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PROFILING STUDENTS' COLLABORATIVE WRITING BEHAVIORS DURING AN ONLINE WRITING PROCESS

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Abstract

This study investigated the types of collaborative behaviors that student writers showed as they collaborated on two online writing activities. Twenty undergraduates took part in the study and were divided into five groups to write jointly on two online tasks within a Google Document and Google Classroom environment. They were given six weeks to complete the tasks. The duration for each task was three weeks during which students were first asked to use the Google Classroom platform to discuss and plan their drafts. Once they moved into the translating stage (i.e. the production of the text), they were asked to complete their joint writing activity using GoogleDocs which allowed them to collaborate in real time. Students could make comments or ask questions within the Google Classroom and GoogleDocs environments. Their online utterances were noted and encoded based on a set of behaviors that are indicative of collaborative behaviors. The two underlying questions guiding this study were: (1) What were the online collaborative behaviors that students show during stages of the writing process; and (2) Are their collaborative behaviors associated to the quality of their writing? Results from the qualitative and quantitative data showed that groups that were actively showing higher indicators of collaborative behaviours performed better in their writing scores. However, groups that were passive, lacked the collaborative learning indicators which inhibited the entire writing process.

Keywords: Collaborative writing, collaborative learning behaviors, online writing

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1. Introduction

The quick development of technology, online tools and settings has opened up fresh opportunities for student groups to work together and allow instructors to view, monitor, and remark on students' writing progress more quickly and in greater detail (Brodahl et al., 2011; Birnholtz et al., 2013; Chu & Kennedy, 2011). Since writing is a dialogic activity, an online writing environment has the potential to support group discussions and joint projects, allowing students to develop, analyse, and synthesise ideas while working in a well-organized collaborative writing setting. Students' metacognitive awareness is also increased when they collaborate on a piece of writing, aiding in their concentration on grammar checks, language styles, while promoting a culture of learning and sharing information (Janssen et al., 2012; Lingard, 2021; Mufeeda, 2022; Moonma, 2021; Nykopp et al., 2018).

Today online collaborative writing systems offer a variety of co-editing capabilities which are readily available. Two commonly used tools are Microsoft Word and Google Docs in which new features have been developed to specifically support collaboration, particularly for collaborative writing activities. Recent research has re-emphasised the use of GoogleDocs as an effective collaborative software to influence and promote students' learning (Nykopp et al., 2018) and was helpful in easing students' writing apprehension while enhancing their collaborative writing skills (Moonma, 2021). Although research has highlighted the benefits of using online platforms such as GoogleDocs or Google Classrooms as user-friendly digital tools for collaborative writing, there are limited studies that investigated the types of communication and interactions that occur as students collaborate during the writing process.

1.1. Online Collaborative Writing

An online collaborative writing environment offers both teachers and students an enriching and engaging learning experience. Past research has focused on the use of various platforms for online writing (Banerjee, 2000; Curtis & Lawson, 1999; Mufeeda, 2022; Moonma, 2021; Nykopp et al., 2018) however, many of these studies were more inclined in highlighting the benefits or difficulties that learners or instructors encounter during an on-line collaborative writing environment.

One of the initial studies conducted when computer-aided group writing was still in its infancy was by Curtis and Lawson (1999). In their study, the online interactions of 24 native speakers of the English Language who were involved in the study used email and the Web to communicate as they collaborated on three tasks were analysed. The volume and nature of text contributions made by group members during their online communications via email and discussion board postings were counted and examined. Their study revealed some commonality between online collaborative behaviours and F2F learning situations. The students exhibited the similar patterns of behaviour that normally occur in F2F interactions thus suggesting that successful online collaborations are possible when students show similar patterns of collaborative behvaiours. A system for encoding the various collaborative behaviours was created as a result of their findings. Thus, Curtis and Lawson's coding scheme will form part of the conceptual framework to guide the present study.

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In a different study, Choi (2008) looked at a 36-student ESL writing class at a college in Hong Kong. By sending drafts to peers who provided feedback and recommendations for improvement and collaboration via email to complete the writing tasks, the students participated in three online collaborative writing activities. Overall, the results show that students valued the encouraging environment promoted by online collaborative tasks and saw it as a way to enhance their writing by boosting motivation, metacognitive awareness and reducing stress and anxiety levels. Moonma (2021) and Erdal and Sadi (2017) also maintained that the use of online platforms has the ability to assist learning and have a good impact on writing. However, past studies also found that if the participants were inactive, unwilling to share their opinions, and did not respond when asked, group members suffer because they were unable to benefit from peer feedback on how to improve or organise their work. Therefore, it was proposed that instructors should equip students with the skills of working effectively together such as giving feedback or comments, offering peer help, sharing resources and other collaborative behaviours before the online writing process begins (Kim et al., 2022; Lingard, 2021; Moonma, 2021).

In their investigation on students' online collaboration, Janssen et al. (2012) discovered that for a group to collaborate effectively, members must coordinate efforts to work towards a common goal. Online collaborative writing relies on communication between the writers, thus it is critical to make sure that they are executing their joint writing process in the most productive way possible. Students must cooperate, plan, and actively participate in the collaborative activities to make online collaboration successful. Lingard (2021) and Janssen et al. (2012) also reiterate that groups who placed more efforts on actively contributing towards the collaborative learning process, such as sharing resources and ensuring good communication among group members, outperformed those who did not. The findings of Birnholtz et al. (2013) also concurred that it was crucial for students to maintain strong communication skills and social relations during an online collaborative activity in order to promote successful collaboration.

2. Problem Statement

The main objective of online writing classes, according to prior studies, was to give students the chance to build knowledge through collaborative group projects. As was previously mentioned, using online tools like Google Docs, wikis, or emails might improve students' writing skills when they are more eager to work together and support one another to produce better results. What sort of skills learners should have or be ready for, nevertheless, in order to guarantee efficient collaboration, is a topic that has yet to be resolved. In other words, what kind of skills or behaviours should instructors promote to help their students apply that are indicative of the collaborative learning behaviours listed in Curtis and Lawson's (1999) framework.

Within an online collaborative writing process, Mufeeda (2022) felt that the problem may not lie in the way the collaborative process was facilitated but rather that instructors may be overlooking the way students are interacting, coordinating and collaborating during an online learning activity. In other words, even while there are several tools available to aid in the organisation and support of collaborative writing, the majority of them pay little attention to how the activity is really carried out (Lingard, 2021). Therefore, by observing the behaviors of student writers as they collaborate and coordinate through their

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writing tasks, instructors can draw insight into how to facilitate an online collaborative writing activity that encourages students to make use of their existing resources and draw on assistance from their peers . During the online writing process, certain behaviors may promote or inhibit the collaborative process, thus affecting the quality of students' work. This means to say that students' actions or inactions could make or break the collaborative learning process (Moonma, 2021). Thus, gaining a better understanding of the types of behaviours that promote effective collaborative learning would help instructors to provide the right prompts or interventions to help students achieve the best learning outcome. As such, the question of how online interactions and behaviour contribute towards the enhancement of a learning process particularly in the area of writing instruction requires continuing investigation.

3. Purpose of the Study

This study investigated the types of behaviours university students used to complete their online writing assignments and how they managed online collaborative writing projects. By looking at the ways students collaborate online, the study hopes to improve knowledge of how they interact with and act during the three major stages of the writing process. It also attempts to look at the kinds of behaviours that help or hinder students' writing. Thus, it will be insightful to identify the collaborative patterns of students working together within an online writing activity to help instructors understand the types of behaviours that enhanced students' engagement in the writing process. The two research questions guiding this study were: : (1) What were the online collaborative behaviors that students show during each stage of the writing process; and (2) Are their collaborative behaviors associated to the quality of their writing?

3.1. Conceptual Framework

3.1.1. Curtis and Lawson's (1999) Coding Scheme

Curtis and Lawson conducted a study in 1999 to identify the aspects of F2F collaborative learning that also existed in the online interactions of students in collaborative learning groups (see table 1). The quantity and variety of text contributions made by 24 group members throughout their online communications via email and message boards were counted and analysed. Their research found some similarities between F2F learning environments and online collaboration behaviours. This indicates that successful online collaborations are possible when students display similar behavioural tendencies. A coding system was created for the utterances that enlisted the collaborative behaviours as a result of their findings.

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Table 1. Coding Scheme Used to Categorise Types of Collaborative Behaviours (Curtis & Lawson, 1999)

Behaviour categories	Codes	Description	Example
Planning	IA	Initiating activities: Setting up activities such as chat sessions to discuss the progress and brainstorming ideas	I think [names] let's list down some main points for the topic first…
	OW	Organising work: Planning group work; setting shared tasks and deadlines	I think it's better we share out the work. Each person starts elaborating one main point and the rest of us can comment and edit...
Contributing	HeG	Help Giving: Responding to questions and requests from others.	To comment on the draft, just do a right click...
	FBG	Feedback giving: Providing feedback on proposals from others.	Good point about giving counselling to the victims. I think add about the consequences of abuse on the children too…
	RI	Exchanging resources and information to assist other group members.	If you go to this link...you can read more about laws that protect battered wives in our country…
	SK	Sharing knowledge: Sharing existing knowledge and information with others.	From what I have read, these victims often end up going back to their abusive husbands…
	Ch	Challenging others: Challenging the contributions of other members and seeking to engage in debate.	What makes you say most women ask for it? Are you stereotyping women?
Seeking input	HeS	Help seeking: Seeking assistance from others.	Can anyone help correct my references for newspaper articles?
Reflection/Monitoring	RM	Reflecting and monitoring on the task: Comments about the writing structures and writing activities.	After reading the draft again, I think we need to give more examples to convey our ideas clearly. Also let's use more transitions…
Social Interaction	SI	Social interaction: Conversation about social matters that is unrelated to the group task. This activity helps 'break the ice'.	So how many of you watched the movie? / It's based on a true story about an abused housewife and how she fought back. Interesting storyline.

Therefore, Curtis and Lawson's (1999) framework will be used to identify and profile the types of behaviours students show during their writing activities and to get an overview of the types of behaviours that encourage students to be more immersed or engaged in the writing process. Examples of the type of discourse functions that were present and easily identifiable in the synchronous and asynchronous discussion data for the collaborative groups are listed in Table 1. All the behaviours listed complement each other in such a way that the absence or the dominance of a particular behaviour may cause varying results to the way collaboration affects the students' learning process.

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3.2. Flower and Hayes (1981) Process Writing Model

Flower and Hayes (1981) define three general stages of the writing operation: planning, translating and reviewing (see Figure 1). During the planning stage, ideas are generated from memory and the environment. Information retrieved during this process is then used to develop the goals in relation to the writing task. Translating is where the information obtained from the long-term memory is organized to meet the writer's goals and to develop a word, a phrase or a sentence with it. At this juncture, the writer works under all the constraints imposed by his knowledge of the language. According to the above theorists, this stage of the writing process may put too much pressure on the writer and may result in interference between sentence formulation and global planning. The writer's ultimate objective during the reviewing stage is to raise the text's quality through monitoring, assessing, and rewriting. Here, the author reads the text to ensure that the planned objectives are achieved. This would entail editing the final work for accuracy. When the writer goes through the aforementioned steps, the monitor that "acts as a gatekeeper" permits the writer to attend to specific actions at a specific time to improve their writing quality.

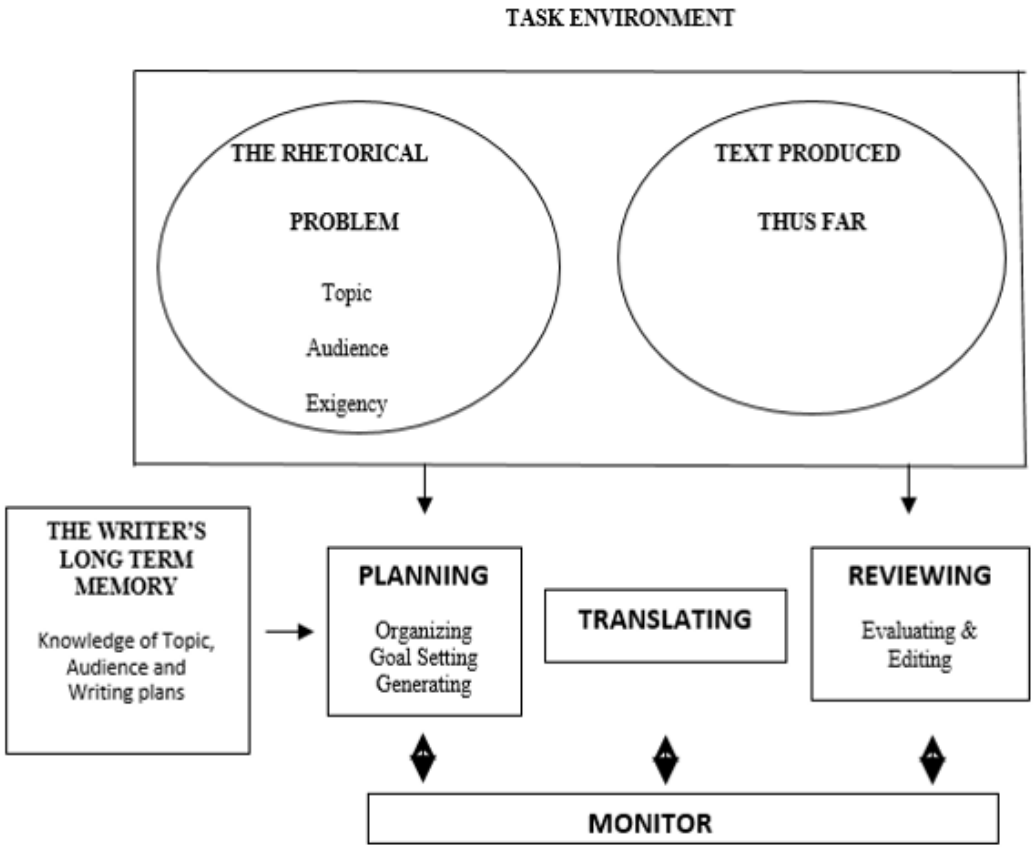

Figure 1. Flower and Hayes Writing Process Model

For the purpose of this study, the collaborative learning indicators are translated to the three stages of the writing process. The collaborative indicators that come under the Planning category correspond to

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the Pre-Writing or Planning stage, while the Composing or Translating stage of the writing process is represented by the Contributing and Seeking input categories. Meanwhile, the Reflection and Monitoring category corresponds to the Revision or Reviewing stage. In hindsight, student engagement in the writing process may depend on how they collaborate with one another during the stages of the writing process. Understanding the different behaviours that the students display as they advance through the writing process can therefore provide insight into how their behaviours influence their writing skills.

3.3. Social Interaction - Integral Element in Online Collaborative Learning

A new and integral element which Curtis and Lawson (1999) have included in the framework is Social Interaction (See table 2). They theorise that by linking social interaction with all the other collaborative learning behaviours listed in the framework, successful collaboration can take place. Similarly, within an online writing environment, when students exhibit collaborative learning behaviours, learning can be transformed to a meaningful level. In the case of this study, when students exhibit collaborative learning behaviours that enhance their engagement in the writing process, their writing quality should show improvement. Therefore, observing students' behaviours as they navigate and coordinate their collaborative writing tasks can be insightful.

4. Research Methods

This was a mixed-method study in which the researchers aimed to identify students' behaviours during an online collaborative environment and how the types of behaviors shown affected students' engagement and writing quality during the writing process. The online writing environment was carefully structured to maximise students' participation and active engagement during the writing process. All the interactions and conversations that took place mostly occurred through text-based communication either synchronously or asynchronously. 20 students who participated in the study were divided into four groups of five students each. These students were fourth-semester undergraduates in a local university whose English proficiency was of intermediate level. They were asked to collaborate often throughout the course of the six weeks and all the students were well-versed in the use of online learning settings.

4.1. Text-based Communication

The textual record of students' online interactions and comments via the Google Classroom and Googledocs environments served as valuable sources of information about the types of behaviours shown during the joint writing activities. Both quantitative and qualitative analysis were utilised to collect important data in order to address the research questions of this study. Online conversations between students were first qualitatively examined. Transcripts of the collaborative groups' online exchanges captured from their interactions were categorised and coded. Thematic Units (T-units) were used to identify and record the number of 'electronic moves' or utterances that represent specific types of online behaviours as categorized in Curtis and Lawson's (1999) framework. One T-unit may consist of more than one sentence uttered by a student. For instance, "*Can anyone help give more examples to support this main idea? Can you elaborate with examples?"* would be described as one thematic unit which fall

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under Seeking Assistance (HeS) while *"What do you mean when you write this? It doesn't sound right! Do you really think this example is really relevant? Can you cite a source?*" would be identified as one T-unit for (Ch) under the Contributing Category.

Throughout the two writing activities, the researchers would read and encode the types of online collaborative behaviors students were exhibiting as they progress through the writing process. To establish reliability checks during the coding and recording of the number of T-units of the students' online utterances, comments and exchanges, the researchers acted as co-raters to decide and encode the type of textual communication within the various categories of behaviours. Then, the number of T-units were quantitatively analysed using decsriprive analysis.

4.2. Writing Tasks

Similarly, the students' joint essays were scored by one researcher and co-rated by another to ensure validity and reliability of the scores given. During the entire duration of the study, the groups were given six weeks to complete two joint writing tasks. During the first week, they were instructed to begin their Pre-Writing or Planning Stage of the writing process using the Google Classroom platform. Then, for the next two weeks, they migrated to the GoogleDocs platform to begin their Translating or Composing Stage and finally, ending with the Reviewing or Revising Stage. This three-week process was repeated when they started on their second task. The two joint tasks were scored based on a set of writing rubrics and co-rated for reliability checks. In order to determine whether there was a significant correlation between the students' writing performances and the number of T-units of the collaborative learning behaviours as stated in the coding scheme, a Pearson's Correlation Test was also carried out.

5. Findings

The quantitative data recorded a total of 2005 T-units for all the categories of collaborative behaviours indicated in the framework. From this data, three out of the five groups of students distinctively displayed higher T-units for all the categories listed. As a result, these groups were labelled as Active Collaborative groups. Conversely, those that showed a lack of collaborative learning indicators were labelled as Inactive Groups (See Table 2).

Further analysis revealed that the Active groups A, B and C contributed a total of 491 T-units, 476 T-units amd 470 T-units respectively. On the other hand, inactive groups D (290 T-units) and E (270 T-units) exhibited lacklustre contributions towards all the collaborative learning indicators at every stage of the writing process. Upon closer inspection, the active groups also performed better in their writing performance scoring an average of 5.2, 5.0 and 4.8 respectively. The inactive groups, however, scored averagely low. Group D scored an average of 3.8 while group E only managed a 3.6. This strongly indicates that there is a relationship between the number of T-units for behaviours that indicate collaborative learning and the students' writing quality. To further support this association, a Pearson's Correlation Test was conducted which revealed a significant relationship between these two variables (see Table 2). This implies that the active groups were more immersed in the writing process and were, therefore, more collaboratively enhanced. They exhibited similar patterns of behaviours in all the five

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categories which supported the groups' abilities to establish a more effective collaborative working relationship. As a result, their writing quality is enhanced. As supported by Curtis and Lawson's (1999) study, this pattern of behaviour enabled them to maintain a high level of positive interdependence and group cohesion. These active collaborative groups also performed consistently well in all their two tasks thus, indicating the influence of certain general behaviours that may have enhanced their writing performance.

Table 2. Pearson Correlation Test between the Number Of T-Units of Collaborative Learning Indicators for All Categories and the Average Task Scores of Active Collaborative and Inactive Collaborative Groups

Collaborative Behaviour Indicators	All Categories	Active Collaborative Groups			Inactive Collaborative Groups		Sig.(2-tailed)
		A	B	C	D	E	
Total T-units	2005	491	476	470	298	270	0.05
Avg. Task Scores		5.2	5.0	4.8	3.8	3.6	

To obtain a profile of the type of behaviours that may have contributed to successful collaborative learning as indicated by the active groups' writing scores, the discussion that follows is divided into the three stages of the Writing Process.

5.1. Planning Category- Pre-Writing Stage

From the data presented in Table 3, the active collaborative groups consistently exhibited high frequencies of planning behaviours.

Students' planning behaviour was inflated with high instances of 'initiating activity' (IA) and 'organising' (OW) indicators. The data recorded T-units of (IA) between the ranges of 48 to 49 and T-units of (OW) from 32 to 41 which were consistently shown by the active groups. High levels of (IA) and (OW) behaviours imply that these groups' initial impulse was focused on seeking clarification about the tasks and brainstorming ideas to organise and plan their writing activities.

Table 3. Analysis of Group Postings during Online Discussions

Collaborative Behaviour categories		Codes	Active Collaborative Groups			Inactive Collaborative Groups	
			A	B	C	D	E
Planning	Pre -Writing Stage	IA	48	48	49	32	30
		OW	40	41	32	25	21
Code Totals		366	88	89	81	57	51
Contributing	Composing Stage	HeG	35	34	33	22	21
		FBG	48	47	49	22	20
		RI	35	35	36	17	16
		SK	40	37	38	11	10
		Ch	28	29	23	5	6
		HeS	18	17	18	40	45

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Code Totals			835	204	199	197	117	118
Monitoring	Reflection/ Revision Stage	RM	63	66	57	57	50
Code Totals			235	63	66	57	26	23
Social Interaction	Group Dynamics	SI	136	122	135	98	78
Code totals			569	136	122	135	98	78
Total T-units			2005	491	476	470	298	270
Avg. Task Scores				5.2	5.0	4.8	3.8	3.6

In line with Janssen et al. (2012) and Moonma's (2021) observations of collaborative learning, students who work together would take the initiative to contribute actively towards the learning activity. Thus, high contributions of T-units of (IA) and (OW) behaviours indicate a strong commitment to perform well in their writing tasks among group members. In contrast, the inactive groups (D and E) showed lower levels of (IA) and (OW) behaviours which may have inhibited their abilities to plan and organise their writing tasks well.

5.2. Contributing Category – Composing Stage

The translating or the composing stage of the writing process demands a high level of engagement from the students in order for them to brainstorm activities, forge connections and find the right words and phrases to represent their ideas (Flower & Hayes, 1981). Therefore, based on the framework, students need to exhibit high levels of contributing behaviours in order to collaborate successfully and perform the composing stage with greater efficiency. The number of electronic exchanges devoted to the behaviours in the Contributing category was impressively high for the active collaborative groups. This indicated the students' abilities to generate and brainstorm ideas during the 'composing' stage of the writing process. With high T-units of 'helping behaviours' (HeG) ranging from 33 to 35 and 'providing feedback' behaviours (FBG) of 47 to 49, the data imply that these groups were actively collaborating during the composing stage of the writing activity where information and ideas were being generated and brainstormed. This also shows that the students displayed a great sense of willingness "to help" and 'to respond to questions and requests by others' (HeG) and in 'providing feedback' (FBG) on ideas or suggestions given by others. High levels of (HeG) and (FBG) behaviours among the group members reflect the students' abilities to prod each other into thinking about the subject matter thus, resulting in a reflective discussion about the tasks (Elola & Oskoz, 2010; Fleck, 2003; Gerdt, 2001; Haneda & Wells, 2000). In their study, Curtis and Lawson (1999) also found such behaviours to be prominent features and concluded that the participants' behaviours were genuinely collaborative. This engendered an environment of sharing information, concepts and conclusions. Cicognani's (2000) study also supported the fact that when students collaborate together, they naturally exhibit (HEG) behaviours that are part and parcel of real-life activity. (HEG) behaviours showed that students would act as more knowledgeable others and willingly assist their peers during collaboration to learn (Curtis & Lawson, 1999; Foote, 2009; Fleck, 2003; Kessler, 2009; Lingard, 2021).

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The data in Table 3 also showed that the students' positive contributing behaviours are complemented by other indicators in the same category: 'exchanging resources and information' to help others (RI) and 'sharing of existing knowledge' with others (SK). The active groups exhibited a high number T-units towards these two indicators. They manifested (RI) exchanges ranging between 35 to 38 and (SK) behaviours of between 38 to 40. These behaviours were an extension of the (HEG) behaviours described earlier. It is through the culture of helping and assisting others to understand the magnitude of the problem that (RI) and (SK) occur. Curtis and Lawson (1999) stress that elements of (RI) and (SK) behaviours provide building blocks for a strong collaborative learning environment which can propel students to think and explore their own social context or experience learning from within and without. Displaying a strong sense of (HeG) and (FBG) coupled with a high level of (RI) and (SK) during the writing process can empower the students' own understanding of the subject matter and how they should go about writing it.

Another feature that made the active groups highly unique was the fact that many of the groups' discussions were highly charged with levels of (Ch) which displayed the active groups' abilities to challenge and question the responses made by their group members. With T-units of (Ch) behaviour ranging between 23 to 29, the students in the active groups seemed to have a strong sense of confidence to challenge or comment on the ideas or contributions made by others. In their research studies, Kim et al. (2022) and Banerjee (2000) maintained that students who take risks in their learning exhibit the courage to express their viewpoints and question the views put forth by others. When students have the opportunities to do so, they allow higher order thinking skills to take place. Chu and Kennedy (2011) also agree that to achieve successful learning, cooperation alone is not the essential ingredient but rather it depends on accommodating disagreement and exploring hypotheses.

On the other hand, the inactive groups demonstrated low levels of these Contributing indicators (HeG, FBG, RI and SK) coupled with low frequencies of (Ch) behaviours. As a result, these groups were not collaboratively enhanced which may have affected their writing ability.

5.3. Reflection/Monitoring Category – Revision Stage

Table 3 also displayed the active groups' levels of 'reflection and monitoring' (RM) between the range of 57 to 66. This suggested that the active groups were displaying behaviours to self-regulate their own writing which consequently helped them to be more aware of their metacognitive abilities to review their writing skills. High levels of (RM) behaviours encourage students to apply metacognitive abilities that were necessary to edit and improve the quality of a text not only at the surface level but also at the deeper level (Kim et al., 2022). The inactive groups, however, were very much lacking in this category displaying low levels of (RM).

5.4. Social Interactions (SI)

Generally, social interactions that occur during online discussion is often associated as unproductive. Far from being a distraction to the tasks, the high levels of (SI) exhibited by the students engender collaborative behaviours that are indicative of an online community. The high levels of (SI) exchanges indicate not only the way students enjoy chatting online but also how comfortable they feel

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working with each other. Therefore, it would seem that the higher the level of (SI) the more at ease students are with each other. Additionally, Curtis and Lawson (1999) study came to the conclusion that since the students do not meet F2F, a lack of (SI) could inhibit the more robust exchanges that characterise "challenge" (Ch) behaviours. Since the active groups contributed a large number of utterances towards (SI), this may have strengthened the bonds of friendship and familiarity among the group members and opened the portal for students to brainstorm, link and synthesis new ideas more effectively. According to Nykopp et al. (2018) and Janssen et al. (2012), coordination of social activities in particular was a requirement for effective group performance. They agree that students fared better when their social interactions were more organised. According to the findings of the current study, the collaborative groups that were more socially and interactively engaged, produced higher-quality texts compared to their inactive counterparts.

6. Conclusion

With reference to Research Question One : "What type of online collaborative behaviors do students show as they move through the stages of the writing process?", the data elicited evidence that group work does not necessarily lead to effective learning unless students show behaviours that contribute towards positive interdependence and group dynamics. The findings show that these elements were easily established when students exhibited the various collaborative indicators at every phase of the writing process. Otherwise, their collaborative learning process is hindered thus affecting the quality of their writing.

As for Research Question Two: "Are these behaviours associated to students' writing quality? , it is clear from the groups' joint writing scores that the students' writing quality was very much influenced by the types and degree of collaborative learning behaviours they showed during the writing process. When students exhibit active collaborative learning behaviours at every stage of the writing process, students' metacognitive awareness is enhanced thus creating a more conducive environment for successful writing achievements.

In the final analysis, the study is significant as it provides online instructors greater insight into how online writing environments can be facilitated more effectively. Instructors could provide prompts of the types of behaviours that could enhance collaboration during the online writing process. Alternatively, instructors could also design tool-kits or check lists to guide students as they collaborate independently on online writing tasks. Furthermore, by observing students' online behaviours, instructors could exercise necessary interventions to ensure effective collaboration takes place.

This study was limited to data derived from a homogeneous group of undergraduates in a local university. Therefore, this study's conclusions can only be generalised to the target group. As such, suggestions for future research would include a follow-up study using a larger and more heterogeneous sampling. An extension of this study focusing on the use of a tool-kit to prompt students to self-regulate during the collaborative writing process would be an interesting area of research.

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