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Storyboarding-based collaborative narratives on Google Docs: Fostering EFL learners' writing fluency, syntactic complexity, and overall performance

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This study examined the impact of storyboarding-based collaborative narrative writing using Google Docs on EFL learners' writing fluency, syntactic complexity, and overall performance. For this purpose, a cohort of 30 EFL college learners was selected and exposed to a nine-week intervention where they collaboratively wrote storyboarding-based narratives on Google Docs. This study adopted a pretest posttest quasi-experimental mixed-method design in which both quantitative (writing tests) and qualitative (reflection as well as group and self-evaluation cloud forms) data were collected and analyzed. Results of the study revealed significant differences between students' pretest and posttest mean scores on writing fluency and overall writing performance with a large effect size. Conversely, there was no significant difference between their mean scores on syntactic complexity. Qualitative results showed that most students appreciated the

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storyboarding-based collaborative narrative writing activities on Google Docs and reported that they were of much benefit to them.

Keywords: collaborative narratives; Google Docs; storyboarding; syntactic complexity; writing fluency; writing performance.

Introduction

Many students nowadays spend a lot of their time using social media for fun and socialization. They create and share content with others who in turn write comments or give feedback on that content. In an attempt to seize that opportunity in favor of EFL teaching and learning, web-based collaborative writing (CW) is widely researched in recent writing literature using different Web 2.0 tools: Google Docs (Ebadi & Rahimi, 2017; Kessler, Bikowski, & Boggs, 2012; Seyyedrezaie, Ghonsooly, Shahriari, & Fatemi, 2016; Shintani, 2015; Suwantarathip & Wichadee, 2014; Woodrich & Fan, 2017), Wikis (Forsythe, 2014; Hsu & Lo, 2018; Kessler, 2009; Lee, 2010; Mak & Coniam, 2008; Prichard, 2008), Weblogs (Fellner & Apple, 2006; Pham & Usaha, 2016; Prichard, 2008), Facebook (Dizon, 2016; Yu, 2014), and Forums (Al-haq & Al-Sobh, 2010).

Closer observation of practices on social media reveals that digitally literate students are, by one way or another, creating storyboards of their daily situations and experiences. To explain, using the "Story" feature in social networking sites and applications (like Facebook), they recount and report on their daily experiences by posting their photos accompanied by a short textual comment. The question now is: How could this skill and tendency to storyboard (visually and textually share daily experiences) online be exploited for the potential improvement of those students' EFL writing performance?

The current study, therefore, was an attempt to make use of students' habitual informal practice of writing and reporting on their daily experiences on social media as well as their tendency to collaborate by creating and sharing visual media-based written content using Web 2.0 tools and applications. To be specific, the current study investigated the impact of storyboarding-based collaborative narrative writing (using the cloud application Google Docs) on EFL college learners' writing fluency, syntactic complexity, and overall performance. Besides, it explored the participants' views of storyboarding-based collaborative narrative writing using Google Docs. Thus, the main research questions of the current study were:

1. What is the effect of storyboarding-based collaborative narrative writing on Google Docs on EFL learners' writing fluency?
2. What is the effect of storyboarding-based collaborative narrative writing on Google Docs on EFL learners' writing (syntactic) complexity?
3. What is the effect of storyboarding-based collaborative narrative writing on Google Docs on EFL learners' overall writing performance?
4. What are students' perceptions of storyboarding-based collaborative narrative writing on Google Docs?

Literature review

Storyboarding-based narrative writing

According to Brown (2001), narratives are types of texts where writers recount an incident or event. This incident may be imaginative (Fictional Narratives) or real-life (Personal Narratives). Research on narrative writing recommended using storyboards or comic strips as a prewriting activity (Kristi & Ferri, 2013; Megawati & Anugerahwati, 2012; Ni'mah & Pusparini, 2014; Ratnasari, 2014). Essley and Rocci (2008) argue that storyboards are increasingly being incorporated in teaching and learning contexts because combining pictures with text provides learners with a large amount of entertaining and informative details.

According to Bruce (2011), storyboards "deliver a narrative through discrete visual representations" (p. 78). As defined by Varvel and Lindeman (2005), "storyboards are a means to graphically represent layout, organization, content, and linkages of information to create a conceptual idea of the information, location, meaning, and appearance" (p. 1). Glebas (2009) pointed out that a storyboard is a plan whose purpose is the visualization of the story to be narrated. Generally, a storyboard is a set of boxes sequenced in a logical (mostly chronological) order. In each box or frame, there are pictures, symbols, and/or short text that convey the incidents or meaning of the story. Pictures in storyboards can be photographs, simple cartoons, drawings, or sophisticated technical diagrams (Doherty & Coggeshall, 2005; Essley & Rocci, 2008). These storyboards can either be prepared by students themselves or provided in advance by instructors. Bruce (2011) states that storyboards are used as scaffolds of the final written product. That is, during writing, students are free to add, omit, or adapt the images of the storyboard and consequently the incidents of the story.

As a prewriting activity, storyboarding enhances students' planning, outlining, brainstorming, elaborating, and sequencing of the incidents or events of the story to be narrated (Bruce, 2011); fosters their organization, time management, and planning skills (Doherty & Coggeshall, 2005); expands students' linguistic resources and repertoire provided that they stimulate students' interpretation (Piri, Barati, & Ketabi, 2012); helps them retrieve words and generate ideas for their writing; and offers them interesting and motivating writing prompts (Megawati & Anugerahwati, 2012). Essley and Rocci (2008) added that storyboards can be used as an alternative technique to support students with problems in writing.

Collaborative writing

Collaborative writing has become commonplace not only in academic, but also in many professional and practical contexts and even obligatory in some of them (Skaf-Molli, Ignat, Rahhal, & Molli, 2007). Simply put, Haring-Smith (1994) defines collaborative writing as getting more than one individual involved in the writing process so they contribute to the creation and thus share responsibility of the final product. However, as described by Erkens, Jaspers, Prangsma, and Kanselaar (2005), it is a very complex process where the phases (i.e., planning, drafting, revising, and editing) gone through during individual writing "are complicated and intensified by the addition of more authors" (Lowry, Curtis, & Lowry, 2004, p. 72).

Despite this complexity, collaborative writing is very fruitful when effectively implemented in EFL contexts. To elaborate, it yields a better written product (Blau & Caspi,

2009; Storch, 2005); more attention to meaning than form; more accurate than inaccurate edits (Kessler et al., 2012); improved content, organization, and vocabulary as compared to individual writing (Shehadeh, 2011); a lower level of writing anxiety (Jalili & Shahrokhi, 2017); greater construction of knowledge; developed writing and social skills (Fung, 2010); increased participation and sense of ownership (Storch, 2005); and improved thinking skills (Tanrıkulu, 2020).

Before proceeding on a collaborative writing task, collaborators should agree upon the strategy they will follow during collaboration. In this regard, the following are the main CW strategies (Haring-Smith, 1994; Lowry et al., 2004):

a. *Sequential writing:* Each member writes one part of the draft in sequence.
b. *Parallel writing:* Each member writes a separate parallel draft.
c. *Co-authored writing:* All members synchronously co-construct a single draft.
d. *Group single-author writing:* One member at a time writes the draft.
e. *Mixed-mode writing:* More than one of the abovementioned strategies is adopted for producing the group draft. To exemplify, they may be asked to write the introduction of the essay following the co-authored CW strategy then write the body following the sequential CW strategy. It is noteworthy that these drafting strategies are implemented based on the ideas generated collaboratively in the prewriting phase then revised and edited collaboratively in the post-writing phase.

Collaborative writing technologies and Google Docs

In recent decades, there has been an increasing interest in developing new collaborative technologies. Research in this respect indicated that online collaborators developed writing fluency, accuracy (Fathi & Rahimi, 2020; Pae, 2011; Soleimani, Modirkhamene, & Sadeghi, 2017), and complexity (Fathi & Rahimi, 2020; Pae, 2011; Storch, 2005); focused more on meaning than form (Kessler, 2009); managed collaborative writing more effectively and finished tasks more quickly (Apple, Reis-Bergan, Adams, & Saunders, 2011); and appreciated giving and receiving feedback online (Zheng, Lawrence, Warschauer, & Lin, 2015).

Collaborative writing technologies are classified into three broad categories:

a. *Desktop-based applications* which must be installed on the computer of each collaborator like Gobby, Recdit, PREP Editor, and plug-ins for Microsoft Word (Vens, 2010).
b. *Asynchronous web-based tools and applications* such as wikis, blogs, and e-mails.
c. *Synchronous cloud-based tools* that allow collaboration to take place in real time (e.g., Google Docs, Zoho Writer, Etherpad, co-ment, SynchroEdit, Sync.in, TypeWith.me, ThinkFree, and Writeboard).

Cloud-based CW tools like Google Docs are increasingly examined in recent EFL/ESL research for a number of reasons: First, they are available for collaborators anytime and anywhere. Second, they override the most common demerit of asynchronous collaboration tools: 'Blind Modification' (as termed by Skaf-Molli et al., 2007, where collaborators do not instantly see their peer edits and thus possibly re-edit already edited mistakes) and duplication of efforts. Third, cloud-based CW applications provide different degrees of proximity of the writers (i.e. to work at the same location or at different locations) and different degrees of synchronicity of writing activities (i.e. to work at the same time or at different times). Thus, they enable learners to adjust learning mode to learner's conditions.

Overall, cloud-based tools, like Google Docs, facilitate the entire process of writing, from

task planning and negotiation and language selection to text co-construction, revision, and editing until publishing the final written product (Li, 2018). Besides, they offer different ways for writers to interact with each other (Brodahl & Hansen, 2014). To put it differently, Google Docs, for example, facilitates three modes of collaboration as collaborators can:

a. *Collaborate on text* (in the editor mode) during collaborative text production through adding, deleting, substituting, or rearranging some parts of text.
b. *Collaborate around text* (in the viewer mode). Using built-in chat rooms and commenting features, they collaborate around the text to be produced. Before text production, they collaborate by preparing and planning for what they are going to write. Then, during and after text production, they collaborate by negotiating, commenting on, discussing, and even generating more ideas. Such sub-processes are very crucial to process writing in which writing is more than focusing on form and language; it is a process of knowledge construction and text building through negotiation and discussion with peers.
c. *Collaborate through text* (in all modes). All the way through previous processes and phases, students communicate in a written form. That is, they use written text to prepare and plan for writing, and to generate, organize, negotiate, and discuss ideas using written chatting and commenting features. This is in addition to using text to write in the collaborative document (through adding, deleting, replacing, and arranging parts of written text) using in-text editing features.

Google Docs is an Office-like application that allows students to create and share documents with the class online, then synchronously edit and make comments on each other's contribution (Godwin-Jones, 2008; Yang, 2010) while viewing their changes in real time (Yang, 2010). An extensive revision history and a meta-communication chat box together with numerous add-on applications (like OneLook Thesaurus, Translate plus, Writing Mentor, Language Tool, and SpellRight) are also available. Google Docs with its synchronous, as well as asynchronous, editing tools is a very promising and powerful collaborative writing platform (Li, 2018; Yang, 2010) as it enables learners to get involved in authentic and meaningful learning experiences (Goold, Coldwell, & Craig, 2010) due to the features of time/space independence, and writing interaction and reflection (Li, 2018). Besides, it increases students' writing motivation (Yang, 2010), enhances their higher order thinking skills like evaluation (Godwin-Jones, 2008), facilitates the process of working together to perform a shared writing task and accomplish a common goal (Ebadi & Rahimi, 2017; Godwin-Jones, 2008; Kessler et al., 2012), makes metalinguistic understanding of the different components of writing easier (Shintani, 2015), and facilitates class project work and course/program management (Firth & Mesureur, 2010).

Previous research on Google Docs supported these promising potentialities. For example, Ebadi and Rahimi (2017) found that students who used Google Docs for peer editing outperformed those in face-to-face classroom and their academic writing skills significantly developed. They added that learners (using Google Docs) collaborated more with their peers on editing and providing feedback on written assignments as compared to face-to-face ones. Shintani (2015) also reported that Google Docs-based synchronous and asynchronous corrective feedback provided EFL writing students with opportunities for noticing linguistic features of writing in context, helped them give suitable input, and allowed them to transfer it to subsequent production.

In addition, Suwantarathip and Wichadee (2014) indicated that students in Google Docs-based collaborative writing groups gained higher mean scores on the writing test than

those working in face-to-face groups. Moreover, they reported that students collaborated more efficiently in Google Docs and that most students highlighted the ease of use of Google Docs as a CW tool. In the same vein, Kessler et al. (2012) investigated the use of Google Docs-based collaborative writing to plan and report on a research project. Their findings showed that students focused more on the content than the form of writing and highlighted that their grammatical edits were generally more correct than incorrect.

As aforementioned, previous research revealed the benefits and positive effects of using Google Docs in collaborative writing tasks on students' writing performance. However, limited, if not scarce, studies investigated how supplementing such tools with student-generated storyboards, as a collaborative prewriting activity, might affect the process and product of writing. The current study is an attempt to fill this gap in web-based EFL writing research.

Method

Study design

This study adopted a pretest posttest quasi-experimental mixed-method design in which both quantitative and qualitative data collection and analysis methods were used.

Participants

Using criterion-based purposive sampling, a cohort of 30 participants was selected. Criterion-based purposive sampling refers to selecting participants because they represent one or more study-relevant criteria (Collins, Onwuegbuzie, & Jiao, 2007). For this purpose, a checklist, comprising a number of pertinent criteria, was administered on junior EFL College learners. Eligibility criteria included the availability of an internet connection at home; knowledge of the basics of dealing with computer, word processing software, and popular social networking sites; and acceptance and willingness to join the study.

Concerning the participants, they were third year (advanced) English Major students whose ages ranged from 20 to 21 years old. They studied a writing course for one semester each year. Thus, before joining the study, they had studied two writing courses: one in the first year and the other in the second year. First-year writing course focused on paragraph writing. The second-year writing course focused also on paragraph writing in addition to an introduction to essay writing and analysis of model essays.

Instruments

As mentioned earlier, a mixed-method triangulation approach (Creswell & Plano Clark, 2018) was adopted to gather both quantitative and qualitative data. For this purpose, in addition to the (quantitative) pre and post narrative writing tests, a number of qualitative data collection instruments (i.e., students' reflection forms and group and self-evaluation forms) were also implemented. All these instruments were administered on the cloud using Google Docs and Google Forms.

The writing tests and scoring rubric

Two parallel forms of individual narrative writing tests were administered: one before and the other after the intervention (Appendix A). To score students' pretest and posttest essays, the researchers developed an analytic scoring rubric (Appendix B) after a survey of relevant literature and previous studies (e.g., Myskow, 2011; Scott, 2012; Wang & Liao, 2008). The written products were scored based on six criteria: (a) introduction, (b) body, (c) conclusion, (d) organization, (e) conventions, (f) and language and diction. Additionally, task-specific rating scheme (i.e., specific descriptors pertaining to narrative writing tasks) was provided as guidelines for raters.

For inter-rater reliability, students' written products were rated by two raters (the two researchers) who blindly scored the written samples using the rating scale. Preliminary disagreements between raters were resolved by consensus discussion till an acceptable agreement level was reached. Pearson correlation coefficient between the two raters was calculated and inter-rater reliability was found to be high (r =.84).

The reflection form

To get students' reflections on the collaborative activities they practiced on Google Docs, the researchers adapted Barkley, Cross, and Major's (2014) reflection sheet and developed a cloud-based self-reflection form. Students were asked to fill it (after the intervention) giving their opinions and reflections on the most and least enjoyable activities, the challenging activities and what they did to overcome the problems they faced, etc.

The evaluation forms

Additionally, cloud-based self- and group evaluation forms were used to grope students' evaluation of their individual and group performance during collaboration on Google Docs. These forms were adapted from Barkley et al. (2014). In the self-evaluation form, students were required to respond to a rating scale on their performance within the group. As for the group evaluation form, they were asked to respond to questions about the strengths and weaknesses of their group, things they learned from the group, and overall group performance.

Instructional procedures and data collection

During the second semester of the academic year 2019/2020, the intervention was administered for nine weeks (two sessions a week, about 60 minutes a session). During intervention, students (in groups of three) practiced the phases of storyboarding-based process writing collaboratively on Google Docs following a preset CW strategy. Meanwhile, the instructor monitored the process activities of each group using cloud monitoring features of synchronous viewing, commenting, editing, chatting, and revision history.

As for group membership, it was a shared responsibility between the instructor and students. That is, the instructor assigned the first member of each group (from the highest scoring students in the writing pretest). Then, to ensure harmony and coordination between the members during collaboration, this student selected the other two members. Process phases that were practiced were as follows:

Prewriting (in Google Docs)

Before writing the first draft of their narrative essay (or part of the essay), the members of each group collaboratively storyboarded the narrative they selected (which was drawn from a fable, favorite movie, life experience, or famous story). At other times, having been provided by a ready-made storyboard (prepared by the instructor), the members of each group went on brainstorming ideas, phrases, and expressions on the given storyboard. Having generated ideas, and incidents for the narrative, each group selected, agreed on, and organized the proposed ideas, and incidents. Accordingly, each group made an outline for their first draft.

Drafting (in Google Docs)

Each group, following the preset CW strategy, collaboratively wrote the first draft of the narrative (or part of it) based on the storyboarding-based prewriting activities they practiced. In this respect, two CW strategies were used: serial and parallel CW strategy.

Revising (in Google Docs and Google Sheets)

Having finished, each group collaboratively revised the produced sample(s) using the Revision Checklist (in Google Sheets) provided through a link to the resources folder on the cloud drive (i.e., Google Drive).

Editing (in Google Docs)

Through synchronous direct edits in text and comments, using commenting feature, each group collaboratively edited its draft in terms of errors of grammar, mechanics, and word choice. More importantly, sample review was performed at two levels: group review and external review, allowing for both intra- and inter-group interaction and collaboration to take place. That is, each group reviewed (revised and edited) its draft first, then the sample was shared with other groups for further revision and editing. Finally, the instructor gave her corrective and non-corrective feedback.

Publishing (on the web)

Having received class and instructor feedback, each group made the required changes and published the very final drafts on the web using Google Docs feature of online publishing.

Data analysis

As aforementioned, a mixed-method triangulation approach was adopted to analyze quantitative and qualitative data collected in this study.

Quantitative data analysis

Students' pretest and posttest narrative essays were quantitatively analyzed using the writing scoring rubric to obtain the overall writing performance scores. Further, these essays

were also analyzed in terms of writing fluency and complexity. For this purpose, a number of fluency and complexity indices were used. To be specific, fluency was estimated by the average number of words and T-units per text (following Fathi & Rahimi, 2020; Pae, 2011; Soleimani et al., 2017; Wigglesworth & Storch, 2009). To assess syntactic complexity, the mean length of T-units (MLTU) was estimated. MLTU has been chosen since it is, according to Ortega (2003), the most widely-used syntactic complexity measure at the college level. Besides, the number of clauses per T-unit (C/TU) and dependent clauses per clause (DC/C) were used as additional indices of syntactic complexity (following Fathi & Rahimi, 2020; Frear & Bitchener, 2015; Soleimani et al., 2017; Storch, 2009; Wigglesworth & Storch, 2009). It is noteworthy that syntactic complexity and fluency were analyzed using Lu's (2010) L2 syntactic complexity analyzer (L2SCA), a free python-based automated text analyzer.

The paired sample t-test was used to compare students' pre- and posttest (fluency, syntactic complexity, and overall performance) scores. Prior to conducting the t-test, its main parameters were checked. For this purpose, the assumption of normality of distribution was examined (there was no need to check the other assumption of homogeneity of variances because this is a one-group design study). For this purpose, the skewness and kurtosis values were estimated and found to be within the allowable ranges for a t-test. To explain, according to Kline's (2011) skewness and kurtosis indices, skewness values were between +3 and −3 and kurtosis estimates ranged from +10 to −10.

Subsequently, to determine the effect size, point biserial correlation coefficient (rpb), as recommended by Rosenthal, Rosnow, and Rubin (as cited in Fritz, Morris, & Richler, 2012), was calculated. The obtained values were interpreted using Cohen's (as cited in LeBlanc & Cox, 2017) benchmarks as presented in Table 1 below.

Table 1. Cohen's referential effect size benchmarks and relevant interpretation

Effect size (rpb) Value	**Interpretation**
From **.10** to **.29**	**Small** effect size
From **.30** to **.49**	**Medium** effect size
.50 or more	**Large** effect size

Qualitative data analysis

In addition to the quantitative scoring of the pretest and posttest essays, they were qualitatively analyzed. In other words, salient features of writing and changes in the different writing components were analyzed and subsequently subjected to further qualitative examination. Additionally, thematic analysis was used to analyze qualitative data collected from the cloud-based reflection and self- and group evaluation forms. In this respect, the researchers used the inductive content analysis approach as no predetermined codes were used to guide the analysis of raw data. Homogeneity and heterogeneity of codes were checked. Then, adopting a statistics-by-theme approach for joint display of data (Creswell & Plano Clark, 2018), the researchers counted the number of times the code/ theme occurs across students' responses. Eventually, exemplar (participants') quotes were selected to illustrate the themes and they were chosen based on their representativeness of the themes.

Results

Quantitative results

Data on students' pretest and posttest writing fluency, syntactic complexity, and overall performance are reported in Table 2.

Table 2. The T-values for pre- and posttest writing fluency, syntactic complexity, and overall performance

Component	Test	*N*	*M*	*SD*	*df*	*t*	*p*	r_{pb}
Number of words per text	Post	30	408.87	208.63	29	6.63	.01	.78
	Pre	30	161.67	79.31				
Number of T-units per text	Post	30	28.13	13.37	29	7.53	.01	.81
	Pre	30	12.07	6.53				
Mean length of T-units	Post	30	14.79	4.55	29	.65	.522	-
	Pre	30	14.09	3.09				
Number of clauses per T-unit	Post	30	1.79	0.30	29	–.54	.591	-
	Pre	30	1.84	0.39				
Number of dependent clauses per clause	Post	30	0.36	0.09	29	–1.57	.128	-
	Pre	30	0.40	0.12				
Overall writing performance	Post	30	30.57	5.75	29	11.16	.01	.90
	Pre	30	18.77	5.60				

Results of the paired-sample t-test indicate that there were significant differences between students' pretest and posttest mean scores on writing fluency and overall performance at the 0.01 level in favor of the posttests. This means that students significantly wrote more fluently and performed better in the narrative essay writing posttest. Further, as denoted by the effect size coefficient value, storyboarding-based collaborative narrative writing on Google Docs largely affected students' writing fluency and overall performance.

Conversely, Table 2 shows that there was no significant differences between students' pretest and posttest mean scores on syntactic complexity (at the level of the three indices: MLTU, C/TU, and DC/C) at the 0.01 level. That is, students' syntactic complexity did not improve as a result of using storyboarding-based collaborative narrative writing activities on Google Docs.

Qualitative results

Analysis of the participants' pretest and posttest essays on each writing component. For in-depth analysis of students' written samples, their pre- and posttests were qualitatively analyzed (as shown in Table 3) for salient features of writing on each writing component.

Table 3. Students' pretest and posttest performance on each writing component

Component	Test	Number of students at each level				
		Exemplary	Skilled	Developing	Novice	Way off
Introduction	Pre	0	3	6	15	6
	Post	15	8	5	2	0
Body	Pre	0	1	12	13	4
	Post	7	10	9	4	0
Conclusion	Pre	0	12	11	7	0
	Post	14	10	5	1	0
Organization	Pre	0	1	9	10	10
	Post	7	13	8	2	0
Conventions	Pre	0	6	14	10	0
	Post	3	17	7	3	0
Diction	Pre	0	6	13	11	0
	Post	2	17	9	2	0

Table 3 shows that students' performance on each writing component developed after being exposed to storyboarding-based collaborative narrative writing on Google Docs intervention. To be specific, half of the participants wrote exemplary introductions and conclusions in the posttest as compared to their pretests where none of them did so. Also, half of those high-level students also performed exemplarily on writing the body and organization. To add, another evident point is that none of the participants performed exemplarily on each writing component in the pretest, whereas none of their posttest samples could be described as "Way off". In terms of writing conventions and diction, roughly the same pattern of development could be detected. To put it differently, the number of participants in each level, of these two components, are nearly the same.

Most importantly, in respect of introduction writing, none of the pretest samples included a thesis statement or even a hook in the beginning. Contrarily, varied grabbing hooks and well-written thesis statements were also there in most of their posttest essays. Examples of those hooks include "Have you ever felt so happy to the extent of crying? That was my feeling when my friends surprised me…", "Life is full of ups and downs.", " Do you think love can change one from devil to angel?", and "Success comes from the darkness of suffering. That's what I learned through the previous 3 years".

As for the body of the narrative, vivid details, engaging dialogue, and interesting description were eminent elements in most of the posttest essays and almost lacking or even reduced in the pretests. Besides, though problem resolution of and reflection on the problem were, to some extent, found in the pretests, strong closures and reflection sentences were salient features of posttest samples. When it comes to organization, it is no exception to that; a very obvious feature of students' pretest samples is the lack of overall structure and paragraphing scheme, not to mention the almost missing cohesive devices. Conversely, much development at these subcomponents was detected in their posttest essays.

Analysis of the participants' responses in the cloud-based reflection form. For further qualitative investigation, students' responses in the cloud-based reflection forms were analyzed as illustrated in Table 4.

Table 4. Analysis of the participants' responses in the cloud-based reflection form

Reflection form question	Response theme	Percentage
What did you enjoy most so far? *	Collaboration	50%
	Google Docs-based writing practice	30%
	Varied narrative writing topics	13%
	Storyboarding-based writing	7%
What did you dislike/ enjoy least so far?	Nothing	80%
	Mistakes being pointed out in the public	13%
	Inappropriate or incorrect comments made by some peers	7%
What did you do to overcome the problems/ failures you faced while doing required collaborative activities? *	Consulting and coordinating with other group members	40%
	Accessing cloud-based resources	22%
	Consulting the instructor	20%
	Planning well	9%
	Doing nothing	9%
What was the most challenging thing that happened so far?	Giving and receiving feedback	60%
	Putting ideas into writing	30%
	Writing topics	10%
If there were any similar writing classes, would you join them? Why?	Yes, to further improve my writing skills	100%
	No	0%

* Some students' responses included more than one theme.

As shown in Table 4, analysis of students' responses yielded that students attributed their enjoyment during intervention to the following factors in sequence: collaboration (as mentioned by half of the students), Google Docs-based writing practice and feedback (by one third of students), varied narrative writing topics, and storyboarding-based writing activities. Exemplar participants' quotes highlighting their appreciation of collaborative practices include "Collaboration and exchange of ideas", "What I enjoyed most is collaborative work", "Sharing writing with group members and exchanging opinions ", "Working together as if we [were] one person to be a successful team", and "Being in a group". Highlighting their interest in the varied narratives they were asked to write, students responded, "I enjoyed the topics that I wrote about.", "I really liked the topics I used to write about, and I was very excited when I wrote and never got bored".

Conversely, when asked about the things they disliked, the majority of them mentioned nothing in this respect whereas very few of them were disappointed by the unsuitable and sometimes incorrect comments and feedback. This shows how most students appreciated and were interested in storyboarding-based collaborative narrative writing activities they were involved in on Google Docs.

Further, more than one fifth of the students reported that they accessed cloud-based resources to overcome the problems they faced while writing. The resources they mentioned were cloud mini-lessons, dictionaries, and translation and editing resources in addition to links to further readings and tutorials on the cloud. More importantly, the number of those who sought their peers' help (using cloud-based communication tools like the chat box and commenting features) was two-fold those who consulted the instructor. Further, few students mentioned planning as a way out and they were the same number as those who

did nothing in this respect. These data illustrate how the cloud (represented in Google Docs) with its communication tools and resources facilitated collaboration and helped students get over any difficulties they faced while writing.

Additionally, when asked about the most challenging things during storyboarding-based activities on Google Docs, two thirds of students mentioned feedback-relevant issues. Exemplar quotes include "when we gave feedback and corrected the assignments of other members was the most challenging and beneficial activity", "Really, I enjoyed the discussion with and feedback from my group". Also, one third of them added expressing idea and feelings and putting them into writing to the most challenging ones. Eventually, all students reported that they would like to join similar Google Docs-based CW classes in the future. Among the reasons they mentioned were "I had that wonderful experience that I will never ever forget ", "It helped me to improve my skills in writing ", and "My writing skills have developed and essay writing has become a very easy thing for me. Unlike previously, I used to feel it was difficult to write a good essay". These responses clearly reflect how practicing storyboarding-based CW on Google Docs really impressed and benefited students.

Analysis of the participants' responses in the cloud-based evaluation forms. In response to a question asking students to evaluate their individual performance within the group during collaboration, students' response choices were as follows in Table 5.

Table 5. Analysis of the participants' responses in the cloud-based self-evaluation form

	Percentage of participants in each category				
Pre-given responses	**Always**	**Frequently**	**Sometimes**	**Rarely**	**Never**
I was prepared to contribute to the group	62%	23%	7%	4%	4%
I stayed on task	81%	15%	4%	0%	0%
I listened to others	62%	27%	11%	0%	0%
I negotiated ideas/ meanings with others	54%	38%	8%	0%	0%
I participated in discussion	73%	23%	0%	4%	0%
I encouraged others to participate	55%	27%	7%	11%	0%
I could handle conflicts effectively	15%	38%	36%	11%	0%

Table 5 indicates that most of the students were active participants within their groups during storyboarding-based collaboration on Google Docs. That is, the majority of them responded that they always or frequently did the abovementioned sub-collaborative tasks. Besides, very few of them mentioned that they never or rarely did these tasks. This shows that the majority of the students were effective collaborators with the other members in their groups. The only exception to that overall trend is that nearly half of the students could handle conflicts effectively whereas the other half faced problems in this respect.

Additionally, students' evaluation of their group performance during collaboration (through responding to the items of the group evaluation form) was assessed and analyzed as indicated in Table 6.

Table 6. Analysis of the participants' responses in the cloud-based group evaluation form

Evaluation form item	Response theme	Percentage
Overall, how effectively did your group work together on the assignments?	Extremely well	48%
	Well	48%
	Adequately	4%
	Poorly	0%
Out of the three group members, how many participated actively most of the time?	Three	68%
	Two	32%
	One	0%
	None	0%
Give one specific example of something you learned from the group that you probably would not have learned when working alone.	Varied and new expressions, structures, and vocabulary	46%
	Generating and sharing ideas	19%
	Accepting criticism	19%
	Organizing ideas	16%
What are the top strengths of your group?	Harmonious collaboration	52%
	Respect and acceptance of opposing views	24%
	Positive interaction	12%
	Good language command	12%
What are the top weaknesses of your group?	Unpunctuality	32%
	Inadequate linguistic knowledge	18%
	Nothing	18%
	Sensitiveness to criticism	18%
	Public writing apprehension	7%
	Unequal participation	7%

As illustrated in Table 6, the majority of students (96%) indicated that their groups worked effectively during collaboration. That is, nearly half of the students evaluated their group performance during collaboration as extremely well whereas a similar percentage of students saw it as well. Further, two thirds of them pointed out that all their group members were active participants whereas one third of them confined this description to just two members. Moreover, when asked about the benefits they got from collaboration, students' responses enumerated their gains in relation to the language (vocabulary, expressions, and grammar), content (the ideas), and organization of writing. They also added that, during collaboration, they learned to accept criticism.

In terms of the strengths of the group, half of the students mentioned harmonious collaboration and one quarter of the respondents added respect and acceptance of opposing views ("I enjoyed learning to listen to each other", "We learned to accept, excuse, and understand each other", and "We shared our ideas and accepted our different opinions" are examples of students' quotes in this respect).

Other points of strength included positive interaction and good language command. In respect of the weaknesses, one third of them indicated that not being on time (mostly due to unstable internet connection) was the main disappointing thing, especially during synchronous collaborative activities. Besides, the same percentage of students (18%) added

inadequate linguistic knowledge, nothing, and sensitivity to criticism. Eventually, few of them (7%) considered public writing apprehension as well as unequal participation their main weaknesses. All of these points show how they were keen on successful collaboration and how they were aware of its hindrances. As can be seen, students' responses in the cloud-based evaluation forms show that they appreciated and benefited from the Google Docs-based collaborative writing activities and resources.

Discussion

Quantitative and qualitative analysis of data revealed that there was an improvement in students' overall writing performance and writing fluency after being exposed to the proposed intervention. Overall, these findings are in line with those of Fathi and Rahimi (2020) who reported that collaborative activities in a flipped writing classroom significantly enhanced students' global writing performance and writing fluency but not their writing complexity.Also, the current study results are concurrent with those of Ambrose and Palpanathan (2017); Kessler et al. (2012), Seyyedrezaie et al. (2016), and Suwantarathip and Wichadee (2014) who found that Google Docs-based CW played an effective role in improving students' writing. They are also compatible with those of Ni'mah and Pusparini (2014), Megawati and Anugerahwati (2012), Kristi and Ferri (2013), and Ratnasari (2014) who concluded that the implementation of storyboards/comic strips in teaching writing of narrative texts (through a collaborative classroom in the second study) could successfully improve students' ability in writing. Besides, the current study findings are in agreement with those of Soleimani et al. (2017) and Pae (2011) who found that those who wrote collaboratively did improve in terms of writing fluency.

However, those study findings are not consistent with those of Biria and Jafari (2013) and Jalili and Shahrokhi (2017) where collaborative writing yielded less fluent compositions than those not written collaboratively. Additionally, they are also incompatible with those of Woodrich and Fan (2017) who found that collaborative writing using Google Docs did not produce better writing products than face-to-face CW. Conversely, Ebadi and Rahimi (2017) indicated that Google Docs-based collaborators outperformed face-to-face ones. As a matter of fact, differences in design, population, assigned tasks, and even the writing genre of the studies may justify the variety and sometimes discrepancy between results.

Actually, performing the computer-mediated (i.e., Google Docs-based) writing tasks repeatedly enabled students to develop their writing automaticity and freer attentional capacity so that they could attend to other aspects of written production (i.e., fluency) more effectively (Amiryousefi, 2016). Improvements in students' overall writing performance and writing fluency could be a result of the storyboarding-based CW activities they practiced on Google Docs. Excerpts from students' reflections revealed data that support this conclusion. Additionally, the varied potentials of the cloud applications contributed to enhancing and enriching collaboration among students. To put it differently, the synchronous and asynchronous interactive tools provided (like the chat box and commenting features) facilitated written meta-communication (meaning and idea negotiation, conflict resolving, and decision making) among collaborators and between collaborators and the instructor.

More importantly, these tools made it easy for different parties (i.e., instructor and students) to provide varied feedback including corrective and non-corrective, instant and delayed, content- and form-based, and peer and instructor feedback. Besides, among the most influential factors are the rich cloud-based resources provided or obtained by students

themselves making use of the add-on feature of Google Docs. To add, the varied and storyboarding-based narrative writing topics played an effective role in stimulating students to produce better and more fluent samples.

As to writing complexity, storyboarding-based collaborative narrative writing on Google Docs did not significantly affect students' syntactic complexity. This finding is in line with that of Jalili and Shahrokhi (2017) and Soleimani et al., (2017) who reported that collaborative writers did not outperform the non-collaborative ones in terms of complexity (though they did in respect of fluency in the second study). It is also consistent with that of Piri et al. (2012) who found that online planning in storyboarding-based narrative writing tasks had no effect on students' writing complexity. Eventually, Storch and Wigglesworth's (2007) study seem to support the finding of the current study as they reported that collaborative writing had no effect on syntactic complexity.

However, this finding contradicts that of Hafour (2019) who found that Google Docs-based collaborative writing positively affected students' writing complexity (as well as writing fluency). It is also in disagreement with that of Hsu and Lo (2018) who concluded that wiki-mediated collaborative writing positively affected students' writing complexity. Similarly, Pae (2011) and Storch (2005) reported that collaboratively written texts were better in terms of complexity.

Lack of development in syntactic complexity could be attributed to the relatively insufficient treatment time (Storch, 2009; Tai, 2015) which lasted for nine weeks. In this respect, Ortega (2003) maintained that college-level students may take up to 12 months of writing instruction before any improvement in their syntactic complexity could be detected. To add, another possible interpretation of this finding is that the participants in the current study were rather advanced ones (junior college students) and thus improvement in complexity might be harder or might take longer time to attain (Green, 2004).

Another reason could be ascribed to the writing genre used in this study (i.e., narrative writing). Johnson, Mercado, and Acevedo (2012) pointed out that familiarity and prior exposure to the writing genre might affect the quality, and consequently the complexity, of writing. Since the participants in the current study were not familiar with narrative writing genre (as their writing courses focused on expository essay writing only), this might be a reason why their writing complexity has not been positively affected. According to Kellogg (2001), knowledge or experience with the genre of writing places less attentional load on EFL writers.

Conclusion

The implications inferred from the results of the current study support the usefulness of student-generated storyboards, as a prewriting activity in a cloud-based context, in enhancing EFL students' writing fluency and overall performance but not syntactic complexity. However, some limitations may not allow for generalizing these findings. To explain, this study was limited in scope: the writing genres (only narratives were examined), the cloud tools (only Google Docs application and Add-ons were used), and the number of participants (only 30 students participated). Accordingly, the findings of the current study should be interpreted with caution.

Therefore, replicating the current study on a larger sample using other student-led prewriting activities and cloud-based CW tools to write essays representing more or all of the writing genres would perhaps reveal interesting comparable results that might broaden

and validate the findings of the study in hand. Further, in the current study, students were grouped into base teams (not changing throughout the study) of three members. Other grouping patterns (where membership changes and groups include four or five members) should be explored and their effect on students' writing performance and finished products should be examined. In addition, the current study also made use of two collaborative writing strategies (i.e., parallel and sequential CW). Henceforth, it is also recommended to conduct a comparative study, comparing the effect of using the four CW strategies (i.e., parallel, sequential, co-authored, and single-author CW) on students' overall writing performance and their performance on the different writing subcomponents (i.e., diction, conventions, and organization), is also recommended.

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Appendix A

Pre- posttest narrative writing prompts

Pretest

WRITING TASK: Narrative Essay Writing

Time: 45 minutes.

Write an essay narrating a misfortunate day or a negative experience or situation that deeply affected you so much so that you could never forget it. Be sure to capture the significance of your story.

Posttest

WRITING TASK: Narrative Essay Writing

Time: 45 minutes.

Write an essay narrating a happy day or a positive experience or situation that deeply affected you so much so that you could never forget it. Be sure to capture the significance of your story.

Appendix B

Narrative writing scoring rubric

Criteria	Descriptors	Exemplary (All*)	Skilled (Most*)	Developing (Some*)	Novice (Few*)	Way Off (Almost) None*
Introduction Orientation: Hook, Setting, Characters	– Has an inviting **hook** that engages the reader – Clearly describes the **setting** of the narrative to orientate the reader – Introduces the main **characters** and or narrator – Effectively establishes the context of the narration	5	4	3	2	1
Body Complication/Problem, Elaboration/ Events, Narrative Techniques, Sensory Details, and Description	– Clearly introduces the problem or complication – Provides thorough and effective elaboration using vivid details, engaging dialogue, exciting pacing, interesting description, deep and detailed reflection, clear point of view, and multiple plot lines. – Uses a variety of narrative techniques to develop events and/or characters or illustrate experiences. – It is very easy for the reader to understand the problem the main character(s) face and why it is a problem. – Development of incidents includes action – Effectively uses the five senses to create atmosphere – Vividly describes feelings, thoughts, and memories	10	8	6	4	2
Conclusion Resolution/ Solution Closure	– Provides a conclusion that follows from and reflects on what is narrated. – The solution to the character's problem is easy to understand and is logical. – Ends the narrative successively and subtly not abruptly or quickly – There are no loose ends. – Wraps up the narrative creatively and shows insight about the situation – Uses one or more of the narrative closure strategies effectively.	5	4	3	2	1

Criteria	Descriptors	Exemplary (All*)	Skilled (Most*)	Developing (Some*)	Novice (Few*)	Way Off (Almost) None*
Organization Overall Structure, Paragraphing Scheme, Coherence and Cohesion	– Has a clear **overall structure** that enhances the narrative – **Paragraphing scheme** clearly guides the reader through progression of narration and reflects the overall structure – Narration is **flowing logically** – Uses a variety of techniques to sequence events smoothly so that they build on one another to create a coherent whole – Effectively and consistently uses varied **cohesive devices** between ideas, sentences, and paragraphs (e.g., transitions, parallelism, repetition, enumeration, collocation, pronouns, and synonyms) – Uses a variety of complex and unique linking words/ phrases that support cohesion of the text and effectively show the passing of time.	10	8	6	4	2
Conventions Grammar, Mechanics	– Demonstrates few, if any, errors in **usage and sentence structure** – Consistently writes in the past tense throughout the text and changes tenses when appropriate (e.g., dialogue). – Sentences are extensively **varied in pattern** (structure and sentence openers) and **length** – Demonstrates effective and correct use of **punctuation, capitalization, spelling,** and **paragraphing**	5	4	3	2	1
Language and Diction Word Choice and Variety	– Uses engaging sensory, concrete, and figurative language to convey a vivid picture of the experiences and events – Uses **clear, precise,** and **appropriate** words – Diction is broadly **varied** – Uses **powerful action verbs** to describe events and incidents – Many vivid, descriptive words are used to describe characters and feelings and show when and where the story took place.	5	4	3	2	1

* These adverbs of frequency refer to the extent to which the features/ descriptors are present in the written sample.