



## The Impact of Task Manipulation on Interactional Patterns during Video-Conferenced Collaborative Writing: A Classroom-Based Study

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This classroom-based study investigated how task manipulation would affect second language learners' interactional patterns in video-conferenced collaborative writing task. In Zoom-mediated courses in a university in Hong Kong, 22 students collaboratively wrote suggestions for improvements to their peers' lesson plans using Office 365. To examine the impact of different task features on learners' interactional patterns, the suggestion-giving task was manipulated in terms of discourse-structural demands (i.e., listing bullet-pointed sentences vs composing a coherent letter) and interactional demands (i.e., working in a pair vs working in a group of three or four). Data came from audio-recordings of the students' peer collaborations and responses to a post-task survey. The results revealed that students rated writing a coherent letter considerably more demanding than writing bullet-pointed sentences, resulting in fewer discussions on how to improve a given lesson plan. In addition, the students' discussions were predominantly meaning-based with very little focus on the target language use. The findings of this study cast light on the importance of careful task design when implementing video-conferenced collaborative writing tasks.

**Keywords:** video-conferenced interaction, learner collaboration, task manipulation, interactional pattern, classroom-based study

### Introduction

Rooted in the sociocultural approach that posits knowledge is socially co-constructed through constant interaction with others (Swain & Lapkin, 1995; Vygotsky, 1978), collaborative tasks have long been regarded to enhance L2 learners' meta-cognitive and linguistic awareness, and thereby generate acquisitional opportunities (e.g., Storch, 2011). In accordance with the advancement of Web 2.0 technology that enables multiple users to share and edit web-based documents such as Google Docs and wikis, researchers have explored pedagogical efficacy of collaborative L2 writing in online space (Yim & Warschauer, 2017; Yu, 2022). This line of research has received particular attention in foreign language learning settings in which learners typically have limited chances to engage in meaningful interactions in the target language (TL), as web-based learning has been deemed able to compensate for such physical limitations (Aydin & Yildiz, 2014; Çimenli et al., 2022; Roose, 2022; Vorobel & Kim, 2017). Against this background, this classroom-based study explored how EFL learners in a university in Hong Kong would perform video-conferenced collaborative writing tasks that were mediated by Zoom ([www.zoom.us](http://www.zoom.us)) and Office 365 ([www.office.com](http://www.office.com)). In addition, within the framework of task-based language teaching, this study further examined how different task features would affect second language (L2) learners' task performance as reflected in their interactional patterns as well as linguistic features of the written products.



## Literature Review

### Web-based Collaborative Second Language Writing

Collaborative writing, i.e., co-development of a text by multiple authorship (Storch, 2011), has been considered to generate chances for learners to reflect on their TL use and solve linguistic problems together with their peers, which in turn raises their metalinguistic awareness and facilitates L2 learning (Li & Kim, 2016). Recently, the development of Web 2.0, such as Google Docs (e.g., Abrams, 2019; Zou et al., 2012) and wikis (e.g., Kessler, 2009; Li & Zhu, 2013), has further expanded the instructional potential of collaborative writing into online space. Previous studies have in general supported the positive impact of web-based collaborative writing on L2 learning in terms of its potential to improve the content and textual organization of written products (Shehadeh, 2011) and facilitate the development of academic literacy skills (Sun & Chang, 2012).

Research into L2 learners' interactional patterns in web-based collaborative writing tasks (e.g., Cho, 2017; Jung & Fu, 2021, 2022; Li & Zhu, 2013, 2017; Li & Kim, 2016), however, reveals that collaboration in online space is often highly unpredictable due to multiple associated factors. Li's studies (Li & Kim, 2016; Li & Zhu, 2017), for instance, demonstrate that learners' interactional patterns in web-based collaborative writing tasks change drastically in response to different task features, goal orientation, and group composition. In these studies, international university students on an EAP course participated in two different wiki writing tasks, i.e., writing a research proposal and writing an annotated bibliography. Careful analyses of archived wiki records, questionnaire responses, and interviews revealed that participants demonstrated considerably different interactional patterns within each group and across the two tasks. That is, each group interpreted the goal of the writing tasks in distinct ways, exhibiting divergent interactional patterns between the two tasks as well as across the groups. Based on this finding, Li and Zhu (2017) suggest that web-based collaborative writing entails dynamic processes depending on how group members perceive a task goal and adopt different strategies to achieve the task goal.

Among diverse features of interactional features, some studies have paid particular attention to potential benefits of web-based collaborative writing as a catalyst to promote language-related episodes (LREs), which is normally operationalized as learners' meta-talk on linguistic aspects of the TL in collaborative language learning (Swain & Lapkin, 1998). In general, few LREs have been reported in a web-based mode, and learners have been shown to focus more on content or text organization than linguistic accuracy or complexity (Jung & Fu, 2022; Kessler 2009; Kessler et al., 2012; Li & Kim, 2016; Li & Zhu, 2017). In Kessler et al. (2012), for example, it was found that the participants made fewer contributions to linguistic forms, as they often felt that correcting linguistic errors was not important or relevant to task completion. Regarding this issue, Li and Kim (2016) suggest that the nature of the task may affect the number of LREs generated by a web-based collaborative writing task. For instance, in their wiki-based study, two different genres of academic writing, i.e., writing a research proposal versus writing a bibliography, led participants to pay heightened attention to the required genre structure rather than linguistic accuracy, underscoring the overriding impact of task features over appropriate TL use in web-based collaborative writing tasks.

Role assignment is another important factor in a web-based collaborative writing task, in that it affects the interactional patterns and the perceived task experience (e.g., Li & Zhu, 2013; Seluck et al., 2019). Seluck et al. (2019), for instance, investigated how learners assign roles in web-based collaborative writing tasks and found that learners tended to choose a leader who could facilitate and guide group discussions. This peer leadership approach was further shown to be conducive to the development of learners' self-efficacy and autonomy. This study shows that the need for a clear role assignment may become even more pronounced when learners have to collaborate with each other in a web-based mode. It should be noted, however, that little is known whether and how different task features would affect the role assignment among learners in web-based collaboration.

Previous studies have also pointed out a few aspects of web-based collaborative writing that warrant

attention, such as learners' reluctance to comment on peers' writings, unbalanced participation and contribution made by learners, and unwarranted learning benefit from peer collaboration, to illustrate. For one, as aptly noted by Arnold et al. (2012), the nature of learner interaction may not necessarily be collaborative, i.e., learners share the authorship and edit each other's text, but rather cooperative, i.e., learners mostly edit only their own writing. Indeed, it has been reported that learners often feel uncomfortable and reluctant to comment on their peers' writing, especially when it comes to content (Lee, 2010). This issue is connected to the fact that learners do not perceive themselves as authoritative experts in the domain, which places a limitation on providing feedback to each other (Strijbos et al., 2010). In addition, more often than not, there may be learners who have difficulty in engaging in group discussions and feel isolated and unwelcomed by their group members (Boling et al., 2012).

As can be seen above, web-based collaborative writing has spawned many studies in diverse directions and the findings have shown its potential as well as limitations. It is also revealed that the impact of task demands has received only scant attention. This is an important gap in the literature, given that web-based collaboration is becoming more prevalent in language teaching and learning, and hence it is fundamental to understand the relationship between task design and the amount of language learning opportunities (Chong & Reinders, 2020). That said, more research appears to be imperative to investigate the potential influence of task demands on L2 learners' performance in a web-based collaborative writing task.

## Impact of Task Manipulation on Collaborative Writing

Task can be defined as a meaningful activity that entails learners' use of the TL to achieve a specified task objective (Bygate et al., 2001). Within the information processing perspective, it has been further claimed that the attentional demands induced by various task features would affect learners' task performance as well as learning from engaging in the task (Robinson, 2011; Skehan & Foster, 2001). To better understand and explain the effects of manipulation of diverse task features on L2 learners' language performance and learning, two competing models are often called upon, i.e., Skehan's (2009) *Limited Attentional Capacity Model* and Robinson's (2011) *Cognition Hypothesis*. Based on a single-resource view (VanPatten, 1990), Skehan (2009) proposes that overloading learners' working memory triggers competition among different aspects of linguistic production, namely, complexity, accuracy, and fluency, having a trade-off effect between form (complexity and accuracy) and meaning (fluency), and between complexity and accuracy. Skehan (2009; Skehan et al., 2012) further asserts that a task that entails conceptually more complex pre-verbal message will require L2 learners to prioritize linguistic accuracy at the expense of avoiding attention-demanding structures, and this conceptual load further leads to difficulty in efficient assembly of speech.

On the other hand, drawing upon a multiple-resource view (Wickens, 2007), Robinson (2011) proposes the Cognition Hypothesis and claims that increased task demands would promote both complexity and accuracy in learner production, having facilitative impact on learning of the TL. According to Robinson, task demands can be manipulated along two distinct dimensions, i.e., resource-directing and resource-dispersing. Along the resource-directing dimension, a task can become demanding by including more task elements or greater amounts of reasoning. Along the resource-dispersing dimension, task demands can be increased by removing planning time or including an unfamiliar topic. In addition, tasks can also be manipulated in terms of interactive conditions such as one-way versus two-way communication or the number of participants in each group. That is, learner-based variables may affect performative demands, and thus change interactional patterns and perceived task difficulty.

Only recently, researchers have begun to direct their attention towards how different levels of task demands would affect L2 learners' performance in collaborative writing tasks (Adams et al., 2015; Hse, 2020; Jung & Fu, 2021; Kim & Taguchi, 2016; Nik et al., 2012). Kim and Taguchi (2016), for example, examined how cognitive and pragmatic demands of a collaborative pair writing task would affect learners' interactional patterns by analysing episode that contains meta-linguistic comments related to pragmatics. The results of this study indicated that higher cognitive task demands elicited more

interaction, especially discussions of sociopragmatic factors, regardless of pragmatic task demands. When it comes to technology-mediated collaborative L2 writing, similar finding was reported in Jung and Fu (2021) in which L2 learners performed collaborative writing tasks with or without pragmalinguistic support. In this study, the participants collaboratively provided suggestions to their peers' writings, and some of them received useful expressions for delivering suggestions politely. The analysis of the transcribed interactions demonstrated that reducing the task demands through the provision of pragmalinguistic support encouraged the participants pay more attention to language and the suggestion-giving task, whereas greater task demands due to the absence of this support led to more discussions on pragmatic aspects, i.e., how to provide suggestions without harming the recipients' face.

Adams et al. (2015) explored if task demands manipulated along two dimensions, i.e., structural support and language support, could affect L2 learners' collaborative writing via text-chat. The analysis of chat exchanges revealed that increased task demands promoted the linguistic accuracy in the participants' production, but not the linguistic complexity. Also, Hse (2020) examined how task demands would affect L2 learners' interactional patterns in an asynchronous collaborative writing task. In this study, participants were assigned to pairs and carried out two academic writing tasks using Google Docs. Task demands were manipulated in terms of the reasoning demands, i.e., argumentative writing that entails logical reasons (more complex) versus explanatory writing that delivers factual information (less complex). The results of this study revealed only marginal impact of task demands on the pairs' interactional patterns, indicating that diverse learner variables may moderate the impact of task demands in an asynchronous web-based collaborative writing task. These studies highlight the importance of careful adjustment of contextual elements of collaborative L2 tasks to facilitate learners' peer interaction and thereby generate more L2 learning opportunities.

The review above reveals that research on how different task features and demands affect the way L2 learners perform collaborative writing is only scant, even more so in the context of synchronous video-conferenced language learning. Considering the accelerated adoption of technology-mediated language learning and teaching in conjunction with the continued emphasis on peer collaboration, there is an urgent need to explore how learners' performance changes in web-based collaborative writing tasks with different goals and structures (Li, 2020).

## Research Questions

This classroom-based study attempted to fill the aforementioned gaps in the literature, that is, the impact of different cognitive and performative task demands on L2 learners' performance in synchronous video-conferenced collaborative writing, as reflected in the interactional patterns as well as the written texts. More specifically, this study addresses the following research questions:

1. To what extent do discourse-structural demands affect L2 speakers' performance in video-conferenced collaborative writing tasks as reflected in their interactional patterns?
2. To what extent do interactional demands affect L2 speakers' performance in video-conferenced collaborative writing tasks as reflected in their interactional patterns?

## Methodology

### Design

This study included 22 L1 Chinese students who collaboratively wrote suggestions for improvement to their classmates' lesson plans. The video-conferenced collaborative writing task was manipulated in terms of discourse-structural demands, i.e., writing bullet-pointed sentences versus composing a coherent

letter, and interactional demands, i.e., pairs versus groups of three or four. The data for this study came from the audio-recordings of the participants' discussions and post-task survey responses.

## Participants

The participants were 22 (4 male and 18 female) L1 Chinese speakers in a university in Hong Kong. Their average age was 24.83 years ( $SD = 6.19$ ). Their IELTS score ranged from 7.0 to 8.0 ( $M = 7.39$ ,  $SD = 0.44$ ), indicating that they were high-intermediate to advanced L2 English speakers. They were students in Zoom-mediated TESOL courses that were designed to help them translate their knowledge about theories of instructed second language acquisition into English teaching practices, and thus the courses were pedagogically-oriented rather than language-oriented. Seven students had experience of teaching English at a private or a public educational institute, and three of them were full-time teachers at local schools the time of data collection.

## Suggestion-giving Task and Task Manipulation

As briefly introduced above, the task used in the present study was making suggestions to peers' lesson plan presentations. Each week, four students presented their lesson plans with PowerPoint slides that were shared using the Screen Share function of Zoom. Each presentation was followed by pair/ group discussions on how to improve the presenter's lesson plan, which took place in the Breakout rooms of Zoom.

In every class, the students were randomly assigned to either pairs or groups of three or four. This decision served dual goals: (a) to give the students equal chances to experience of working in pairs and groups so that they could compare their subjective experiences in different task conditions, and (b) to cancel out any confounding impact of familiarity with other students in their task performance. While discussing lesson plans in the Breakout rooms, they wrote down their suggestions on an Office 365 document, which allowed them to write and edit together synchronously. The suggestions collected from all pairs and groups were forwarded to the presenters so that they could revise and resubmit their lesson plans based on the suggestions. Therefore, the task used in this study had a clear communicative purpose with a real audience and consequences. The time for writing suggestions to make to each presenter was controlled at 10 minutes, which was determined considering the limited class hours, but at the same time, to cancel out the confounding impact of time allowed for task completion.

For the first four weeks, pairs and groups were instructed to write at least two or more suggestions for each presentation in the form of bullet-pointed sentences. In contrast, for the following three weeks, they were instructed to write their suggestions in the form of a coherent letter. Given that writing an organically structured text requires connecting propositions logically and cohesively (e.g., Khalifa & Weir, 2009), writing a coherent letter of suggestions was considered more demanding than listing isolated sentences. Also, drawing on Robinson (2011), it was assumed that working with two or three group members would be more demanding than working with a single partner.

## Post-Task Survey

In the final week of the courses, the students were asked to respond to a survey that was developed based on previous surveys on learners' perception about web-based collaborative writing (Aydin & Yildiz, 2014; Cho, 2017; Kuteeva, 2011; Lee, 2010; Wang, 2019; Yang, 2018) (see Tables 1). The survey contained four 6-point Likert-scale questions and four open-ended questions. The survey questions tapped into the students' perceived task difficulty and evaluation of Zoom-mediated and Office 365-supported collaborative writing tasks. The survey was constructed using Google Forms, and administered online.

TABLE 1  
*Post-task Survey Items*

<i>Likert-scale items</i>						
1. Working in a pair was easier than working in a group of 3 or 4.						
Strongly agree	Agree	Slightly agree	So-so	Slightly disagree	Disagree	Strongly disagree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I struggled more when working in a group of 3 or 4 compared to working in a pair.						
Strongly agree	Agree	Slightly agree	So-so	Slightly disagree	Disagree	Strongly disagree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Writing bullet-pointed suggestions was easier than writing a letter of suggestions.						
Strongly agree	Agree	Slightly agree	So-so	Slightly disagree	Disagree	Strongly disagree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Writing a letter of suggestions was more challenging than writing bullet-pointed suggestions.						
Strongly agree	Agree	Slightly agree	So-so	Slightly disagree	Disagree	Strongly disagree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Open-ended items</i>						
1. How do you evaluate video-conferenced collaborative writing?						
2. What do you think are the benefits (good points) about video-conferenced collaborative writing?						
3. What do you think are the drawbacks (negative points) about video-conferenced collaborative writing?						
4. Do you have any additional comments you would like to make about your experience of video-conferenced collaborative writing tasks?						

## Procedure

Data were collected over a period of eight weeks. In the first four weeks, the students were instructed to make suggestions to the presenters by collaboratively writing a list of bullet-pointed sentences either in pairs or in groups of three or four. Data came only from the latter two weeks, as in the first two weeks the students had to become familiar with the suggestion-giving task and to check if there were any technical issues or procedural challenges. In the following three weeks, the students were asked to write their suggestions in the form of a coherent letter. Again, data came only from the sixth and seventh weeks, as the fifth week was to familiarize the students with the new task requirement, i.e., organizing their suggestions as a coherent letter. In the final week, an online survey was administered to collect the students' evaluations of the video-conferenced collaborative writing experience.

## Analysis

### Interactional Patterns

The audio-recorded pair and group discussions were transcribed verbatim to identify, code, and analyse interactional patterns emerging from the transcripts. NVivo 12.0 for Windows was employed for annotating interactional patterns. First, the number of turns and words was counted for each student to examine the distribution of turns, the relative contribution made by each student, and dominance of each student in pair/ group work. Using the statistical software R (R Development Core Team, 2016), the numbers of words and turns produced by each student were subject to mixed-effects modelling with the lmer function to examine if these measures were influenced by task manipulation. Fixed effects were discourse-structural task manipulation and interactional task manipulation, and random effects included students and lesson plans. As t statistics do not provide *p*-values, 2.0 was set as the significance criterion

(Gelman & Hill, 2007). Effect sizes were checked with the *r.squaredGLMM* function, and  $R^2$  values of .06, .16 and .36 were evaluated as small, medium and large, respectively (Plonsky & Oswald, 2014).

Next, the transcripts were annotated for *off-task*, *on-task*, and *about-task* episodes following Storch (2011). Off-task episodes referred to students' comments that were not relevant to the suggestion-making task; on-task episodes consisted of students' discussions on how to improve the presenter's presentation; and about-task episodes included the students' attempts to manage and control their task performance and completion. On-task episodes further subsumed *task-related episodes* (TREs) and *language-related episodes* (LREs). As defined by Swain and Lapkin (1998), LREs are defined as any discussions or questions on how to use the TL correctly; TREs were operationalized as any episodes that contained discussions to identify limitations in a presenter's lesson plan and make suggestions about limitations. In addition, about-task episodes further involved *checking task requirements*, *assigning roles*, *asking for more ideas* and *mentioning technological issues*. Upon the initial coding by the author, randomly selected transcripts were reviewed and annotated by a second coder who was an expert in Applied Linguistics, and inter-coder reliability was 91 per cent as computed with Kappa.

## Written Suggestions

The collaborative writing produced by pairs and groups was analyzed in terms of its lexical diversity and syntactic complexity. Lexical indices involved the first most frequent thousand words (K1), the second most frequent thousand words (K2), VOCD (McKee et al., 2000), and MTLTD (McCarthy & Jarvis, 2010), which were computed using Vocabprofile (Cobb, 2020). Indices for syntactic complexity included the numbers of verb phrases, clauses and complex nominals per T-unit, and complex T-unit ratio, which was calculated with a web-based L2 syntactic complexity analyzer (Lu & Ai, 2015). Lastly, metadiscourse markers (Bax et al., 2019) were analyzed in terms of the number of emphatic expressions (or boosters), hedges, logical connectives, and sequencing words (see Table 1) using Text Inspector (2020). These indices were subject to mixed-effects modelling using the *lmer* function (Bates et al., 2012) to test if task manipulation had any impact on the indices.

## Survey Responses

For the Likert-scale items, average values were calculated to capture and compare the students' perception in an efficient and effective way (maximum value = 6, Cronbach's alpha = .904). For open-ended survey items, participants' responses were analysed qualitatively by identifying any common and noticeable patterns in their comments.

## Results

### Impact of Discourse-Structural Demands

#### Perceived task difficulty

The students in this study responded that composing a coherent letter to their peers was substantially more challenging than writing a list of bullet-pointed sentences (Item 2: 5.09, Item 4: 4.50). The results from paired-sample *t*-test confirmed that their responses were significantly higher than the neutral value (Item 2:  $t = 4.294$ ,  $p < .001$ ,  $d' = 1.295$ ), indicating that they struggled when they had to frame their suggestions in the form of a polite letter. The responses to Item 4, however, missed significance narrowly ( $t = 1.629$ ,  $p = .118$ ,  $d' = 0.491$ ).

## Interactional patterns

A greater number of turns were produced from the bullet-pointed writing task compared to the coherent letter writing task (see Table 2). Mixed-effects modelling also confirmed that the participants produced significantly more turns in bullet-pointed writing, with a medium effect size ( $t = |3.177|$ ,  $R^2 = .218$ ). To be more specific, the average numbers of turns were 288 for pairs and 271 for groups when writing bullet-pointed sentences, whereas there were 219 and 123, respectively, when writing a coherent letter. The results seemed to indicate that increased discourse-structural demands decreased the amount of interaction during the collaborative suggestion-giving tasks.

TABLE 2  
*Number of Turns and Words*

	Number of words/ number of turns ( <i>Mean number of words per turn</i> )				
	Student 1	Student 2	Student 3	Student 4	Total
<i>Writing in bullet-pointed sentences</i>					
Pair 1	1862/ 208 (8.95)	2055 / 201 (10.22)			3917/ 409
Pair 2	1548/ 168 (9.21)	1969/ 161 (12.23)			3517/ 329
Pair 3	1128/ 112 (10.07)	1743/ 105 (16.60)			2871/ 217
Pair 4	1013/ 101 (10.03)	969/ 96 (10.09)			1982/ 197
				Mean	3072/ 288 (10.67)
Group 1	4152/ 183 (22.69)	1682 / 149 (11.29)	529/ 38 (13.92)	209/ 17 (12.29)	6572/ 387
Group 2	2549/ 144 (17.70)	1254 / 114 (11.00)	759/ 86 (8.83)		4562/ 344
Group 3	947/ 66 (14.35)	1555/ 58 (26.81)	333/ 14 (23.79)		2835/ 138
Group 4	988/ 46 (21.48)	660/ 41 (16.10)	591/ 34 (17.38)	488 / 34 (14.35)	2727/ 155
				Mean	4174/ 271 (15.40)
<i>Writing a coherent letter</i>					
Pair 5	1568/ 133 (11.79)	1931/ 129 (14.97)			3499/ 262
Pair 6	1262/ 132 (9.56)	1926/ 127 (15.17)			3188/ 259
Pair 7	1726/ 80 (21.58)	1367/ 79 (17.30)			3093/ 159
Pair 8	1210/ 98 (12.35)	1542/ 96 (16.06)			2752/ 194
				Mean	3133/ 219 (14.31)
Group 5	889/ 58 (15.33)	1222/ 55 (22.22)	256/ 22 (11.64)		2367/ 135
Group 6	788 /51 (15.45)	552/ 46 (12.00)	785/ 40 (19.63)	182/ 7 (26.00)	2307/ 144
Group 7	1216/ 44 (27.64)	200/ 31 (6.45)	388/ 26 (14.92)	325/ 20 (16.25)	2129/ 121
Group 8	664/ 47 (14.13)	169/ 26 (6.50)	149/ 20 (7.45)		982/ 93
				Mean	1941/ 123 (15.78)

The coding results further revealed that more annotations emerged for the bullet-pointed writing task for on-task, off-task, and about-task (see Table 3). This tendency was also found for sub-codes such as TREs, checking task requirements, and asking for more ideas. There were also exceptions in which more annotations were made for the letter-writing condition, such as assigning roles between members and commenting on technological issues.

## Impact of Interactional Demands

### Perceived task difficulty

The responses to the post-task survey revealed that the number of group members had only a marginal impact on perceived task difficulty (Item 1: 3.14, Item 3: 2.36). The results from paired-sample  $t$ -test showed that their responses were significantly lower than the neutral value (Item 1:  $t = 4.294$ ,  $p < .001$ ,  $d' = 1.295$ ; Item 3:  $t = 4.294$ ,  $p < .001$ ,  $d' = 1.295$ ), indicating that working in pairs and in groups of three or four were rated comparable in terms of perceived task difficulty.



## Interactional patterns

The results from mixed-effects modelling showed that significantly greater numbers of turns and words were produced by the participants when they were working in pairs, with a medium (Words:  $t = |3.199|$ ,  $R^2 = .192$ ) to a large effect size (Turns:  $t = |4.407|$ ,  $R^2 = .410$ ). In addition, as shown in Table 2, turns were overall evenly distributed between the students when they were working in pairs (e.g., 50.3%: 49.7% of Pair 7), and this pattern disappeared when they were assigned into groups of three or four (e.g., 50.5%: 28.0%: 21.5% of Group 8). Another noteworthy pattern was that there was normally a student who dominated the group discussion, as in Groups 1, 2, 4, 7, and 8. In each of these groups, there was one student who produced considerably more turns and words compared to the other students. At the same time, there was often a passive member in groups. For instance, Student 4 in Group 1 produced only 17 turns out of 387 turns in total (4.4%) and 209 words out of 6,572 words in total (3.2%). Last but not least, the coding results revealed that very few LREs were found, all of which were from pairs.

## Textual analysis of the written suggestions

In order to see if task manipulation had any significant impact on the written products, a textual analysis was conducted at the lexical, syntactic, and metadiscourse levels. The results of a series of likelihood ratio tests showed that the inclusion of Complexity (i.e., writing bullet-point sentences vs writing a polite letter) did not improve the model fit of null models for all indices. By contrast, Condition (i.e., pairs vs groups) emerged as a significant factor for K2 ( $\chi^2(1) = 4.75$ ,  $p = .03$ ,  $R^2 = .12$ ). As presented in Table 4, summaries of the maximal model revealed that task manipulation had a significant influence on the number of K2 ( $t(7) = -2.27$ ,  $R^2 = .17$ ), indicating that the increased number of members per group affected the number of K2-band words significantly negatively. In other words, when working with more members, the students were less likely to use K2-band words than when they were paired up.

TABLE 3  
Code Frequency of Pair/Group Interactions

Code	Bullet-pointed		Letter		Example comments
	Pair	Group	Pair	Group	
Off-task	85	152	23	30	<i>Don't even get me started on that, I'm still working on that paper, that presentation for Saturday. You've got that course as well?</i>
On-task	1212	835	520	505	<i>Yes, the video was too demanding. The video could be too difficult for the target students.</i>
TREs	84	97	37	41	<i>S1: Do you think there are too many tasks in one lesson? S2: Yes, I think so. S3: Yeah, yeah, yeah, yeah. S1: Because after listening this, you have to do a discussion and also presentation. I think that may be too much for one lesson. S3: You are right.</i>
LREs	3	0	0	0	<i>S1: What is the term, implication, exactly? I am always confused. S2: I think it is about what we do in our lesson plans, based on theory. S1: Okay.. S2: Ah.. S1: So, for example, implication of TBLT is including tasks in a lesson plan. S2: Something like that. S1: Yeah.</i>
About-task	194	339	173	140	<i>Okay, so let's give her some more suggestions.</i>
Checking task requirement	37	21	26	22	<i>How to change the bullet points into letter. [laughter] It's a little bit difficult. Let's see how we could... One, two... How many points have we got? Three points. Okay. Maybe we've got enough suggestions</i>
Assigning roles	25	22	41	38	<i>Okay, this time, I'll be writing. I am sharing my screen. Can you see my screen?</i>
Asking for more ideas	19	12	9	8	<i>Yeah, so do we have any other suggestions for her?</i>
Technological issues	42	16	55	23	<i>Sorry, my internet is a little bit unstable. Can you hear me?</i>
Total	1701	1494	884	807	

TABLE 4  
Summary of the Mixed-effects Models

		Fixed effects			Random effects	
		Estimate	SE	t	by Subject SD	by Time SD
K2	Intercept	9.81	.47	21.07°	.00	.61
	Complexity	1.00	.92	1.09	–	1.06
	Condition	-1.31	.58	-2.27°	.12	–
	Complexity*Condition	-.47	1.12	-0.42	–	–

*K2 ~ Complexity\*Condition + (Condition | Subject) + (Complexity | Time); R<sup>2</sup> = .17.*

Note. Significance: °|t| > 2.0.

## Responses to Open-ended Survey Items

As summarized in Table 5, the participants rated video-conferenced collaborative writing as very valuable. They perceived the interface of Zoom as clear, understandable, and flexible to communicate and collaborate with their peers. They additionally commented that the Screen Sharing function facilitated their collaboration and working with new members each week, and this was refreshing and stimulating. Office 365 was also evaluated as useful to engage in collaborative writing tasks with peers. To be more specific, the participants reported that Office 365 allowed them to write and edit collaboratively with their group members in real-time, which was highly satisfying. In addition, the students rated collaborative writing as a highly educational experience, as it enabled them to generate useful ideas and facilitate writing processes.

However, the open-ended survey responses also revealed many limitations in this video-conferenced collaborative writing task. Most notably, network connection was acknowledged as a major technical concern. That is, the students consistently mentioned that the network should be strong and stable enough to benefit from the user-friendly functions of Zoom and Office 365. In addition, the students reported that they sometimes felt anxious and uncomfortable when interacting on Zoom, especially when they could not see members' faces. Lastly, they commented that it was often too noisy when multiple people were talking at the same time, and it was challenging to speak, listen, and type simultaneously.

There were additional comments related to perceived difficulty in reaction to task manipulation. It was found that they felt that writing a polite letter was more demanding than listing bullet-pointed sentences, and they preferred working in pairs to interacting with two or three other members.

TABLE 5

*Example Responses to the Open-ended Survey Items*

## A. Convenient interface

Promoting collaboration

*It's efficient for group discussion, and thanks to the online Microsoft, real-time sharing about the suggestion can be seen. Besides, discussing in group and then sharing suggestions are better than asking us to give ideas orally in front of the whole class. I was always inspired to think of some new idea while discussing with my group members.*

Technological convenience

*Everyone could see what was being typed and could contribute comments, corrections, and other suggested edits in real time. It was a smooth process in general.*

Efficient group assignment

*We can collaborate with different students whether they are one who we are familiar with or not familiar with since we were arranged randomly. It's like a kind of "walking out of my comfort zone" since in the real class, we usually sit with our close friends and collaborate with them naturally.*

## B. Limitations

Network issues

*It relies on the network. If some of the group mates have unstable network, it may affect the discussion or output.*

Anxiety in Zoom-mediated interaction

*Still feel a little bit clumsy...especially when I am arranged to collaborate with someone very talkative. I will feel anxiety if I cannot cut in and Zoom really exacerbates this anxiety since I cannot see the other's face and cannot make an appropriate response.*

Minor limitations

*Clear role assignment should be confirmed, such as who is going to do recording and take notes. It's a little bit difficult to speak, type, and listen at the same time.*

## C. Task manipulation

Bullet-pointed sentences vs polite letters

*If it is in the form of a letter, it can only be written by one or two members because we have to make it cohesive.*

Working in pair vs group of four

*I prefer pair work to group work. In a group of 4, someone may stay mute. I once finished sharing my idea and the other 3 group members kept silent. They might wait for others to talk. It was embarrassing. If there are only two persons, we can take turns to talk and take notes.*

## Discussion

This study investigated if manipulation of output requirement and condition of video-conferenced collaborative writing would affect L2 English speakers' interactional patterns while performing the task. The writing task in this study involved making constructive suggestions about their peers' lesson plans, and the task was manipulated in terms of the required discourse format and the number of students in each group.

### Impact of Discourse-Structural Demands

As predicted, the students felt that it was more manageable to write their suggestions as a list of isolated sentences without worrying about how to organize them into a logical structure. The transcripts also revealed that the students struggled when they had to transform their suggestions into a coherent letter. Also, coding of the transcripts further showed that the number of TREs was substantially greater when the students did not have to connect their sentences into a coherent letter, which appears understandable given that the number of turns was greater for the bullet-pointed writing task than the coherent letter writing task. In addition, the students checked more frequently if they met the task requirements and asked for more ideas from group members. Although both Skehan (2009) and Robinson (2011) did not make explicit predictions on the impact of task demands on L2 learners' production in collaborative writing tasks, overall, the finding of this study seems not aligned with both models in that increased task demands did not boost the amount of interaction as well as learners' attention to the TL use. The finding of this study, however, support a few previous studies (e.g., Kim, 2009; Nuevo, 2006) that reported more learning opportunities in tasks with lower cognitive demands. Kim, for example, suggests

that cognitively less demanding tasks may allow learners to enjoy larger surplus attentional resources to monitor their task performance and create more learning opportunities. When applied to this study, it seems reasonable to assume that the bullet-pointed writing task enabled the students to be relatively free of textual encoding demands and thus they could discuss more about how to improve lesson plans.

There were additional codes that emerged more for writing a coherent letter, such as assigning roles. It is worth noting that role assignment was one of the major concerns of the video-conferenced collaboration reported in the post-task survey (see also Li & Zhu, 2013; Seluck et al., 2019). For instance, some students reported that clear role assignment could have facilitated their collaboration to a great extent. Also, there were comments that implied that interactional demands materialized more clearly in the letter-writing task. Similarly, one student commented on her frustration when members did not participate in group work. That said, it appears that the importance of clear role assignment became more evident when the students were engaging in more complex task that entailed greater discourse-structural demands.

### **Impact of Interactional Demands**

While unique interactional patterns within and across the task conditions were the most noticeable characteristics as in previous studies (Hse, 2020; Li & Kim, 2016; Li & Zhu, 2017), the transcripts also revealed that turns were overall evenly distributed in pairs. It appears that when the students were paired up, they could be naturally situated in a setting wherein they had to cooperate with and respond to the other student actively and responsibly to complete the task. In a similar vein, within the same time limit, pairs could have enjoyed more chances to make contributions to the task, as manifested in the greater number of turns and words. Indeed, survey responses demonstrated that students evaluated pair work as more manageable compared to group work, although this did not have significant impact on their perceived task difficulty. When working in groups, on the other hand, there were often a dominant student who produced a majority of the total turns and words, as well as a passive student who rarely contributed to the group discussion. It seems possible to assume that working in a larger group might have induced higher interactional demands for determining one another's roles in the group, participating in the on-going discussions, understanding and tuning diverse opinions and perspectives, to illustrate.

In a similar vein, very few LREs were found overall, and all of them were from pairs. This finding supports previous studies that reported few LREs from web-based collaborative writing tasks (e.g., Kessler 2009; Kessler et al., 2012; Li & Kim, 2016; Li & Zhu, 2013, 2017). The scarcity of LREs, in general, seems to be in line with the lack of significant differences in the written texts in terms of linguistic complexity, except for the proportion of K2. As claimed by Li and Kim (2016), the nature of the writing task might have affected the results. That is, the suggestion-making task in this study was highly authentic and communicative, in that the task included a clear audience (i.e., a presenter) with real-world consequences (i.e., revision and resubmission of a lesson plan based on suggestions). Thus, this meaning-based nature of the suggestion-making task could have diverted the students' attention away from language forms but towards the content of their production. The fact that they had only 10 minutes to write suggestions for each presenter could be another factor that did not allow them additional time to deliberate over their TL use. It should also be noted that the students had fairly high English proficiency, and thus linguistic problems should have not arisen as the main concern in their collaborations (Ishikawa, 2006). That said, caution will be needed when extrapolating the findings of this study with students with low or different proficiency levels.

### **Learners' Perception toward Video-conferenced Collaborative Writing**

Overall, the students showed a very high level of satisfaction with the video-conferenced collaborative writing task. Their survey responses revealed that they regarded Zoom, when combined with Office 365, as an effective learning platform with a user-friendly interface, which enabled them to collaborate with

each other smoothly. For instance, one student mentioned, “*It was very convenient as we could stay home and still share ideas and work through zoom. Besides, it was better than only typing, as verbal discussions could elaborate our ideas clearly.*” Another student also commented, “*Zoom provided a very useful and constructive way of working collaboratively, provided there were no technical issues.*” There were also comments that pointed the screen-sharing function as a useful tool that facilitated their interactions, and many students also reported that breakout rooms enabled them to work with new classmates every time, which was normally not feasible in the face-to-face mode. In addition, they mentioned that having multiple channels to communicate with their group members, i.e., voice chat, text chat, screen-share, and the shared Office 365 document, allowed them to collaborate with each other highly efficiently.

For successful implementation of video-conferenced collaborative writing tasks, however, there was a critical condition to be satisfied: a strong and stable network. Many students pinpointed that they enjoyed Zoom-mediated learning, given that network is strong enough (e.g., *It relies on the network, as if some of the group mates have an unstable network, it may affect the discussion or output.*). Another frequently reported limitation of Zoom is that it does not allow its users to copy and paste their comments from the Zoom chat window, which was pointed out as a persistent and frustrating problem by many students (e.g., *I couldn't copy and paste each other's answer. That's the bad thing about zoom.*). Additionally, some students reported that clear role assignment could have facilitated their collaboration to a great extent (e.g., *It is not difficult to complete the task, but a clear role assignment is better to confirm before, like who is going to do recording and take notes.*). This is in alignment with previous studies (e.g., Bailey et al., 2022; Tseng et al., 2011) on the importance of robust understanding about the nature of the platform as well as thorough preparation in order for successful implementation of learners' collaborative task performances in a video-conferenced mode in the e-learning context.

## Conclusion

The present study aimed to explore if task manipulation would affect L2 learners' interactional patterns in video-conferenced collaborative writing task. The results of this study showed that requiring the students to connect isolated suggestions into a coherent letter made the task significantly more demanding, in fewer discussions on how to improve a given lesson plan. Also, the transcripts of pair/group discussions revealed that turns were more evenly distributed in pairs, whereas groups normally included a dominant or a passive student. As reflected in the very few LREs, however, the students prioritized task content and structure over language regardless of task manipulation.

This study is not free from limitations. First and foremost, due to the nature of classroom-based research (Tulung, 2009), many related variables could be not controlled. For instance, learners' individual factors, such as personalities, gender, and English proficiency for each subskill (e.g., speaking and writing), could not be accounted for when assigning them into pairs and groups. That said, more research on separate and combined impact of task manipulation and learner-based variables would provide more readily applicable pedagogical implications. In a similar vein, presenters and their lesson plans were randomly assigned each week, and thus could not be controlled. Also, potential practice effects could not be controlled, as bullet-pointed writing condition was implemented before the letter-writing condition for all participants. That is, the students could have gradually developed strategies for completing the suggestion-making task. Thus, future studies may need to counter-balance the task sequence so that the practice effects could be cancelled out.

Regardless of the above limitations, this study has several implications and insights for future studies. First, this study suggests that Zoom is a very user-friendly web-based tool for collaborative learning and teaching. Especially when combined with Web 2.0 technology such as Office 365, it seems feasible to conduct web-based collaborative writing tasks for L2 learners. This study further casts light on the impact of differential task demands, both cognitive and performative, on video-conferenced collaboration, in that

different task structure and requirement can alter the way learners engage in the task, and hence affect the number of learning opportunities.

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