

## **Wikis and Wiki-Based Activities: On Peer Collaboration in Wikispaces and Its Implications for the Development of the L2 Writing Ability**

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### **Abstract**

This study aimed to examine the effects of wikis and wiki-based process writing activities on the L2 writing ability of Iranian intermediate EFL learners. To this end, 16 Iranian students were identified as intermediate EFL learners based on their scores on a language proficiency test. The qualified candidates were then divided into two groups: In one group, the students participated in collaborative writing through engaging in wiki development and online collaborative process writing activities in a social writing platform called Wikispaces. In the other group, the participants engaged in collaborative process writing without using wikis and Wikispaces and received peer feedback on their compositions as they exchanged paper drafts of their essays between the peers the conventional way. The steps involved in using a process writing approach to developing L2 writing ability, however, were the same for both study groups, and all the participants, regardless of the treatment condition under which their writing ability was developed, engaged in process writing activities. At the end of the experiment, a posttest measuring the participants' writing ability gain was administered. The results showed that both groups made significant progress, albeit the students who engaged in process writing activities in Wikispaces performed significantly better. The results also revealed that wikis and Wikispaces as an online social writing platform provide a more felicitous condition for promoting learners' L2 writing ability in an enjoyable learning environment characterized by increased learners' motivation and autonomy, as well as enhanced scaffolded learning.

**Keywords:** EFL learners; feedback; peer collaboration; L2 writing; wikis

### **Introduction**

Barnett and Coate (2005) contend that students' engagement with lectures, participation in the class, and deep immersion in a subject have been weakened in recent years and that teachers are increasingly seeking for effective means of promoting students' engagement

in the class as well as knowledge of the course material. Collaboration is one of such tools, and collaborative learning is assumed to help generate academically stronger students (Kennedy-Clark, 2017). Collaboration is linked to a number of important educational outcomes, including critical thinking, metacognition, and motivation (Johnson & Johnson, 2002). The use of teamwork can be an especially effective teaching strategy for several reasons: Students with strong critical thinking skills and dispositions, including the ability to consider multiple perspectives, may be better collaborators. Collaborative approaches also promote metacognitive discourse among students to the extent that students are able to interiorize processes of providing elaborated explanations and to make their thinking and reasoning visible (Lai, 2011). In a world where being a ‘team player’ is often linked with success, collaborative learning is a very effective and applicable tool (Ingleton, 2000).

Collaborative learning is an educational method of teaching and learning that involves groups of learners working together to complete a task or to create a product (Laal & Ghodsi, 2012). It refers to a systematic technique in which learners work together in a group to achieve learning goals. Findings of studies in collaborative learning have revealed that collaboration has a positive effect on learners’ achievement. Researchers, too, believe that collaborative learning is one of the most effective and constructive teaching techniques (Aydın & Yıldız, 2014; Felder & Brent, 2007; Zhang, 2010). There is, then, a great consensus that two heads may be able to do more work than one. Indeed, when students are given the opportunity to work collaboratively, they are able to perform stronger thanks to their use of advanced strategic thinking skills. These positive outcomes and the associated benefits, however, cannot be achieved without careful management of classroom activities (Ocker & Yaverbaum, 2001; Wentzel & Watkins, 2002).

The use of technology in different fields has been so useful particularly for those who are learning a foreign language (Amiri, 2012). In fact, technology is undergoing far-reaching changes, and it is changing the way by which people communicate. On the other hand, second language researchers show a tendency to frame learning in terms of the opportunities that are available for students’ engagement in interactions (Blake, 2016). Online technologies for teaching writing have been used very effectively (Abdel Hakim, 2011; Elabdali, 2016; Oskoz & Elola, 2014); they offer the potential to make the composition, review, and revision processes easier. These technologies also provide a means for students to share their writing with a broader audience and use the provided feedback to get a more accurate understanding of their audience, which is an important element of effective writing (Al Khateeb, 2013; Elabdali, 2016; Liou & Lee, 2011).

Convictions are strong that the interactivity afforded by these technologies can provide authentic and exciting motivation for writers who may have previously been disenfranchised or detached as potential writers (Wilder & Mongillo, 2007). In computer-assisted language learning environments, teachers and students are more likely to engage in real-time electronic writing, with more student involvement in writing and immediate online teacher feedback. Teachers’ meticulous guidance and vigilant individualized feedback lead students to harness their L2 writing ability (Han & Shin, 2017). Web tools such as wikis allow users to develop collaborative Web content.

The strength behind the wiki idea is that any user could now read and write at the same time using their web browser. As such, it holds great promise for serving as an effective Web tool in both learning and teaching processes (Al-Shareef & Al-Qarni, 2016). This effective tool also allows for managing cooperative activities by allowing users to track the changes as well as to trace when, how, and by whom they have been made. Accordingly, it can be contended that using it in a team may also significantly help enhance language learning among learners (Lee, 2002).

Marin and De la Pavay (2017) argue that a successful learning environment would require teachers to guide students toward planning, monitoring, and evaluating their own learning processes. Kuteeva (2011) likewise contends that writing on the wiki can contribute to raising awareness of the audience. Moreover, it encourages students to devote close attention to grammatical accuracy as well as structural coherence in their writing. Kedziora (2012) conducted a case study of wiki use in academic reading and writing courses for teacher candidates. She explained how the wiki pages were employed and exploited to encourage teacher candidates to proofread and edit their own and others' texts in their attempt to look more precise in academic writing. As shown by the results, the general impression of using the wikis was favorable. Liu, Jiao, and Chen (2016) evaluated wikis' application in the teaching of English collaborative writing, and the results showed that they helped resolve the traditional problem in teaching English writing. More specifically, it was found that they saved the teacher a lot of time in correcting the compositions and that they allowed students to proceed at their own pace and provided them with an environment for fruitful collaboration.

In this day and age of modern technology and social media, writing has received a great deal of attention owing to the crucial role it plays in transforming knowledge, learning, and fostering creativity. Learners, then, need to further practice their writing skills in their attempt to achieve a relative mastery in the L2 (Salma, 2015); however, fulfilling this objective, without recourse to some innovative means of developing the L2 writing ability, typically presents a daunting challenge to them.

### **Aims of the Study**

For years, it has been observed that Iranian EFL students suffer from weaknesses in writing in a foreign language (Assadi, 2012; Salma, 2015; Salmani Nodoushan, 2018). Given this area of weakness, the present study was carried out to propose and employ an effective solution that has the potential for effective development of the L2 writing ability of EFL students. The present study can be a worthwhile endeavor in that little research has so far examined the contributions of wiki development and collaboration through wiki-based activities to students' L2 writing ability. The overriding objective was to ascertain whether development of wiki pages and engagement in wiki-based activities as a modern approach to L2 writing development could promote student cooperation and provide the necessary conditions for the provision of feedback and error correction by the learners.

One hypothesis was that engagement in wiki development and sharing of information through wiki-based activities would produce a drastic effect on the development of students' L2 writing ability by generating increased levels of motivation in learners, promoting student autonomy, as well as enhancing their metacognitive strategies like their ability to monitor and evaluate their peers' works or their own progress, provide feedback and do corrections, and take part in collaborative writing activities. It is, then, hoped that the results of the present study can provide grounds for firmer judgments to be made as to the efficacy of wikis and wiki-based activities for language learning, in general, and the L2 writing development, in particular.

## **Research Questions**

Given the aforementioned objectives, the present study aimed to provide an empirically justified answer to the following questions:

Q<sub>1</sub>: Does involvement of EFL learners in collaborative writing activities via a conventional method produce a promising effect on the development of their L2 writing ability?

Q<sub>2</sub>: Does engagement of EFL learners in collaborative writing activities via Wikispaces produce a promising effect on the development of their L2 writing ability?

Q<sub>3</sub>: Does collaborative writing as implemented via wiki-based activities and the conventional approach differentially impact learners' development of the L2 writing ability?

## **Method**

### **The Design of the Study**

The present study drew on a true experimental design to compare the effects of wiki development and wiki-based activities with those of a conventional method on the L2 writing ability of Iranian EFL learners. A process writing approach was employed for the development of the writing ability of EFL learners under both experimental and control conditions with the exception that under the experimental condition, this approach was implemented by the participants working in groups, jointly engaging in collaborative writing activities such as drafting, responding, revising, evaluating, and so on in a wiki-based learning environment, whereas their counterparts embarked on collaborative writing, engaged in cooperative activities, and provided peer correction the traditional way under the control condition.

As a classroom activity, process writing incorporates five basic writing stages (Seow, 2005): (a) planning or pre-writing that involves any activity in the classroom that encourages learners to write; (b) drafting—after ideas are gathered at the planning stage, the first attempt at writing is drafting that may proceed quickly, and at this stage, the writers focus on the fluency in writing; (c) responding, which is characterized by the provision of feedback on students' writing by the teacher or other students; (d) revising or redrafting—when students revise, they review their texts on the basis of the feedback given in the responding stage; and (e) editing—students are engaged in tidying up their texts as they prepare the final draft for evaluation by the teacher. In the present study, attempts were made to incorporate these steps into process writing activities in a wiki-based learning platform as hosted by Wikispaces under the experimental condition or through a conventional approach under the control condition when a similar strategy was adopted to promote collaborative writing among the participants the conventional way.

## Participants

The participants in this study were 16 Iranian EFL learners consisting of five male and 11 female candidates who ranged in age from 22 to 32 years old. They were all graduate students (Bachelors and Masters) of Mehraeen University, Bandar Anzali, Guilan, Iran. At the beginning of the study, it was made sure that all the students had studied English courses at the university. Before the experiment, the researcher also taught them how to write different types of paragraphs such as narrative, process, comparison and contrast, as well as cause and effect essays. They had also learned how to write the introductory, body, and concluding paragraphs of an essay. At the beginning of the study, a proficiency test based on a sample copy of the Oxford Solutions Placement Test was administered to an initial pool of 30 students. Based on the results of the test, 25 participants were identified as intermediate-level learners. Next, using a digital randomizer called SuperCool Random Number Generator<sup>1</sup>, 16 qualified candidates were ultimately chosen and then randomly assigned to two equivalent groups of experimental and control, with each consisting of eight students.

## Materials

**Sources for L2 writing practice.** Based on the postulation that the use of different writing sources as well as practicing L2 writing through a process writing approach in a wiki-based learning environment characterized by promoted learner autonomy and increased levels of language learning motivation are foundational to effective development of L2 writing skills among EFL learners, several topics were discussed and used as writing prompts for essay writing over the course of the experiment. Specifically, the base material used in the present study came from the following sources: *Ace the*

*TOEFL Essay* (Avants, 2007), *For and Against* (Alexander, 1969), and *TOEFL Writing (TWE) Topics and Model Essays* (Okul, 2012).

**The language proficiency test.** A sample copy of the Oxford Solutions Placement Test was administered to the initial pool of participants to allow for the recruitment of intermediate EFL learners. The test consists of three modules: The first part of the test includes 50 multiple-choice items of grammar and vocabulary, the second part of the test contains 10 reading comprehension items, and the third section is a writing task that is optional. The 50 multiple-choice questions and the reading task are designed to be done together in a 45-minute time period. The writing task was done separately in approximately 20 minutes. Individuals who manage to obtain a score of 47 and beyond are identified as learners of an intermediate level of language proficiency.

**The pre- and posttests of L2 writing ability.** The pretest aimed to measure the students' writing ability before the experiment and also to ascertain the homogeneity of the groups prior to their receiving treatment. The posttest, on the other hand, aimed to measure the amount of gain obtained by the participants as a result of the treatment effect. To allow for more objective assessment of the participants' writing ability, an analytic scoring procedure was employed. The procedure drew on the composition profile developed by Jacobs, Zingraf, Wormuth, Hartfiel, and Hughey (1981) which is a rating framework commonly used in ESL/EFL writing assessment. The profile consists of five differentially weighted scales that measure five key sub-skills of writing ability, namely 'content', 'organization', 'vocabulary', 'language use', and 'mechanics'. Each scale in turn consists of four rating levels with clear descriptors and a numerical value corresponding to each description. The sum of these values is indicative of the overall writing proficiency level of the examinees and ranges from zero to 95.

Likewise, to discount the possibility for inter-rater reliability error jeopardizing the credibility of analysis, a second rater was asked to examine the learner's writing drafts, and the average of the scores assigned by the two raters was then reported for individual learners' performance on the tests. Capitalizing on the Pearson's product-moment correlation coefficient (PPMCC), the coefficient of the correlation between the two sets of scores assigned by the two raters was obtained, too, which turned out to be 0.85 and 0.89 for the pre- and posttests scores, respectively.

### **The Orientation Session**

Since the participants in this study had little familiarity with both process writing and the knowledge and skills for wiki development, the experiment began with an orientation session that was essentially a two-week training period aiming to familiarize the students with both the stages involved in a collaborative process writing approach to harnessing L2 writing ability and the knowledge and skills required of them to create wikis and to use the embedded wiki tools such as the grammar-and-spelling-check and mind map tools provided by Wikispaces. The participants were also given a copy of the performance profile by Jacobs et al. (1981) and were instructed to use the correct rubrics and descriptors whenever they were asked to rate different sub-skills of the L2 writing ability. As for the control group, the participants practiced responding to their peers' essays by

giving both oral and written feedback directly on the paper drafts, whereas their counterparts in the experimental group learned to give visual comments on the digital copies of the compositions by the help of available gadgets selectable from Wikispaces tools pane.

## **Procedures**


All students in both study groups went through several distinct stages of collaborative process writing requiring them to move through the planning phase, drafting a composition, responding to errors, revising and editing the initial drafts, and evaluating the end product. In each group, the participants were divided into dyads, with the first two individuals going through the planning, drafting, revising, and editing stages, and the other two, serving as the assessors, engaging in the responding and evaluating steps. The participants also had role reversal over the course of the experiment, meaning that those who had served as composers and those who had served as assessors or evaluators in one session would change their roles in the following sessions. The essay topics were carefully selected from the aforementioned sources based on several criteria such as recency, interest, and prior familiarity of the participants.

As for the experimental group, the participants were required to sit at computer terminals with ready access to the net and Wikispaces. There were eight desktop PCs, and each dyad works with two computers. The planning stage, the first stage the participants went through during the experiment, involved the use of any activity in the classroom that would encourage the students to write. It could stimulate thoughts for getting started. At this stage, the experimental group participants were first encouraged to create an account on Wikispaces and start creating a wiki homepage using the available options on the start page. They were then given a topic by the teacher, gave it enough thought, and jot down whatever idea that occurred to them using the mind map tool provided by Wikispaces.

The communication between individuals in each dyad did not proceed face-to-face; they only shared their own mind maps with each other by editing the first page of the wiki. Once they put different ideas together, one of the participants in each dyad, serving as the composer, would start writing the initial draft on the wiki page. He/she would then exchange the initial draft with the other peer so that it could be examined and probably completed by the other member of the group. Since the wiki page was dynamically updated at regular intervals, the other peer in the dyad would be automatically notified once the initial draft was ready. In the drafting stage, the writers chiefly focused on the writing fluency and were not preoccupied with the grammatical accuracy (Seow, 2005). Figure 1 below shows one of the students (user: Jack Solivan) participating in the drafting phase of process writing.

JackSolivan Jul 24, 2017 ← Older Version Newer Version →

Highlight Changes Deleted Inserted  View WikiText  Review Changes  Revert to This Version



**Hello, Welcome to our writing class!**

**When students move to new school, they sometimes face problems. How can schools help these students with their problems?**

We can categorize these problems to two major problems. Mental and physical living problems.

About students mental living, they meet a new environment which may be different. The main tactic that school can help them is by providing sufficient information about the school. When new students come they have no idea about the environment of that particular school.

For example, they don't know where library or restaurant is located. In this situation, the school director can provide new student orientation guide for their new students by which students can get familiar with the campus. There should be enough information about living, learning and thriving at university.

New students can deal with too many physical problems. For example, paying tuition or finding a place to stay in. I think, school can provide a counseling group or office where new students can share their problems. It will help the school director to know more about their problems. Also schools have to give a proper guideline to their students. Schools should have an own dormitory for new students. In fact, living in a school dormitory can be a wonderful experience for students.

Figure 1. One of the students (user: Jack Solivan) is participating in the drafting phase.

Next was the responding stage. Responding was done through the provision of feedback on students' writing by their peers (or by the teacher if required), and it came between the drafting and revising phases (Seow, 2005). In this phase of writing, the participants in the second dyad, serving as the assessors, would use the embedded grammar-and-spell-check tool to identify potential typos, misspellings, as well as grammatical mistakes. Using the stationary tools, the participants could also give additional comments on the initial drafts written by their peers in the previous step. For example, they could offer alternatives for words or phrases they thought not fitting the context; they could give suggestions on the organization of information in paragraphs; or any other errors not spotted by the checking tool. The teacher would not typically intervene with the process; however, he would do so if required. For example, the assessors would send the drafts they examined to the teacher, and he would give the final comments on the drafts only if there were still errors not highlighted by both the participants and the checking tool. Figure 2 below shows the teacher (user: Kioumars) giving the final comments on the initial drafts of the essays:



The screenshot shows a Wikispaces editor interface. At the top, there is a toolbar with various icons for text formatting (bold, italic, underline, text color), alignment, and content insertion (link, file, widget, table, comment). Below the toolbar, the main text area contains a paragraph titled "When students move to new school, they sometimes face problems. How can schools help these students with their problems?". The text discusses mental and physical living problems, the importance of orientation guides, and the need for dormitories. A comment box is open over the text, showing the user name "kioumars" and the comment text "on the other hands". The comment box has a "Save" button and icons for locking and visibility.


Figure 2. Teacher's comment in the responding stage (user: Kioumars)

Revising is yet another important step involved in process writing. When students revise, they modify their texts on the basis of the feedback given in the responding stage (Seow, 2005). They reexamine what was written to see how effectively they have communicated their meanings to the reader. Using the stationary tool, the composers of the drafts would jointly engage in revising the initial draft by highlighting the changes made to sentence structures, choice of word, punctuation marks, and the other parts of their essays in the Wikispaces platform. Since it was impossible for both composers to apply the changes to their essay at the same time (the editing option was inaccessible whenever a member was updating the content), they took turns effecting the changes. For example, the first composer would modify part of the composition based on the comments given in the revising stage, and then he would notify the other composer that he was already done with making the corrections. The other composer would then start applying the remaining changes. Figure 3 below shows that one of the students made the requested changes in the revising stage (user: Jack Solivan):

JackSolivan 13 minutes ago

← Older Version    Newer Version →

Highlight Changes (Deleted, Inserted)  View WikiText  Review Changes  Revert to This Version



**Hello, Welcome to our writing class!**

**When students move to new school, they sometimes face problems. How can schools help these students with their problems?**

We can categorize these problems to two major problems. **Mental** which are mental and physical living problems. **And school can help them by several ways.**

About students mental living, they meet a new environment which may be different. The main tactic that school can help them is by providing sufficient information about the school. When new students come they have no idea about the environment of that particular school.

For example, they don't know where library or restaurant is located. In this situation, the school director can provide new student orientation guide for their new students by which students can get familiar with the campus. There should be enough information about living, learning and thriving at university.

New students can deal with too many physical problems. For example, paying tuition or finding a place to stay in. I think, school can provide a counseling group or office where new students can share their problems. It will help the school director to know more about their problems. Also schools have to give a proper

Figure 3. One of the students (user: Jack Solivan) made the requested changes (revising)

Editing is the fourth and the most necessary step of the writing process. At this stage, students are engaged in tidying up their texts as they prepare the final draft for evaluation by other peers and the teacher. The difference between the revising and the editing phases of collaborative process writing lies in the fact that revision is a recurrent process of writing; however, editing focuses more on stylistic and grammatical facts once the students have produced a satisfactory draft. (Seow, 2005). They edit their own work for grammar, spelling, punctuation, diction, sentence structure, as well as the accuracy of supportive textual material. In the present study, the experimental group followed a similar procedure in joint editing the finalized copy of their essays using the stationary tools, which was later sent to the assessors (i.e. the other two peers in the subgroup) and also the teacher for final appraisal. As was the case with the previous step, here again the composers took turns when rechecking their modified drafts for stylistic issues. Figure 4 below shows that one of the students in the dyad embarked on editing the latest draft by making the final necessary changes (user: Raziye):

Recent Changes Notification

Pages  Messages  Comments  Files  Tags  Members

Username  Date  Filter

▼ Today

home edited Raziyeh 7:54 am

...  
 Hello, Welcome to our writing class!  
 When students move to new school, they sometimes face problems. How can schools help these students with their problems?  
 ...  
 major problems. **mentalMental** and physical  
 About students mental living, they meet a new environment which may be different. The main tactic that school can help them is by providing sufficient information about the school. When new students come they have no idea about the environment of that particular school.  
 New students can deal with too many physical problems. For example, paying tuition or finding a place to stay in. I think, school can provide a counseling group or office where new students can share their problems. It will help the school director to know more about their problems. Also schools have to give a proper guideline to their students. Schools should have an own dormitory for new students. In fact, living in a school dormitory can be a wonderful experience for students.  
[\(view changes\)](#)

Figure 4. One of the students (user: Raziyeh) made the final changes to the draft of their composition (editing)

Once the participants in the subgroups edited the modified draft, they sent it to the other two peers in the second subgroup or dyad as well as the teacher for final evaluation. This way, the participants' progress over the course of the study was also quantitatively recorded and kept for later analysis by the researchers. As for the control group participants, the learners were required to move through the same stages as their experimental counterparts except that joint composition writing, the provision of peer feedback, and collaborative revising of the drafts were all carried out through exchanging the paper copies of the drafts. There were no online tools, specialized spelling and grammar checkers, mind maps available in digital copies, and so on to use, and the pace of learning was tightly controlled by one of the researchers as their teacher. In fact, the control group also engaged in the process writing activities; however, they did so the traditional way (face-to-face talk in lieu of using Wiki tools and Wikispaces).

More specifically, the participants in the control group would receive the same support from their peers and the teacher over the course of the study. The token or amount of feedback they received on their compositions, especially in the responding and evaluation phases, was the same as that provided for their counterparts in the experimental group. In a similar vein, the type of feedback was the same as that given to the experimental group (i.e. recasts or metalinguistic explanations given on the errors seen in the drafts); however, the modality of the feedback the two groups received on their writing drafts was somehow different (visual commentary with the help of stationary tools and associated effects, e.g. bubble text frames, colorful highlights, blinking and fading effects, etc. vis-à-vis handwritten remarks, manual checking vs machine-checked drafts, pocket dictionaries, etc., all assumed to have greatly added to the novelty of the experience).

At the end of the experiment, a posttest of L2 writing was administered where the participants were required to write on the topic assigned by the researcher. The exam

papers were scored using the same performance profile proposed by Jacobs et al. (1981) where a discrete-scoring procedure was employed to rate different writing sub-skills. The obtained data were then statistically analyzed using paired and independent samples t-tests running on SPSS v24.

An oral interview was also conducted with the participants of the experimental in an attempt to poll the learners' opinions on their feelings, if any, about the experience they had with Wikispaces, the tools, and the learning environment in general. The interviews were recorded and transcribed. An inductive analysis was used to identify potential themes in the data. The procedure employed was based on a model of inductive analysis proposed by Strauss and Corbin (1988) suggesting that qualitative data analysis involves codification of data fragments in different phases (p.101-103). Since qualitative data analysis is time-consuming, the researchers of the presents study opted for using a specialized qualitative data analysis tool in analyzing the interview data. The tool called MAXQDA<sup>2</sup> allowed the researchers both to define related categories of meaning and to report on the percentages of individuals who had already agreed with a particular idea or opinion, for example, an idea about how they liked working with the stationary tools, or an opinion as to the overall efficiency of the experience, the amount of control they could exercise over their learning, and so on.

## Results

The statistics of the pre- and posttest performance scores of the two study groups are summarized in Table 1 and Table 2 below.

Table 1

### *Descriptive Statistics of the Pretest Scores*

	Study Groups	N	Mean	Std. Deviation	Std. Error
Pretest Scores	Experimental Group	8	49.7500	2.60494	.92099
	Control Group	8	49.2500	2.05287	.72580

As shown in the table, the mean scores are highly close to each other, suggesting that, before applying the treatment, the three groups were homogeneous regarding their writing ability, belonging to the same population. Moreover, the participants performed a little bit beyond average. Their lackluster performance on the test, then, clearly suggested that

their writing ability was not at a satisfactory level and hence they were in need of furthering their L2 writing ability.

Table 2

*Descriptive Statistics of the Posttest Scores*

	Study Groups	N	Mean	Std. Deviation	Std. Error
Posttest Scores	Experimental Group	8	75.0000	3.25137	1.14953
	Control Group	8	60.3750	2.77424	.98084

At the end of the experiment period, all the participants took a posttest of L2 writing. The aim of the posttest was to evaluate the progress, if any, of the learners over the course of the study as well as to find out which technique or modality of treatment proved more beneficial in developing the participants' writing skill. Analysis of the posttest results, as can also be seen in the above table, revealed that the mean scores on the posttest were much higher than those of the pretest, suggesting that the participants made significant progress as a result of the treatment effect; however, a further glimpse at the table shows that the mean scores varied greatly, implying that the two treatment conditions might have differentially impacted the participants' writing abilities. The amount of gain obtained by the participants in the control group is not comparable in size to that achieved by their counterparts under the experimental condition, implying that using wikis and engaging in wiki-based collaborative writing activities had proved more effective in the development of the learners' L2 writing ability.

Table 3

*Comparison of the Pre- and Posttest Mean Scores of the Experimental Group on Measures of L2 Writing Sub-Skills Using Jacobs et al.'s (1981) Performance Profile*

Measurement Criterion	Descriptor	Pre- or Posttest Mean Score / Maximum Score	
		Pretest Mean:	Posttest Mean:
Content	knowledgeable, thorough development of thesis, relevant to assigned topic	17.05/30	22.55/30
Organization	fluent expression, ideas clearly stated, succinct, well organized, logical sequencing	10.25/20	14.90/20
Vocabulary	effective word / idiom choice and usage, appropriate register	10.14/20	18.64/20

Language Use	few errors of agreement, tense, number, word order/function, etc.	Pretest Mean: 10.21/20	Posttest Mean: 14.01/20
Mechanics	demonstrate mastery of conventions, few errors of spelling, punctuation, capitalization, etc.	Pretest Mean: 2.10/5	Posttest Mean: 4.9/5
Total		49.75 / 95	75.00 / 95

The analytic scoring scheme employed in the present study allowed for both more objective judgment of the participants' performance on measures of the L2 writing ability and also estimation of the amount of gain that occurred in the command of the sub-skills over the course of the experiment. As can be seen in the above table, writing mechanics showed the greatest improvement, followed by improvement in the knowledge of vocabulary (e.g. word choice, appropriate register, style, colloquialisms, etc.) by almost 8 increments, development of content knowledge by 5 increments on average, as well as development of organization and language use knowledge (each showing improvement by roughly 4 increments).

Table 4

*Comparison of the Pre- and Posttest Mean Scores of the Control Group on Measures of L2 Writing Sub-Skills Using Jacobs et al.'s (1981) Performance Profile*

Measurement Criterion	Descriptor	Pre- or Posttest Mean Score / Maximum Score	
Content	knowledgeable, thorough development of thesis, relevant to assigned topic	Pretest Mean: 18.04/30	Posttest Mean: 20.22/30
Organization	fluent expression, ideas clearly stated, succinct, well organized, logical sequencing	Pretest Mean: 9.05/20	Posttest Mean: 10.10/20
Vocabulary	effective word / idiom choice and usage, appropriate register	Pretest Mean: 11.07/20	Posttest Mean: 16.02/20
Language Use	few errors of agreement, tense, number, word order/function, etc.	Pretest Mean: 9.03/20	Posttest Mean: 11.01/20

Mechanics	demonstrate mastery of conventions, few errors of spelling, punctuation, capitalization, etc.	Pretest Mean: 2.06/5	Posttest Mean: 3.02/5
Total		49.25 / 95	60.37 / 95

The above table reports on the mean scores the participants in the control group received on different measures of the sub-skills of the L2 writing ability they developed over the course of the experiment. As can be seen, vocabulary knowledge had the greatest improvement by roughly 5 increments, followed by content and language use knowledge, each showing improvement by 2 increments. Organization and writing mechanics, on the other hand, showed the least improvement by almost 1 unit.

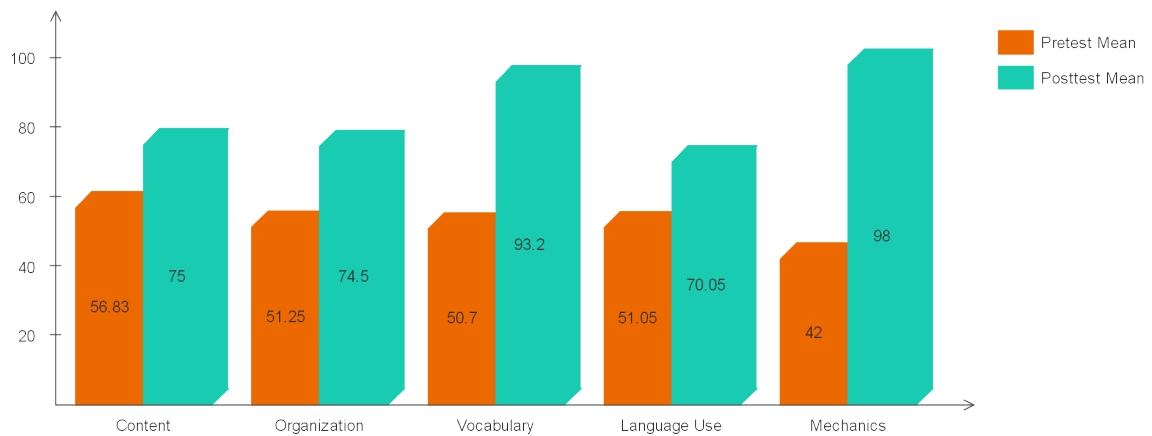


Figure 5. Side-by-side comparison of the mean scores of the experimental group on different measures of the sub-skills of the L2 writing ability

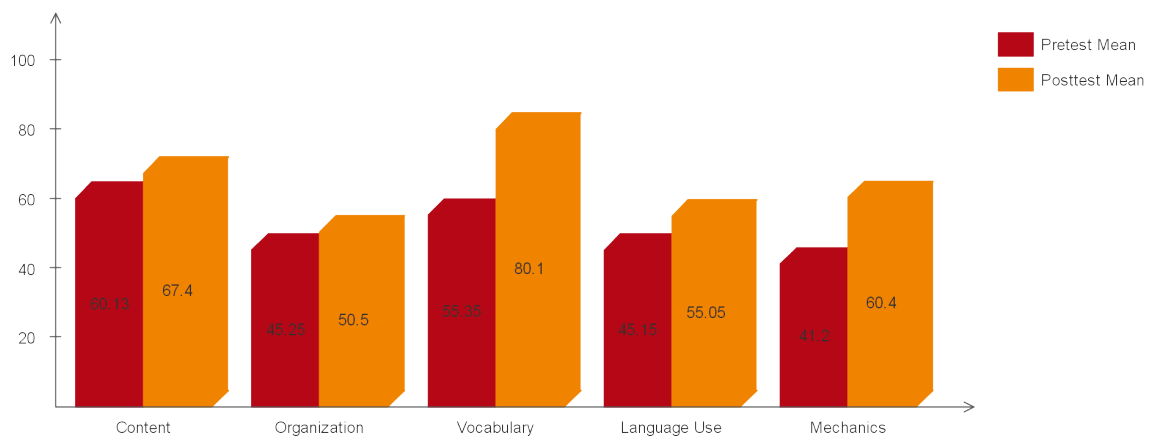


Figure 6. Side-by-side comparison of the mean scores of the control group on different measures of the sub-skills of the L2 writing ability

The above figures also allow for visual comparison of the pre- and posttest means of the study groups as measured by different rating criteria of the sub-skills of the L2 writing ability. The maximum score defined by individual descriptors, however, was not the same across different criteria of measurement; accordingly, the mean scores were first converted into a common metric interpretable on a scale of 100 points, which would ultimately allow for more valid comparison of scores across different measures and hence more plausible interpretation of the amount of gain achieved by the participants. Normalization of the scores was made possible by dividing the mean score by the total possible that the participants could have obtained on separate measures and multiplying the result by 100.

As can be seen, the amount of gain achieved in the knowledge of the sub-skills of the writing ability by the experimental group is comparatively higher and also more evenly distributed. Columns representing the degrees of improvement are not comparable in height to those indicative of the base knowledge of the participants prior to the application of the treatment. As for the control group, however, some columns (Content and Organization in particular) are almost of the same height, suggesting that the participants' knowledge in these areas had little improvement over the course of the study. The implication is that learning might not have proceeded much smoothly for the control group as opposed to that occurred for their counterparts in the experimental group.

Comparison of the participants' test performance scores prior to and after their receiving treatment on their writing ability also allowed for estimation of the size of within-subjects effects or the degree to which the participants of the two groups progressed over the course of the experiment. To this end, paired samples t-tests were performed to allow the researchers to gauge whether the amount of the gain obtained by the groups would be statistically significant and hence meaningful.

Table 5

*Results of the Paired Samples T-Tests Based on the Pre- and Posttests Means*

		Paired Differences						Sig. (2-tailed)	
			Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference			t
						Lower	Upper		
Pair 1	Exp. Group Pretest Scores – Exp. Group Posttest Scores	Mean	Std. Deviation	Std. Error	Lower	Upper	t	df	
		-25.25000	1.03510	.36596	-26.11536	-24.38464	-68.996	7	.000



Pair 2	Cont. Group								
	Pretest Scores	-11.12500	2.03101	.71807	-12.82297	-9.42703	-15.493	7	.000
	- Cont. Group								
	Posttest Scores								

As can be seen in the above table, the difference between the pre- and posttest means of the two study groups is statistically significant ( $p < 0.05$ ), showing that both groups made satisfactory progress over the course of the study largely thanks to the treatment effect. This provides an empirically justified answer to the first two questions addressed in the present study that asked whether the two modalities of treatment would produce a sizeable positive effect on the L2 writing ability of the participants.

The inferential statistics likewise reported on the size of between-subjects contrasts representing the extent to which the observed difference between the means of the study groups are statistically significant and hence meaningful enough to suggest that the two treatment conditions have produced differential effects on the learning of the participants. Tables 6 and 7 below summarize the results of independent samples t-tests, which give an estimate of the size of between-subjects effects at the beginning and at the end of the experiment.

Table 6

*Results of the Independent Samples T-Test Based on the Pretest Statistics*

		Levene's Test		t-test for Equality of Means				95% Confidence Interval of the Difference		
		F	Sig.	t	df	Sig. (2-tailed)	Mean D	Std.Error D	Lower	Upper
Pretest Scores	Equal variances assumed	.390	.542	.426	14	.676	.50000	1.17260	-2.01499	3.01499
	Equal variances not assumed			.426	13.275	.677	.50000	1.17260	-2.02794	3.02794

As shown in the table, the probability value for the Levene's test is higher than 0.05 preset alpha, suggesting that the variance across the two study groups was the same, or the two groups were homogeneous, belonging to the same population at the beginning of the experiment. Further evidence supporting the tenability of such a claim comes from the results of the independent samples t-test whose Sig. value exceeds 5% level of significance ( $p > 0.05$ ). Moreover, the confidence interval contains zero, showing that the assumption of homogeneity of variances is justified and that the difference between the means is not statistically significant.

Table 7

*Results of the Independent Samples T-Test Based on the Posttest Statistics*

		Levene's Test		t-test for Equality of Means				95% Confidence Interval of the Difference		
		F	Sig.	t	df	Sig. (2-tailed)	Mean D	Std.Error D	Lower	Upper
Posttest Scores	Equal variances assumed	.354	.561	9.678	14	.000	14.62500	1.51112	11.38397	17.86603
	Equal variances not assumed			9.678	13.662	.000	14.62500	1.51112	11.37642	17.87358

As can be seen in the above table, the probability value for the Levene's test exceeds 0.05 alpha level, which suggests that the assumption of homogeneity of variances is justified and hence the condition is met for using parametric tests like t-test. Yet, the Sig. value for the t-test is smaller than 0.05 alpha value, which shows that the mean difference on the posttest is statistically significant. Further evidence comes from the fact that it can be observed that the confidence interval contains no zero, which in turn suggests that the two groups belonged to two different populations at the end of the experiment.

In general, the results show that the mean difference is statistically significant in favor of the experimental group and that the treatment led to varying degrees of learning success for the groups involved. This provides an empirically justified answer for the third question of the study that asked whether the learners' writing ability would be differentially impacted under different treatment conditions.

### **Analysis of the Qualitative Data**

Analysis of the participants' responses to interview probes was made possible using MAXQDA and the model of inductive analysis described earlier. Qualitative data were analyzed to either provide corroboration for or offer initiation (a different perspective) on the quantitative findings of the study (Dörnyei, 2007).

There were three overarching questions the participants would need to answer when being interviewed. The first probe asked about the utility of the tools available in Wikispaces in terms of, for example, their user-friendliness, suitability, and efficiency. Analysis of the respondent's answers revealed that 75% (6 out of 8) of the participants had found the embedded tools easy to use, suitable for the goals they were designed for, as well as efficient enough in aiding in the development of their writing ability. The other two respondents felt it was a bit difficult for them to work with the tools, albeit they still believed they already helped with the proofreading and also visual commentary and

ascribed this to their having little experience with working with such tools. One of the participants voiced her comment the following way:

The stationary tools were really easy to use; everything's available at a single click. The bubble text tool allowed me to put and share my comments in a funny way. The shape tool helped with the visual commentary in such a way as to make it marked and stand out. There were lots of visual effects to choose from, most of which, I believe, were stunningly exciting. The grammar tool, too, did a great job, though could fail at correctly spotting errors at times. It did exactly what it was designed for. I also loved the mind map tool. It greatly helped with the organization of my ideas in a systematic and coherent way. It greatly helped with the exchange of information between me and my friend, too, as I felt I could easily figure out my friends' ideas about different facts as soon as I saw the map on the wiki page...

The second question asked about aspects of the L2 writing knowledge or the sub-skills the participants felt collaborative writing in Wikispaces greatly helped in their development. Analysis of the transcribed interviews revealed that all the participants unanimously agreed on the idea that at least part of their writing ability improved greatly over the course of the experiment, especially when asked to deliberate on the sub-skills that they felt had greatly improved over time. They felt the sub-skills showing greatest improvement were mechanics and vocabulary, although they did not deny that the others developed to lesser degrees, too. One participant shared his view the following way:

When we were asked to brainstorm ideas and exchange the initial drafts with the other pal, I thought the words I'd chosen to express them were effective enough to readily get the message across. But, as soon as I received comments from the other group, I noticed that, for some phrases, there were more acceptable alternatives I could have used in our essay. In the commentaries, structures needing improvement or terms with more suitable substitutes were underlined or highlighted in different colors and came with explanations of errors. I learned many new words in this way. I also learned when to correctly use punctuation marks like semicolons and commas. The comments appearing in bubble texts of different colors looked funny and very attractive. I think they could somehow stick in my mind...

Finally, the third probe asked about the participants' overall feelings on the new experience in comparison to the view they had about the affordances, if any, that could be have been offered by a typical classroom procedure. Analysis of the responses showed that 87% (7 out of 8) of the respondents found the whole experience highly enjoyable and memorable, compared to typical classroom activities targeting the development of students' L2 writing ability. One individual, even though believed that the new approach had lots of benefits for students, performance-wise, felt the same benefits could have been afforded by a conventional method in case the teacher had been knowledgeable and skillful enough in the design and implementation of the collaborative process writing approach in an innovative way, thereby ascribing the success of the method to the teacher's expertise and initiative. One student talked about her view the following way:

We've never shown a great interest in the use of technology in our country. Most teachers would rather stick to the technique they've got used to and show resistance to whatever strategy or approach that runs counter to their expectations, are not consistent with their ideologies, or present a serious challenge to them when it comes to its implementation in the classroom. Unfortunately, the same misbelief has become widespread among the students as well such that they, too, think that the best method is the one with which the teacher and learners have the most familiarity and is indeed the 'easy' one in terms of time management and classroom implementation. To me, wikis and Wikispaces have the potential to garner your attention all the time, arouse your curiosity, and keep you motivated throughout your learning. You enjoy great freedom in using whatever tools available and give and share your knowledge with your friends in the most exciting experience you've ever had...

## Discussion

As shown by the results, the posttest scores of the participants in both experimental and control groups were significantly different from their pretest means. This finding is in line with the findings of previous research suggesting that the process writing approach greatly improves the L2 writing ability of language learners (Bayat, 2014; Gabrielatos, 2002; Onozawa, 2010). Brown (1994) stated that the process approach to writing focuses on the processes that will lead to the final written text, helps student writers to understand their own writing process, motivates them to build a wide repertoire of strategies for prewriting, drafting, and rewriting, gives learners time to write and rewrite, lets students discover what they want to say as they write, gives students feedback throughout the composing process as they attempt to bring their expressions closer to their intentions, inspires feedback from both the instructor and peers, and includes individual discussion between teachers and students during the process of writing. Writing as a process has been recognized as an important tenant to integrate into L1 and L2 language courses. Research in this area has shown that collaboration in the form of peer-review exercises can improve writing outcomes (Pardo-Ballestera & Carrillo Cabello, 2016).

The results further revealed that the students' writing scores were significantly higher for the students in the experimental group, where the learners participated in collaborative writing through Wikispaces, compared to their counterparts in the control group, where the learners participated in collaborative writing without using wikis and Wikispaces, implying that the use of technology proved to be comparatively more interesting and effective in furthering learners' L2 writing ability. This finding is in line with those of previous studies that have corroborated the view that the use of wikis can turn students into producers of online content, enable peer-to-peer learning, and create a more exhilarating collaborative learning environment (Chao & Lo, 2011; Kovacic, Bubas, & Zlatovic, 2007; Oskoz & Elola, 2014). It has also been argued that collaborative writing and peer feedback in wikis help learners write better essays in terms of content, structure, and grammar (Chao & Lo, 2011; Lee, 2010; Woo, Chu, Ho, & Li, 2011).

According to Kovacic et al. (2007), internet-based technologies provide an opportunity for the development of innovative teaching materials and promote interactive and student-centered learning, collaboration, and the creation of learning communities. By extension, the present study sought to identify and evaluate the causal relationship between using wikis (a relatively new, state-of-the-art piece of technology aiming at harnessing L2 writing ability) and development of Iranian EFL learners' L2 writing knowledge. A few research studies conducted so far have also reported on the perceived benefits of wikis. Students perceived that wikis are fun and interesting tools to share knowledge (Ducate, Anderson, & Moreno, 2011; Lund, 2008), and according to Chao and Lo (2011), motivating for learning. In fact, they developed a wiki-based collaborative writing plan and found that EFL students at the university level demonstrated very positive perceptions of the wiki-based collaborative writing environment.

Woo et al. (2011) evaluated the challenges and potential benefits of a wiki for students and teachers where English is taught as a second language (L2). They examined how the wiki's key affordances might help in scaffolding and shaping students' learning during their collaborative writing projects. The results revealed that the students enjoyed using the wiki and that the overall perception was that it helped foster teamwork and improved writing. Lee (2010) likewise studied wiki-mediated collaborative writing and contended that wikis fostered students' motivation to be self-regulated due to peer interaction and individual accountability in the wiki-based collaborative work. She made a case that creating wikis has a positive impact on the development of students' writing skills through promoting collaborative engagement and scaffolding learning via peer feedback that in turn play a key role in the development of the L2 writing ability through which students not only help each other organize the content but also provide error corrections to ensure attainment of high language accuracy in their written products. As such, with the development of computer-based technologies for instruction and learning, wikis for collaborative learning will be increasingly implemented in second and foreign language classes (Li, 2012).

In fact, wikis could improve student learning by eliminating the inflexibility, the spatial, as well as temporal barriers of traditional modality, producing a change in the learning approach toward a more open education in which students are more involved and more active in the construction of knowledge (Marin & De la Pava, 2017; Pinto-Llorente, Sánchez-Gómez, García-Peñalvo, & Casillas-Martín, 2017). In favor of the aforementioned arguments, the present study clearly suggests that the students who use wikis, engage in doing wiki-based collaborative writing, and use Wikispaces as a platform for doing joint writing activities, providing peer feedback, and joint revising of the final draft can achieve a better performance compared to those using the mainstream methods of writing ability development. This could be reasonably justified by the fact that wikis provide a better atmosphere for collaboration and learning (Al Khateeb, 2013; Arumugam, Rafik-Galea, Mello, Dass, & 2013; Aydin, 2014; Liou & Lee, 2011; Parker & Chao, 2007; Zhang, 2010). Wiki provides them with an environment for collaboration. In addition, it has been argued that correction and collaboration through wikis create a low-anxiety learning environment for the learners such that the learning processes could proceed more smoothly and steadily (Liu et al., 2016).

From the ELT practitioners' perspective, then, the experience of using Wikispaces for collaborative writing is new, time-saving, beneficial, and enjoyable. It is believed that using wikis in lesson preparation could help teachers grow professionally and help them explore new teaching methods. Accordingly, many teachers have gained deep levels of experience about their own performance (oral or written) in language classrooms by deliberating more on teaching writing as a process (Alghasab, 2014; Aydin & Yildiz, 2014; Woo et al., 2011).

From the viewpoint of students, studies have shown that learners' feelings were generally positive toward using wikis and engagement in wiki-based writing activities (Al Khateeb, 2013; Aziz Faraj, 2015; Chao & Lo, 2011). In the present study, for example, the students declared that while this was the first time they engaged in such a collaborative writing plan, they had enjoyed collaborating within Wikispaces rather than communicating via pen and paper. Several students also mentioned that they would consider how to use Wikispaces as a platform for learning from other courses that they were going to take in the institute. Another positive side of using Wikispaces is that by creating an effective network, parents, teachers, and students can easily keep up with what is going on in just a few clicks. The universities or institutions can inform parents about the upcoming procedures, and teachers can use wikis to share instructional materials. In fact, one can reap much benefit from having a modern educational system, which exploits the best that technology can offer to schools, teachers, and students.

In sum, it can be argued that, according to the results, using Wikispaces can play a significant role in effective learning/teaching of writing and offers the potential to enhance EFL learners' overall linguistic performance. In this study, wikis are believed to have proved to be good exemplars of Web tools that could potentially expedite the development of L2 writing skills and improve them, accordingly. When it comes to the sub-skills, however, content knowledge, vocabulary, as well as mechanics are highly likely to show great improvement via wiki-based collaborative activities thanks to several reasons: In antithesis to face-to-face communication characterized by individuals interacting with one another chiefly through spoken discourse which is typically fraught with hesitations, memory lapses, lots of repetition, and so on, negotiation of ideas through wikis offers the potential to aid in deep concentration, systematic organization, and innovative presentation of thoughts in an environment where the written language is one modality of communication. Written discourse is believed to be lexically dense in that it needs to be highly detailed for effective communication to take place (Tribble, 2010). As such, opportunities are provided for extended communication and exposure to words unlikely to be heard by learners when talking.

The stationary tools together with the mind map and the language checker allow for the delivery of information in yet another modality believed to produce the greatest visual impact on learner's memory. Visual texts, commentaries, graphic organizers, as well as digital mind maps are highly elaborate in nature (Khalili Sabet & Babaie Shalmani, 2010) and thus have the caliber to more vividly communicate the ideas to learners and in such a way as to persist in their visual memory. The referential connections (Paivio, 1971) established between the memory modules would, then, account for the internalization and

long-term retention of information. Given the freedom offered by the variety and ubiquity of wiki tools, learners are also more likely to monitor and regulate their learning strategies, proceed at their own pace, and enjoy greater autonomy in guiding theirs and their peers' learning.

What still is subject to close scrutiny, however, is examination of the relative contribution of individual wiki tools to student learning. The combined effects, if any, of these tools in Wikispaces on learners' writing ability has been the foci of discussion in the present study. Future research may unravel the pedagogical benefits each of these tools could bring for language pedagogy, in general, and L2 writing ability development, in particular.

## Conclusion

To conclude, the results of the current study showed that students' writings improved in both control and experimental groups as a result of the implementation of a process writing approach to the development of the L2 writing ability; however, the students who developed wikis and used Wikispaces as a platform for essay writing achieved better results when compared to those who were taught by using the conventional technique. Among the suggested explanations is the idea that wikis are an inspiring and effective tool to get students to write about a specific subject and that they help facilitate collaboration and promote scaffolded learning in line with the constructivist approaches to language learning.

Based on the observation made in the present study, the students' feelings were totally positive toward using wikis and the Wikispaces. Likewise, it was believed that, unlike some other Web tools, Wikispaces is manageable and could be watched and to some extent controlled by teachers, students, and even their parents. All these features make Wikispaces an effective platform for reimagining and modernizing our outdated educational system as well as our schools such that we could better meet the needs of our students. In sum, the results of the present study are congruent with previous research findings (e.g. Aydin, 2014; Chao & Lo, 2011; Liou & Lee, 2011; Parker & Chao, 2007; Pellet, 2012) and suggest that wiki-based instruction holds great promise for the development the L2 writing ability of EFL learners.

## Notes

<sup>1</sup> <http://www.supercoolbookmark.com/download/supercoolrandom104.zip>

<sup>2</sup> <https://www.maxqda.com/trial>

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