

**The Effects of Wiki-based Recursive Process
Writing on Chinese Narrative Essays for Chinese as a
Second Language (CSL) Students in Singapore**

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Abstract

This paper reports on the effects of using wiki-based process writing in Singapore's Chinese as a Second Language (CSL) scenarios. A group of 32 Secondary 1 (Seventh Grade) students ("Students") received various forms of online scaffolding at different steps of the writing process over two years. A whole set of teaching materials on 45 writing skills was developed and uploaded to the Wiki platform through five recursive cycles. In each cycle, the students were encouraged to apply skills they learned via Wiki platform in their writing and afterwards work as a team in the platform to peer-review each other's first draft. With feedback received from peer revision, students proceeded to edit their first draft, focusing on the content of narratives and the appropriateness on their use of micro writing skills. The scaffolding decreased as the project progressed. Students' pre-, mid- and post-writing tests were marked and compared. The authors analyzed the impact that the feedback in the process had towards the students' overall writing performance. It was discovered that students' quality of written products was improved in general. It was also discovered that students benefited the most from giving remarks to their peers' writing. The revision patterns of high, medium and low language ability students were also compared. It was found that the higher the language ability of the students, the more concerned they were with macro level for their revisions. ICT-mediated process writing has not garnered much attention in the field of CSL. The study hopes to contribute to the literature of ICT-mediated writing instruction in the field of CSL.

Keywords: Process Writing; Chinese Narrative Essay; Peer Revision; Recursive Model; CSL.

Introduction

Since educational reforms took place in 1984, the social linguistic environment in Singapore has been undergoing rapid transformation. The transformation is clearly represented by the percentage of ethnic Chinese students whose first home language is English, a figure which rose from 28% in 1991 to 59% in 2010 (MOE, 2010). Ethnic Chinese Singaporean students' linguistic capability in the Chinese language has been on the decline; most of these students find it a challenge to learn Chinese, especially where the acquisition of writing skills is concerned (Liang, 2000).

Today, people communicate using a multitude of methods other than conversing in person or via a telephone. It has become a norm to use highly interactive virtual environments to exchange information and ideas. The Internet provides an alternative outlet for students to publish their work, which gives them the satisfaction and pride of displaying their writing for a potentially enormous audience and encourages greater care in presenting their texts (Hyland, 2003). Language teachers should help students develop a sense of what it means to write for a broader, unknown audience beyond the classroom. This will heighten the writers' awareness that they are writing for an audience, rather than merely writing for the sake of writing.

The emergence of Web 2.0 technology provides new possibilities for language teachers to organize online learning experiences and provide opportunities for students to practice collaborative writing in their target language. It is hoped that by tapping on the advanced technology in the information era, Chinese language teachers in Singapore could better help their students who are taking Chinese as second language (CSL) to improve the writing competency.

This paper explores the effectiveness of collaborative process writing in the Web 2.0 environment for lower secondary CSL students with different language abilities in the Singaporean context. The study hopes to contribute to the literature of ICT-mediated writing instruction in the field of CSL.

Literature Review

Process writing and its effectiveness

Writing is a complex process which involves a lot of cognitive and meta-cognitive activities (Murray, 1972). In the conventional product-oriented writing process, students are asked to formulate their ideas by using prescribed rhetorical frameworks set by teachers and to submit their written work for grading. The generation, formulation and development of ideas seem to be ignored throughout the whole writing process (Zamel, 1982).

Process pedagogy arose in the late 1960s in response to the dominance of product-centred pedagogy (Matsuda, 2003). In the 1970s, second language educators started to show interest in finding out how written work is produced by second language writers (Hedge, 2011). Many educators and language teachers have since done research about the teaching of writing to second language writers (Ramies, 1978, 1987; Taylor, 1976; Young, 1978; Zamel, 1976, 1982, 1983, 1987; Jacobs, 1982). Their findings have shown that writing is not a straightforward process and should be viewed as "non-linear", exploratory and generative (Taylor, 1981; Zamel, 1983). Writing is a process of discovery in which ideas are generated and not just transcribed, as writers think through and organize their ideas before writing and revising their drafts (Lee, 2006).

The writing process is recursive in nature whereby revision and writing are integrated, and initial ideas get extended and refined (Zamel, 1982). To a large extent, a written product is "the outcome

of a set of complicated cognitive operations" (Hedge, 2011: 303) that involves planning, drafting, revising and editing. Teachers should guide learners in the writing process in a recursive, interactive, and potentially simultaneous way (Hyland, 2003).

It was observed that revising took place throughout the writing process and generally involved considerable changes (Zamel, 1983). Proper and systematic guidance in the process will assist second language writers to generate logical, elaborate or consciously-written works. Providing constructive feedback is one useful way of guiding second language writers (Hyland, 1990). Group work is also frequently a key element in generating ideas, collecting information, focusing priorities and structuring a piece of text. This is often achieved in a group environment where practical, genuine communications abound (Hyland, 2003).

Peer-review for learning during process writing

Peer review is a form of collaborative learning. It requires students to act as the audience and collaborate in their peers' drafts as they share opinions and ask questions. It is a frequently-used technique in the process-oriented writing approach (Villamil and De Guerrero, 1996; 1998). Beaven's (1977) study shows that the students would most probably rely on the teacher during the writing process if the teacher was the only reader of the written product, whereas students would have more ownership of their writing and give more consideration to their audience if they were aware that there were readers besides the teachers. When students are to give feedback, they benefit from reading other students' work (Rollinson, 2005).

Students also "[transfer] abilities they learn when reviewing peer texts" (Lundstrom and Baker's, 2009:38). Peer revision fosters communicative behavior because it provides a chance for students to explain, defend and clarify their points of view while peer feedback has a significant effect on the quality of writing and leads to more learner autonomy (Villamil & De Guerrero, 1996; 1998). Through peer review, L2 writers "discovered the discrepancy between their intended and understood meaning of their text" (Berg, 1999:231). In revising their peers' work, students highlight to each other the areas that did not make sense to audience and compel each other to make changes.

The research findings quoted above recognized the effectiveness of peer revision and the importance of guiding students in the revision process. However, most of those research findings did not make comparisons between peer feedback and teacher feedback and tended to undermine the teacher's role in the revision stage. Others have suggested that in comparison with peer feedback, teacher feedback is more valued and has a more important influence on students (Connor & Asenavage, 1994; Miao, B adger & Zhen, 2006; Paulus, 1999; Zhang, 1995). Some research findings have suggested that we need to combine both teacher review and peer review to improve the quality of writing (Tsui & Ng, 2000). The extent to which peer feedback and teacher feedback each contributes to the quality of written products is worth exploring further.

Using Wiki to support collaborative process writing

By definition, collaborative learning is "learning in groups with a high degree of interaction between the group members in a defined setting" (Hoppe, 2010:6). Collaborative writing process requires students to work together to gain insight into the topic and refine their written works. Communication in an online collaborative environment helps in information exchange, knowledge building and promotes the quality and the relationship of ideas (Peres and Pimenta, 2010; Karayan and Crowe, 1997), which will facilitate generating, organising and revising of ideas in the writing process. An online learning environment facilitates interaction as many students would be able to communicate ideas simultaneously and hence would be able to

produce more feedback on peers' composition (Schultz, 2000). Learning through the use of social media stresses the use of knowledge networking and community building to leverage, sustain and share knowledge in a collaborative way, which emphasizes on penetrating classrooms boundaries (Paliktzoglou and Suhonen, 2014).

The emergence of Web 2.0 technologies in recent years has created good prospects for the process-oriented collaborative writing approach. Among the wide range of interactive technologies, wikis are platforms where content can be created, edited and shared by users (O'Neill, 2005). Unlike traditional course systems, wiki provides users with simple features like open editing and the latest supporting social media tools, hence it has the potential to facilitate and enhance online collaboration (Elgort et al., 2008; Alexakis et al., 2014). It emphasizes "active participation, connectivity, collaboration, and the sharing of knowledge and ideas among users" (Wang et al., 2013: 216) and provides "an interactive process of review from a group of people who are also sharing the review as authors" (Clarke, 2008: 275). Wiki provides an environment for L2 students to write and edit collaboratively, creates a platform for L2 teachers to trace the content and timing of the revision and enables them to examine and derive revision patterns from students' writing, allowing them to plan and remedy their instructions according to students' needs in the next round of composition exercise.

The user-friendly and student-centered characteristics of the Wikis have opened up venues for language teachers to experiment with process-oriented approaches in the teaching of writing. Wong et al (2009) advocated a recursive, bottom-up process writing approach whereby groups of Chinese as a second language (CSL) secondary school students were required to collaboratively carry out "word/phrase pooling", "sentence making", "paragraph writing" and "outlining" on wiki, and eventually compose their essays individually. Results showed that students' micro-skills for writing were improved significantly due to peer coaching. Liou and Lee (2013) compared wiki-based collaborative and individual writing processes in a class of Taiwan university students taking English as their second language. Students started with planning and brainstorming together and composed their drafts on wikis. Results showed that students who worked in the collaborative groups produced longer and more accurately expressed written products than those who worked in individual groups. All students who participated in the study felt that collaborative activities improved their writing.

Although results of these studies reveal positive impacts of wiki-based collaborative writing, they are not without limitations. Wong et al.'s (2009) study only focused on micro-skills for writing that brought about surface changes. Their study did not investigate the impact of the model at a macro level which could involve changes in content organization, overall structure and meaning. Liou and Lee's (2013) studies only involved subjects undergoing tertiary education. Their studies were not directly relevant to junior high or secondary level education. All of their studies did not investigate the revision patterns adopted by L2 writers of high, mid and low abilities. The inadequacies of their studies have hence created room for our present study.

To date, ICT-mediated process writing has not garnered much attention in the field of CSL teaching. Studies on the effects of wiki-based collaborative writing on secondary or junior high CSL students are scarce in present literature. Henceforth, the present study would like to tap on the advantages of Web 2.0 technology, using wiki as the study platform, to investigate the effect of process-oriented collaborative writing in CSL teaching with special reference to the Singapore context.

Scope of Study and Methodology

For this study, we have formulated the following three research questions:

Question 1: Is the wiki-based process writing on Chinese Narrative Essay effective for lower secondary school CSL students in enhancing students' performance?

Question 2: Do the revision remarks or comments received and generated in the writing process contribute to students' overall performance?

Question 3: What revision patterns do lower secondary CSL students with different language abilities show during wiki-based process writing?

Methodology

The participants were 60 Secondary One students from a neighborhood school, forming an experimental class (N=32) and a comparison class (N=28). The whole study lasted for two years. The experimental class was involved in five rounds of recursive writing activities, during which they were given parallel writing instructions and were asked to give group presentations. In the control class, the teacher went about her normal practice but arranged for her students to take the pre-, mid- and post-tests that the experimental class took. Artifacts produced by students of High, Medium and Low abilities from both classes were also analyzed.

Intervention

The intervention involved the following procedures:

Table 1: Procedures of Wiki-based Process Writing Used in the Study

procedures	activities
1. training	Orientation: Students are briefed about the purpose of the project and learn how to use the rubrics
2. writing techniques	Self-directed learning (SDL) of writing techniques via wiki platform
3. check SDL outcomes	Students take quiz in groups
4. in-class teaching	Teachers lecture about the writing materials, focusing on important points and some weak points that caused the students to fail the quiz
5. out-of-class study	Students study good and bad writing samples in groups, follow the scaffolded instructions and learn how to deconstruct a piece of writing
6. group presentation	After out-of-class preparation, students work in groups to present how they differentiate good writing from bad writing and how to improve bad writing using writing rubrics provided
7. first writing	Students draft their writing online outside class
8. peer review	Students do peer revision outside class in a given time using wiki platform
9. second writing	Students try to revise their first draft with suggestions given by their peers and teachers
10. comments	Teacher announces group scores and comments on the common mistakes made by the class during the writing activity
11. finalize writing	Students finalize their writing after class
12. reflection	Students reflect on their performance for this writing activity

Before the study, wiki accounts were created for each student within the class wiki platform. There were five writing activities in the two years' study, excluding pre-, mid- and post-tests. In each writing activity, the students wrote the first draft and then did revision and editing, adding up to a total of 13 attempts at writing. In the first writing activity, we practiced the 12 steps

including the orientation and modelling on how to use the rubrics to assess others' writing. In the subsequent activities, the same 11 steps mentioned in the table above (step 2 to step 12) were practiced and followed in a recursive pattern.

During the orientation, the teacher provided a model by demonstrating how students should assess their peer's work and give feedback, using the structure of peer assessment rubrics and guiding questions, covering writing organization, content, and language. The orientation also covered 10 items of writing, such as theme, choice of materials, plot, emotions, consistency, cohesion, deployment, vocabulary, grammar, and rhetoric techniques. Teacher's modelling may again appear in the first and second writing activity, but will cease from the third writing activity onwards.

In order to strengthen the impact of peer assessment, besides the guiding questions, activities such as 'Tell me why this is a piece of good writing' and 'Come, let Dr. Woodpecker treat you' were blended in. In each of these activities, we provided several steps to guide the students in forming standards on how to appreciate good writing, how to break down/deconstruct texts and how to transform bad writing into good writing. All the activities were arranged for students to carry out in groups so as to facilitate discussion and collaborative learning. After some preparations, the students did class presentations using the guiding tasks and questions. With this kind of 'comprehensible output' activity, the students learned to judge texts critically and to refine and consolidate vague ideas into principles to assess writing by doing oral presentations.

Data collection

We collected three sets of data related to the study. The first comprised pre-, mid- and post-test writings for scoring and analysis of the artifacts. The second is the feedback that the students received from their teachers and peers as well as the feedback that they gave out to their peers. Thirdly, we collected information on how students of different levels revised their writing by conducting face-to-face interviews with selected student representatives from all three High, Medium and Low ability level students after showing them the differences between their first draft and final draft. This case study data was intended to help us find out the revision patterns of students with different levels of proficiency, which could help teachers guide students of different levels to revise their writing. The interviews were audio taped and transcribed.

Measurement

In pre- and post-tests, students were asked to write a timed essay. The writings were marked by raters using the grading rubric of ten items, with a total score of 100. The grading rubric was developed by the project team but was validated by an external consultant who is a professor specialized in writing assessment and is now working at Hong Kong Polytechnic University. The scoring guide is based on a ten-point scale for each of the ten items. All the essays were graded by at least two raters and the scores were then averaged.

The three raters worked several times before and during the study to mark. They were given same essays to mark, compared their scores and discussed their reasons for choosing the scoring, followed by adjusting the scoring together until all the raters agreed on a common score. They repeatedly practiced this until all felt comfortable and equipped to rate within the same scale.

Analysis

In order to answer the first research question, an independent-sample t-test was conducted. This was accompanied by the calculation of the effect size (in terms of Cohens' *d*) to indicate the magnitude of the observed mean difference. In order to answer the second research question, we

calculated the correlation between the post-test results and amount of feedback that the students received from both their teachers and peers as well as the feedback that they gave to their peers. The third research question was answered by analyzing the information gathered from face-to-face interviews with students with different levels of proficiency.

Findings

t-test and effect sizes for the writing scoring

Before answering the first research question of the effectiveness of intervention on process writing, we verified that the experimental and comparison classes were equivalent. This was done by running the independent t-test on the writing scores of the two classes. As shown in Table 1, for the pre-test, there is a mean difference of -2.58 ($t = -1.30$, $d.f. = 58$, $p > 0.05$) indicating that the two classes were equivalent but the experimental class scored lower than the comparison class. The Cohen's $d = -0.34$ indicates a small effect size which is not trivial to be dismissed. On the post-test, however, the experimental class scored higher than did the comparison class, with a mean difference of 3.06 ($t = 1.67$, $d.f. = 58$, $p < 0.05$). The corresponding Cohen's $d = 0.44$ indicates a small but nearly medium effect size.

Table 2. Mean Comparisons on Writing Scores

	Experimental group (N=32)		Comparison group (N=28)		Mean differences	t-value	Cohen's d
	Mean	SD	Mean	SD			
Pretest	57.44	8.89	60.02	5.96	-2.58	-1.30	-0.34
Posttest	61.17	8.27	58.11	5.40	3.06	1.67	0.44
Gain	3.73	7.69	-1.91	5.10	5.64	3.29	0.86

Notes: (1) Effect size Cohen's d was calculated using the web-based Effect Size Calculator of the University of Colorado (<http://www.uccs.edu/~lbecker/>) which uses the pooled standard deviation as the denominator. For gain-scores, $SD = \sqrt{(S1^2 + S2^2 - 2 * S1 * S2 * .6)}$, assuming a $r = .6$ between the pretest and post-test scores.

As noted previously, the initial difference favoring the comparison class is not so small that it can be totally dismissed. To offset this disadvantage to the experimental class, a gain-score analysis was attempted. As can be seen in Table 1, the experimental class has gained by 3.73 from the pretest to the post-test whereas the comparison class has in fact deteriorated by -1.91. This suggests that, by comparison, the experimental group has gained by 5.64 ($t = 3.29$, $d.f. = 58$, $p < 0.05$) through the intervention. The corresponding Cohen's $d = 0.86$ indicates a large effect size. This leads to an affirmative answer to the first research question: the wiki-based process writing on Chinese Narrative Essay was effective for lower secondary school CSL students in enhancing students' performance. Effect size is typically used at the conclusion of a research project to ascertain its success or lack thereof (Soh, 2010). The obtained Cohen's $d = .86$ for the gain scores indicates a large effect size. This compares very favorably with the average effect size of Cohen's $d = .40$ recommended by John Hattie (1999, 2009, cited in Soh, 2010) as a benchmark. Hattie's (2009) study, with a large number of more than 800 meta-analysis covering 165,258 studies, helps us look at the average effect size of similar experiments in the same field. This helps us to examine the value of the effect size of our own project in a more objective and comparative perspective without focusing solely on the value itself. According to Hattie's (2009) research, the average effect size of 566 computer-assisted instruction experiments is 0.31 and the average effect size of 122 studies on peer influence is 0.38. The obtained gain score effect size (.86) demonstrates that the combination of both computer use and peer review can greatly improve the effect of mere computer use and mere peer assistance in language teaching.

Correlation

To answer the second research question on whether revision remarks or comments received and generated in the writing process contribute to students' overall performance, Pearson's correlation coefficients between the students' individual scores and the number of remarks that the students gave and received from their peers and teachers were calculated. The resultant correlation coefficients are displayed in Table 2.

Table 3. Correlation Coefficients (between the writing scores and the number of remarks received/made)

	Pearson's r
Correlation of remarks only the students gave to their peers with post-test	0.69*
Correlation of all the remarks that the students received from their peers and teachers and gave with post-test	0.49*
Correlation of all the remarks that the students received from their peers and gave with post-test	0.48*
Correlation of remarks the students received only from their teachers with post-test	0.20
Correlation of remarks the students received only from their peers with post-test	0.07
Correlation of remarks the students received from both their teachers and peers with post-test	0.11

Note: Asterisked coefficients are statistically significant ($p < 0.05$, *df* 58, two-tailed).

As can be seen from Table 2, three of the six correlation coefficients are statistically significant. The largest $r = .69$ ($p < 0.05$, *df* 58, two-tailed) goes to remarks the students gave to their peers with post-test. This suggests the effectiveness of involving the students in peer review where they had to be able to evaluate their own works first. This is followed by two moderate correlation coefficients of $r = .49$ and $r = .48$ ($p < 0.05$, *df* 58, two-tailed) when the students both received and gave comments, where the involvement of teachers made very little difference. The statistically significant correlation coefficients echo some researches that address the effectiveness of peer review for writing (Berg, 1999; Rollinson, 2005; Villamil & De Guerrero, 1998), the effectiveness of teacher review (Zhang, 1995; Connor & Asenavage, 1994; Paulus, 1999) and the combined effectiveness of both teacher review and peer review (Tsui & Ng, 2000). It is of interest to note that students benefited the most when they were required to give remarks to their peers' writing using the rubrics; this corroborates with Lundstrom and Baker's (2009) findings.

Revision Patterns of Students with Different Ability

For the third research question on the revision patterns of lower secondary CSL students with different language abilities shown during wiki-based process writing, the researchers compared the written products and interviewed students from the three different levels. Revision patterns of high, medium, and low level students were examined. Typical revision behaviors of the three types of students are summarized below.

High level students tend to examine the theme first when they review either their own or their peers' writings, followed by examining the selection of suitable themes or materials and whether the beginning and the ending cohere with each other. When all these are found to be suitable, they will then focus on checking whether they have used the right level of details in different parts of the writing as well as the rhetorical devices used. Last but not least, they will check the grammar and transitions between sentences and paragraphs.

Medium level students also tend to examine the theme first when they review either their own or their peers' writings, followed by examining the transitions between paragraphs. If they perceive no problems with the content in the writing, they will try to add some writing techniques and rhetorical devices to lengthen their writing. In addition, checking on grammar is considered to be quite important to them as marks will be deducted for grammatical mistakes and wrong words or Chinese characters. Selection of suitable themes or materials was reported as not important for them as they have already planned for the themes and content at the outlining phase of the writing. As long as the writing does not digress from the subject, according to them, writing a less fanciful or less extraordinary essay is not a problem for them.

Low level students are unlikely to focus on the grammar and wrong words or Chinese characters. After they have checked for the theme, they will proceed to check if the ending coheres with the beginning, and if the writing content is suitable. Limited by their language proficiency, techniques like transition, rhetorical devices and the portioning of details that can help improve sophistication are usually neglected.

Results and discussion

The wiki-based process writing of the Chinese narrative essay showed to be an effective model for lower secondary CSL students as far as this study is concerned. It is shown that the study is successful in helping students improve in their overall performance for Chinese writing. We attribute the improvement to the skills and abilities that the students gradually acquired during the five recursive collaborative process writing activities, especially the peer review segment when they mutually engaged with each other in a coordinated effort to raise questions and solve problems together. Sometimes if the feedback was not accepted, they would discuss and justify themselves; this also provides chances for critical thinking and target language output.

As to the contributions of the revision remarks or comments that were received and generated in the writing process towards the overall performance of students' final written products, the findings are complex. Theoretically the amount of feedback received should correspond with the amount of feedback that the students adopted in their editing of the draft. In this study, we have found that the students benefited more from giving feedback and assessing each other through questioning, justifying themselves, discussing and sharing. 'To give is better than to receive'; this saying also applies when we are talking about students' collaborative learning because only when they use the writing rubrics to assess their peers' work and give corresponding suggestions can they really learn from this writing process.

Without giving suggestions, questioning and answering to each other and using the feedback they accepted to edit the first draft, the feedback they received had no impact on their writing. Teachers incorporating this method into their teaching of writing must bear in mind that effective strategies and activities must be created and applied in order to make sure their students produce 'comprehensible output' which proves that the students have actually digested and absorbed the information. Most importantly, students need to be taught and equipped with necessary knowledge and skills to assess their peers' written work via wiki platform. Without proper prior training, students will not be able to perform peer review in the virtual environment. Familiarity

with education technology indeed plays a crucial role in implementing ICT-mediated teaching and learning (Alexakis et al., 2014). Furthermore, peer feedback does not only help students to improve in overall performance in writing, it also encourages critical reasoning as the students need to consider the validity of their peers' suggestions and make decisions on whether to use them or how to use them. When their critical reasoning has been enhanced, it will again help students with their writing because writing is an act of discovering meaning. A willingness to engage with students' assertions is crucial, and response is a central means to initiate and guide ideas (Straub, 2000). Hence, teachers could focus more on the ideas that our students produce, rather than dwell on the formal errors (Hyland, 1990; Murray, 1985).

From the study, it was found that the revision patterns of students with different language abilities were different. We observed that in the peer revision process, the higher the language ability of the students, the more attention they pay to the macro level in their revisions. Students with higher language levels tend to examine the theme first and then the suitability of the materials or coherence of the contents. Students with lower language levels tend to focus more on surface errors like grammar and word collocations. The study also found that the assessment rubrics significantly enhance the quality of writing for students from all three levels. However, if the teachers can provide students with different kinds of feedback and cater to their language proficiency, it will be more beneficial to them. Hence, based on the idea of differentiated instruction, the researchers suggested three different reviewing and editing procedures in the table below for the teachers and students to consider.

Table 4. Revision and Pedagogical Suggestions for Teachers and Students

Language Levels	Suggested Revision Patterns	Pedagogical Suggestions
High	Theme → Selection of Materials → Ending Echoes Beginning → Right Level of Details → Rhetorical Devices → Grammar and Spelling → Transition	Let students read more, especially literary works
Medium	Theme → Rhetorical Devices → Grammar, Collocation and Spelling → Transition → Ending Echoes Beginning → Right Level of Details	Let the students read more about writing techniques, and also help them with good examples on how to review others' writing
Low	Theme → Grammar, Collocation and Spelling → Ending Echoes Beginning → Selection of Materials → Simple Rhetorical Devices	Teachers should focus more on the grammar, collocation and spelling mistakes first, after which students can practice writing techniques starting from 're-write' paragraphs. If they make good progress, they can then follow the revision pattern of medium level students.

Though the positive effects of the process-oriented writing have been supported by the study, we cannot assume that it will take place naturally. It will be unrealistic to assume that students will be able to effectively read and respond to peers' writing and give constructive feedback (Berg, 1999). At the initial stage, teachers need to help students to compare original and reformulated

copies and invite them to comment, question or suggest changes (Hedge, 2011). Students need to be empowered by teachers to perform the peer evaluation tasks. Crucially, students need to be trained and prepared for their participation in peer response activities and collaborative process writing. This is the underlying purpose of putting 'training' as the first step of our 12-step intervention procedures. Through the training, students are oriented to use assessment tools to evaluate organization, content and language of an essay.

Conclusion and implications

The study has shown the effectiveness of wiki-based recursive process writing and also identified the revision patterns of students of different proficiency levels. Wiki platform increased students' chances to read each other's writings. Feedback they gave and received not only enhanced their exposure to the target language but provided more opportunity for critical thinking.

The usefulness of giving peer feedback and reading feedback from both teachers and peers was strongly acknowledged in this study, especially giving peer feedback. The peer assessment rubrics and guiding questions as well as the presentations helped the students internalize what they have learned about differentiating good writing from bad writing and how to transform bad writing to better ones. In order to achieve this, sufficient and appropriate scaffolding is needed. Teachers also need to learn how to allocate time and the level of scaffolding efficiently.

Where pedagogical implications are concerned, teachers conducting writing classes not only need to teach specific writing techniques, but also need to teach students to stand at a higher point to plan and assess writing as well to give them more ownership towards, confidence in and enjoyment from their writing. As the adage goes, *give a man a fish and you feed him for a day; teach a man to fish and you feed him for a lifetime.*

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