

A SYSTEMATIC REVIEW OF COLLABORATIVE WRITING IMPLEMENTATION IN K-12 SECOND LANGUAGE CLASSROOMS

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Abstract: In recognizing that writing is a social act, collaborative writing has received increased attention in second language (L2) classrooms. A large body of research literature explores the varied ways of L2 collaborative writing development in tertiary education settings, but relatively little is known about the implementation of collaborative writing in K-12 classrooms. In this study, the authors systematically reviewed a total of 12 peer-reviewed empirical studies on the use of collaborative writing in K-12 L2 classrooms to provide new insights into this particular context. Comprehensive analysis has been conducted, including the research context, writing task, mode of interaction, research focus, and assessment. The findings reveal that the majority of the selected studies have involved K-12 students learning English as a target language with diverse writing tasks. Three different collaborative writing approaches have been implemented in K-12 classrooms of L2, including face-to-face, online, and a blend of both styles. The main research foci of the reviewed literature are writing processes, writing outcomes, and collaborative writing affordances. Diverse assessment methods are utilized to measure L2 writers' writing process and product. Drawing on the analyses, the researchers discuss the pedagogical implications and research strands that deserve further examination.

Keywords: collaborative writing, K-12, L2 writing, writing instruction, L2 instruction

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This systematic review addresses an emerging area of research in second language (L2) writing that concerns using collaborative writing in K-12 classrooms. Much of the earlier work on L2 collaborative writing surrounded

discussion about adult L2 learners' collaborative writing experience in college settings. However, students in K-12 settings are facing multiple high-stakes assessments while they bear heavy language learning objectives. Therefore, whether collaborative writing can benefit L2 learners in K-12 settings the same as the adult population demands further analysis. In this study, we begin with a brief explanation of collaborative writing research, then address research questions that guide this systematic review. It should be noted that throughout this paper, the term L2 is used as an umbrella term to refer to both second and foreign languages, although the researchers acknowledge that there are important differences between second and foreign language contexts in terms of exposure to the target language and learners' need and motivation to write in the target language (Manchón, 2011).

Collaborative writing has received considerable attention, and there are several approaches to its definition. In a broader sense, collaborative writing means "the co-authoring of a text by two or more writers" (Harris, 1994, p.2). Under such a broad definition, individual writers composing with a potential audience in mind or seeking assistance, such as peer editing or peer planning, from others at some stages of their writing would qualify as collaborative writing. Ede and Lunsford (1990) provide an alternative view of collaborative writing. They define a writing activity as collaborative if there are (1) substantive interaction during all stages of writing, (2) shared responsibility of decision making over the text produced, and (3) a single text product. Along this line, Storch (2013) elucidates collaborative writing as "an activity where there is a shared and negotiated decision-making process and shared responsibility for the production of a single text" (p. 3). Additionally, collaborative cognition emerges when one or more people reach insights that neither could have reached alone nor can be traced back to a single writer's contribution (Stahl, 2006). In this systematic review, we follow Storch's (2013) definition of collaborative writing and consider mutual engagement and a coordinated effort by all group members throughout the writing process as key to collaborative writing. Thereby, peer planning or peer editing will not be considered collaborative writing in this paper because the interaction only occurs at one stage of the writing process. Thus, the ownership of text produced rests with the individual writer (Storch, 2013). The collaborative tasks that only focus on language or task negotiation but do not require the

production of written texts are not regarded as collaborative writing either (Storch, 2013).

L2 writing scholars have taken various theoretical and methodological approaches to study collaborative writing. Storch (2016) identified three major strands in research on collaborative writing. The first strand examines the factors that are likely to encourage languaging through collaborative writing (e.g., Storch, 2001; Swain & Lapkin, 2002). These studies tend to document the interactional and edit history data to examine the interactional patterns fostered through collaborative writing. While the first orientation focuses on how learners collaborate, the second strand studies the connection between writing processes and writing products. Scholars (e.g., Kim, 2008; Watanabe & Swain, 2007) look into whether the languaging used during collaborative writing process leads to language development and its effect on the text produced. Another strand investigates what affords successful collaborative writing (e.g., Ducate et al., 2011; Kost, 2011). Technological tools such as wikis and Google Docs are the focus of this research strand.

Since the purpose of Storch's (2016) chapter was to provide a general understanding of collaborative writing and the range of factors that impact the use of collaborative writing in L2 classrooms, we still have little information on the use of collaborative writing in K-12 contexts. In a recent review of 21 empirical studies on computer-mediated collaborative writing in L2 contexts, Li (2018) further confirms that the majority of studies (19 out of 21) have been conducted in tertiary education settings. What characterizes the collaborative writing research where learners learning a L2 in K-12 education remains under-researched. In order to gain a better understanding of the use of collaborative writing with L2 learners in primary and secondary school levels, we reviewed the relevant body of literature to provide a holistic picture of the current state of collaborative writing research conducted in K-12 L2 classrooms. For this aim, the current review explores the following research questions: (1) What research contexts have been investigated? (2) What collaborative tasks have been investigated in K-12 L2 classrooms? (3) How was collaborative writing implemented in the K-12 L2 classrooms? (4) What aspects of collaborative writing did the reviewed literature examine? (5) How was the collaborative writing assessed?

METHOD

The research questions were the guiding criteria for the inclusion of publications in the systematic review. The two researchers conducted library searches separately to identify relevant empirical research published in peer-reviewed academic journals between 1990, when Ede and Lunsford first established a comprehensive definition of collaborative writing, and December 2019, when the library search was performed. The databases consulted were *ERIC (EBSCO)* and *Google Scholar*. Three categories of keywords were used for the searches: (1) *collaborative writing*, (2) *second language learning* or *foreign language learning* or *additional language learning*, and (3) *K-12* or *elementary school* or *middle school* or *high school* or *primary school* or *secondary school*. Based on Storch's (2013) definition of collaborative writing and the study's focus on K-12 contexts, the researchers excluded studies that (1) asked a group of participants to produce more than one writing product; (2) investigated native speakers only; or (3) examined beyond the K-12 settings. Three articles that did not contain enough information about the participants' linguistic backgrounds or research contexts were also excluded. Based on the criteria, a total number of 12 peer-reviewed articles were collected (see Table 1).

Table 1. An Overview of the Reviewed Studies

Author	Year	Title	Journal
Alghasab & Handley	2017	Capturing (non-) collaboration in wiki-mediated collaborative writing activities: The need to examine discussion posts and editing acts in tandem	<i>Computer Assisted Language Learning</i>
Alghasab, Hardman, & Handley	2019	Teacher-student interaction on wikis: Fostering collaborative learning and writing.	<i>Learning Culture and Social Interaction</i>
Challob, Bakar, & Latif	2016	Collaborative blended learning writing environment: Effects on EFL students' writing apprehension and writing performance	<i>English Language Teaching</i>

Chu, Capio, van Aalst, & Cheng	2017	Evaluating the use of a social media tool for collaborative group writing of secondary school students in Hong Kong	<i>Computers & Education</i>
Mak & Coniam	2008	Using wikis to enhance and develop writing skills among secondary school students in Hong Kong	<i>System</i>
Musk	2016	Correcting spellings in second language learners' computer-assisted collaborative writing	<i>Classroom Discourse</i>
Swain & Lapkin	1998	Interaction and second language learning: Two adolescent French immersion students working together	<i>The Modern Language Journal</i>
Vorobel & Kim	2017	Adolescent ELLs' collaborative writing practices in face-to-face and online contexts: From perceptions to action	<i>System</i>
Wong, Chen, Chai, Chin, & Gao	2011	A blended collaborative writing approach for Chinese L2 primary school students	<i>Australasian Journal of Educational Technology</i>
Woo, Chu, & Li	2013	Peer-feedback and revision process in a wiki mediated collaborative writing	<i>Educational Technology Research and Development</i>
Woo, Chu, Ho, & Li	2011	Using a wiki to scaffold primary-school students' collaborative writing	<i>Journal of Educational Technology & Society</i>
Woodrich & Fan	2017	Google Docs as a tool for collaborative writing in the middle school classroom	<i>Journal of Information Technology Education: Research</i>

The two researchers separately read each publication in full, taking notes of emerging themes and keywords from their annotated bibliography. Next, the researchers compared their list of emerging themes and highlighted keywords

to generate a collaborative spreadsheet that contains the five significant overlapping themes: research contexts, collaborative writing tasks, modes of interaction, aspects of collaborative writing, and assessment. The two researchers read the collected studies again, focusing on the emerging themes, and synthesized and documented relevant information under each category. The research team then reviewed, analyzed, and discussed together to compile and refine the findings reported below.

FINDINGS AND DISCUSSION

This section presents the findings to the research questions by displaying the key information from the aspects of research contexts, writing tasks, collaborative writing implementation, research focus, and assessment. Implications for pedagogical implementations and future research are also discussed following each section. Since the findings are drawn from collaborative writing research conducted in K-12 settings, L2 students or L2 learners are employed to refer to the learners receiving L2 education from K-12 education.

Research Contexts

The majority of the studies (10 out of 12 studies) were conducted in contexts where English is learned as the target language, which calls for more diversity in collaborative writing research. Two studies investigated languages other than English, which were French and Chinese. Swain and Lapkin (1998) studied 8th graders learning French as a second language in Canada, and Wong et al. (2011) studied primary school students studying Chinese as a second language in Singapore.

Among the ten studies involving English language learning objectives, four of them were conducted in English as a second language (ESL) contexts (Mak & Coniam, 2008; Vorobel & Kim, 2017; Woo, Chu, & Li, 2013; Woodrich & Fan, 2017), where students receive English input outside the classroom. Six studies (Alghasab & Handley, 2017; Alghasab et al., 2019; Challob et al., 2016; Chu et al., 2017; Musk, 2016; Woo et al., 2011) were conducted in English as a foreign language (EFL) contexts where students receive English as a school subject but has limited communicative function outside the classroom (Richards et al., 1985). Out of the six studies conducted

in EFL contexts, five involved secondary school students from grade 9 to 12 (Alghasab & Handley, 2017; Alghasab et al., 2019; Challob et al., 2016; Chu et al., 2017; Musk, 2016). Only one study (Woo et al., 2011) implemented collaborative writing with primary school L2 writers.

While most of the studies examined collaborations among English language learners, one study (Woodrich & Fan, 2017) investigated L2 students working collaboratively with English native speakers. In the study conducted by Woodrich and Fan (2017), a total of 97 participants, including both ESL students and native English-speaking students, collaboratively wrote three argumentative essays using Google Docs. One of their findings indicated that when ESL students were grouped with native English-speaking students, they contributed more to online collaborative writing activities and showed more improvement in writing face-to-face activities. The finding suggests that various contextual factors, including group arrangements in terms of language proficiency levels and contexts of interaction (i.e., face-to-face and online), may impact collaborative writing in various aspects.

Writing Tasks

The analysis also reveals that a wide range of collaborative writing tasks has been implemented in different contexts, including essays, posters, reports, biographies, and stories. These tasks were typically performed by collaborative writing groups of two or six students. Studies with collaborative writing activities in pairs (3 out of 12 studies) and small groups (9 out of 12 studies) did not show significantly different findings. Regardless of the number of writers in a collaborative writing group, an essay was the most common task genre among the reviewed studies (4 out of 12). Four studies that implemented an essay as a task include descriptive, narrative, and argumentative essays. Three out of four studies that had an essay as a task were conducted in ESL contexts (Mak & Coniam, 2008; Vorobel & Kim, 2017; Woodrich & Fan, 2017). Compared to studies conducted in ESL contexts where there was a unity of task genres to a certain degree, relatively more diverse task genres were implemented in EFL contexts, including essay, poster, report, biography, story, etc. While most studies (9 out of 12) had their participants collaboratively perform one task, three studies (Vorobel & Kim, 2017; Woo et al., 2013; Woodrich & Fan, 2017) had their participants collaboratively perform multiple

tasks involving two different task genres or multiple productions of the same task genre.

Designing appropriate tasks is a crucial aspect when implementing collaborative writing activities in K-12 L2 classrooms. Research has shown that the nature of the writing task will influence students' interactions and collaborations (Mak & Coniam, 2008; Swain & Lapkin, 1998). For example, Mak and Coniam (2008) argued for a situated and authentic design of the collaborative writing tasks as it will afford learners a real-world perspective as well as draw their attention to the content of the writing. In their study, the researchers assigned 24 EFL learners into groups of four and asked the groups to collaboratively create a school brochure to their parents using wikis. This task was closely related to students' school life and was well situated in a real-world context. It was found that the task's real outcome boosted students' confidence as L2 writers and tapped students' creative skills.

Although collaborative writing studies draw implications that it is important for practitioners to design appropriate tasks tailored to their students (Mak & Coniam, 2008), little is known about how different types of tasks influence collaborative writing. We still have little clue how collaborative writing groups writing an essay differ from the other groups writing a report. What are the appropriate collaborative writing tasks when writers are in pairs, small groups, and large groups? What are the benefits of implementing multiple tasks over implementing a single task? In order to have a better understanding of collaborative writing, more research on tasks is needed.

Collaborative Writing Implementation

In the collected studies, collaborative writing was implemented through three modes of interaction: (1) face-to-face, (2) online, and (3) blended interaction. Two studies (Musk, 2016; Swain & Lapkin, 1998) were conducted in face-to-face settings where teachers and students collaboratively work on a writing task within the same physical environment. Collaborative writing was also found to be implemented online (4 out of 12) using various technologies through which students can collaborate synchronously and asynchronously, without physically being present in the same space (Alghasab & Handley, 2017; Chu et al., 2017; Mak & Coniam, 2008). Technologies employed in online collaborative writing include wikis (e.g., PBworks, PBwiki, wikispace.com), class blogs, Viber, Word documents, and PowerPoint.

However, it should be noted that the integration of technology can also occur in face-to-face collaboration. For example, students can collaboratively write a text together in a computer lab while negotiating with each other face-to-face. What differentiates the two types of collaborative writing interactions are whether collaboration among participants occurs face-to-face or solely via online technologies.

Woodrich and Fan (2017) compared the implementation of collaborative writing in face-to-face and online contexts, investigating different advantages and challenges of engaging in each interaction mode. Using a quantitative approach, Woodrich and Fan (2017) assessed students' collaborative writing products conducted in face-to-face, online, and anonymous online settings in terms of the clarity of assertion, coherence of example, details of explanation, the significance of argument, grammar, mechanics, and formatting. Using Statistical Package for the Social Sciences, the results of Analysis of Variance showed that the average writing scores for face-to-face, online, and anonymous online contexts were significantly different ($F = 8.02, p < .001$). This confirms that each mode of interaction may have different benefits for L2 writers.

Acknowledging the benefits of both face-to-face and online interactions for L2 writers, a large number of the studies (7 out of 12) adopted a blended approach, including both face-to-face and online interactions, to implement collaborative writing (Alghasab et al., 2019; Challob et al., 2016; Vorobel & Kim, 2017; Woo et al., 2011; Woo et al., 2013; Wong et al., 2011; Woodrich & Fan, 2017). By integrating both face-to-face and online interactions, blended collaborative writing allows more “flexibility, personalization, and interactivity derived from an online component and direct observation, immediate feedback and spontaneity” (Challob et al., 2016, p. 239).

One example of a blended approach is to integrate both synchronous (face-to-face) and asynchronous (online) collaboration into a VSPOW (vocabulary, sentence, paragraph, outline, and writing) model (Wong et al., 2011). After dividing students into groups of four to five, the researchers asked their students to collaboratively create a story about a student getting caught cheating during an exam. During each of the four stages (vocabulary pooling, constructing sentences and paragraphs, outlining texts, to the essay writing process), groups of students first sat together in a computer lab, working together face-to-face. Students then accessed the same wiki page at home after school, revising and editing their work individually. The research findings

showed that intensive peer-learning had taken place during the class when learners were working face-to-face in small groups, while a relatively low level of out-of-class wiki editing activities was achieved. This suggests that the value of face-to-face discussion in a blended approach cannot be overlooked. Also, asynchronous wiki-based activities out of class can serve as supplementary means with advantages of self-pacedness and flexible learning.

Many studies brought up that learners' proficiency in using online writing technologies and their openness to such technologies greatly impact their collaborative writing performances (Chu et al., 2017; Woo et al., 2011; Woo et al., 2013). Therefore, specific training on these factors is necessary to successfully implement collaborative writing in L2 classrooms. For example, Chu et al. (2017) reported that students' limitations in operating the technology appeared to be one of the greatest challenges for using online collaborative tools in K-12 contexts. In addition to students' familiarity with technology, the beliefs and expectations from the institutions, teachers, and parents indirectly affected students' openness to the online learning platforms. Students in Chu et al.'s study (2017) showed significantly lower usage, and less collaboration online might be due to their lack of competency in technology, which indicates a greater need for technology support. K-12 students, in particular, are more likely to be affected by such technological factors. Moreover, most of the collected studies utilized wiki-based technology for face-to-face, online, and blended learning. With the advance of technology, we now have more variety of online collaborative writing tools. Future research should also investigate various types of technologies to obtain more comprehensive research evidence concerning collaborative writing tools.

Research Focus

Writing Process

One main research focus lies in the students' collaborative writing process. Many of the reviewed studies have examined students' interactions (Alghasab & Handley, 2017; Alghasab et al., 2019; Swain & Lapkin, 1998) and revision behaviors (Mak & Coniam, 2008; Musk, 2016; Woo et al., 2013) during collaboration in relation to their L2 development. In collaborative writing, writers interact with each other throughout the various stages of the writing process to produce one shared text. This nature of collaborative writing

requires writers to engage in continuous interactions, which have captured the researchers' attention.

Research has found that collaborative writing among L2 writers promotes interactions leading to their L2 development (Alghasab et al., 2019; Chu et al., 2017; Swain & Lapkin, 1998). For example, Swain and Lapkin (1998) examined two French immersion adolescents' interactions when working collaboratively on a jigsaw task. They found that collaborative writing tasks opened a space for L2 writers to co-construct knowledge about language through engaging in Language Related Episodes (LRE). The authors coded the interaction between the participants into units of instances of learners' deliberate language use, such as grammar discussion (i.e., LRE). Based on the quantity and type of LRE learners produced, they proved that the language used between the two participants was both an enactment of mental processes and an occasion for language learning (Swain & Lapkin, 1998).

In the online space, researchers have investigated students' collaboration and non-collaboration behaviors in collaborative writing activities. For example, drawing upon coding schemes developed by previous research (i.e., Arnold et al., 2009; Li, 2013; Li & Kim, 2016; Kessler & Bikowski, 2010; Mak & Coniam, 2008), Alghasab and Handley (2017) were able to identify students' interactional behaviors that were not visible in their wiki posts. Students were engaged in responding to feedback in the edit history and showed reluctance to revise wiki text in response to the discussion. The finding suggests that a more comprehensive understanding of learners' interaction during collaboration should include both the discussion posts and edit history that capture students' interactions and revisions behaviors.

The studies reviewed have examined not only student-student interactions but also teacher-student interactions. Alghasab et al. (2019) explored the teacher-student interactions during wiki-mediated collaborative writing activities and how teachers' interactional moves impact students' collaborative writing performance. Drawing upon sociocultural theory, the authors identified two distinct patterns of the teachers' interaction during the tasks: dialogic and directive. The different approaches adopted by the teachers had a direct impact on students' performance. When the teachers took a directive approach, students tended to interact more with the teacher than with their peers. Where the teacher adopted a more dialogic approach, learners tended to generate more peer interaction and collaboration, leading to jointly constructed texts. The

researchers also found that students' online collaborative writing behaviors were deeply associated with teachers' face-to-face teaching practices. Since this study was conducted in an EFL context where students were not given many opportunities to contribute to the discussion in the face-to-face classes, their lack of confidence in dealing with the teacher's direct feedback might be explained. Alghasab et al.'s (2019) study acknowledges the affordances that wiki-based collaborative writing brings to learners' L2 learning, and it also highlights the importance of teacher's interactional moves on students' collaborative writing performances. To secure an improvement in student engagement and learning through collaborative writing, teachers need to carefully decide the interactional approach they adopt during collaborative writing tasks.

Two studies (Musk, 2016; Woo et al., 2013) have also examined students' recursive writing processes during collaboration, mainly through analyzing their revision behaviors. For example, Musk (2016) used multimodal conversation analysis to examine EFL elementary school learners' spelling corrections during a computer-mediated collaborative writing task. The researcher videotaped the students' real-time revising behaviors on spelling when they were working in pairs. Three agents involved in the initiation and correction of spelling errors were identified by the research, including the student typing, the other student, and the computer software. The research found that most spelling corrections occurred when the student typing without being interrupted by the collaborator or the spell checker. The authors argue that the triadic ecology and the timing of correction trajectories entail a structural preference for self-correction, which reduces the affordances of collaboration. Woo et al. (2013) also explored primary school L2 writers' comments and revisions during a wiki-mediated collaborative writing task through a mixed-method design. The qualitative analysis suggested that the majority of students' comments were revision-oriented in nature. A closer examination of the revisions revealed that students tended to make more content- and meaning-level revisions than surface-level changes. They also tended to have more macrostructural level revisions than microstructural level content and meaning changes. Quantitative analysis showed a positive correlation between comments and microstructure changes at both meaning and content levels. There was also a positive correlation between comments, meaning preserving, and formal changes at the surface level.

As one of the main research foci in L2 collaborative writing, writing processes have mostly been studied by socioculturally informed constructs such as scaffolding and mediation. Although there was one study (Swain & Lapkin, 1998) that has considered recording students' text-construction behaviors in person, most studies mainly draw on the edit records of wikis as the main research data source. Future research should consider not only capturing students' collaborative writing records (e.g., wiki discussion and comments) but also the entire recursive collaborative writing process in order to derive a full picture of students' collaborative writing behaviors, especially if they are given chances to interact with each other or use chatting tools during their collaborative writing activities.

Writing Outcomes

Another main research focus lies in the discussion of collaborative writing outcomes. Previous research has reported collaborative writing outcomes on the improvement of writing quality, quantity, and the development of writing skills. Researchers (e.g., Chu et al. 2017; Mak & Coniam, 2008) have examined the effects of collaborative writing tasks on L2 learners' writing quality and quantity improvement. Chu et al. (2017) used a mixed-method approach to explore the value of wikis in supporting collaborative group writing qualities among secondary school students. In this study, 219 secondary school students worked in groups of four or five, collaboratively writing a detailed report of their chosen topic on a wiki platform named PBworks. The quality of the group writing projects was measured based on the teacher's evaluation of the report in terms of its scope, methodology, data analysis, conclusion, feasible suggestions, and presentations. Adopting a Generalized Linear Mixed Model analysis, the study found a positive association between collaboration and group writing quality. Also, by reviewing the students' online revision history, the authors identified eight types of revisions. The findings also showed that student groups with higher writing performance demonstrated greater use of collaborative activities on the wiki. These findings suggest that there is a direct relationship between collaborative writing activities and learners' output qualities. When learners used the collaborative functions on wikis, they generated high-quality output.

Not only was the quality of the joint writing product studied, but an evaluation of the quantity of writing produced was also reported in the

reviewed studies. In a mixed-method study conducted by Mak and Coniam (2018), the authors investigated both the writing quality and quantity of 24 middle school EFL learners' online discussion posts on an authentic, collaborative wiki task. Based on qualitative analyses, the researchers found that the quality of the jointly written texts showed improvement in terms of coherency and accuracy. To provide a quantitative picture of the amount of writing produced by the participants over the two month study period, the authors collected four students' writing and used it to calculate the amount of text and text-units produced. In addition, the number of student's revisions such as adding, expanding, reorganizing, and correcting was also counted and coded into text-units. Students were found producing substantially more texts than the 150 words requirement per month. Although one student in the focal group contributed less than 100 words, all other writers wrote more than 500 words, confirming the quantity issue. Text-unit length also increased as the project developed, which indicated a greater complexity of the students' output.

Many of the reviewed studies have examined L2 students' micro and macro writing skills development during collaborative tasks. In L2 writing, micro-skills refer to the lexical and grammatical aspects at a sentence level, while macro skills concern the global aspects of writing such as the development of ideas, audience, coherence, and organization (McGroarty & Zhu, 1997). Studies on collaborative writing in K-12 contexts report positive effects of collaborative tasks both on an individual's micro and macro writing skills development. For example, in an aforementioned study, Wong et al. (2011) examined a blended collaborative writing approach VSPOW to young Singaporean Chinese students' L2 writing process with a focus on the improvement of students' micro-skills such as the correct use of punctuation marks, vocabulary, grammar, essay structure, etc. Using a pre-test and post-test design, the researchers analyzed individual students' writing before and after the collaborative writing tasks. The results showed a significant improvement in all micro-skills for writing after the intervention, which indicates a successful transfer of the micro-skills for writing that students have improved through the blended collaborative writing approach. Challob et al. (2016) also reported a positive impact of collaborative learning on learners' micro and macro aspects of writing from the learners' perspective. Students self-reported that they had acquired knowledge relevant to the macro and micro aspects of writing such as "improvement in grammar, organization of ideas, planning and

brainstorming ideas” (p. 236), “organization of paragraph and ideas...and how to connect them together” (p. 237). Students also reported that the acquired knowledge helped them improve their writing in terms of grammar, organization, planning, and outlining.

Overall, research on writing outcomes has shown positive influences of collaborative writing on the improvement of L2 writers’ writing quality and quantity, as well as different levels of writing skills. So far, none of the research has investigated the connections between collaborative writing outcomes and group writing/interaction process. Future research that examines the relationship between students’ collaborative writing patterns and the produced quality will yield important pedagogical implications.

Collaborative Writing Affordances

Many studies have focused on the affordances of collaborative writing on L2 development. Adopting Norman’s (1988) definition of affordances as “the fundamental properties that determine just how the thing could possibly be used” (p. 9), in this systematic review, we consider affordances as the potentials that collaborative writing creates for learners’ L2 development. Three major affordances of collaborative writing emerged from the reviewed studies: (1) equalizing participation, (2) decreasing writing apprehension, and (3) developing communicative skills. L2 learners often feel less comfortable interacting with native speaking students in face-to-face contexts, creating a disparity in contribution among group members. Research on collaborative writing has shown that collaborative writing may afford L2 writers to have equal participation and contribution to a text, especially in an online context. For example, in their study investigating 8th-grade L2 students’ use of online collaborative technology, Woodrich and Fan (2017) found that online or blended collaborative writing has the potential to equalize the disparity of writers in participation among diverse proficient group members. In this study, students were involved in face-to-face, online, and anonymous online collaborative writing activities to produce three argumentative essays. They found that L2 students’ contributions increased when they were interacting through Google Docs anonymously online. They may have benefited from longer planning or preparation time because when L2 writers engage in online or blended collaborative writing, they can perform in any place where they feel more comfortable and safer (Wong et al., 2011). Also, online collaborative

writing can encourage writers' participation through various functions of online tools such as notifications of modification to the text, which may keep the students motivated to write (Alghasab & Handley, 2017).

Collected collaborative writing research contends that participating in collaborative writing activities can reduce the writer's writing apprehension (Challob et al., 2016; Woodrich & Fan, 2017). Writing apprehension is the negative perceptions learners hold toward writing, which may lead to their avoidance of writing or general anxiety of the writing process (Challob et al., 2016). It is a common phenomenon among L2 writers in K-12 settings as they are often facing high-stakes tests containing writing elements. Thus, the effects of collaborative writing on writing apprehension have been one of the main focuses of research conducted in EFL contexts. For example, Challob et al. (2016) conducted a study in Malaysia, having EFL students in tenth grade writing collaboratively using a wiki program named Viber. The participants were divided into groups of three and collaboratively worked on a descriptive essay through face-to-face and online discussions. By analyzing the interviews and the participants' learning diaries, the researchers found that 11 out of 12 participants self-reported that collaborative writing helped them improve their writing performance and reduced their writing anxiety. Participants mentioned in the interviews that collaborative writing tasks allowed them to form close relationships among writers and afford a safer environment, making them feel less apprehensive. In other words, a collaborative writing environment creates a space for learners to "pool their writing resources, test their ideas safely, and actively participate in the process" (Woodrich & Fan, 2017, p. 394).

Research has found that collaborative writing not only affords learners' development of L2 writing but also their improvement in L2 communicative skills. In a comparison of collaborative writing practices of four adolescent L2 students learning English in face-to-face and online contexts, Vorobel and Kim (2017) found that the collaborative writing assignment benefited the learners in their development of communication skills in ESL. The participants self-reported an improvement in their L2, especially in terms of speaking in the target language and learning how to provide and negotiate feedback. While contributing collaborative writing research on L2 writing development, this study also demonstrates the great promise of collaborative writing tasks for fostering other aspects of second language development.

Assessing Collaborative Writing

Assessment is one of the most well-known challenging aspects of collaborative writing. The assessment used to evaluate students' collaborative writing performance in K-12 contexts is closely related to each study's research focus. Typical aspects of collaborative writing assessed include the evaluation of students' joint writing products (7 out of 12) and the collaboration process (5 out of 12). The assessment of the joint writing product generally includes the use of rubrics (Vorobel & Kim, 2017; Wong et al., 2011; Woodrich & Fan, 2017; Woo et al., 2011) and student self-evaluation (Challob et al., 2016). Rubrics adopted by current research typically consists of evaluation on (1) content and organization (e.g., the presentation of ideas, content richness, analytical skills, cohesion, etc.); (2) language (e.g., grammar, spelling, vocabulary, punctuation, etc.); and (3) visual presentations (e.g., graphics, photos, or pictures).

The assessment of the collaboration process includes the evaluation of the individual writer's contributions (Alghasab & Handley, 2017; Mak & Coniam, 2008; Woo et al., 2011), functions of interactions/comments (Chu et al., 2017; Mak & Coniam, 2008; Woo et al., 2003), and levels of collaboration (Chu et al., 2017). Most studies that assess the collaborative writing process used online edit history as the main data source; in some studies, teacher observations (Woo et al., 2011), video and audio recordings (Musk, 2016; Swain & Lapkin, 1998), and students' self-reports were also used. The measurement of individual writers' contributions includes counting posts and edit changes, measuring the number of words and text-unit produced, and measuring the number of revisions.

Most studies adopted a coding framework to analyze and assess learners' interactions. For example, one of the most frequently adopted frameworks assesses the students' interaction in terms of different writing change functions, such as adding, expanding, reorganizing, and correcting (Chu et al., 2017; Mak & Coniam, 2008). In Chu et al. (2017), the level of learners' collaboration during a joint writing process was also measured by two independent raters by counting the numbers of collaborative and cooperative types of comments based on the wiki's editing history. In addition to the writing product and process evaluated in the reviewed studies, we also found significant use (7 out of 12) of questionnaires, surveys, and interviews to obtain the participants' perceptions and attitudes towards the use of collaborative writing activities.

One study used a pre-and post-test design to measure learners' mastery of linguistic items (Swain & Lapkin, 1998).

As one of the essential aspects of L2 collaborative writing, assessment deserves great attention when considering the implementation of collaborative writing in L2 classrooms. Previous research suggests that separately examining the product and process is insufficient to understanding students' collaborative writing efforts. Therefore, the assessment criteria need to take into account both the writing process and product since not all the collaborative writing interactions are visible in the final writing product (Alghasab & Handley, 2017; Storch, 2013). Implementing computer-mediated collaborative writing tasks can be one of the options because teachers could easily track each individual's writing behavior and the recursive joint writing process due to the transparency of modern technologies. Future studies could further develop assessment strategies and coding frameworks to allow teachers to capture and evaluate dynamic peer interactions and their writing products, as well as the connections between the joint writing process and writing product.

CONCLUSIONS

By reviewing 12 studies, this systematic review investigated L2 collaborative writing in K-12 classrooms regarding how it is implemented in different contexts with various writing tasks. The current body of collaborative writing research has explored writing products as well as writing processes and the affordances of collaborative writing on language development. The collected studies also inform practitioners about the significance of task design, student training, teacher guidance, and assessment. Even though current research has provided an in-depth understanding of collaborative writing in K-12 contexts, there is still room for improvement and development that can be fulfilled by promising future researchers in this field.

First, most studies have English as their target language in both second and foreign language contexts. Research with various languages other than English would add more diversity in collaborative writing research. Second, many scholars advise practitioners to design appropriate writing tasks. Various writing tasks were employed in different studies, including traditional essay writing, academic writing, and casual writing related to students' lives. However, little is known about how different writing tasks afford and influence

students' collaborative writing. We call for more studies to compare collaborative writing using different writing tasks in order to investigate the affordances of different task elements. By doing so, L2 educators would gain clearer ideas about how to design writing tasks for students. Third, most of the collected studies utilized wiki-based technology for face-to-face, online, and blended learning. With the advance of technology, we now have more variety of online collaborative writing tools. Future research should investigate various types of technologies to obtain more comprehensive research evidence of collaborative writing tools. Lastly, the studies have examined both the writing process and writing product. The assessment of writing products has reached a certain degree of agreement compared to the assessment of the writing process. Future research will benefit from better defining the writing process and exploring how it impacts the writing product.

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