Using a Wiki to Scaffold Primary-School Students’ Collaborative Writing

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ABSTRACT
This small-scale case study explores the challenges and potential benefits of a wiki for students and teachers in a primary-five English-language class in Hong Kong. The study examined how the wiki’s key affordances might help in scaffolding students during their collaborative writing projects. The study found that the use of a wiki in a class of primary-five students in a Chinese primary school where English is taught as a second language (L2) was perceived positively. Students enjoyed using the wiki, and the overall perception was that it helped foster teamwork and improved writing. The tracking functionality of the wiki gave in-depth information about the types of edits the students were making and helped the teacher to provide necessary support and feedback, scaffolding their editing process. Findings from this study may help illuminate how Web 2.0, specifically wikis, can help scaffold primary-school L2 writers in collaborative learning.

Keywords
Wikis, Collaborative writing, Affordances, L2 Writing, Scaffolding, Primary school

Introduction

The current technology-driven educational setting emphasizes the integration of Web 2.0 technology in language teaching and learning (Education Bureau, 2007; Richardson, 2009), and teachers are being pressured to integrate technology into their teaching. This study aims to address research problems at both a theoretical and a practical level. At the practical level, how can we integrate Web 2.0 technology (e.g., wikis) into daily English-language writing lessons with primary-school students? What are the benefits and potential of this technology for teachers and students in Hong Kong, where English is taught as a second language (L2)? Does wiki technology enhance students’ writing and, if so, in what way? How can we harness the power of collaborative technology into an effective teaching tool?

At the theoretical level, many studies have started to appear on the application of Web 2.0 in education involving collaborative tools called wikis. The studies examine the application of wikis and explore their usage potential, the effects they have on student learning, and their effectiveness when used with appropriate instructional practices. They occur across different subject disciplines, including English language, geography, engineering, and library and information science, at both the tertiary and the secondary level (Chu, 2008; Engstrom & Jewett, 2005; Mak & Coniam, 2008; Nicol, Littlejohn, & Grierson, 2005). However, whether or not these findings are applicable to young learners at the primary school level and whether they are transferable to young L2 learners needs further investigation.

A case-study approach was used to explore the challenges and potential benefits that a wiki may bring to students and their teacher in a local Hong Kong upper-primary English-language class. The findings may help illuminate the potential of Web 2.0, specifically wikis, for helping to scaffold young L2 writers in creative reasoning and meaningful learning. The notion of “scaffolding,” rooted in the Vygotskian concept of “zone of proximal development,” was coined by Wood, Bruner, and Ross (1976) and refers to teacher and peer support that enables learners to attain a higher level of achievement than they would be able to do by themselves. Our study investigated the students’ and teachers’ perceptions about wiki’s key affordances and how they helped scaffold young L2 learners in their writing through teacher and peer social interaction and collaboration.

Literature review

Literature on collaborative learning in second-language (L2) acquisition strongly supports the importance of social interaction and collaboration in L2 learning (Saville-Troike, 2006) and writing (Hyland, 2003). Most of the literature views technology-supported collaborative learning using computer-mediated communication in L2 learning in a
positive light (Jones, Garralda, Li, & Lock, 2006). New technologies have had a tremendous impact on the teaching and learning of writing in the last few decades (Goldberg, Russell, & Cook, 2003; Hyland, 2003), and there are both advantages and disadvantages in using technologies for L2 writing. Although some researchers have been critical of computer-aided/assisted instruction in language learning (Angrist & Lavy, 2002), generally, the literature seems to point to web-based collaborative learning as potentially promising technology in language learning as well as in writing (Goodwin-Jones, 2003).

Gibson (1986) first coined the term “affordances” as what the environment offers and provides as perceived by the subjects living in it. Similarly, Norman (1998) describes affordances of a tool as both the perceived and actual properties of a tool that determine how it can be used by the user. For technology implementation to be effective, the affordances provided by a wiki and the affordances required by a learning task need to match (Bower, 2008). In computer-supported collaborative learning (CSCL), Kirschner, Strijbos, Kreijns, and Beers (2004) distinguish three types of affordances: educational, social, and technological. Both educational and social affordances are characterized by two factors: (1) a reciprocal relationship between the learner and the environment, and (2) a perception-action coupling. Social affordance should also encourage learners to engage in activities and generate social interaction. Technological affordance is concerned with technical design and its usability in allowing the users to learn, access, and control the device for task accomplishment.

Many studies with wikis have shown that: (a) the easy accessibility, simplicity and transparency of wiki pages helps learners to share information and resources among their team members and across groups, and makes it easier for students to work at their own pace (Nicol et al., 2005); (b) students have positive perceptions about how wikis can improve collaborative group work and the quality of their work (Chu, 2008); and (c) the effectiveness of wiki application in learning and teaching depends on careful planning and training of both students and instructors to familiarize them with the technology, on class size, and on motivating students to learn from one another based on appropriate instructional design (Engstrom & Jewett, 2005).

These are some of the ways in which wikis may help to scaffold students’ collaborative writing through a platform of sharing, peer-commenting, and co-constructing (Richardson, 2009). All of these studies, however, have been at either the tertiary or the secondary level, and it is not clear whether or not they can be applied to primary school L2 writers using wikis. To address the research gaps, an overarching research question was proposed: How does the use of wikis help scaffold L2 writers during collaborative writing in an upper-primary English-language classroom? Three sub-questions helped to guide data collection: (1) What are the perceived benefits and challenges for students and teachers using wikis for a collaborative writing? (2) What are the key affordances in the use of wikis that help scaffold students in collaborating actively during the co-construction of their writing assignments? (3) How might a wiki’s tracking system help teachers scaffold students in their editing?

**Conceptual framework**

The literature in the three broad areas of (1) collaborative and cooperative learning, (2) L2 learning and writing, and (3) technology-supported collaborative learning seems to indicate that the common prevailing learning theories in these paradigms tend to be mainly from constructivism (Gros, 2001; Parker & Chao, 2007) and from a sociocultural perspective (Crook, 1994; Hyland, 2003). In CSCL, specific learning theories developed from constructivism and sociocultural paradigms include knowledge building (Scardamalia & Bereiter, 2006), the process-oriented method (Strijbos, Martens, & Jochems, 2004), and expansive learning based on activity theory (Engestrom, 2001). While the application of wikis in education is an innovation and learning theories are continuing to evolve, researchers have found that wikis support learning approaches from collaborative learning and social constructivist paradigms (Bruns & Humphreys, 2005; Parker & Chao, 2007).

Collaborative learning regards learning as an active, constructive process, in which knowledge is not just transmitted but is jointly created in an inherently social context where students work in groups or together with teachers within an authentic situation using high-order thinking and problem-solving skills (Smith & MacGregor, 1992). In CSCL, Gros (2001) defined collaborative learning with three underlying theories: (a) constructivism, (b) cultural-historical theory, and (c) situated-cognition.
1. Constructivism originated from Piagetian theory and highlights individual knowledge construction with respect to social interaction.

2. Cultural-historical theory originated from Vygotskian psychology, and argues that internal cognitive change is affected by social interaction, in which scaffolding is provided through adults or capable peers.

3. The theory of situated-cognition advocates that new knowledge should be learned within a specific context so that learning can be applied to a new situation (Brown, Collins, & Duguid, 1989).

Social constructivist learning environments promote complex and realistic problem-solving skills in order to engage students in collaborative and individual knowledge building through group collaboration and interaction, and in which the teacher facilitates, manages and provides guidance (Bruns & Humphreys, 2005).

Methodology

A case-study design using both quantitative and qualitative data was chosen to explore how wiki technology helps to scaffold L2 writers in the complex and continuously changing dynamics of a real-life classroom context where the researcher has little control over the occurring events (Yin, 2009).

Participants

A class of 38 primary-five students and their English teacher were selected for this case study by purposeful sampling. The school was selected from Chinese primary schools of mid to high level in terms of students’ ability to write in the English language. This was to ensure that the primary-five students of ages ten to eleven were able to write a minimum of 100 words in English so that a sufficient quantity of writing could be produced to examine the effect of the collaboration using the technology.

Intervention program

The students and their teachers participated in an intervention program for approximately six weeks, only during their English writing lessons. The intervention program was designed with the integration of a wiki into the existing English-language curriculum (HKCECES, 2008) in collaborative writing. For its user-friendliness, the teacher chose one of the wiki tools now renamed PBworks (http://pbworks.com/academic.wiki). To scaffold the students in their writing, the teacher asked students to co-construct their writing on PBworks pages created for each group and to exchange constructive feedback and comments through its platform guided by teacher-provided wiki rules. The students worked collaboratively in mixed ability and gender groups of four to six to produce a non-fiction text on a topic of their choice from different animals and illustrate their work with photos and graphics. The lessons were planned for both face-to-face learning situations in the classroom or the computer laboratory and for online learning outside their normal classroom. The teacher helped scaffold students’ writing by providing a genre framework and timely feedback, which included teaching skills such as critically evaluating and extracting appropriate information from the Internet and encouraging students to paraphrase and summarize main ideas. For ethical reasons, the intervention program was offered to other classes and their English teachers on a voluntary base. However, this study focused on just one classroom.

Data collection and analysis

The data were collected and examined through a triangulation method using multiple sources of evidence, including student and teacher questionnaires given after the intervention program, a semi-structured interview with the teacher, focus-group discussions with selected students, and students’ editing information recorded in the wiki system. The teacher questionnaire consisted of open-ended questions, while the student questionnaire consisted of both open-ended and closed questions. Responses to closed questions were recorded on a five-point Likert scale to measure the participants’ perceptions, the wiki’s key affordances, and the learning outcomes. Overall, closed questions yielded Cronbach’s α reliability coefficient of 0.70, which was over the minimum 0.60 generally recommended for internal
reliability in psychology (Aron, Aron, & Coups, 2006). The interview and focus-group discussions were conducted after the questionnaires to probe further into the respondents’ answers for clarification.

Qualitative data from open-ended questions in both student and teacher questionnaires, transcribed interviews, and student focus-group discussions was coded according to categories of affordances by Kirschner et al. (2004) to examine the key affordances involved in this study. The participants were asked to cross-check the transcription for accuracy. Edited information generated by different groups as recorded in the wiki system was analyzed and sorted by types of revision. The types of revision were categorized using an adapted version of Mak and Coniam’s (2008) four identifiers used with Hong Kong secondary students: (1) adding ideas, (2) expanding ideas, (3) reorganizing ideas, and (4) correcting errors (e.g., grammar, spelling, and punctuation). Group writings were analyzed using a score sheet adapted from Lo and Hyland’s (2007) study on Hong Kong primary-five students’ composition writing. To maximize the accuracy of coding by categories and marking group writing, two raters coded and marked independently. The correlation between results of the two raters was more than .96 in each case.

Findings and discussion

Student and teacher perceptions

Data from student questionnaires concerning students’ perceptions of the use of a wiki in their group writing helped to address the sub-research questions 1 and 2. For the closed-ended questions, the students were asked whether they enjoyed using the wiki (Q1), whether the wiki helped them work better as a team (Q2), whether the wiki helped them write better (Q3), whether commenting on the wiki helped in improving their writing (Q6), and whether the wiki was useful for group work online (Q7). Table 1 shows how students rated their responses using a five-point Likert scale from 1, “not at all,” to 5, “very much so,” where 3 is the mid-point. All the questions had ratings over 3 from the lowest of 3.5 (Q2) to the highest of 3.8 (Q6 and Q7). Data from student questionnaires indicated that students’ perceptions of the use of a wiki in their group writing were generally positive, which is supported by Chu’s (2009) findings that primary-four students regarded the positive use of information technology in their inquiry project-based learning.

One of the highest positive responses concerned how peer comments posted on the wiki platform helped in scaffolding the students’ writing (Q6). This was also echoed in the students’ responses to the open-ended questions: “We write comments to correct our mistakes,” and “Others can give comments to me and help me make it better.” All the sample quotes have been translated and edited.

![Table 1. Students’ perceptions of a wiki](image)

<table>
<thead>
<tr>
<th>Question items</th>
<th>Mean Rating (SD)</th>
<th>Median</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 Enjoy using PBwiki</td>
<td>3.6 (.75)</td>
<td>4.00</td>
<td>38</td>
</tr>
<tr>
<td>Q2 Work better as a team</td>
<td>3.5 (.80)</td>
<td>3.00</td>
<td>38</td>
</tr>
<tr>
<td>Q3 Write better in groups</td>
<td>3.6 (.88)</td>
<td>4.00</td>
<td>38</td>
</tr>
<tr>
<td>Q6 Commenting on PBwiki improves writing</td>
<td>3.8 (.72)</td>
<td>4.00</td>
<td>38</td>
</tr>
<tr>
<td>Q7 Useful for group work online</td>
<td>3.8 (.73)</td>
<td>4.00</td>
<td>37</td>
</tr>
</tbody>
</table>

The teacher’s perceived benefits from the open-ended questionnaires provided some answers to the sub-research question 1. The teacher mentioned that the students found wiki’s shared platform for exchanging ideas and sharing information they had collected from the Internet very convenient and motivating: “. . . students will be more motivated to find the information they look for from the Internet” and “They will exchange their ideas via the platform as well, as it is more efficient and convenient”.

Figure 2 shows how actively the students exchanged their ideas on the wiki platform as recorded in its tracking system. The frequency of comments during the study period ranged from a high of 28 to a low of nil. Comments varied from:

- Simple positive and negative feedback to elaborated feedback:
  - “Good. I like your idea.”
  - “Your information is too detailed.”
The teacher reported some of the following problems and solutions in the questionnaire:

1. Uneven gender distribution of this class (13 boys and 27 girls) created conflict in mixed-gender grouping: “. . . students of this age group tend to be more aware of their gender . . . and become more sensitive to working with a different gender.” The teacher created a student preference table to facilitate even gender distribution and foster better understanding of gender differences within the groups, thus enhancing effective peer learning.

2. There were problems with job distribution among group members: “. . . every member in the group works on the project simultaneously; they have no ideas on whose writing they should edit/comment on.” Subsequently, “Group members had to nominate one student in their group to write and collate information. Others collected new information and commented on the writing.”

3. Technical problems, such as slow loading time when students were using PBworks simultaneously, were reported: “It took more than 30 minutes for some users to gain access . . . and the experience discouraged the use of the platform for exchange of ideas.” Subsequently, students saved their findings and comments in their personal USB as a backup, or e-mailed them to the members in charge of collating and organizing the ideas.

4. There were inadequate facilities at home: “Some students may not have the computer/internet access at home, or they are not allowed to use the systems.” Consequently, those having problems accessing computers at home were encouraged to use computers at school, in the public library, or at other members’ homes.

5. Students did not have adequate skills prior to the tasks: “. . . namely, scanning and skimming, note-taking skills; as well as translation techniques as they have to read a relatively large amount of information in English and Chinese.” The skills were taught after the problem had been identified, such as using an “online dictionary to help understand and translate the information they acquired.”

Focus-group discussion was conducted with eight students and their English teacher. Eight students were selected, as evenly as possible, to represent genders, and positive and negative respondents. Some students in the focus-group discussion mentioned the difficulties and challenges that they faced:

- “. . . it is frustrating to see how slow the computer is, and at those times I would rather write it on a paper instead.”
- “. . . it would be better if we could set the restrictions of who can edit my page and who cannot.”

However, generally, they were positive about their experience with the wiki:

- “. . . I can copy and paste the information on PBwiki easily without the need of any manual copying from paper to paper.”
- “I can put and edit anything I like in the content, and I can always organize the information and ideas without the feeling of wasting anything.”

This is in line with the findings from the student questionnaires. However, the students’ and teacher’s positive perceptions should be regarded with caution, since using wiki technology was a new experience for both the teacher and the students in this study. Thus, a “Hawthorn effect,” an effect of novelty, may have influenced their enthusiasm and overall outcomes.

**Wiki’s key affordances**

Qualitative data from open-ended questions in both student and teacher questionnaires and from transcribed interviews and student focus-group discussions were coded using Kirschner et al.’s (2004) three categories of affordances. To address sub-research question 2 on the key affordances that support student collaboration, elements of collaborative affordances were also included in social affordances.
Educational affordances

Various educational affordances were perceived by the students: the opportunity to write in English, posting peer comments to learn new words and grammar usage, the opportunity to use an online dictionary, extracting main ideas from the Internet, critically evaluating suitable information for the students’ use, and generally learning to write better through sharing and examining examples from other groups. As one student said, “Maybe I wrote some words or sentences wrongly, and some other students would help me, and then I would correct it” (Student group discussion [SGD]).

Similarly, the teacher felt that the students had improved their writing skills: “Students read more and they learnt and used some new vocabulary and language forms” (Teacher questionnaire [TQ]). Other skill improvement that she observed was, “Improvement in reading, IT, collaboration skills and subject knowledge” (TQ). Wiki’s tracking system afforded the teacher the opportunity to view the types of revision taking place and to provide the necessary support. It also provided the opportunity for the teacher to scaffold students when critically evaluating and extracting suitable information from the Internet, and to encourage students to paraphrase and summarize main ideas to avoid plagiarism. As the teacher said in her interview:

- “. . . I asked them to find, scan and skim for a few big topics. . . . It also helped to narrow down the amount they had to read.”
- “Usually they wrote too little or just did the copy and paste. I would remind them to write in their own words. Sometimes they were also too long, and they had to cut some of the content.”

Social and collaborative affordances

Regarding social affordances, many students cited the usefulness of peer-commenting through the wiki platform, as reported in the section on Student and Teacher Perceptions of this paper. The peer-commenting acted as scaffolds to improve students’ writing and as a channel of communication, similar to MSN, encouraging interaction among other group members: “We can use the Wiki like an MSN to talk” (Student questionnaire [SQ]), and “They give me some messages and I feel so happy” (SQ). The open platform seemed to help communication between different genders, and the exchange of written comments online seemed to help those who were shy or had difficulty speaking in English:

- “. . . it is difficult for boys and girls to exchange information directly because some people might think there are secret dates going on if a boy talks to a girl, or vice versa. In wiki there are no such problems so we can type what we want to say easily without the embarrassment” (SGD).
- “. . . it is not easy to make them talk to each other in English. But when they type, it is easier for them to share what they think and share ideas. . . . Even the shy students will do a little bit more” (Teacher Interview [TI]).

Collaborative affordances had similar characteristics to social affordances in terms of affording social interactions, but the focus was more on whether the created interactions resulted in collaboration within a team. The transparency of sharing other groups’ work and learning from them, collective feedback, and synergy in co-constructing the writing provided affordances for collaboration: “We can share our comments and teach others” (SQ), and “In PBwiki, I can read the work of other groups and learn from their examples” (SGD). Collaborative affordance provided an environment that encouraged students to engage in collaborative behavior, as illustrated below, where whatever challenges they encountered, they solved creatively in their own ways:

- “Someone would change our work, and we talked to the teacher to resolve this problem. Sometime the computer isn’t working so we call each other” (SQ).
- “Our ideas may be different, but we voted to choose the title” (SQ).

Technological affordances

There were technological affordances that enhanced collaboration and task accomplishment. For example, the students cited the convenience of being able to amend their writing and post photos, and effective peer-communication prompting speedy idea sharing across group members: “. . . when we have found or written something, it is difficult to send the hard copy to other group mates. But with wiki, it can be done easily by copy and
Matching affordances

Affordances required for collaborative writing tasks were matched against wiki’s affordances based on Bower’s (2008) classification of e-learning technology affordances focusing on the educational and social functionality. Table 2 shows affordances in the area of applications, such as media, spatial, temporal, navigation, emphasis, synthesis, and access control. Affordances are further defined as abilities providing possibilities of actions they offer users. As the Table 2 shows, the affordances provided by PBworks aligned well with the affordances required by the learning tasks involved in collaborative writing. This was further supported by Table 3, which summarizes the participants’ perceived affordances and shows how they aligned with Bower’s categories of wiki’s affordances.

**Table 2. Matching affordances of a wiki and of collaborative writing task**

<table>
<thead>
<tr>
<th>Affordances</th>
<th>Wiki’s affordances (Bower, 2008)</th>
<th>PBworks</th>
<th>Collaborative writing task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media</td>
<td>Readability</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>View-ability</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Write-ability</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Draw-ability</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Spatial</td>
<td>Resize-ability</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Move-ability</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Temporal</td>
<td>Playback-ability</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Accessibility</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Record-ability</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Synchronous-ability</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Navigational</td>
<td>Browse-ability</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Search-ability</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Data-manipulation-ability</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Link-ability</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Emphasis</td>
<td>Highlight-ability</td>
<td>✔</td>
<td>*spell-check-ability ✔</td>
</tr>
<tr>
<td>Synthesis</td>
<td>Combine-ability</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Integrate-ability</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Access control</td>
<td>Permission-ability</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Share-ability</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

*PBworks provides spell checks.

**Table 3. Matching perceived affordances with Wiki’s affordances**

<table>
<thead>
<tr>
<th>Participants’ perceived affordances</th>
<th>Wiki’s affordances (Bower, 2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational</td>
<td>Media, navigational, emphasis</td>
</tr>
<tr>
<td>English writing</td>
<td>Media, spatial</td>
</tr>
<tr>
<td>New words and grammar usages (using online dictionary)</td>
<td>Media, navigational, access control</td>
</tr>
<tr>
<td>Extracting main ideas (paraphrasing and summarizing)</td>
<td>Media, temporal, navigational, emphasis, access control</td>
</tr>
<tr>
<td>Critical thinking skills (critically evaluate information from the Internet and peer’s work for peer critiquing)</td>
<td>Media, temporal, navigational, emphasis, access control</td>
</tr>
<tr>
<td>Wiki’s tracking system helps teachers provide student supports:</td>
<td>Media, temporal, navigational, emphasis, access control</td>
</tr>
<tr>
<td>• View students’ revision and give timely intervention</td>
<td>All</td>
</tr>
<tr>
<td>• Scaffolding students to critically evaluate and extract information from the Internet.</td>
<td>All</td>
</tr>
<tr>
<td>Other skills: reading, IT, collaboration, subject knowledge</td>
<td>Media, temporal, access control</td>
</tr>
<tr>
<td>Social &amp;</td>
<td>Media, temporal, access control</td>
</tr>
<tr>
<td>Social interaction among group members, role of gender,</td>
<td>Media, temporal, access control</td>
</tr>
</tbody>
</table>

paste for sharing” (SGD). Since technological affordance is concerned with the usability of technical devices (hardware), it is not the focus of this study.
collaborative benefits for shy or students with communication difficulties
Channel of communication outside classrooms
Creative problem-solving for authentic problems within collaborative group tasks
Peer critiquing provides collective feedback and scaffolds students with their writing
Transparency for sharing and examining others’ group work
Synergy in co-construction of writing

Media, temporal, access control
Media, temporal, navigational, Synthesis, access control
Media, temporal, emphasis, Access control
Media, temporal, navigational, Access control
Media, temporal, navigational, synthesis, access control

**Analysis of revisions**

Wiki’s tracking system provided information that was useful for gaining an in depth understanding of what kind of editing was taking place and how that would affect student collaboration and writing skills, addressing sub-research questions 2 and 3. Figure 1 shows types of editing seen in an excerpt from the wiki’s tracking system. Figure 2 shows the number of activities recorded in the tracking system, varying from 1 to 27 for the number of edits posted and 0 to 28 for the comments posted during the first edits on Jan 22 to the last edits on March 14, 2009. Most groups from A to E were actively involved in either editing or commenting on their own group writing. Some groups posted more comments than editing to accomplish their group writing, while others frequently edited through the platform rather than commenting, as in the case of groups F and H, which had no comments recorded. Group G actively contributed to their group writing through comments, but constructed their group writing on Microsoft Word due to their familiarity with the program before pasting onto the wiki, thus showing a low frequency count on the editing record. Figure 2 and Table 4 indicate that the active groups spent more days working on their group work, as seen from the duration in days counted from the first edits to the last edits. Those groups that spent more days on their work tended to have higher scores for their written work based on a scoring method adapted from Lo and Hyland’s (2008) study.

![Figure 1. Excerpt from wiki tracking system](image-url)
A detailed analysis of the edits shows that most concerned content (adding, reorganizing, replacing, and elaborating on ideas) rather than form (syntax, spelling, punctuation, and formatting). Table 4 shows the types of revision done by eight different groups as recorded in the wiki’s tracking system, categorized according to Mak and Coniam’s (2008) adapted version of identifiers. Since the text type for this group writing was non-fiction, most of the first and second edits show new ideas being added, with the new ideas not being students’ original ideas, but new information from the Internet. While exploring the use of the wiki platform, students frequently visited to change their spacing, fonts, and resizing of pictures as recorded under the formatting. Surprisingly, common edits concerned other content such as elaborating, reorganizing, and replacing ideas, which was also reported by Mak and Coniam in their study involving secondary-school students using a wiki. This is a good sign in encouraging writing skills from a whole-language perspective, especially in L2 writing, where many students tend to focus on form rather than content (Hyland, 2003). Although both content and form are important for quality writing, content and idea revision tend to involve sophisticated higher-order thinking skills that lead to better conceptual planning for a good writer (Bereiter & Scardamalia, 1987). Figure 2 and Table 4 show that those groups that edited frequently tended to revise more, as in the case of Group D, who recorded 27 visits and had 65 revisions in their work. On the other hand, frequent visits did not mean that quality revisions were taking place, as in the case of Group B, who had 10 visits, but recorded 12 content revisions. This is compared to Group F, who had only 4 visits, but had a greater number of content revisions, 16. Groups A, B, C, and D, with a higher number of revisions, tended to have better writing scores compared to the other groups, who had a lower number of revisions.
The fact that there were more edits on the content of ideas may be due to the spell checks that are built into PBworks and on access to the Internet. The spell checks helped students ease their cognitive load, thus allowing them to concentrate on the content. Similarly, a host of ideas and information was made available through the Internet, freeing the students to focus on analyzing and evaluating the content to extract the main points for their own writing. Other reasons might be that the students tended to feel at ease communicating through their familiar domain of technology, as was found in a study with peer tutoring for L2 writers using ICQ (Jones et al., 2006). The local study found that online interaction tended to produce more discussions concerning content and process, while face-to-face peer tutoring focused on forms such as syntax, vocabulary, and style. Although the study involved university students, it may be applicable to primary students who are familiar with MSN technology, as was observed from the data on social affordances. Another reason might be that students are more actively involved in the self-correction process when they have doubts or reservations about their peers’ feedback, while teachers’ feedback is believed to be correct and will not lead to further self-initiated correction, as was reported in a study of L2 writers’ peer feedback with Chinese university students (Yang, Badger, & Yu, 2006). Teacher instruction encouraging students to focus on content also plays an important role and the reasons cannot be credited to technology alone.

All the groups were able to write 309.8 words on average, with the lowest word count being 123 and the highest count, 593. Length was not a problem, for with access to the Internet, students were able to produce much information: “. . . with the use of Internet resources, students tend to write more than they used to on paper” (TQ). They needed to exercise their critical-thinking skills to choose the appropriate information for their writing, as one student commented, “It was too difficult to group too much information when we were doing the work. We chose the main point in each information” (SQ). Another skill students needed was to paraphrase the information to avoid plagiarism, which the teacher realized as the project progressed. During the teacher interview, the teacher mentioned that she had noticed students cutting and pasting the information straight from the Internet. Subsequently, the teacher gave a mini-lesson on how to paraphrase information taken from other sources and to acknowledge the source.

Although a wiki platform seems to provide educational affordances for writers to focus on content, this does not happen automatically, as shown by differences in the quality of revision for Groups B and F. Quality content still needs to be encouraged and enforced through teacher instruction, and some groups may need more scaffolds in content revision than others. The tracking system provides teachers with windows of information on what is happening in each group’s editing process and provides necessary support to scaffold writers during the writing process rather than when the writing is finished. The teacher in this study was beginning to realize the usefulness of the tracking system: “I could easily know and check who worked and edited their work as there were email notifications to remind me of every change my students made in their work in PBwiki” (TQ).

**Conclusion and implications**

The study found that a class of primary-five students in a Hong Kong Chinese primary school were positive in their perceptions of using a wiki. The students enjoyed using the wiki and commented how it helped them to work better as a team and write better, encouraged peer-to-peer interaction, and facilitated online group work. Both the students and their teacher perceived the exchange of comments through a wiki platform as beneficial to their collaboration and construction of their group writing. Among the eight groups observed in this primary-five class, those active groups that spent more time working on their project tended to produce higher writing scores.

The study observed three key affordances: educational, social (collaborative), and technological. It illuminated how these affordances were perceived as enhancement in collaborative writing and helped scaffold students to foster skills, including critical thinking and creative problem-solving. The study also found that the affordances for collaborative writing tasks seem to match the affordances provided by a wiki, which was further supported by a good alignment with participants’ perception of affordances. The technological affordance missing in a wiki is providing users with information, such as charting the frequency of all members’ visits and postings, which helps students to perceive an overall picture of interaction and encourage further collaboration. The data may also allow future research on how peer critiquing actually leads to creative-thinking skills and subsequently to revisions or new creative ideas.

A detailed analysis of the types of revisions in the wiki’s tracking system indicated that the idea content was being revised more than the form. This may be due not only to PBworks’ affordances in providing writers with spell
checks to lessen their cognitive loads, but also to the ease with which the Internet allows a host of ideas and information to be made available, freeing writers to focus on analyzing and evaluating the content to extract main points for their own writing. Other reasons may be that students feel at ease with communicating through technology, which tends to produce more content and process discussions (Jones et al., 2006), and that peer-feedback activates self-corrections (Yang, et al., 2006). Among this class of primary-five students, most groups revising ideas more than form seemed to produce higher writing scores. The teacher’s instruction focusing on content also played an important role. This may need further investigation through comparative study to examine what other factors contribute to help produce content revision among the writers.

A wiki is an open-editing tool that is easily accessible online and simple enough for primary-five L2 writers to manage, as this study found. It may be easily integrated and adapted into other classrooms with appropriate scaffolds to guide students in posting constructive comments and timely teacher feedback. Although a wiki may provide affordances for writers to focus on content, it is not automatic, and a teacher’s instructional role is still important in scaffolding students by teaching them the appropriate skills. Wiki’s tracking system gives in-depth information about the types of edits the students are making and helps teachers assess their collaboration and the development of their group writing process, a task that may be difficult to monitor in traditional group work. This can help teachers decide on the kind of support to be given, and provide immediate feedback when necessary to scaffold the writers during the course of writing and not at the end when the product is finished.

In this study, wiki’s key affordances helped facilitate students to engage collaboratively in creative problem solving and peer critiquing. This, in turn, may have helped scaffold students in applying their critical-thinking and creative-reasoning skills as they analyzed and evaluated their writing to construct comments and revise based on their peer-critique or formulated solutions to naturally occurring problems within their collaborative group tasks. Fostering these skills further may also help students nurture creative-thinking skills for generating more original and creative content ideas in their writing.

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