

Prospective teachers' insights towards scaffolding students' writing processes through teacher–student role reversal in an online system

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Published online: 7 October 2010

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Abstract Teachers are encouraged to plan their teaching based on students' needs from the student-centered perspectives. Of the many teacher training programs, teacher–student role reversal is regarded as one of the most effective avenues to help teachers identify students' learning difficulties and further provide adaptive instruction. However, as the role reversal process is difficult to document in the face-to-face environment due to its interactive and dynamic property, very few studies on teacher–student role reversal have been empirically conducted. Studies on this issue thus were mainly presented in the form of position papers or experience sharing entries. The purpose of this study was to explore prospective teachers' (PT) role reversal experience within the computer-supported (CS) environment. In the CS environment, 14 PT were invited to play the role as student Writers, Editors, and Commentators. The results showed that the teacher–student role reversal activities provided the PTs with a first-hand experience to formulate and reformulate their professional knowledge through reflection. By reflecting on their role-reversal, the PTs could identify the difficulties that impeded students' writing and generated the insights on how they could better scaffold their students' writing, editing, and revising process. With the feature of the process data, the CS environment was found to effectively support teacher–student role reversal as the PTs employed the process data, such as action logs or written texts, to reflect on their role play process to probe into the students' writing problems and develop insights into pedagogy.

Keywords Role reversal · Writing process · Student-centered perspectives · Prospective teachers · Computer-supported environment

Introduction

Many scholars have advocated the importance of role reversal in encouraging students to play the roles of writers and editors in order to understand what gets involved in the

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different roles (e.g., De Wever et al. 2010; Scardamalia et al. 1984). They believe that students can observe and realize the responsibilities in writing one's own text and in correcting peers' texts through role reversal. Similarly, to better fully comprehend students' writing process, teachers are expected to become "learners of the learners" (Eken 1999, p. 241) to explore students' difficulties, strategies, and motivations in the writing process. It is expected that through role reversal, teachers are able to realize how students process writing and what impedes their writing so that teachers can plan and adjust their teaching based on students' needs and difficulties (Ellis 2003; McCombs 2001; Ransdell 1993; McDonough 2002).

Researchers regarded role reversal as a reciprocal teaching process to reduce conflicts in which one plays dual roles to obtain a comprehensive scope of the problems and issues which they have overlooked from their individual perspectives (Palinscar and Brown 1984; Jamaludin et al. 2009). Through the role reversal process, one can reduce self-defensiveness, perceive the differences and similarities between themselves and others, comprehend others' viewpoints, and formulate one's own viewpoints. Specifically, teacher–student role reversal enables teachers to relive the frustration of being a language learner in which teachers step back from their teaching position, and allow them to reconsider teaching principles and generate new pedagogical insights (Darling-Hammond and McLaughlin 1995; Ransdell 1993; Sparks and Hirsh 2000). Teachers' insights reflect "an understanding gained from personal experience which allows us to see how previously understood realities could be different... [It] makes sense of something previously incomprehensible, or lends a new perspective on something taken for granted" (Ellis 2003, p. 150). It is expected that insights derived from teacher–student role reversals might continue to form and reform with the theoretical knowledge gained from both coursework and readings. As such, insights obtained from the teacher–student role reversal, may assist teachers in recognizing students' learning difficulties. This will further aid teachers to provide scaffolding, adjust teaching strategies, and plan for follow-up instruction. Ransdell (1993) concludes role reversal taught her more than what she had learned in several years of attending conferences and reading journal articles.

Language learning experience (LLE) is proposed to be one of the most effective approaches to allow teachers to position take with students and to "renew their connection with language learning, and thereby to become more sensitive to the problems and processes confronting their learners" (Lowe 1987, p. 89). When teachers undergo the learning process as students and encounter learning difficulties in LLE, they recognize students' struggles and difficulties more easily than only from traditional in-class observations, microteaching, or internships alone. Some studies (e.g., Lortie 1975; Cohen 1992; Bailey et al. 2001; Ransdell 1993; Walters et al. 1990) have reported the effects of engaging teachers in LLE. Teachers who participate in LLE are more capable of valuing their own judgments, drawing on their experience rather than heavily relying on disciplines and knowledge passed on by experts. LLE also enables teachers to plan their course from students' perspectives, and construct a more student-centered teaching environment. Cohen (1992) emphasizes that "... if ... teachers themselves are willing and able to put themselves in the role of language learning, they most likely will become more acutely aware of the kinds of challenges and problems that confront the learners" (p. 249). Students' learning problems, challenges, and feelings would be more observable by teachers (Cohen 1992; Bailey et al. 2001). Teachers can then reflect upon the LLE to choose more appropriate instructions and meet students' needs (Bailey et al. 2001; Cohen 1992). Many studies have advocated that teachers should be positioned as writers themselves to experience the tensions, struggles, and difficulties involved in writing from readers'

perspectives (e.g. Burton 2005; Grainger 2005; Morgan 2010). Only when teachers step out the comfort zone and live through the writers' roles can they continually renew their understanding of the writing process and provide students appropriate assistance accordingly.

Many studies reported the effects of role reversal in language learning and teaching. However, Ellis (2003) indicates that teacher education programs usually centered the practicum experience on doing classroom observations, designing lesson plans, and experiencing internship to enhance teachers' professional knowledge. Teachers, particularly prospective teachers (PT) in the teacher education programs, were seldom given the opportunities to experience becoming students first to understand what was involved in students' learning of a second or foreign language, and later reflected on their personal learning processes (Anderson et al. 2005; Eken 1999; Gray 1998; Liu 2005; McDonough 2002; Ransdell 1993). As the role reversal process is difficult to document in the face-to-face environment due to its interactive and dynamic property, very few studies on teacher–student role reversal have been empirically conducted. Literature on this issue is mainly presented in the form of position papers or experience sharing entries (McDonough 2002; Ransdell 1993; Walters et al. 1990).

A computer-supported (CS) environment is proposed to effectively support teachers to reflect on their role reversal process, as with the feature of the “process data” (Lin et al. 1999, p. 45), a computer system can serve as “a good tool to expand human cognitive development and knowledge construction” (Yeh 2003, p. 613). In other words, different from the face-to-face environment, the CS environment provides teachers with the alternatives to record and explicitly visualize their role reversal process (Lin et al. 1999; Yang et al. 2008; Yeh et al. 2010). Therefore, the CS environment is more tangible than the on-site environment for teachers to experience role reversals to obtain authentic student-centered perspectives, and adapt appropriate scaffolding skills for students. With the process data, teachers are able to engage in the deeper reflection on their role reversal process to discover the possible reasons of their students' inability to accomplish learning tasks (Lin et al. 1999; Scardamalia and Bereiter 1991; Yeh and Yang 2010). With the scope of the students' learning problems through reflection, teachers can in turn design their teaching curriculum or look for innovative teaching pedagogy to support their students. Pennington (1995) also indicates the significance of self-reflection for teachers to frame different views toward routine practices to generate new insights to tap into students' learning difficulties. Through ongoing back and forth self-reflection on their role play process as students, teachers could internalize the new insights into their own teaching and develop insights into pedagogy (Ritchie and Wilson 2000).

Purpose of this study

This study intends to fill in the void in the existing literature by exploring PTs' role reversal experience and analyzing the insights generated from this experience. In this study, the prospective teachers (PTs) were encouraged to take on students' roles in writing texts. This provided PTs with an avenue to learn how to provide support to their students, understand students' writing process (Walters et al. 1990) and generate possible solutions to solve the emerging problems. To investigate the PTs' insights generated from the teacher–student role reversal experience, two research questions were addressed: (1) What difficulties do PT encounter and overcome in the teacher–student role reversal in an online system? (2) What are the PT' insights generated from their role reversal experience?

Methods

Participants

Fourteen PT who registered in a 3-credit graduate course entitled “Seminar in Reading and Writing” participated in this study. These PTs had been studying English as a Foreign Language (EFL) for 10 years, and were the second year graduate students in a Master’s program in English teaching. In this graduate course, they discussed topics such as “Understanding L2 reading and writing,” “Exploring research in L2 reading and writing,” and “Researching reading and writing in the classroom.” Before taking this graduate course, the 14 PTs had approximately 30 h of in-class observations, 20 h microteaching, and a 16-week internship related to in-field experience.

In this study, the 14 PTs received an on-site teacher–student role reversal training course and learned how to employ an online system to facilitate the role reversal activities. In the on-site training course, the theories of role reversal were first introduced, and then the PTs were trained on how to experience role reversal through their participation in three writing cycles. Each writing cycle involved students’ writing, editing, evaluating, and re-writing texts, with each cycle lasting for 3 weeks. Within the three consecutive weeks, the PTs had to play the roles of student Writers, Editors, and Commentators. For the first week, the PTs wrote and posted their first versions of texts (student Writers). Then, the PTs served their roles as student Editors by revising their peer teachers’ texts and by providing corrections and suggestions (student Editors). In the third week, the PTs had to evaluate and decide whether they would accept or reject their peer Editors’ suggestions (student Commentators). Finally, they rewrote and posted their final texts online. After they underwent three writing cycles, the PTs were guided to participate in a group meeting in which an open-ended questionnaire was delivered for the PTs to reflect upon and discuss their role reversal process with other PTs.

In the online system, the PTs were instructed how to employ the functionality of the online system to facilitate their role play as student Writers, Editors, and Commentators. Pseudonyms for the 14 PTs were adopted in the online system in order not to reveal their identities.

Experiencing teacher–student role reversal as Writers, Editors, and Commentators

Three different but interchangeable roles (Writers, Editors and Commentators) were designed in this study, in order to allow the PTs to experience role reversal. The following briefly introduces the three roles.

As student Writers, the PTs were required to post three essays for their peers to revise. After viewing others’ revisions and feedback, the student Writer underwent the revision process and posted final drafts. Playing the role of student Editors, they were encouraged to read any posted texts and were suggested to revise a student Writer’s text, by utilizing the function keys on the Editor interface. As student Commentators, the PTs needed to evaluate the peer Editors’ suggestions. These suggestions are considered as scaffoldings, of which the peer Editors’ suggestions on the development, style, organization of the text should be included.

The Writeam system

The Writeam system was designed to create a CS environment to facilitate teacher–student role reversal, including the Writers, Editors, Commentators, and the management interface. The following introduces the functionality within each interface.

The Writer interface

Writers can click “Publish” on the interface to post a new essay. After the new essay is published successfully, detailed information such as the date of submission, number of clicks (e.g., frequency of reading peer writers' texts, editing peers' errors, and evaluating peer Editors' suggestions and corrections), and the number of responses from editors will be shown on the interface for writers.

The Editor interface

Two different function keys are implemented for an editor to make both local and global revisions. *Suggest Local Revision* refers to an Editor's corrections on grammatical errors such as redundant words, misuse of punctuations, and subject-verb agreement. By clicking on the *Suggest Local Revision* button, an editor will be able to select error types from the tool bar, and then revise the writer's text (Fig. 1). *Suggest Global Revision* indicates an editor's suggestions on text organization, development, and style of the writer's text. When an Editor detects inconsistencies or unrelated statements in a text, he may click *Suggest Global Revision* on the upper left-hand side of the interface, to provide suggestions. Global revision types are categorized into (1) Perspectives; (2) Text Construction; (3) Clarity of Purpose; (4) Development of Purpose, (5) Inter-paragraph Transition, and (6) Correctness in the Standard Conventions.

The Commentator interface

This system offers Commentators' *evaluations of local revisions, evaluations of global revisions, and the viewing of different versions of a text. Evaluations of local revisions* allow Commentators to click the “triangle” icon to read peer Editor's corrections (Fig. 2). A Commentator can evaluate the editors' local revisions and global revisions by giving smile icons in a 5-point scale from strongly disagree to strongly agree in the “Evaluation” column. The Commentator then writes the reasons for the evaluation in the “Reasons of evaluation” column. *View different versions of a text* is designed for Commentators to compare different versions of the same text edited by multiple peers. By comparing the differences, Commentators can reflect on and learn different views from their peers (Fig. 3).

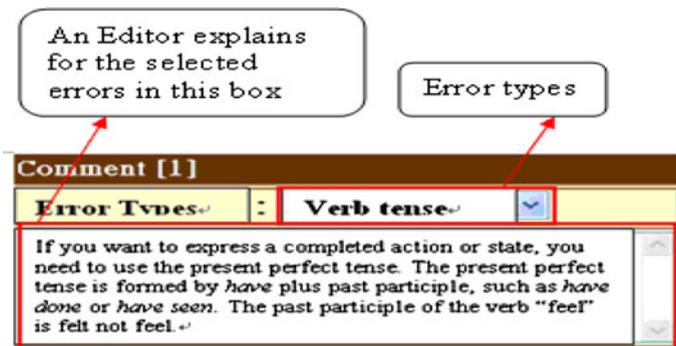


Fig. 1 An editor could select local errors from the error type box

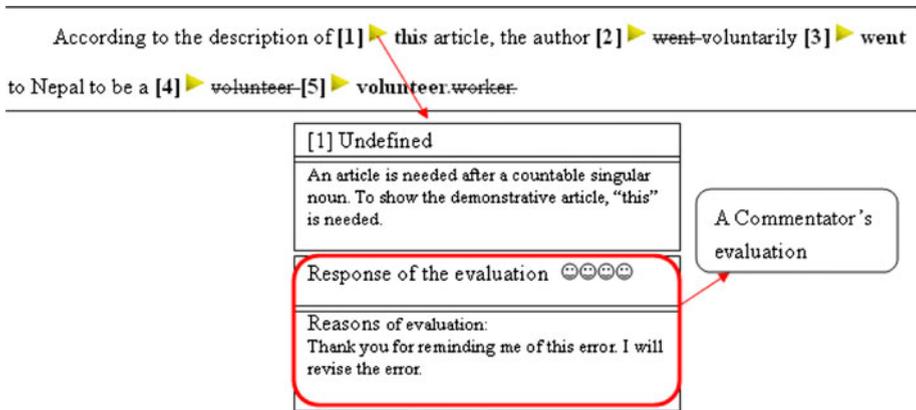


Fig. 2 A Commentator's evaluations on a peer Editor's local revision

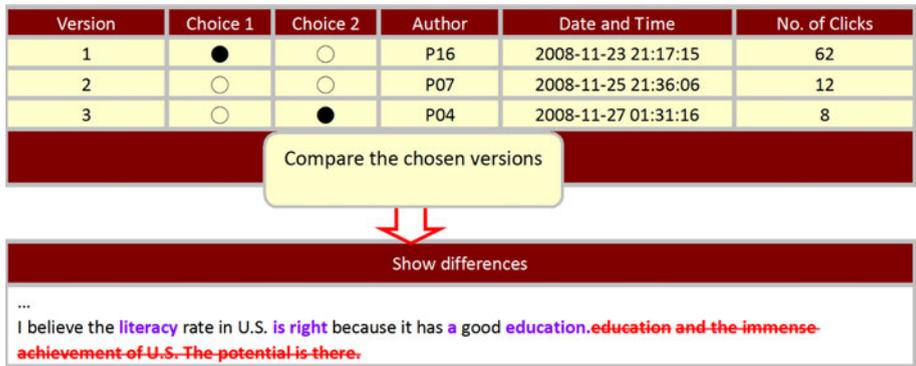


Fig. 3 Comparison between one's own text and the one revised by a peer Editor

The management interface

All the PTs have the access to the management interface. The feature of the management interface is to allow the PTs to document their writing and revising actions and behaviors. In the management interface, the PTs first view the names and the numbers of the each PT. By clicking one of the PTs' names, the PTs can observe a PT's action logs to observe how one plays the role of a student Writer, Editor, and Commentator (Fig. 4). The PTs can also click each action to trace the articles that each of them published, read, edited or revised.

Data collection

The data was collected from the online Writeam system and the on-site teacher training course. The data from the online Writeam system included the PTs' written texts and the action logs. The written texts referred to the PTs' reaction essays, revisions, and the dialogues in the Writeam system; the PTs' action logs referred to the actions that PTs took in the Writeam system. Both the written texts and the action logs would be employed as the process data for the PTs to reflect on the role reversal process.

Sandy's (g9641702) action logs		
1	Publish article [Oil spill] version [1] view	2008-10-2808:35:24
2	Read article [Oil spill spells catastrophe for Russian coast] version [1] view	2008-10-2808:55:33
3	Read article [Oil spill spells catastrophe for Russian coast] version [1] view	2008-10-30 08:13:47
4	Edit article [Oil spill spells catastrophe for Russian coast] version [1] view	2008-10-31 09:43:08
5	Read article [Summary of WEF global competitiveness survey] version [1] view	2008-11-05 08:27:24
6	Read article [Summary of WEF global competitiveness survey] version [1] view	2008-11-05 08:51:31
7	View article [Junior high more stressful than senior high] version [1] view	2008-11-05 09:13:01
8	Read article [Junior high more stressful than senior high] version [1] view	2008-11-05 09:20:56
9	Read article [Junior high more stressful than senior high] version [1] view	2008-11-05 09:25:38
10	Evaluate article [Junior high more stressful than senior high] version [1] view	2008-11-05 09:38:40
11	Publish new topic [Junior high more stressful than senior high] view	2008-11-05 10:02:17
12	Rewrite article [Junior high more stressful than senior high] version [1] view	2008-11-05 20:32:22
13	Publish new topic [Europeans charged over child abductions in chad] view	2008-11-07 08:54:56

Fig. 4 Details of the action logs

The data from the on-site teacher training course included the open-ended questionnaire and the follow-up interviews. The open-ended questionnaire was delivered to inquire the PTs' role reversal process as student Writers, Editors, and Commentators. The questions included "What were the major problems you had encountered in student Writer's, Editor's, and Commentator's role?", "How will you scaffold your student Writers to overcome the difficulties?", "How would the role reversal experience help you in your future teaching?", and "What did you learn from the role reversal experience?" To help the PTs answer those questions, the PTs were encouraged to form small groups in onsite sessions and to employ the action logs and the written texts as the process data to reflect upon their role reversal process with others. The follow-up interviews were conducted after the panel discussions to elicit more specific information.

Role of the researchers

The researchers of this study were both the teacher educators and the researchers. In the one-site training course, the role of the researchers was to teach the PTs the theory and the process of teacher–student role reversal as being student Writers, Editors, and Commentators. Second, the metacognitive skills were taught for the PTs to learn how to reflect on their role reversal process through the action logs and the written texts from the Writeam system. Finally, the researchers led the PTs to form small groups in the one-site training course to share and discuss their role reversal process with others.

In the online Writeam system, the role of the researchers was to teach the PTs how to employ the Writeam system to play their role as student Writers, Editors, and Commentators. The researchers were also the observers in the Writeam system to investigate how the PTs play their students' roles by examining the PTs' action logs and the written texts. While the PTs were informed that their written texts and the action logs would be observed and used for research, the observations were unintrusive to ensure the PTs' natural writing process and behaviors.

Data analysis

The data was analyzed by content analysis, including coding, categorization, description, and interpretation (Weber 1990; Patton 1990). The meaningful statements regarding the difficulties the PTs experienced (coding) were initially highlighted from the data sources, including the PTs' writing texts, the PTs' *action logs*, the open-end questionnaire, as well as follow-up interviews. Next, the meaningful statements were assigned into different categories (categorization) such as potential difficulties which the PTs experienced and also the insights they generated when playing the role of student Writers, Editors, and Commentators. Then, similar categories were integrated by comparing and contrasting the properties of each category, and constantly refining and collapsing the categories as stronger themes emerged. We then summarized the similar ideas into statements, to present the PTs' common difficulties and insights from the role reversal experience (description). Finally, the main ideas of each category were interpreted by offering exemplary cases, drawing conclusions, and making inferences (interpretation). Both of the researchers reached inter-rater reliability of writing texts, the open-ended questionnaire, and the interview at 0.78, 0.82, and 0.83. Participating teachers' member checking was also conducted to confirm the external validity of the study. If a discrepancy occurred between the researchers and the participants in the interpretation of the data, the data would not be included for further analysis.

Results

This study aimed to investigate the insights generated by PT' from their online role reversal experience. Through role reversing with students, potential difficulties in writing were identified by the PTs when they played students' roles as Writers, Editors, and Commentators. While they experienced the writing and rewriting processes themselves, they projected some alternatives and generated their insights on how to scaffold their students from the student-centered perspectives. Finally, the PTs' perceptions towards the role reversal in an online system were reported.

Table 1 PTs' experiencing difficulties as student Writers

Statements	PTs
I find it hard to use appropriate words and sentence structures in expressing my ideas in writing	Amy, Lily
I cannot come up with enough supporting ideas to support the thesis	Sally, Laura, Anita, Emma
I do not have any idea about how to contribute unique and different perspectives	Angel, Amy Lydia
Writing is a hard task. I have a lot of anxieties in writing texts. I cannot organize my thoughts logically	Zina, Helen, Vicky
It is very difficult for me to write the texts at first. After I have had a chance to view other's texts, it is not as difficult as at the start	Angel, Lily, Zina, Helen
I think I need some exemplary essays to read before I can write anything	Lily, Lydia, Zina, Helen

Table 2 PTs' insights towards scaffolding student Writers

Statements	PTs
Brainstorming and discussing with peers help students get started to write an essay	Emma, Anita, Sally, Amy
Since the system externalizes an individual's writing behavior and process, I am able to retrieve <i>trace results</i> on how more-competent writers write and rewrite, as well as what writing strategies are involved	Zina, Helen, Vicky
Regarding the improvement of students' writing, providing them with the chance to read extensively is vital. In the online system, the extensive reading becomes possible since reading others' texts is just a click away	Emma, Anita, Laura

The role as student Writers

Experiencing student Writers' difficulties

Becoming student Writers provided an avenue for the PTs to recognize students' difficulties in organizing texts or developing ideas in writing (Table 1). The PTs indicated that writing was not an easy task for students. As student Writers, they found difficulty in writing a text without reading examples. They needed to read some exemplary essays before composing their own texts. They also had difficulties in generating supporting sentences to support the main ideas, and strengthen arguments in their texts. Four PTs claimed that they could not organize their ideas logically, and use appropriate words and sentence structures to clearly express their ideas. Some PTs were also worried that they did not know how to develop different perspectives to interest their readers.

PTs' insights towards scaffolding student Writers

The PTs indicated that the initial stage of writing a text had been difficult. Student Writers should not be left to struggle alone. Instead, the PTs came to recognize the importance of utilizing writing techniques, such as brainstorming or viewing others' texts to support their future students in overcoming their difficulties in writing (see Table 2). They also realized that the online system implemented in this study, supported student Writers to read peers' texts before starting to write on their own. Reading others' texts and ideas could serve as springboards for student Writers to brainstorm and generate their own ideas for text development.

From the teacher–student role reversal experience, the PTs stated that an individual student needs to be a good reader who reads extensively in order to become a good writer. The PTs also claimed that the online system allowed students to view others' texts easily, so that students can read peers' texts when needed. These PTs then suggested that with the *trace results* in this online system, they could externalize those exemplary student Writers' behaviors and processes, and make them all visible for others to learn.

The role as student Editors

Experiencing student Editors' difficulties

The major difficulties that the PTs confronted in editing peer teachers' texts were analyzed in terms of local revision and global revision (see Tables 3 and 4). In local revision, the

Table 3 Experiencing student Editors' difficulties in local revision

Statements	PTs
I am not sure whether the corrections I made are correct or not. My English grammar is not good enough, so I sometimes make inaccurate corrections on peer teachers' texts	Lydia, Zina, Helen, Vicky, Carol
I am not sure whether my peer teachers' usage of a word is correct or not	Emma, Anita, Sally, Amy
When my peers make many grammatical errors, I do not know what counted as effective revisions. I wonder if I need to correct each grammatical error	Angel, Lily, Lydia, Zina, Helen
I have no idea how to revise an essay. I tend to correct each grammatical error. I spent more than 2½ h to correct a 250-word paper	Vicky, Emma, Laura, Sally

Table 4 Experiencing student Editors' difficulties in global revision

Statements	PTs
I do not have a clear concept of global revision	Sally, Laura, Anita, Emma
My English teachers in high school corrected my local errors only, and never taught me how to revise a text globally. As a result, I had a hard time providing global suggestions to my peer teachers regarding the text structure, development and style	Vicky, Helen, Judy
I can hardly provide personal opinions and viewpoints about text development	Carol, Lily
I think the more-proficient students are capable to give global suggestions	Angel, Amy Lydia
I can only give very superficial comments, like <i>well done</i> and <i>your text is well organized</i> , when I detect the student Writer' language proficiency is higher than mine	Vicky, Judy

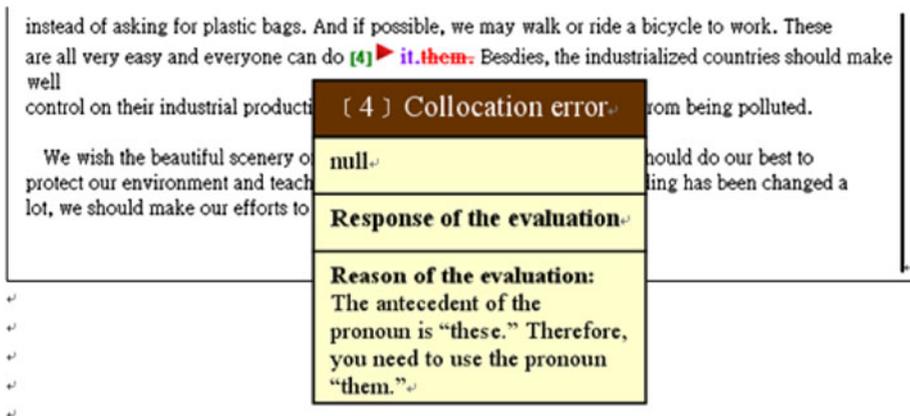


Fig. 5 Prospective teacher Anita provided a problematic correction on her peer's text

PTs reported that they feared they were not equipped with sufficient grammatical knowledge to make corrections upon their peers' texts. As shown in Fig. 5, prospective teacher Anita incorrectly revised the pronoun "them" into "it" in the sentence "These are

very easy and everyone can do them.” Prospective teacher Anita, playing the role as a student Editor, did not know the reference of the pronoun “them” could refer to two things, “walking to work” and “riding a bicycle to work,” so she corrected the pronoun from “them” to “it.” Though the pronoun was revised, it could be seen that textual meanings were still problematic. In correcting peers’ grammatical errors, the PTs noted it was very time consuming. They often had to spend approximately 2 h correcting each peer teacher’s text. One of the PTs spent 2½ h correcting 97 grammatical errors in a 250-word essay.

In global revision, the PTs mentioned that it was relatively difficult to provide suggestions for their peer teachers’ texts, regarding their text development, organization, and style. As shown in Table 4, the PTs expressed that they were not familiar with the concept of global revision. They analyzed the problem of not knowing how to revise globally, and suggested that it was due to their English teachers in high school, who tended to focus mainly on local revisions. Hence, they did not know how to provide global suggestions to their peer teachers. The PTs were concerned that their writing skills were also not competent enough to identify their peers’ problems in text development and organization (global revision). They could only give compliments; such as *well done* or *your text is well organized*, particularly when the texts were written by more proficient Writers (see Table 4).

PTs’ insights towards scaffolding student Editors

After the PTs experienced difficulties as student Editors, they generated the following strategies to scaffold their students in editing texts (see Table 5). First, they claimed that more-proficient student Editors needed to be assigned to edit the less- proficient student

Table 5 PTs’ insights towards scaffolding student Editors

Statements	PTs
After looking at hundreds of grammatical errors on the revised text, student Writers would feel depressed. I suggest that Editors could focus on one type of the grammatical errors each time rather than overwhelming the Writers with errors	Helen, Emma, Vicky
With the online system, I will be able to show students what counts for global revision by having the ability to retrieve good examples from many students’ global suggestions at my disposal	Carol, Lydia, Laura, Sally
I will encourage students to read others’ suggestions for either local or global revision. Reading others’ suggestions will lead students to become good Editors	Helen, Vicky, Judy
After being a student Editor, I started to recognize the importance of being an editor in the writing process. I finally came to view the texts from a reader’s perspective after serving in the role as a student Editor	Angel, Carol, Vicky
I think most of our EFL students do not have the ability to give global suggestions as it requires higher proficient language skill	Angel, Sally, Lily
I think it is necessary to arrange the roles of student Writers and Editors based on their language proficiency. When a student becomes a Writer, he/she needs chances to obtain feedback from a more capable peer	Helen, Carol, Laura, Vicky
I think teachers should teach students how to make global revisions in writing so that both student Writers and Editors know how to work on global revision	Angel, Laura, Vicky

Writers' texts. In this arrangement, every student could obtain corrective feedback from someone more capable.

Second, student Editors should be encouraged to correct repetitive grammatical errors only in texts. The PTs believed that it was inappropriate to overwhelm the student Writer with hundreds of grammatical corrections in a 250-word essay. Three PTs indicated that they would highlight the important concepts in text revisions, such as subject-verb agreement or past tenses, rather than having student Editors make each correction for student Writers.

Finally, the PTs generated new insights on how to better support student Editors in global revision. The PTs indicated that it was important for students to view some good examples of global suggestions, so they could learn to give global suggestions on their peers' texts. The PTs also claimed that it was indeed a nurturing process for Editors to observe how others provide suggestions and sharpen their own skills in giving constructive advice.

The role as Commentators

Experiencing student Commentators' difficulties

The PTs stated it was a difficult task to be Commentators, as they had to decide whether they should accept or reject the Editor's corrections and suggestions (see Table 6). In playing the role as a Commentator, the PTs claimed they could not understand Editors'

Table 6 PTs' experiencing difficulties as student Commentators

Statements	PTs
I am afraid that my comments will hurt the Editors, so I often write "thank you" as my response to them	Helen, Judy, Anita
I find that the Editor does not explain the reasons for his corrections. The corrections without explanations do not help me	Lily, Laura, Emma, Amy
I sometimes find that Editors' corrections are not correct. I have to verify and evaluate which suggestions I should accept	Angel, Carol, Lydia, Vicky
I do not understand or sometimes I misunderstand Editors' suggestions	Laura, Carol, Amy, Sally

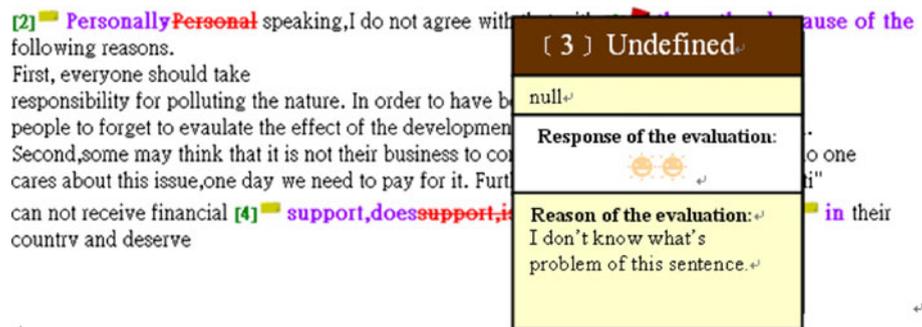


Fig. 6 The Commentator could not understand the Editor's correction



Fig. 7 The Commentator (prospective teacher Carol) asked the Editor for examples

revisions, since Editors usually provided no explanation for their corrections. As shown in Fig. 6, the Commentator remained puzzled about the corrections the Editor made, since the reasons were not provided. Furthermore, the PTs pointed out that they could not benefit from Editors' global revisions when Editors' examples or reasons were unclear (see Table 6). As shown in Fig. 7, prospective teacher Carol claimed that she did not know how to incorporate her Editor's suggestions on developing more "supporting ideas" in her essay, for the Editor did not provide examples for developing supporting ideas. In addition, the PTs pointed out that the local and global revisions from Editors were sometimes inaccurate. Hence, they gradually became more skeptical of the Editors' revisions.

On the other hand, the PTs also noted that as Commentators, they were inclined to give approvals and appreciations in "Reasons of evaluation" instead of informing Editors' inaccurate corrections. For instance, feedback such as *thanks* and *I appreciate it* were often given by Commentators in the dialogue box in order not to hurt Editors' feelings. In fact, such feedback did not help Editors become more skillful in providing corrective revision.

Table 7 Insights on scaffolding Commentators

Statements	PTs
Commentators should be encouraged to verify whether the Editors' corrections are accurate or not	Angel, Judy, Amy
Commentators must be encouraged to explain concretely why they accept and reject Editors' suggestions	Lily, Laura, Emma, Anita
Commentators should read revisions from multiple Editors and make their own judgments. The comparison functions make it possible for Writers to view multiple revisions	Helen, Carol, Lydia, Laura
Commentators should be reminded of their anonymity in the writing process so that they would not hesitate to provide constructive response to help editors to give corrective feedback	Lily, Laura, Emma, Anita
Comments such as "Thanks" or "Good job!" are not helpful in text revision. Teachers have to remind students of giving concrete examples to their peers when serving as Editors, so Writers will have a clearer guideline to work on revision	Angel, Judy, Anita, Vicky
Commentators should be encouraged to verify the Editors' feedback by looking up resources, like dictionary or grammar books	Helen, Carol, Lydia, Laura

PTs' insights toward scaffolding student Commentators

As the PTs played the role as Commentators, they suggested that it was important to model students on becoming a good Commentator (see Table 7). To be good Commentators, students should first be encouraged to continually ask Editors about unclear revisions. The continuous dialogues would assist Commentators in clarifying Editors' corrections or suggestions. Secondly, students should make use of various language tools, such as using dictionaries and grammar books, to facilitate Commentators' self-evaluation in accepting or rejecting those Editors' corrections. In addition, comparing different revisions and suggestions from multiple Editors, by utilizing the *diff engine* in the online writing system, also assists Commentators' self-evaluation. Commentators were encouraged to compare different Editors' revisions, and decided which corrections were correct and which suggestions were beneficial. Finally, the PTs expressed that Commentators should avoid providing their "Reasons of Evaluations" in unclear terms, such as *thanks* or *good job*. Instead, Commentators must specify and clarify their evaluations to Editors, such as "Your suggestions help me provide more examples for my argument." The more specific the comments, the more helpful it is for Editors to learn how to provide suggestions.

Students should constantly be reminded of their anonymity in the online system, and they should also be encourage to identify whether or not the Editors had provided helpful suggestions for Writers to revise their own texts. The PTs realized that they could create

Table 8 PTs' perceptions towards their role reversal experience in an online learning environment

Statements	PTs
I really think this online role reversal process is helpful for my future teaching in writing	Emma, Vicky, Lydia, Judy, Carol
I understand that a reflective stance is very important during writing, editing, and evaluating texts after undergoing this online role reversal experience	Carol, Amy, Angel
I finally understand what students actually need in their text revisions through this online in-field experience. The recorded trace results in the system further enable me to look into their writing process and figure out what difficulties they faced	Helen, Emma, Lily, Judy
I realized that I should encourage students to read peers' texts extensively in order to improve their writing	Sally, Lydia, Amy, Lily, Angel
I understand that vague comments do not help students understand their writing problems in text revision	Angel, Carol, Vicky
I've played roles as a student Writer, Editor, and Commentator in the online system and I know what responsibilities that each role should take. It is a really good idea for our student Writers to step out of their Writers' role and read the texts from others' perspectives	Laura, Anita
It is important for students to learn to make their own judgments in accepting or rejecting the Editors' corrections or suggestions rather than accepting everything. I think tools such as online dictionaries or grammar books are helpful for them to make such decisions	Lily, Helen, Angel, Vicky
When I serve these three roles, I often reflect on how to use the skills obtained from online interactions to assist my future students	Anita, Sally, Emma, Amy, Lydia

more interactive opportunities for both Commentators and Editors to interact anonymously, so as to encourage further clarifications and discussions.

PTs' perceptions towards the teacher–student role reversal process in an online learning environment

Results of the open-ended questionnaire showed that the 14 PTs obtained insights from the role reversal experience in an online learning environment (see Table 8). By playing three different roles in the online system, the PTs reflected on their role reversal process. Their perceptions of the online experience are analyzed and summarized in Table 8. The PTs claimed that they perceived the role reversal as a valuable experience through which they were able to understand their students' actual needs and difficulties in writing. They also learned to empathize with their students so as to provide further assistance. They agreed that the role reversal experience prompted them to self-reflect constantly on their roles as EFL teachers and students, and generate new insights for their own learning and teaching.

Discussion and conclusion

The results of this study showed that different from traditional teacher training programs, such as workshops, conferences, and class observations, the teacher–student role reversal activities provide teachers with a first-hand experience to formulate and reformulate their professional knowledge through reflection (Cohen 1992; Bailey et al. 2001). By reflecting on their role play as student Writers, Editors, and Commentators, the PTs identified the difficulties that impeded students' writing and generated insights on how they could better scaffold their students' writing, editing, and revising process.

Regarding the writing difficulties, the PTs indicated that student Writers could be troubled by a lack of supporting ideas, and often had a hard time putting their ideas into words without sample texts. Being Editors, the PTs realized that students might face problems in providing local and global revisions. In local revisions, they projected that student Editors might have the tendency to correct each single error. In global revision, student Editors might not have sufficient knowledge about how to undertake global revision, since their English teachers in the past had tended to focus solely on local revisions. The PTs indicated that student Commentators might find it hard to understand the revised sentences without further explanations from Editors. In addition, some revisions Editors made might be inaccurate, so Commentators became unconvinced of student Editors' revisions.

In terms of how to better support Writers, the PTs concluded that they would extensively engage the Writers in brainstorming, reading other peers' texts, and analyzing exemplary texts in the online system. In order to better prepare students to be Editors, the PTs claimed that the chance for them to view other Editors' suggestions was a crucial nurturing process for them to provide constructive feedback. Besides, the repetitive error types generated from Writers should be summarized and analyzed for Editors to make comments specifically on those errors in particular. As for the insights on how to better prepare Commentators, the PTs indicated, Commentators should offer concrete reasons about how Editors' suggestions helped them rewrite their final drafts, so that Editors could learn how exactly they could better serve their roles. The continuous meaning negotiations and discussions were the keys to enhancing both Editors' and Commentators' competency in editing and evaluating. Supplementary writing materials like dictionaries might also be

utilized to help Commentators verify whether Editors' revisions were accurate or not. Along with the experience in writing, editing, and evaluating, the PTs admitted that future students can learn how to write from others' perspectives to improve the quality of their texts.

It was also discovered that the PTs were short of knowledge regarding global revision as they were limited to focus on the grammar corrections rather than on the text development or organization. Through lacking knowledge and experiences in revising text development or organization when playing the role of the student Editors, the PTs usually could not identify the students' problems in global revisions and further provide adaptive instructions. In other words, the results highlighted the importance of the global knowledge which is regarded as the world or domain knowledge (Baylor 2002; Butterfield et al. 1996; Land 2000; Choi et al. 2005) in teacher–student role reversal. The PTs could only recognize students' writing problems with regard to the text development and organization, in order to provide the scaffolding, when the PTs were equipped with sufficient world or domain knowledge in global revision.

With the feature of the process data, the CS environment was found to effectively facilitate the PTs engagement in the self-reflection on their role reversal experience in order to share and discuss their role reversal experience with other teachers. Unlike the traditional classrooms, the PTs were able to view and review their action logs through the online system and reflect upon their writing process and difficulties from the student-centered perspectives retrospectively. As Flower and Hayes (1981) indicate the act of writing should be best taken as a means to manifest how writers continually orchestrate and organize during writing and rewriting, to understand one's own thinking process. With *action logs* in Writeam, writing processes and difficulties were externalized and visualized. The PTs observed how they made progress in their text revision through experiencing students' writing process, and projected how to facilitate the writing-editing-revision process for their future students. The PTs could constantly reflect on how to make use of writing, editing, and evaluating strategies they have obtained in the teacher–student reversal experience to provide support for their students. The results follow previous studies which show how the CS environment can provide students with better opportunities to understand peers' difficulties, and support each other through interactions (e.g., Pata et al. 2005; Wishart et al. 2007; Yang 2009).

To facilitate the PTs' role reversal, some implementations for the system will further be designed to reduce users' cognitive overload as well as to foster their reflective thinking. First of all, personal showcases for both teachers and students will be provided automatically by the system to allow them in monitoring their own writing process and activities. Second, curtailing error types for Editors to choose will also make the system more user-friendly. This modification will make it easier for Editors to comment on the errors that the Writers make. Third, the follow-up dialogue box will be added to the system to stimulate the interactions between the teacher and students, as well as among different roles. Finally, user manuals, such as design beliefs and goals and procedures of utilizing the system, will be provided on the student and teacher interfaces. By understanding "how to do it," students' writing ability will be increased, along with the possibility of creating a CS collaborative learning environment (Scardamalia and Bereiter 2006; Yang 2009).

Future research can include the continuous investigation on the impact of role reversal on their real teaching contexts. Furthermore, future studies can also examine similarities and differences between traditional and computer-assisted environments on role reversals. The effect of role reversals in different teaching and learning environments can also be addressed in later studies.

Acknowledgement This study was part of a larger study, supported by National Science Council in the Republic of China, Taiwan (NSC 96-2411-H-224-015). The research grant made the continuation of this study possible.

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