboration and library, are common to all students, but the personal sections are individual workspaces where students may adapt tabs and pages for their personal use. Students in the treatment group were asked to bring their own mobile

devices; for those without a device, one could be borrowed from the community college library.

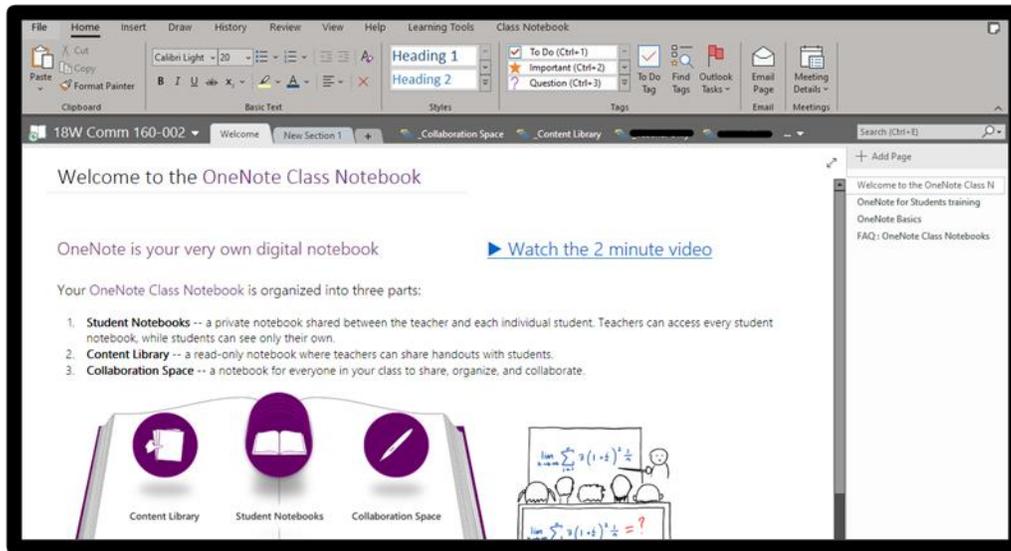


Figure 1: *OneNote Welcome Screen*

The ten-week instructional intervention took approximately 45-60 minutes during each of the regular three-hour weekly class. The lessons were developed by the researcher with her thesis supervisor according to the course curriculum. Lesson content and sequencing were organized to introduce students to the elements of an expository essay and learn the associated skills with focused instruction, gradually progressing to more complex skills to culminate in an essay with references (see Appendix B). The scaffolding of the lessons allowed students to develop their academic language skills in manageable segments, thereby facilitating the synthesis of the reading material. In addition, focused instruction on specific skills was in an attempt to aid students in self-monitoring areas of their reading and writing strengths and weaknesses. The topics of lesson units are presented in Table 2. The readings, skill development exercises, and

tasks used were taken from the course textbook, *The Canadian Writer's Workplace 8<sup>th</sup> ed.* (Lipschutz, Scarry, & Scarry, 2017).

Table 2

*Intervention Lessons*

Intervention	Lesson Topic
1	Identify reading strategies
2	Develop paraphrasing skills
3	Develop summarizing skills
4	Understand the structure of a paragraph by identifying main ideas and supporting ideas in a paragraph
5	Understand development of argumentation
6	Integrate and document source material in writing
7	Recognize structure of an academic essay
8	Develop outline for an expository essay
9	Essay deconstruction with sight reading
10	Writing essay response to a sight reading with references

### 3.6. Measures

Eight tests in total (four pre- and four post-) and post-intervention interviews were administered during the present study. The writing pre- and post-tests and the post-intervention interview questions were developed by the researcher with input and feedback from the research supervisor, adhering to the course curriculum. The standardized tests used for measuring reading, vocabulary, and spelling were Nelson-

Denny Reading Test and Wechsler Individual Achievement Test-Third Edition: Canadian (WIAT-III).

1. Self-developed writing test. Participants completed a pre- and post-test to assess the impact on writing performance before and after the use of the online tool. Writing tests contained a reading and an essay-writing component. Students were required to read the reading and hand-write an essay in response to a writing prompt. Two prompts were given to students from which they could choose one to write their essay response. The reading and writing prompts were developed by the researcher and the course coordinator according to the curriculum. For the purpose of the study, the same writing test was used for both the pre- and post-test.

2. The Nelson-Denny Reading Test. The test was used to collect reading comprehension and vocabulary data. The reading comprehension portion of the multiple-choice test included 38 multiple-choice questions covering seven reading passages. The vocabulary portion was a multiple-choice test with 80 words and five choices. Forms G and H were used for the pre- and post-test, respectively.

3. Wechsler Individual Achievement Test-Third Edition: Canadian (WIAT-III). The spelling test was made up of 44 words and was taken from the WIAT-III Test. The same test was used for the pre- and post-test.

4. Writing rubric for self-developed writing test. Essay writing is evaluated based on how clearly and effectively a student expresses a position by considering the following writing aspects:

- i. Purpose – the degree to which the response clearly addresses the topic

- ii. Organization and development – the degree to which ideas are logically developed and supported
- iii. Vocabulary – the range and use of vocabulary
- iv. Grammar – the range and accuracy of writing conventions

The course-approved rubric used to evaluate the writing tests includes these writing aspects with one additional criterion – citation – to assess the degree that source material is integrated and cited (refer to Appendix C for the course-approved rubric). To compare, the course-approved rubric resembles the IELTS Task 2 writing rubric; both rubrics include the four criteria under different labels. Table 3 matches the criteria labels between the course and IELTS rubrics.

Table 3

*Writing Assessment Criteria: IELTS Task 2 Writing Rubric and Course Rubric Equivalents (British Council, 2020)*

Writing criteria	Purpose	Organization and development	Vocabulary	Grammar	
IELTS rubric criteria	Task achievement	Coherence and cohesion	Lexical resource	Grammatical range and accuracy	
Course rubric criteria	Proposition of argument	Development and organization of evidence/ support	Language use	Grammar	Citation

The course rubric differs from the IELTS rubric in the scoring scale. The course rubric uses varying weights for each criterion across six bands, and the final score is the sum of the criteria scores; the IELTS rubric weights the criteria equally, and the final score is the average of the criteria scores. Table 4 displays the general alignment of the band scores for both rubrics.

Table 4

*Score Bands for Course Rubric and IELTS Rubric*

Grade	Course rubric score bands (%)	IELTS rubric score bands
A	80 – 100	9
B	70 – 79	7 – 8
C	60 – 69	6
D	50 – 59	4 – 5
F	10 – 49	2 – 3
F	0	0 – 1

5. Interviews. All participants in the treatment group were invited to participate in the individual post-intervention semi-structured interviews. Fourteen participants (56% of the treatment population) who expressed an interest were interviewed in the last week of the semester on different days and at different times to accommodate participants' class schedule. Interviews were conducted in a meeting room in the English faculty offices. The interviewed participants were asked nine open-ended questions developed by the researcher about their experiences with the online tool and its perceived benefits and disadvantages (see Appendix D for the survey questions). All interviews were audio-recorded by the researcher.

### **3.7. Data Analysis**

The pre- and post-test scores from the writing test, the Nelson-Denny Reading Test (raw scores), and the WIAT-III Spelling Test were analyzed to respond to Research Questions 1 and 2 while interview transcripts were used to respond to Research Question 3. An independent rater with more than five years of experience in teaching English reviewed

pre- and post-test results. Each pre- and post-writing test was rated by the researcher and the independent rater using the course-approved matrix rubric. Prior to scoring the writing tests, the researcher and the independent rater discussed the rubric to mutually agree on the grading treatment for common student writing errors within the parameters of the rubric categories and ranges. Test scores were assigned in multiples of 5 (i.e., 45, 50, 55) to a maximum score of 100. Where the two raters' scores differed by ten points or more (e.g., 45 and 55), the test results were discussed until agreement was reached. Inter-rater reliability for the writing pre-tests was 0.95 and for the writing post-tests was 0.96, indicating high rater agreement. The independent rater also reviewed 15% randomly selected pre- and post-tests for reading, vocabulary, and spelling to verify the accuracy of the scores.

The data collected were analyzed using correlation tests, *t*-tests, and thematic analysis. Pearson correlation analyses were conducted between writing, reading, vocabulary, and spelling, with the total sample group's pre- and post-test scores as well as on their pre- to post-test gains. Descriptive statistics, independent *t*-tests, and one-way ANOVA were used to analyze the students' performance before and after the intervention. Analyses were completed comparing the results of the control group to the treatment group.

To explore students' performances more fully, the groups were subdivided into higher language proficiency and lower language proficiency based on students' Accuplacer scores in listening and reading. According to Cummins (2008), fluency in conversation could be misleading and mask difficulties students display on academic English tasks; proficiency in basic interpersonal communicative skills (BICS) can

develop quickly while proficiency in cognitive academic language proficiency (CALP) is more gradual. The distinction in language proficiency between BICS and CALP was originally proposed by Cummins (2008) to describe the gap in English language learners' (ELL) conversational language skills and academic language skills. Based on their Accuplacer scores, participants in this study exhibited proficiency in BICS and a lag in CALP. Participants' average Accuplacer scores for listening, reading, and writing correspond to CLB advanced, low-intermediate, and basic proficiency levels, respectively.

The threshold used to subdivide the control and treatment group participants for deeper examination was a combination of listening and reading scores. Participants with a listening score (L) equal to or greater than 85 (advanced low proficiency) and a reading score (R) equal to or greater than 51 (low-intermediate proficiency) were categorized in the higher-proficiency sub-group, and participants whose scores were below these thresholds were categorized in the lower-proficiency sub-group. The listening threshold was determined based on two considerations. First, listening skills are fundamental for the learning environment. Participants were domestic students and presumed to have a high proficiency in BICS; thus, a weakness in listening skills could foreshadow that a student may be underprepared and face potential academic difficulties. The listening score cut-off of L85 was also determined by the community college as the minimum score for placement in the next higher level English course. The reading score cut-off of R51 was the minimum level for this first-year English course; a score lower than R51 denotes low reading proficiency and indicates remedial support may be needed. While students enrolled in this course have been identified to have some weakness in academic

language skills, students with a combined listening and reading score below L85 and R51 face greater challenges and need additional support. Descriptive statistics and one-way ANOVA were used to compare the results among the control and treatment sub-groups.

Eleven males and three females from the research participants were interviewed individually about their views on the value of the tool for developing their reading and writing skills. Interviews were transcribed verbatim by the researcher using conventions identified by Li (2007). Thematic analysis was applied to analyze students' collective experiences and their perceived advantages and disadvantages of using the online collaborative tool. Following Braun & Clarke's process (2006), interview transcripts were read with coded ideas marked throughout. Transcripts and codes were reviewed through an iterative process to identify patterns and predominant ideas in student responses that were sorted until broader, key themes emerged.

## Chapter 4. Results

This section presents the quantitative and qualitative results of the intervention first with highlights of the findings, followed by the detailed results organized in response to the three research questions.

### 4.1. Overview

For Research Question 1, regarding whether there are correlations between first-year community college students' reading comprehension and expository writing skills, a positive moderate correlation was found between reading and writing when evaluating the total sample's combined pre- and post-test scores ( $r = .41, p < .001$ ). The total sample's pre-test reading scores were moderately positively correlated to pre-test writing scores ( $r = .30, p = .01$ ), and the total sample's post-test reading scores were strongly correlated to post-test writing scores ( $r = .49, p < .001$ ).

For Research Question 2, both the control group's writing pre-test ( $M = 54.5, SD = 8.2$ ) and post-test [ $(M = 66.7, SD = 11.3), t = -5.03, p < .001$ ] and the treatment group's writing pre-test ( $M = 51.9, SD = 11.0$ ) and post-test [ $(M = 67.8, SD = 8.4), t = -6.28, p < .001$ ] performances were found to be significantly higher after the intervention.

However, when the control and treatment groups were subdivided into higher language proficiency (HP) and lower language proficiency (LP) based on students' Accuplacer (post-admissions English placement test) scores (L85, R51) to further inspect results, the treatment LP sub-group had a significant positive difference in writing after the intervention ( $p = .01$ ) whereas the control LP sub-group did not have a significant difference (*ns*). Significant positive differences were observed in the means of the writing pre- and post-tests of the treatment as well as control HP sub-groups.

The thematic analysis focused on the experiences with the online collaborative tool of 14 treatment group students to answer Research Question 3. The experiences students shared were organized under two categories: “enhances learning” and “constrains learning.” The main themes for enhancing learning were social support, immediacy of feedback, and stimulus for action. The impediments that students encountered included access to the internet, effective devices, and adequate training.

#### **4.2. Interaction of Reading Comprehension with Expository Writing Skills**

To answer Research Question 1, “Are there correlations between the reading skills and the expository writing performance of first-year community college students?” Pearson correlations were used to identify relationships among writing, reading, vocabulary, and spelling. Correlations among these language skills for the total sample were examined under four aspects: using combined pre- and post-test scores, using pre-test scores only, using post-test scores only, and using the change from pre- to post-test scores. Cohen’s guidelines (Salkind, 2007) were used to interpret the size of a correlation ( $r < .10$  is negligible,  $.10 \leq r < .30$  is small,  $.30 \leq r < .50$  is moderate,  $r \geq .50$  is large).

Pre- and post-test scores of four measures analyzed: The pre- and post-test scores for the writing test, the Nelson-Denny Reading Test (raw scores), and the WIAT-III Spelling Test were used in the correlation analyses. The correlations between all four skills were statistically significant, using combined pre- and post-test scores with effect sizes ranging from moderate to large: reading-writing ( $r = .41, p < .001$ ), vocabulary-writing ( $r = .45, p < .001$ ), spelling-writing ( $r = .25, p = .01$ ), vocabulary-reading ( $r = .58, p < .001$ ), spelling-reading ( $r = .31, p < .001$ ), and spelling-vocabulary ( $r = .53, p < .001$ ) (see Table 5).

Table 5

*Pearson Correlations between Language Skills Based on Combined Pre- and Post-test Scores*

Skill		Writing	Reading	Vocabulary	Spelling
Writing	<i>r</i>	1.00			
	<i>N</i>	126			
Reading	<i>r</i>	.41**	1.00		
	<i>N</i>	115	116		
Vocabulary	<i>r</i>	.45**	.58**	1.00	
	<i>N</i>	119	116	120	
Spelling	<i>r</i>	.25*	.31**	.53**	1.00
	<i>N</i>	115	112	116	116

\* $p < .05$ ; \*\* $p < .001$

Pre- and post-test scores of four measures independently: Next, pre- and post-test scores in writing, reading, vocabulary, and spelling were analyzed separately to examine correlations further. Among pre-test scores from the four test measures, significant moderate correlations were observed between reading-writing ( $r = .30, p = .01$ ), and significant large correlations were observed between vocabulary-writing ( $r = .50, p < .001$ ), vocabulary-reading ( $r = .56, p < .001$ ), and spelling-vocabulary ( $r = .50, p < .001$ ). Small and statistically nonsignificant correlations were observed in the pre-tests between spelling-writing ( $r = .21, ns$ ) and between spelling-reading ( $r = .19, ns$ ) (see Table 6).

Table 6

*Pearson Correlations between Language Skills Based on Pre-test Scores*

Skill		Writing	Reading	Vocabulary	Spelling
Writing	<i>r</i>	1.00			
	<i>N</i>	68			
Reading	<i>r</i>	.30*	1.00		
	<i>N</i>	67	68		
Vocabulary	<i>r</i>	.50**	.56**	1.00	
	<i>N</i>	68	68	69	

Spelling	<i>r</i>	.21	.19	.50**	1.00
	<i>N</i>	68	68	69	69

\* $p < .05$ ; \*\* $p < .001$

All correlations between post-test scores in writing, reading, vocabulary, and spelling were statistically significant; the correlation sizes ranged from moderate between vocabulary-writing ( $r = .39, p = .01$ ), spelling-writing ( $r = .30, p = .04$ ) and between spelling-reading ( $r = .45, p < .01$ ) to large between reading-writing ( $r = .49, p < .001$ ), vocabulary-reading ( $r = .61, p < .001$ ), and spelling-vocabulary ( $r = .56, p < .001$ ).

Pearson correlations for post-test scores are presented in Table 7.

Table 7

*Pearson Correlations between Language Skills Based on Post-test Scores*

Skill		Writing	Reading	Vocabulary	Spelling
Writing	<i>r</i>	1.00			
	<i>N</i>	58			
Reading	<i>r</i>	.49**	1.00		
	<i>N</i>	48	48		
Vocabulary	<i>r</i>	.39*	.61**	1.00	
	<i>N</i>	51	48	51	
Spelling	<i>r</i>	.30*	.45*	.56**	1.00
	<i>N</i>	47	44	47	47

\* $p < .05$ ; \*\* $p < .001$

Pearson correlations were also used to examine correlations based on the difference or gain between the pre- and post-test scores from the four language skill tests. As shown in Table 8, no significant relationships among writing, reading, vocabulary, spelling were observed based on gains in pre- and post-test scores.

Table 8

*Pearson Correlations between Language Skills Based on Gains in Pre- to Post-test Scores*

Skill	Pre to Post-test Gains				
		Writing	Reading	Vocabulary	Spelling
Writing	<i>r</i>	1.00			
	<i>N</i>	58			

Reading	<i>r</i>	.05	1.00		
	<i>N</i>	48	48		
Vocabulary	<i>r</i>	.08	.01	1.00	
	<i>N</i>	51	48	51	
Spelling	<i>r</i>	-.17	-.07	.04	1.00
	<i>N</i>	47	44	47	47

### 4.3. Intervention Effect on Performance

To answer Research Question 2, “What is the effect, if any, of the use of OneNote to enhance students’ reading and writing skills?” *t*-tests and one-way ANOVA were applied to compare pre- and post-test scores collected from the writing test, the Nelson-Denny Reading Test (raw scores), and the WIAT-III Spelling Test, including

1. To compare pre-test results between control group and treatment group to establish comparability before treatment
2. To compare post-test results between control group and treatment group to identify differences in performance after treatment
3. To compare pre- and post-test results within each of control group and treatment group to identify differences that may be attributable to the intervention

These comparisons were performed with the control group and the treatment group in their entirety. Participants in each group were subsequently subdivided into higher language proficiency (HP) and lower language proficiency (LP) based on Accuplacer criteria (listening L85 and reading R51 scores), creating four sub-groups. The three comparisons were repeated with the four sub-groups (control HP and LP and treatment HP and LP) for closer examination.

### Comparison 1: Comparing pre-test means between control and treatment groups

Independent *t*-tests and descriptive analyses were used to determine the comparability among all participants in the control group against the treatment group for writing, reading, vocabulary, and spelling. To test the assumption of normality, measures of skew and kurtosis and the Shapiro-Wilk Test of Normality were applied to the control and treatment groups' pre-test and post-test scores. Since statistical software packages may calculate skew and kurtosis using different methods, these measures are often used as a diagnostic tool to determine normal distribution followed by a formal test of normality such as the Shapiro Wilk (Henderson, 2006; Joanes & Gill, 1998; Kim, 2013). Skew and kurtosis measures indicate the shape or symmetry of the data whereas the Shapiro-Wilk tests data against a null hypothesis that the data is normally distributed. The Shapiro-Wilk has been favoured for testing a wider range of sample distribution types and is more commonly found in statistical software packages (Henderson, 2006; Yap & Sim, 2011). Skew (ranged from -.35 to .33) and kurtosis (ranged from -.86 to .11) were within reasonable normality (skew  $|-1|$  to  $|1|$  and kurtosis  $|-3|$  to  $|3|$ ) (Brown, 2020; Dugar, 2018; Kim, 2013) for the control group's pre-test scores in reading, vocabulary, and spelling. Skew (-2.33) and kurtosis (9.59) for the control group's pre-test writing scores suggested the data were not normally distributed, which was ascribed to one student who submitted a blank writing pre-test. Removing this outlier resulted in skewness .08 and kurtosis -.20 which are within acceptable distribution ranges. Skewness (ranged from -.32 to .72) and kurtosis (ranged from -.94 to .38) were within reasonable normality for all pre-test distributions for the treatment group.

The Shapiro-Wilk test indicated normal distributions for the control group's pre-test scores in writing ( $W = .96, df = 33, ns$ ), reading ( $W = .96, df = 33, ns$ ), vocabulary ( $W = .98, df = 34, ns$ ), and spelling ( $W = .97, df = 34, ns$ ). The Shapiro-Wilk test for the treatment group's pre-test scores in writing ( $W = .94, df = 34, ns$ ), reading ( $W = .95, df = 35, ns$ ), vocabulary ( $W = .97, df = 35, ns$ ), and spelling ( $W = .96, df = 35, ns$ ) suggest normal distributions.

The pre-test scores of the control and treatment groups (all participants) in all four language skills were comparable before the treatment using  $t$ -tests (see Table 9). The sample sizes between the control and treatment groups were similar. Slight differences in the number of participants in discrete skill tests were a result of absent students when the test was administered. In the case of the control group's writing pre-test, the data from an outlier was removed for submitting a blank writing test. The mean scores were slightly higher in writing for the control group ( $M = 54.5, SD = 8.2$ ) than the treatment group [ $(M = 51.9, SD = 11.0) t = 1.08, ns$ ], in vocabulary for the control group ( $M = 36.2, SD = 13.3$ ) than the treatment group [ $(M = 33.6, SD = 11.4) t = .87, ns$ ] and in spelling for the control group ( $M = 26.1, SD = 8.5$ ) than the treatment group [ $(M = 22.1, SD = 8.7), t = 1.91, ns$ ]. None of the differences mentioned above were significant. In reading, the treatment group had slightly higher mean scores ( $M = 16.1, SD = 6.0$ ) compared to the control group [ $(M = 15.0, SD = 6.6), t = -.75, ns$ ], which were also nonsignificant.

Table 9

*Comparison of Pre-test Results for All Participants in Control and Treatment Groups*

Skill	Groups	<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p-value</i>
Writing	Control	33	54.5	8.2	1.08	NS
	Treatment	34	51.9	11.0		

Reading	Control	33	15.0	6.6	-0.75	NS
	Treatment	35	16.1	6.0		
Vocabulary	Control	34	36.2	13.3	0.87	NS
	Treatment	35	33.6	11.4		
Spelling	Control	34	26.1	8.5	1.91	NS
	Treatment	35	22.1	8.7		

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NS = nonsignificant

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Comparability was also tested between the HP sub-groups of the control group and the treatment group as well as the LP sub-groups of the control and treatment groups using one-way ANOVA and post-hoc tests applied to the pre-test scores of the sub-groups (see Table 10). None of the differences in mean scores were significant among the sub-groups in any of the language skills.

Table 10

*Comparison of Pre-test Results for HP and LP Participants in Control and Treatment Groups*

Skill	Groups	<i>N</i>	<i>M</i>	<i>SD</i>	<i>p-value</i>
Writing	Control HP	25	55.5	8.8	NS
	Treatment HP	20	56.0	11.4	
	Control LP	8	51.3	5.2	NS
	Treatment LP	14	46.1	7.3	
Reading	Control HP	25	15.6	6.8	NS
	Treatment HP	21	18.0	5.1	

	Control LP	8	13.3	5.8	NS
	Treatment LP	14	13.4	6.4	
Vocabulary	Control HP	25	40.0	11.6	NS
	Treatment HP	21	39.0	9.4	
	Control LP	9	25.8	12.8	NS
	Treatment LP	14	25.5	9.3	
Spelling	Control HP	25	27.4	8.1	NS
	Treatment HP	21	26.0	7.5	
	Control LP	9	22.4	8.9	NS
	Treatment LP	14	16.4	7.4	

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NS = nonsignificant

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#### Comparison 2: Comparing post-test scores between control and treatment groups

Post-test means of all the participants of the control group were compared with the treatment group using independent *t*-tests and descriptive analyses. Skew (ranged from -.45 to .92) and kurtosis (ranged from -1.33 to -.35) were within acceptable normal distribution ranges for post-test scores in writing, reading, vocabulary, and spelling for both the control group and the treatment group. Shapiro-Wilk tests indicate normal distributions in writing ( $W = .96$ ,  $df = 33$ , *ns*), reading ( $W = .94$ ,  $df = 26$ , *ns*), vocabulary ( $W = .95$ ,  $df = 28$ , *ns*), and spelling ( $W = .94$ ,  $df = 25$ , *ns*) for the control group and in vocabulary ( $W = .97$ ,  $df = 23$ , *ns*) and spelling ( $W = .96$ ,  $df = 22$ , *ns*) for the treatment group. Although non-normal distributions were detected for the treatment group's post-

test scores in writing ( $W = .91, df = 25, p = .03$ ) and reading ( $W = .87, df = 22, p = .01$ ), skew and kurtosis show that the data are not far from being normally distributed.

Results from independent  $t$ -tests showed no significant differences in the post-test scores between the control group and the treatment group in any of the four language skills (see Table 11). Mean comparison of post-test scores for the higher and lower proficiency sub-groups of the control and treatment groups also did not yield any significant differences based on one-way ANOVA (see Table 12).

Table 11

*Comparison of Post-test Results for All Participants in Control and Treatment Groups*

Skill	Groups	$N$	$M$	$SD$	$t$	$p$ -value
Writing	Control	33	66.7	11.3	-0.44	NS
	Treatment	25	67.8	8.4		
Reading	Control	26	18.5	6.9	0.57	NS
	Treatment	22	17.2	8.0		
Vocabulary	Control	28	38.7	13.0	0.36	NS
	Treatment	23	37.4	14.0		
Spelling	Control	25	27.1	8.3	0.98	NS
	Treatment	22	24.4	10.4		

NS = nonsignificant

Table 12

*Comparison of Post-test Results for HP and LP Participants in Control and Treatment Groups*

Skill	Groups	$N$	$M$	$SD$	$p$ -value
Writing	Control HP	24	69.7	10.9	NS

	Treatment HP	17	71.3	7.8	
	Control LP	9	58.6	8.1	NS
	Treatment LP	8	60.3	3.4	
Reading	Control HP	17	20.7	7.0	NS
	Treatment HP	14	20.3	8.5	
	Control LP	9	14.3	4.5	NS
	Treatment LP	8	11.9	2.7	
Vocabulary	Control HP	19	42.7	12.8	NS
	Treatment HP	15	43.3	11.1	
	Control LP	9	30.3	9.6	NS
	Treatment LP	8	26.1	12.3	
Spelling	Control HP	17	28.8	8.6	NS
	Treatment HP	14	28.7	8.0	
	Control LP	8	23.4	6.8	NS
	Treatment LP	8	16.8	10.1	

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NS = nonsignificant

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### Comparison 3: Comparing pre- and post-test means for control and treatment groups

To explore the effect of the intervention, independent *t*-tests and descriptive analyses were conducted on the pre- and post-test scores for the control group and the treatment group.

Significant differences were found in the control group's writing pre-test ( $M = 54.5$ ,  $SD = 8.2$ ) and post-test [ $(M = 66.7$ ,  $SD = 11.3)$ ,  $t = -5.03$ ,  $p < .001$ ] and in the treatment group's writing pre-test ( $M = 51.9$ ,  $SD = 11.0$ ) and post-test [ $(M = 67.8$ ,  $SD = 8.4)$ ,  $t = -6.28$ ,  $p$

< .001]. Results for reading, vocabulary, and spelling were nonsignificant for both the control and the treatment groups (see Table 13).

Table 13

*Comparison of Pre- and Post-test Results for All Participants in Control and Treatment Groups*

Skill	Groups		<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p-value</i>
Writing	Control	pre	33	54.5	8.2	-5.03	< .001
		post	33	66.7	11.3		
	Treatment	pre	34	51.9	11.0	-6.28	< .001
		post	25	67.8	8.4		
Reading	Control	pre	33	15.0	6.6	-1.95	NS
		post	26	18.5	6.9		
	Treatment	pre	35	16.1	6.0	-0.55	NS
		post	22	17.2	8.0		
Vocabulary	Control	pre	34	36.2	13.3	-0.75	NS
		post	28	38.7	13.0		
	Treatment	pre	35	33.6	11.4	-1.07	NS
		post	23	37.4	14.0		
Spelling	Control	pre	34	26.1	8.5	-0.45	NS
		post	25	27.1	8.3		
	Treatment	pre	35	22.1	8.7	-0.84	NS
		post	22	24.4	10.4		

NS = nonsignificant

One-way ANOVA and post-hoc results revealed a significant difference in the control HP sub-group's writing pre-test ( $M = 55.5, SD = 8.80$ ) and post-test ( $M = 69.7, SD = 10.90$ ),  $p < .001$ . A significant difference was also found in the results of the treatment HP sub-group's writing pre-test ( $M = 56, SD = 11.4$ ) and post-test ( $M = 71.3, SD = 7.8$ ),  $p < .001$ . There were no significant results in reading, vocabulary, or spelling scores in the HP sample of the control or treatment groups.

When comparing pre- and post-test writing scores of the control and treatment LP sub-groups, the former showed no significant difference between pre- ( $M = 51.3, SD = 5.2$ ) and post-test scores ( $M = 58.6, SD = 8.1, ns$ ) whereas there was a significant difference in the treatment LP sub-group's pre- ( $M = 46.1, SD = 7.3$ ) and post-test scores ( $M = 60.3, SD = 3.4$ ),  $p = .01$ . No significant differences were found in the LP sub-groups of either the control or the treatment groups in reading, vocabulary, or spelling (see Table 14).

Table 14

*Comparison of Pre- and Post-test Results for HP and LP Participants in Control and Treatment Groups*

Skill	Groups		<i>N</i>	<i>M</i>	<i>SD</i>	<i>p-value</i>
Writing	Control HP	pre	25	55.5	8.8	< .001
		post	24	69.7	10.9	
	Treatment HP	pre	20	56.0	11.4	< .001
		post	17	71.3	7.8	
	Control LP	pre	8	51.3	5.2	NS
		post	9	58.6	8.1	

	Treatment LP	pre	14	46.1	7.3	.01
		post	8	60.3	3.4	
Reading	Control HP	pre	25	15.6	6.8	NS
		post	17	20.7	7.0	
	Treatment HP	pre	21	18.0	5.1	NS
		post	14	20.3	8.5	
	Control LP	pre	8	13.3	5.8	NS
		post	9	14.3	4.5	
	Treatment LP	pre	14	13.4	6.4	NS
		post	8	11.9	2.7	
Vocabulary	Control HP	pre	25	40.0	11.6	NS
		post	19	42.7	12.8	
	Treatment HP	pre	21	39.0	9.4	NS
		post	15	43.3	11.1	
	Control LP	pre	9	25.8	12.8	NS
		post	9	30.3	9.6	
	Treatment LP	pre	14	25.5	9.3	NS
		post	8	26.1	12.3	
Spelling	Control HP	pre	25	27.4	8.1	NS
		post	17	28.8	8.6	
	Treatment HP	pre	21	26.0	7.5	NS
		post	14	28.7	8.0	

Control LP	pre	9	22.4	8.9	NS
	post	8	23.4	6.8	
Treatment LP	pre	14	16.4	7.4	NS
	post	8	16.8	10.1	

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NS = nonsignificant

The variations in the number of participants completing the tests were due to (1) the administration of the tests at different time periods and (2) the attrition of students during the semester, specifically as a result of timetable changes or course withdrawal. The writing tests were administered in the first and last weeks of the semester while the reading comprehension, vocabulary, and spelling tests were completed during the second and second to last week; thus, some students may have been absent for one or more of the tests. To adapt to the course curriculum, the pre- and post-writing tests were used to fulfil the diagnostic writing test in the first week of the semester and the final exam in the last week of the semester. Students present during the pre-tests at the start of the semester may have been absent during the post-tests again due to timetable changes or course withdrawal.

#### **4.4. Student Perspectives on the Use of an Online Collaborative Tool**

To answer Research Question 3, “What are students’ perspectives on using OneNote to enhance students’ reading and writing skills?” semi-structured interviews were completed with 14 participants. Individual interviews were conducted on campus with students’ instructor in the last week of the semester in a meeting room in the English department. The interviews ranged in length between 8 and 20 minutes although participants could take as long as they wished to respond. Interviews were transcribed, using pseudonyms

for students, and thematic analysis was conducted to identify recurring ideas.

Transcription conventions used follow the practice set out by Li (2014). Three dots (...) were used to indicate that the speaker paused in speech while six dots (.....) were used to indicate that the speaker did not finish the sentence. Brackets ( ) indicated transcriber's added content to complete the broken utterance or comments and curly brackets { } indicated visible behaviours. Back slashes in square brackets [///] were used to indicate unclear or indistinct speech.

Responses from student interviews were analyzed for repeated ideas and trends, and students' perceptions were subsequently grouped into two categories: "enhances learning" and "constrains learning." All interviewees except one reported a positive experience with online collaborative writing. The predominant reason given for the positive experience was that collaboration offered a peer support system that helped students through difficulties with comprehension or composition. Of the 14 participants, 12 mentioned that working with peers helped them to generate and develop ideas, thus making the process of writing and completing tasks easier and more efficient. One student (Susanna) described the collaborative learning environment as a source of inspiration because the group discussions offered "a different outlook or different perspective." Beyond assistance in learning, participants enjoyed the social relationships developed through working together. Almost half of the responses indicated that students viewed collaboration as an opportunity to become better acquainted with their classmates, which they considered essential to a positive educational experience. Ten participants referenced the formative feedback received from either their peers or their instructor; they found that the immediacy of the feedback encouraged them to persist and prompted them

to monitor their progress and self-correct. The novelty of the tool and its use in class was also noted by one-third of participants as an experience that captured their attention and curiosity. A few of the students welcomed the use of OneNote or other technology in the classroom because they associated it with preparation for the workplace.

Despite the engaging nature of using an online collaborative tool, participant responses were almost unanimous that technical issues with connectivity was the leading constraint to an enjoyable learning experience with OneNote. The time lapse between the typing of text and its appearance on a classmate's computer caused frustration and annoyance in participants, especially if previously typed text was lost. Other issues that could limit the learning experience were access to an effective device and training on the online collaborative tool. These issues were raised by about one-third of participants, and responses reflected a feeling of inconvenience rather than frustration.

Collaborative work can be problematic because there may be conflicts when differences arise among group members in decision-making, proficiency, or attitude. The student who expressed disappointment with the collaborative experience felt that the differences in language skill and attitude among group members hampered her having a positive experience and any potential gains she could have derived from collaboration (see the discussion along with interview transcript excerpts in the next chapter).

## **Chapter 5. Discussion**

Writing assignments in post-secondary education often stem from students' interaction with texts. Since students are commonly required to summarize a text or to present and support a position (Perin et al., 2017), reading comprehension and writing skills are interwoven and vital to the successful completion of academic tasks.

The aim of this study was to examine the relationship between reading and writing, the impact of an online collaborative tool on reading and writing, and the perceptions students have for using an online collaborative tool.

### **5.1. Reading-Writing Relations**

Results from the present study indicate a relationship between reading and writing. The largest, and statistically significant, correlations were found with vocabulary-reading and vocabulary-spelling. These results are in line with the literature (Allen et al., 2014; Schoonen, 2019; Shanahan, 1984) which has stated that vocabulary knowledge is a strong predictor of reading proficiency. The vocabulary-writing correlation was moderate in this study and fell within the range (.31 to .55) reported by other studies (Allen et al., 2014; Shanahan, 1984). The larger correlation of vocabulary-reading over vocabulary-writing suggests that vocabulary is a shared process between reading and writing but its role in each skill diverges. Fitzgerald and Shanahan (2000) suggested that the divergence occurs because the types of knowledge used in these skills, though similar, develop at different rates. The reading-writing correlation was moderate in the present study; other research results showed large correlations (Allen et al., 2014; Schoonen, 2019) although Shanahan's (1984) results showed a low reading-writing correlation. The low correlation observed by Shanahan may be due to the study design in which participants were

elementary students who wrote in a narrative-descriptive style about an illustration rather than from a reading prompt.

The post-test correlations were statistically significant and larger than the pre-test correlations in all relationships except for vocabulary-writing where the correlation dropped marginally from  $r = .50$  to  $r = .39$ . A notable increase in magnitude was observed in the reading-writing relationship (from moderate to large) and in the spelling-reading relationship (from low to moderate). These changes may reflect changes in participants' language development (Fitzgerald & Shanahan, 2000; Shanahan, 1984). Shanahan (1984) found that vocabulary became more important in reading as a child advanced in grade level. Further, the aspect of vocabulary knowledge in the reading-writing relationship was different between beginner readers and more proficient readers; word recognition and spelling had a stronger influence in the reading-writing relationship for beginner readers while word diversity and complexity were prominent in the reading-writing relationship for more proficient readers. Variations in the strength of the relationships of vocabulary and spelling with reading and writing is complex and may be due to differences in student participants' proficiency level or task type (Parodi, 2007; Yang, et al., 2019); these warrant further study to better understand their impact.

The results from the present study build on previous research by providing insight into the change in correlations after a semester of instruction in expository writing. Aside from Schoonen's (2019) study, the literature reviewed measured correlations at one point in time. Allen et al.'s (2014) investigation of the relationship between lower and higher-level cognitive skills focused primarily on the reading comprehension process, and to a lesser extent, in writing proficiency. Participants in Allen et al.'s study completed all tests

during a one two-hour lab session; thus, correlations reflect results based at one time and did not consider changes. Schoonen (2019) conducted researcher-developed tests in Dutch and in English as a foreign language annually over three consecutive years beginning with participants in Grade 8. Year-over-year, reading and writing correlations in Dutch remained stable; reading and writing were initially more strongly correlated in English than Dutch but dropped to the Dutch levels by the third year, leading Schoonen to conclude that the reduction in English correlation results were indicative of participants' English proficiency gains, explaining that as participants were exposed to more language activities and became more proficient in English, they were able to draw on other knowledge resources for reading and writing. Parodi (2007) also came to similar conclusions in his study; he believed that the lower reading and writing correlations he observed may be attributed to participants' experience with a particular skill. As a result, participants had developed a range of resources that they might draw on to compensate for weaknesses whereas the larger correlations were associated with more complex skills that were newer to participants; thus, they relied on a narrower, more focused range of knowledge. In contrast to Schoonen's results, the reading-writing correlation of the present study increased from pre-test to post-test during the time of the intervention; this increase may demonstrate that participants were developing but had not yet achieved proficiency in the more complex expository, or argumentative, skills.

## **5.2. Online Collaborative Writing Effect on Performance**

The pre- and post-test writing results for the all-participants control and treatment groups showed statistically significant improvement over the course of the intervention. The writing results for both treatment and control HP sub-groups were also statistically

significant. The writing results for the treatment LP sub-group, however, showed statistically significant improvement while the control LP sub-group's writing results were not significant, showing the intervention seemed to have an effect on lower proficiency students. A positive effect from collaborative writing is not surprising. From a social constructivist view, peer interaction can provide support during the learning process (Falk-Ross, 2001), and researchers have observed better-quality writing (Storch, 2005; Yeh, 2014). One of the few quantitative studies on writing performance over time was conducted by Shehadeh (2011) who reported that students participating in collaborative activities had improved significantly overall in their writing performance compared to students who completed the activities individually.

The same instructional design integrated with consistent writing practice was used for both the control and the treatment groups, which may have contributed to the overall improvement in writing. Using structured strategy instruction with scaffolded activities and including repeated opportunities for writing practice have been found to improve the quality of writing (MacArthur et al., 2015; Miller et al., 2015). In the present study, although participants in both the control and the treatment groups followed the same instructional plan with collaborative practice, the treatment LP sub-group's writing results statistically improved over the control LP sub-group's writing scores which seems to indicate that the use of an online collaborative tool may have contributed to positive results. Social strategies, such as discussions, have been found to be used by lower proficiency students more often than by higher proficiency students to manage their learning (Li, 2009, 2010). The perceptions of students about using the online collaborative tool, OneNote, discussed later may offer further insight.

Reading pre- and post-test results for the control and treatment all-participants groups and HP and LP sub-groups were not significant. Similarly, results from the vocabulary and spelling pre- and post-tests were nonsignificant. One possible explanation for these results is that although reading tasks were included in the present study's intervention, guided strategies to develop comprehension, vocabulary, and spelling were not emphasized in the instructional activities. Another reason that results were nonsignificant may be that students placed less priority or overlooked errors on certain language aspects during collaborative activities (Kessler et al., 2012; Shehadeh, 2011). Shehadeh (2011) suggested that collaboration may be less beneficial to students on more straightforward skills that could be learned independently such as spelling. Kessler et al. (2012) noted that students seemingly overlooked errors they considered less important during collaborative writing although they could accurately make the corrections. In these situations, lower-proficiency students would not benefit fully from collaboration because knowledge-sharing would be selective; in other words, if one of the collaborators is more proficient, some errors may be considered negligible and left uncorrected unbeknownst to a lower proficient student. Similarly, in cases where group members are weaker or have gaps in their linguistic knowledge, students would be unable to share or construct knowledge effectively (Shehadeh, 2011; Vorobel & Kim, 2017). The method of assigning the intervention to intact course sections may have also had an impact on results. Course scheduling often results in a cohort of students from one program scheduled in a particular section and a cohort of students from another program scheduled in a second section; hence, the results for the treatment and control groups may have been influenced by the characteristics of students from different programs. It was

noted earlier that the gender mix for all participants were fairly even with 33 males and 36 females, but after dividing the course sections into treatment and control groups, the treatment group had a greater number of males and the control group had a greater number of females which may have been a result of course scheduling. Research has found that females generally outperform males in reading and writing (Reilly et al., 2019), so it is possible that gender may have contributed to the performance scores. Finally, results may have been affected by the cognitive capacity of participants. When students learn, information is temporarily stored for processing in working memory which has a limited capacity (McCutchen, 1996). Beck (2009) noted that students may have difficulty maintaining the level of thinking required for transforming knowledge into writing. With the complex cognitive processing required for integrated writing tasks, participants may not have had the capacity to focus on other skills—their cognitive resources may have been absorbed with assimilating the skills for developing their writing.

As mentioned, the writing results from the present study correspond to the findings of previous studies (Shehadeh, 2011; Suwantarathip & Wichadee, 2014) showing that collaboration and technology scaffolding can improve students' writing, yet there are key differences in the present study that make an important contribution in understanding students' development in expository writing. A review of the literature uncovered a lack of studies on student performance in integrated writing tasks or writing from source. Of the studies analyzing performance, the writing tasks were a paragraph in length and resembled independent writing where students may use personal knowledge or experience to develop their argument rather than source material. For instance, Shehadeh (2011)

used 100-word narrative and descriptive paragraphs for the pre and post-writing tasks in his study comparing the effect of individual writing with pair writing on performance, and although participants in the treatment group collaborated throughout the writing process, technology was not part of the experiment. Suwantarathip and Wichadee (2014) explored the use of Google Docs outside of the classroom to facilitate collaborative writing against traditional face-to-face collaboration. Similar to Shehadeh, participants in Suwantarathip and Wichadee's study wrote 150-word paragraphs (cause and effect and process) for their writing tests. Weston (2015) was the only study located that evaluated performance in source-based writing; however, the study's focus was on investigating the impact that teaching reading, writing or blended strategies had on writing rather than how technology or peer collaboration may be used effectively. In contrast, the present study used source-based argumentative essays to capture participants' academic language skills along with technology to enable peer collaborative writing in the classroom, thereby including conversation for students to engage in persuasive "talk" (Bruffee, 1984); further, the instructional units focused on higher-level skill development such as paraphrasing and summarizing in addition to argumentative composition elements, going beyond narrative or descriptive writing. The lack of empirical research on source-based writing makes the findings of this study an important contribution to understanding the higher-order cognitive processing occurring when developing expository writing skills. By writing lengthier pieces involving source material, students engage with both reading and writing for an extended time and at a deeper level which offers an opportunity to observe how students navigate the higher-level skills characteristic of writing from sources, thus moving attention from lower-level aspects.

### **5.3. OneNote in Use**

Overall, participants expressed a positive experience with using OneNote in the classroom for developing their language skills, with many describing the experience as enjoyable or “fun.” Students favoured the social interaction, the instantaneous feedback, and the novelty of the experience although they did find drawbacks with technology and adequate training.

#### **5.3.1. Online tool enhances learning**

All participants interviewed expressed that collaboration with their peers was the primary attribute that made working with the digital tool, OneNote, appealing—a social support system. The students’ perspectives on the benefits of collaboration varied and can be categorized as follows: understanding concepts, developing social networks, and completing tasks efficiently.

*Learning support.* Among interviewees, 86% mentioned that collaborating with their peers helped them to understand information and overcome any difficulties. Tomas commented that

...um I feel like sometimes when getting the main idea sometimes it can be like really confusing sometimes it can be {thinking, shifts in chair}...um...you know you can be thrown off and you don’t know what the main idea is but like for OneNote I feel like it’s really like convenient that you know...Everyone like everyone’s um since um everyone has their own idea of what the main idea is and as a class, we all can talk about what really is the main idea.

Jagadev shared his experience on the benefit of collaboration:

I wasn't as good as with topic sentences, and then one of our exercises was with topic sentences, and then someone in our group, I forgot what name, and then he was pretty good and then...when he was writing and then I would just point in (add), so some of the points would be good and some might not be, so then he explained why not, why isn't it good, why you should improve, how you should improve it.

Mali explained how collaboration helped him:

Because like there's a lot of times, where like say me for instance. I'll get stuck on one like [///] part of the paragraph or I'll have my essay going and then I'll have 2 paragraphs done but I can't get my examples for my third, and then if you have another person helping you, or two more people helping you, then that...that wall that you hit, wouldn't be there or like it'd be an easy obstacle to get around with more people helping.

The benefit of having a peer to help during learning has been mentioned in previous research, often relating to learning vocabulary or grammar (Chao & Lo, 2011; Storch, 2005). Although some studies have noted that participants collaborated on a text's content or organization (Elola & Oskoz, 2010; Shehadeh, 2011; Vorobel & Kim, 2017), the current study's participants offered specific detail on the barriers they faced with reading and writing.

*Peer relationships.* For 43% of interviewees, collaboration afforded an opportunity to get to know their classmates and learn about them. Maninder explained that "using OneNote for English it brought random people from different programs all together so like we

didn't feel left out," while Raj summed it up by saying that working in a group granted a chance "to meet like let's say you don't know (people you didn't know), you get put into a group, you don't know this person and you get to meet with them, talk with them, make new friends. Yeah {nodding}." Two students applied the group interaction as a reflection or self-assessment of their skills. For instance, Maninder and Edward believed that using the online collaborative tool helped them understand the skills that group members had and, in turn, helped them to understand their own skills and contributions. This self-evaluation of performance in relation to peers can indicate an increased engagement with a task and a deeper analytical thought process (Mendenhall & Johnson, 2010). It is worth noting Tomas' disclosure on the importance of connecting with classmates:

...in college um sometimes it could be like {thinking}...you can be alone, I would say and um...especially with different classes sometimes you're like um with different courses you need like a lot of um...communication with one another to be able to like pass a class but for OneNote,... {nodding} yeah I feel like it's a, it's a great idea to...to actually like you know have a bond.

Tomas' comment reflects that the support from peers can become deeper and more personal (Falk-Ross, 2001; Guthrie et al., 2007). While the majority of interviewees enjoyed collaborating, one student experienced disappointment with her group, saying "It's a little frustrating for myself working with individuals with different levels, so it was a little harder ... maybe with a different group I would've had a different experience." Courtney did not feel that everyone in the group was as invested in the process, thus contributing less meaningfully. Researchers have noted that collaboration may be unsuccessful at times from uneven participation due to differences in language

proficiency (Shehadeh, 2011; Storch, 2005) or differences in group behaviour or attitude (Ducate et al., 2011; Li & Zhu, 2013; Neumann & Hood, 2009). In addition to language proficiency and motivation, Li & Zhu (2013) noted that learner factors such as group member familiarity and technology skills could also influence the group dynamics and suggested that group formation and assessment are central to fostering positive learning experiences.

*Task efficiency.* Besides connecting socially with each other, relating to and building on each others' ideas were other aspects of collaboration that students cited as a benefit, consistent with findings from other researchers (Chao & Lo, 2011; Elola & Oskoz, 2010; Shehadeh, 2011; Storch, 2005; Vorobel & Kim, 2017). Several students associated collaboration with pooling individual skills to complete a task efficiently. As Mali put it, "More minds help to get the job done." According to Mali, "There'd be one person writing and then someone else can focus more on just like the ideas of what should be written, so I think that helped." Fifty percent of interviewees valued the sharing of ideas, explaining that with the online collaboration tool, everyone could see the thoughts and opinions of others, making it easier to expand their own ideas. With online collaboration, students seemed more willing to solicit help from each other than they would have been if they had had to physically approach others, as working with pen and paper would require. Maninder described it as a "team effort" where students were writing individually, yet he could scroll through OneNote and discover "this idea's perfect so let me put it in mine and see if we can work together." Susanna compared the OneNote collaboration to "a live thing where you can easily put it (idea) up for everyone to see," while Ayesha shared,

There was a chat column between the entire class and we were like sharing and trying to, you know, figure things out and just being able to...all of us in a group of being able to access the same document at the same time with each of our answers loading as we go, I think that was great.

Figures 2 and 3 show samples of how groups approached the writing task of outlining their argument. In Figure 2, Kiri elaborated Quan’s idea into a topic sentence, but both seemed to go back and forth with each other’s ideas to build their outline.

**Kiri & Quan**  
 Wednesday, April 18, 2018 4:42 PM

**Writing question**  
 In a preliminary essay, discuss strategies that could be used to prevent young people from cyberbullying their peers.

1.  
 In order to prevent cyberbullying it is important to educate children, parents, law enforcement.

1. Educating children  
 Educating can prevent children from cyberbullying other people and understand the consequences

Recognize bullying when it happens  
 With the ability to recognize they can stop and tell an adult or law enforcement  
 Amanda Todd committed suicide because she sent a picture she was being cyberbullied and wasn't able to identify when she was getting cyber bullied leading to a tragic death which could have been prevent if she knew she was being cyber bullied

2. A key part to preventing cyber bullying for teens is to also educate parents on different ways protect their children  
 Parents will be better informed on what cyberbullying can do and take action so that their children are in a safer environment  
 Parents and teens have a hard time talking about this issue but if parents are educated then it will make it easier Easier to communicate and talk about with their children if they are being cyber bullied and will create a more comfortable environment  
 Set restrictions and boarders to prevent cyber bullying before it happens like pictures and private content should be properly protected and not shared on the internet

3. Educating the law enforcements the stages of cyberbullying and preventing it from happening  
 Understanding the seriousness of cyberbullying and not taking it as a joke  
 Recognizing cyber bullying easier on social media  
 Example: facebook having privacy issues and not making users feel safe

Good job.  
 Sounds like young people need to be educated about the dangers?  
 There seems to be a theme of education  
 Remember to link to law enforcement - maybe discu

Figure 2: Sample of Pair Collaboration in Outlining an Argument

The group featured in Figure 3 approached the task differently and seemed to divide the task so that each worked on a separate supporting idea; however, a joint effort was visible where Avi developed the topic sentence from Kim’s ideas. These samples show how students retained information such as the writing prompt visible while they worked in

different parts of the page; the “boxes” of text could be rearranged easily later. They also display how technology may be used to help students become aware of the stages of writing and how the activities in each stage interconnect (Hunter & Begoray, 1990).

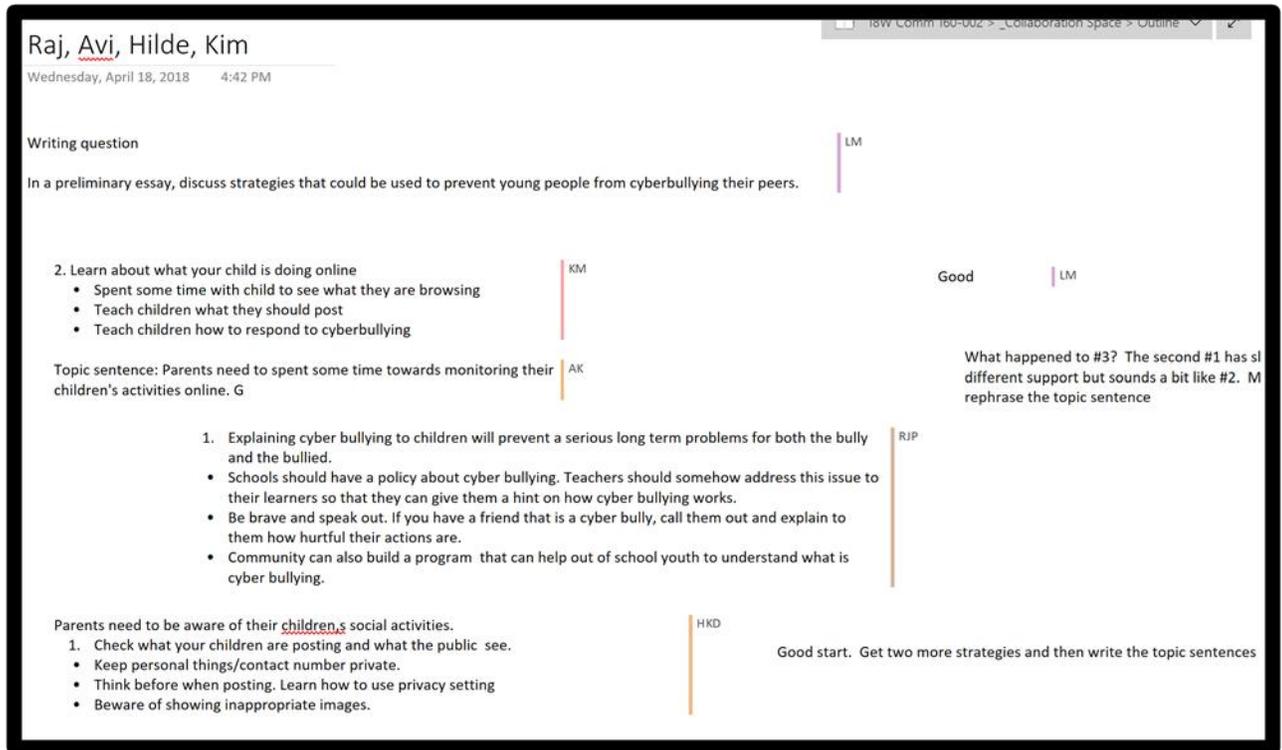


Figure 3: *Sample of Multiple Users Collaborating on an Argument Outline*

*Immediacy of feedback.* The immediacy of feedback was the next significant benefit students identified. Feedback was received almost instantaneously through OneNote’s proofing tool; similar to Microsoft Word, OneNote marks misspelled words or grammar errors. For example, Maninder stated that he learned to correct his spelling errors as he was using OneNote:

...constantly I kept writing it wrong and then as OneNote kept fixing it up, I realized okay I’m writing it wrong and then okay, so this is the proper way to do

it, so I was like okay so...And that's not just once it was more than once, right, so like I was learning on the process of it.

Students also found peer feedback beneficial; to students, peer feedback was another resource to support their learning. Two students explained that the online collaboration allowed them to see each other's work, communicating with each other for help instead of waiting for teacher assistance. Tomas commented that he felt everyone could "rely on one another" and "they could just correct you there, in a matter of seconds."

The third aspect of feedback that students liked was the formative feedback received from the teacher. As students worked in OneNote, the teacher would check on each group's progress in OneNote, leaving brief notes of encouragement or guidance and working directly with groups as needed. Nine of the fourteen interviewees spoke positively about the feedback. Trevor said, "Useful was when you were able to communicate right away with us putting notations in how to fix this or improve that." Susanna "like[d] the way you correct us; you could put it up and you can show to other students and that way it's easier for us to learn from it," adding, "It's a fun way to absorb the feedback instead of having it [in] a strict way or having a rubric." Mali said, "It helped if we made a mistake, then you can at any time just give us a hand or give a little comment and then it would make us rethink it and help us out that way."

A screenshot of one group's summarizing efforts and the feedback received is shown in Figure 4. The page is updated in real-time, so the latest version of the group's work with their revisions is visible.

The screenshot shows a OneNote interface for a collaboration space titled "Mali & Ayesha". The page content includes:

- A task prompt: "1) Ex. 4 Summarize: 'Canadian society in the twenty-first century is very different from that of early Canadians, and not just because we have smartphones and tablets. Two hundred years ago, people lived half as long as they do today, and families had twice as many children. In general, all Canadians are living longer, which means not only is our working life extended, but we can expect to retire from work and live another fifteen to twenty years to enjoy the fruits of our labours. Canadians born in 1700 had an average life expectancy of thirty to thirty-five years due to poor diet, disease, and accidents. By 1831, four generations had passed, and there had been a slight improvement in life expectancy, with males expecting to live to age 40 and females to 42. During the next four generations, major medical breakthroughs and public health education eliminated a number of infectious diseases and reduced infant mortality, so that Canadians' life spans were almost double what they were a little more than a century previously. But while Canadians can expect a long and healthy life, with many living well into their seventies or eighties, the average life span will not increase indefinitely. While we can expect to live longer than the Canadians of the 1700s, we can't expect to live forever.'"
- A student's summary: "Canadian society now is much different than it was two hundred years ago because of how far time has advanced. People were known to live half of long as they do today. Canadians can now enjoy many more years and higher life expectancies due to our advancement in medicine, health education, technology, etc. Major breakthroughs in these advancements include: eliminating a number of infectious diseases and reducing infant mortality. Along with better dieting and more accident awareness, Canadians can now expect 15-20 more healthier years than their ancestors."
- Peer feedback comments:
  - Green box: "Good overall theme/main idea. Now need to sort out the key arguments the author uses to explain/support the main idea. Maybe decide on the key supporting ideas."
  - Orange box with a smiley face: "Great!"
  - Green box: "Canadian society now is far more different from two hundred years ago, not just because of devices. life expectancy has doubled. Life expectancy in the 1700s ranged from thirty to thirty-five because of diseases, poor diet and accidents. Moreover, life expectancy grew to 40 a hundred years later. in the next four generations, life spans doubled after a century due to the elimination of diseases. However, life span will not increase forever."

Figure 4: *Example of Summarizing with Feedback*

The receptivity students felt towards feedback is in line with Nobles and Paganucci's (2015) and Reynolds and Anderson's (2015) findings that students can be positively affected by feedback received through the use of digital tools. Mali's comment also demonstrates self-monitoring behaviour. Some students find it easier to discuss difficulties with their peers (Vorobel & Kim, 2017), but some perceive feedback from teachers to be more informed (Ducate et al., 2011; Vorobel & Kim, 2017); thus, the benefits of feedback would be maximized by including both peer and teacher feedback.

*Stimulus for action.* The third benefit students derived from the use of the online collaborative tool was engagement. All but one student made comments that reflected some aspect of engagement that either made learning enjoyable or minimized the effort to learn. The novelty of the tool appealed to 35% of students who said that OneNote was a

different way to learn and they had not had a similar experience. For four students, having information organized in sections for course notes and handouts made it easier to learn. These students were able to locate and retrieve information effortlessly; Maninder confessed that although he may have a binder for course notes, he could not always recall where he filed his papers.

The view that OneNote eased feelings of boredom was shared by four students. Using technology with features such as stickers and drawing tools made the effort of learning less onerous. Three students added that technology is prevalent and incorporating technology in the classroom is a natural progression for learning. As Maninder put it,

...like using pen and paper and everything which is literally boring now these days that's why we're always on our phone because we don't want to pay attention to the papers now, and like while we're on the technology it kind of sets a mindset to like oh this is what we're doing, this is how our life is now, so like it's more interesting for us to engage.

Denzel reflected that “times are changing, pen and paper is getting replaced.” Other researchers have reported similar sentiments of novelty and boredom that change over time to eventually lead students to recognize the benefits technology can bring to their learning (Alsubaie & Ashuraidah, 2017; Shehadeh, 2011; Storch, 2005).

Typing instead of handwriting lessened the “stress” students had when composing; almost half the interviewees commented on the simplicity of editing and rewriting when using the online tool. To illustrate, two of the students described revising their writing as

having to “start back to zero” or erasing “the whole thing,” and it was frustrating for them. Antoine explained his preference for typing: “...my handwriting is really bad; I can barely understand what I wrote so OneNote is really useful for me.” Maninder was concerned about not recalling an idea if it was inadvertently erased. With OneNote, Maninder could keep his original intact and use “cut and paste” or “undo” if he lost his focus or idea. When revision is made easier, students can focus on more comprehensive changes to their text rather than on low-level edits (Nobles & Paganucci, 2015).

When talking about engagement, most students referred to elements they found entertaining or convenient as capturing their attention; however, five interviewees also introduced active participation from group members as a requisite. With ideas and their authors identifiable on screen (see Figures 2 and 3), it was conspicuous if someone was not contributing. Interviewees contrasted tasks using the online tool with tasks using pen and paper, saying that students were more likely to participate in the writing tasks on OneNote whereas a student “would probably sit at the back of the class and try to wait for class to be done...and put it off” if using traditional notebooks or paper. The transparency of the work was motivation for students to participate; both Denzel and Maninder expressed it as a sense of obligation to work on the task. Three of these students extended the idea of student involvement, commenting that students lacking confidence in their language skills were likely to feel less anxiety when taking part in activities. These comments reflect students’ interest in a reasonable level of contribution by other group members on assigned tasks, reinforcing Li and Zhu’s (2013) views that careful consideration of organizing and assessing groups is necessary for positive learning environments.

### 5.3.2. Constraints to learning

There were three main constraints to learning that students encountered using the online collaborative tool, OneNote: internet availability, device accessibility, and training.

*Access to internet.* The main source of students' dissatisfaction with the use of the online tool was the connectivity. Although students were enthused by the accessibility of course material and cooperative construction of a piece of writing, they were irritated by the slow synchronization of input. The lag between one student's writing and its appearance on another student's computer screen annoyed students. During the lag, students could not tell that another student might be composing or editing, and a student's writing would be deleted unintentionally. Raj described his discontent, saying,

...each person has to build their own box (for writing) right and then let's say people don't know and then they start typing; it (computer) starts lagging and it starts backspacing everything, (erasing everything) and it's just a whole confusion that's the only downside. And sometimes when you have like example, like charts on it, like you fill in the box, like that's another thing that bothers me because like I'd type and then I don't know, it just bothers me a lot {nodding, leans forward}.

Similar to results reported by other researchers (Alsubaie & Ashuraidah, 2017; Chao & Lo, 2011; Ducate et al., 2011; Liu et al., 2018; Matthew et al., 2009), this frustration was interviewees' primary complaint, distracting them from the actual skill development.

*Access to effective devices.* The second constraint students identified was the lack of a suitable device with which to participate. A little more than one-third of interviewees mentioned that having the right device affected their productiveness. Susanna noticed

that some students did not have a mobile device, or the device was not suitable for the activities, and she believed that it “may hinder their learning experience.” Jagadev was more straightforward in his assessment: “...a student might not be (able to) afford...maybe not (be able to) afford a computer or laptop. And then, like for me, I had iPad and it was harder to type.”

*Adequate time for technology training.* The final limitation that students mentioned was their familiarity with the online tool, which is consistent with prior research (Matthew et al., 2009; Neumann & Hood, 2009). Students seemed to adapt quickly to the use of the tool; three of the interviewees explained that being accustomed to using technology and recognizing OneNote’s similarities to Word made using the tool comfortable. However, Denzel, Edward, and Raj suggested that an initial training phase to demonstrate the features of the tool and how it would be used in activities would have been worthwhile. Uncertainty over the mechanics of the online tool seemed to temporarily interrupt students’ efforts to learn.

For the most part, students favoured the use of technology as a collaborative tool in the classroom and sought feedback from their peers and teacher to develop their language skills. The shortcomings they identified were primarily situational and not necessarily within their control, yet inhibited attention to their learning.

## **Chapter 6. Conclusions**

This exploratory study contributes to the limited literature on source-based writing assignments. The intervention comprised an instructional approach that integrated reading and writing to systematically develop discrete expository writing skills, demonstrating positive and significant results for the lower proficiency treatment group over the lower proficiency control group. The experimental pre- and post-test design used standardized tests to measure three different reading aspects to explore the reading-writing connection as well as student performance. The findings of this study reveal that collaborative writing facilitated through the use of online collaborative tools, may potentially help narrow the gap that separates students with weak reading and writing skills from achieving academic success. The educational implications of this study followed by the limitations and future research are addressed below.

### **6.1. Educational Implications**

This study contributes to the limited body of research on writing from sources in three key aspects. First, there is a general scarcity in research on source-based writing, or integrated writing tasks. Among the literature reviewed, the majority referred to argumentative writing supported by personal experiences, and many evaluated narrative or descriptive writing tasks rather than using integrated writing tasks. By using integrated writing tests and standardized tests in reading comprehension, vocabulary, and spelling in a pre- and post-test design, this study provides insight into the change in the relationship between reading and writing while students are developing the higher-order skills essential in source-based writing. Over the course of the intervention, the correlation between reading and writing performance increased which may suggest that students

were acquiring the language and writing knowledge relevant to source-based writing. The results observed in the pre- and post-tests reinforce that the skills students were learning are cognitively challenging which may need to be considered during instruction. Few studies have examined the reading and writing relationship before and after an intervention using source-based argumentative essays and strong standardized reading tests as measures.

Second, the intervention combined reading and writing in the weekly activities. Using readings covering a variety of topics and in varying lengths as a basis for discussion and writing gave students an opportunity to gain a deeper awareness of the reader-writer relationship and to engage with text features such as vocabulary, content, and organization. Combining peer collaboration with the learning framework helped students to differentiate colloquial language from academic language and motivated them to apply the expository writing skills taught. Findings from the interviews indicated that students received this intervention well and were enthusiastic about the opportunities to collaborate with their peers. It was evident that students found that collaborating with their peers helped them understand main ideas in readings and develop supporting points in their writing. The social connections students made with their peers are important for engaging students and contributed to their academic success; therefore, integrated reading and writing activities complemented with peer collaboration should be included in lesson planning when teaching writing from sources where possible.

The third important aspect related to source-based writing that this study contributes is the systematic instruction design. Each instructional unit followed a deliberate sequence of integrated reading and writing activities focused on a discrete skill,

beginning with fundamental skills and leading students to write an expository essay complete with a clear thesis, well-developed supporting points, and incorporated source material. The instruction methodology shifted the learning environment from teacher-centred to student-centred, which created an opportunity for students to build self-monitoring skills and engage in their own learning, especially important for lower proficiency students who may need guidance to identify knowledge gaps and develop effective learning strategies.

Another implication of the study arises from students' perceptions of using an online collaborative tool, and the effect that it had on students' writing. The novelty of the tool encouraged students to invest time writing and engaging with text material. The convenience of writing and revising enabled students to make changes to their writing more easily than they could with pen and paper. In addition, the built-in features such as spell-check addressed low-level revisions while allowing students to focus on other aspects of writing such as developing and organizing content. The accessibility inherent in the tool allowed students to write and simultaneously view each other's work, and the chance to revisit the work outside of class created opportunities for students to reflect on not only their own work but also the work of their peers. Finally, the intervention provided a more constructive environment for both peer and teacher feedback though some students may lack the linguistic knowledge to resolve problems on their own or feel the teacher is more qualified to give feedback. In a traditional classroom setting, teachers may find it challenging to review and provide formative feedback to each group; however, with the use of OneNote in this study, the instructor was able to check on each group's progress and encourage or redirect students while they were in the process of

writing, leaving more time available for in-depth help to groups without excluding anyone. The flexibility of moving or copying information made it easier for the instructor to teach students methods of organizing material so that students could organize their writing and see their ideas transform. The variation observed in performance between the treatment and control lower proficiency groups seems to indicate that OneNote may be an effective support tool to use for teaching academic language skills to lower-proficiency students.

## **6.2. Limitations and Future Research**

There were several limitations to the present study. The first was the sample. When participants are enrolled in a course, program cohorts may be grouped in a section or some attrition may occur—students may change their course schedule, or they may withdraw. As a result, slight deviations from a normal data distribution were observed. Further, the representation of males to females was fairly balanced for the entire sample; however, the distribution became uneven when class sections were assigned to control and treatment groups—the control group had a majority of males while the treatment group had a majority of females. In addition, the majority of students were between the ages of 18 and 24, but three students in the control group were in their forties. Thus, the gender distribution and the age of students may have had an impact on results. In future, a larger pool of participants is required to substantiate the results and to explore differences between higher and lower proficiency students.

Also, the use of multiple *t*-tests and their error structure may be a limitation; when a *t*-test is conducted several times, the actual error may be underestimated, resulting in a

greater than 5% chance of Type I error. T-tests were used to analyze the treatment and control group results and ANOVA was used for the HP and LP sub-group results.

The intervention took place over one semester which is a very short time for students to assimilate complex cognitive skills that students may have had limited exposure to previously. Future research is required with longitudinal data and an expanded curriculum design to examine skills separately and their correlations to understand more deeply the teaching and learning of source-based writing skills.

Finally, although students could navigate the online collaborative tool to competently complete activities, some expressed a desire for more training up-front. Students' competence in using technology tools may have had an impact on results. Future research with technology should include adequate time for students to familiarize themselves with key features so that students can use the technology confidently and attend to activities with less distraction.

It is evident from the present study that underprepared students entering post-secondary education may benefit from a well-structured instructional plan although results should be reviewed with caution. By leveraging peers and technology as scaffolds in the learning process, students may be able to narrow their linguistic gap and enhance their expository writing skills to meet the academic demands of community college.

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## Appendices

### Appendix A: Informed Invitation Letter and Consent Form – Data Collection

**Research Study:** The impact of an online collaboration tool on first-year college students' learning of expository writing skills

Dear Students,

We cordially invite you to participate in a research study entitled “The impact of an online collaboration tool on first-year college students' learning of expository writing skills”. This study has been reviewed by the College Research Ethics Board REB #2017XX, originally approved on December 18, 2017, and by University of Ontario Institute of Technology REB #14592, originally approved on November 24, 2017.

Please read this consent form carefully, and feel free to ask the Researcher any questions that you might have about the study. If you have any questions about your rights as a participant in this study, please contact the Research Ethics Coordinator, University of Ontario Institute of Technology at 905-721-8668 x3693 or [researchethics@uoit.ca](mailto:researchethics@uoit.ca).

**Investigators:** The study is being conducted by Lillian Mak and Dr. Jia Li, Faculty of Education, University of Ontario Institute of Technology, Oshawa, Ontario.

**Purpose of the study:** Researchers at the college and University of Ontario Institute of Technology are conducting a study on how an online collaborative tool (OneNote) supports students' reading and writing development. This study will examine how students feel about using OneNote to enhance their reading and writing skills.

**Description of the study:** College Communications introduces the standards of college level English and helps students develop academic reading and writing skills. As part of the course, there will be reading and writing tests and in-class writing assignments.

Lillian Mak would also like to use the information you provide in the context of the course in her research. The research concerns the impact of reading comprehension on expository writing and how OneNote supports reading and writing development. Specifically, and with your written consent, Lillian Mak would like to use the following activities from the course in her research:

- Pre-writing sample and writing tests
- Reading tests
- In-class writing assignments

There is no additional work beyond the tasks required to complete the course and there is no difference in the tasks whether you choose to participate or not to participate in the study.

**Risks and benefits:** There are no expected risks beyond what might be encountered day-to-day associated with this study. Through this study, you may find the research activities are helpful to improve your reading and writing skills and you will be contributing to the teaching of academic reading and writing skills.

**Voluntary nature of participation:** Participation is voluntary. The information that is shared will be held in strict confidence and discussed only with the research team. If you choose not to participate, this will not influence your standing in your program. If you participate, you may withdraw from the study at any time with no effect on your academic status. Consent forms will be collected, placed in a sealed envelope, and will be retained by the department. Lillian Mak will not receive these or be able to make use of any of the course information for her research until after the final grades have been submitted to ensure that until that point, she does not know who has agreed that she can use their information in her research and who has not. You may decide to withdraw from this study at any time by advising the department and may do so without penalty. If you withdraw from the research project at any time, any data that you have contributed will be removed from the study before the study is completed and you need not offer any reason for making this request.

**Costs or compensation for participation:** There are no direct costs or compensation for participating in this study.

**Confidentiality:** All information you provide is considered completely confidential. Your name and identity-related information will not be included with the data collected in the study. All data will be reported as group data. No individual will be identified in any report. Confidentiality will be provided to the fullest extent possible by law, professional practice, and ethical codes of conduct. The data will be securely stored in locked offices to which only researchers associated with this study have access. The data will be kept for five years after publication of the research, after which it will be confidentially shredded.

**Questions about the study:** If you have any questions about the study, please feel free to contact the researchers, Lillian Mak or Jia Li, at 905-721-8668 x3708 or by email at [jia.li@uoit.ca](mailto:jia.li@uoit.ca). If you would like a copy of the final report, please email Lillian Mak.

If you have any questions about your rights as a research participant or the conduct of the study and wish to speak to someone who is not associated with the study, please contact the Research Ethics Coordinator, University of Ontario Institute of Technology at 905-721-8668 x3693 or [researchethics@uoit.ca](mailto:researchethics@uoit.ca).

**Consent to Participate:**

1. I have read the consent form and understand the study being described.
2. I have had an opportunity to ask questions and my questions have been answered. I am free to ask questions about the study in the future.
3. I freely consent to participate in the research study, understanding that I may discontinue participation at any time without any negative consequence. A copy of this Consent Form has been made available to me.

Yes  No I agree that my in-class tests and assignments can be used for research purposes

\_\_\_\_\_  
Name of Participant

\_\_\_\_\_  
Date (year/month/day)

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Signature of Researcher

## Appendix B: Sample Intervention Lessons

<b>Task</b>	<b>Procedure-Treatment Group</b>	<b>Procedure-Control Group</b>
<p><b><i>Intervention #3 Develop summarizing skills to respond to reading comprehension questions</i></b>            In-class, students receive instruction on summarizing and practice writing using exercises in textbook.            Students will work collaboratively on summary writing tasks (short answer responses on audience, purpose, tone).            Exercises are in their textbook p. 169 build to paragraph summary exercise</p>	<p>Students review Chapter 15 (Lipschutz et.al, 2017) p. 168 on acceptable summary and tips for summarizing (10 min)            In their groups, students use OneNote to collaboratively write responses that require summarizing skills in both reading and writing to Ex 1 (summarize phrases) and Ex 2 (summarize 216-word paragraph to one third i.e., 72 words) (35 min)             Class debrief – teacher asks students to compare paraphrasing and summarizing and reflect on process for each (5 min)</p>	<p>Students review Chapter 15 (Lipschutz et.al, 2017) p. 168 on acceptable summary and tips for summarizing (10 min)            In their groups, students use paper to collaboratively write responses that require summarizing skills in both reading and writing to Ex 1 (summarize phrases) and Ex 2 (summarize 216-word paragraph to one third i.e., 72 words) (35 min)             Class debrief – teacher asks students to compare paraphrasing and summarizing and reflect on strategies for each (5 min)</p>
<p><b><i>Intervention #4 Understand the structure of a paragraph by identifying main ideas and supporting ideas in a paragraph</i></b>            In-class, students receive instruction on paragraph development (topic sentence and support sentences).            Students will work collaboratively on developing topic sentences and support details. Students will identify topic sentences and supporting sentences in model paragraphs in chapter and practice writing sentences using exercises in textbook.</p>	<p>Students review Chapter 19 (Lipschutz et.al, 2017) pp. 199-200 on paragraph structure, topic sentence definition p. 200, controlling idea definition p. 203, and supporting details pp. 205-210 (10 min)            1. In their groups, students collaboratively write topic sentences in Ex 1 using OneNote (15 min)            2. In their groups, students practice identifying topic and main supporting sentences with Ex. 3 p. 208 (discuss) (5 min)            3. Students collaboratively write supporting sentences in Ex 7 using OneNote (25 min)            Class debrief – groups will be paired to review task #3 with each other and offer feedback on whether support is specific (5 min)</p>	<p>Students review Chapter 19 (Lipschutz et.al, 2017) pp. 199-200 on paragraph structure, topic sentence definition p. 200, controlling idea definition p. 203, and supporting details pp. 205-210 (10 min)            1. In their groups, students collaboratively write topic sentences in Ex 1 using paper (15 min)            2. In their groups, students practice identifying topic and main supporting sentences with Ex 3 p. 208 (discuss) (5 min)            3. Students collaboratively write supporting sentences in Ex 7 using flipchart paper (25 min)            Class debrief – groups will be paired to review task #3 with each other and offer feedback on whether support is specific (5 min)</p>
<p><b><i>Intervention #5 Understand development of argumentation</i></b>            In-class, students will read model argumentation essay</p>	<p>Students review Chapter 25 (Lipschutz et.al, 2017) pp. 291-293 on argumentative techniques (10 min)</p>	<p>Students review Chapter 25 (Lipschutz et.al, 2017) pp. 291-293 on argumentative techniques (10 min)</p>

<p>“Smartphones and lousy friends” (Bielski, 2014) p. 295 and receive instruction on identifying adequate support for arguments in preliminary essay through in-depth reading and analysis. Model argumentation essay analysis questions:  <i>In your own words, what is Bielski’s thesis statement? Which sentence, in particular, is her thesis statement?</i>  <i>What is her strongest supporting detail? Why? What is her weakest supporting detail? Why?</i>  <i>What does she want her readers to do?</i>  <i>Is her argument reasonable? Why or why not?</i></p>	<p>Students review model argumentation essay “Smartphones and lousy friends” (Bielski, 2014) p. 295 (5 min)  1. In their groups, students analyze model argumentation essay “Smartphones and lousy friends” p. 295. Students discuss analysis questions linking back to techniques in textbook. Students write response for Q4 in OneNote (15 min)  Class debrief – groups are paired and review responses to analysis Q4 and understanding of adequate support. Groups discuss: What relevant evidence or examples does the group give to support their justification? (10 min)</p>	<p>Students review model argumentation essay “Smartphones and lousy friends” (Bielski, 2014) p. 295 (5 min)  1. In their groups, students analyze model argumentation essay “Smartphones and lousy friends” p. 295. Students discuss analysis questions linking back to techniques in textbook. Students write response for Q4 on notepaper (15 min)  Class debrief – groups are paired and review responses to analysis Q4 and understanding of adequate support. Groups discuss: What relevant evidence or examples does the group give to support their justification? (10 min)</p>
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## Appendix C: Writing Rubric for Self-developed Writing Test

Proposition of argument 10	Development and organization of evidence/support 35	Language use 25	Grammar 20	Citation 10	Grade /100
Responds with excellent thesis/ topic sentences; correct formula thesis/topic sentence with opinion word controlling ideas; includes three major points/ paragraph.; provides expected length (5-7 sent/ par)	Demonstrates critical thinking and exceptional techniques of essay and paragraph development; Provides exemplary forms of support, including paraphrased content from reading and personal experience, and concluding content; uses consistent development techniques	Demonstrates excellent facility with a high level of language and vocabulary; shows clarity, precision and effectiveness in sentence types; demonstrates mastery of collocation & methods of achieving coherence and unity	Uses grammar and mechanics flawlessly with rare error(s); no major errors; shows excellent facility with all sentence types	Uses references correctly with introduction, information and citation; includes number of references required	A+ 90-100  A 80-90
8-10	28-35	20-25	16-20	8-10	
Writes good thesis/topic sentences in response to question; Uses topic sentence /2 strong and 1 weak that are directly linked to controlling idea(s); formula is mainly correct; Provides good length	Provides highly developed paragraphs integrating content from experience and reading; provides relevant support, concluding content, often uses very good examples	Demonstrates very good knowledge and use of collocation & coherent techniques; seldom uses vague statements; shows good vocabulary choice and language use	Uses all sentence types easily with occasional errors in choice or their punctuation. Demonstrates strong grasp and use of grammar and mechanics (1-5 errors)	Uses mainly appropriate references with necessary introductory phrase and citations; includes number of references required	B 70-79
7-7.5	24.5-27	17.5-19	14-15	7-7.5	
Provides adequate topic sentences that answers question; some weakness in formula of topic sentence; adequate organization of points; length is adequate	Develops the majority of points with adequate support- may repeat some content; develops ideas with original points and paraphrased content from reading; may or may not use examples	Chooses correct and adequate vocabulary, occasional vague statements; increases frequency of errors when more complex language attempted; achieves coherence through transition words; Uses adequate sentence collation	Demonstrates an average grasp of most sentence types; writes with a few grammatical and mechanical errors (1-3 major errors, 3-5 minor errors); uses both simple and compound sentences with few errors	Demonstrates adequate sense of reference and citation use with occasional errors; may include some of the required references	C 60-69
6-6.5	21-24	15-17	12-13	6-6.5	
Responds partially to the question; with absent, unclear or not parallel thesis/ topic sentences; uses incomplete formula in topic sentences; uses inappropriate essay length	Uses weak development with insufficient relevant content; uses support that is flawed in clarity and /or logic; uses no original content in developing paragraphs	Uses transitions and collocation inconsistently; language inadequate in many areas (frequent slang, contractions and informal phrases); attempts at complex language results in many inaccuracies	Shows some grasp of sentence structure and grammar rules (many major and min. errors)	Provides insufficient number of references to the reading; references poorly integrated and cited; uses poor introductory phrase for citation	D 50-59
5-5.5	17.5-20	12.5-14	10-11	5-5.5	
Writes on topic but not in response to question; uses structure, length, and/or format outside of requirements; Uses thesis/topic sentences that is not parallel/ may be incorrect structurally	Uses points of development that may be weak, irrelevant, unconvincing, and/or unclear; Use of content may be entirely from reading without citation; uses only original content	Attempts at complex language or structure result in significant numbers of inaccuracies; uses informal vocabulary; weak use of coherence and collation	Frequent use of major grammatical & mechanical errors – poor grasp of rules	Demonstrates incorrect knowledge of how to integrate or cite referenced material; includes content from reading without citation	F 1-49
1-4.5	1-17	1-12	1-9	1-4.5	

Uses incorrect structure, length, format and response to question 0	Demonstrates no grasp of development; no explanation or examples used 0	Uses spoken language in writing; Uses excessive slang 0	Uses a grammatical error in each sentence 0	Uses no citations or references as requested 0	F 0
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## **Appendix D: Semi-structured Interview Questions**

1. Overall, how would you describe your experience using OneNote?
2. What features of OneNote did you like, and why?
3. What features of OneNote did you dislike, and why?
4. In what ways, if any, did using this tool help you with your reading skills?
5. In what ways, if any, did using this tool help you with your writing skills?
6. How do you feel about using OneNote when you work with your peers on assignments?
7. What benefits, if any, are there to using OneNote?
8. What disadvantages, if any, are there to using OneNote?
9. Would you like to add other comments, or do you have any suggestions as to using technology tools to support your reading and writing in college?