

# The Learning Science of Multi – Peer Feedback for EFL Students

Christian D. Schunn , Yong WU  
University of Pittsburgh

**Abstract:** Peer feedback is found to positively influence student learning and achievement. Despite concerns from learners and teachers , it is increasingly being used successfully in ESL and EFL writing classrooms. To help teachers and researchers understand the application of peer feedback , this paper presents a new theory based on the learning sciences for why all students , even beginning EFL students , can meaningfully participate in peer feedback. It highlights the importance of feedback that is carefully structured for maximal impact. Further , it introduces the idea of the Persuasive Zone of Competence: Students are generally sufficiently competent to address performance problems among their peers , and multi-peer feedback tends to be especially persuasive. We conclude with suggestions for how to maximize the learning potentials in peer feedback in EFL/ESL writing classrooms.

**Key words:** Multi-Peer Feedback; Online Peer Feedback; Feedback Zones; Zone of Competence

中图分类号: H319.3

文献标识码: A

文章编号: 1001 – 5795(2019)05 – 0013-0009

## 1 Introduction

Peer feedback ( also called peer review and peer assessment) is a process by which students within a class give each other information about quality of their performance in the form of ratings and comments. It is a teaching/learning tool that has been explored in many contexts and has generally received considerable research support ( Topping , 1998; Liu & Hansen , 2005; Liu & Carless , 2006; Lee , 2017) . For example , it engages students more actively in their learning process , reduces teachers burden in providing all the feedback , provides students with timely feedback , and allows students to learn from both the feedback they receive and the process of giving feedback to others ( Liu & Hansen , 2005; Min , 2005; 2006; Lundstrom & Baker , 2009) .

Online tools make peer review especially efficient and effective , most notably in allowing for multi-peer feedback ( Cho & Schunn , 2007) . Peer review is often

conducted in groups of three or four , so that students' essay can receive comments from more than one reader. As noted by Confucius , at least one within a group of three individuals is likely to be able to act as a teacher. Research suggests that multi-peer review is more likely to lead to revision , produce more substantive revisions ( Cho & Schunn , 2007) , and result in greater learning from observing both good and weak examples ( Hu , 2005; Schunn *et al.* , 2016) . Online tools can also include additional supports to encourage students to take the giving feedback task seriously and thereby produce longer , more substantive , and more accurate feedback ( Patchan *et al.* , 2017) . For example , back-reviews ( as found in Peerceptiv ) , in which authors evaluate the helpfulness of the feedback they received , can serve such a function.

Peer feedback has most commonly been studied in English as native language classroom contexts , but there is also an extensive literature supporting its use in ESL

classrooms ( Stanley , 1992; Berg , 1999 ) and EFL classrooms ( Min , 2005; 2006; Yang *et al.* , 2006; Gao *et al.* , 2018 ) . This literature finds that in writing classrooms , EFL and ESL students , at least when given some foundational training and good rubrics/commenting prompts , are able to give useful and accurate feedback ( Min , 2005; 2006 ) . Students also improve their self-evaluation and revision skills so that they can take greater control over their own writing ( Lundstrom & Baker , 2009; Lee , 2011 ) .

However , it is also important to note that there is considerable suspicion among teachers and students about whether peer feedback can be trusted ( Yu & Lee , 2016 ) . A common analogy that they invoke is one of the blind-leading-the-blind. They ask: how can it be that students who are learning the skills can help their fellow students? This suspicion is especially common in Chinese EFL contexts , where English is challenging to Chinese EFL learners , given the very large rhetorical distance between English and Chinese , a culture that give authority to teachers , a harmony-oriented culture in which students avoid critical comments , and limited prior experiences with peer feedback in instruction because of large class sizes , heavy teacher workload , and tight teacher schedules ( Yang *et al.* , 2006; Lee , 2011 ) .

The purpose of the current article is to provide a learning science theory that explains why even beginning EFL students can meaningfully participate in peer feedback. Such a theory can help teachers and other researchers understand why studies finding positive outcomes of peer feedback should be trusted , rather than potentially non-generalizable statistical flukes. Such a theory can also inform the design of improved teaching methods and supports for implementing effective peer feedback routines in classrooms.

## 2 A Learning Science Theory of Peer Feedback

We will divide the learning science theory into three parts: how does getting feedback produce learning , how does giving feedback produce learning , and how does the relative ability level of the feedback provider matter. The last part is the one that is most concerning to teachers and

students and thus given the most depth.

### 2.1 Learning from Getting Well-Structured Feedback

Although learning can occur without feedback , that kind of learning is slow and inefficient; getting feedback is thought to be one of the most important factors in improving learning outcomes ( Hattie & Timperley , 2007 ) . Feedback is so powerful because it has many functions: 1) helps to point out errors the learner has failed to detect; 2) draws attention of aspects of the situation not previously noticed by the learner; 3) addresses learner misconceptions/deepen understanding of the domain; 4) suggests new strategies/ideas for improved performance; and 5) motivates the learner to improve ( Hu , 2005; Liu & Carless , 2006; Hattie & Timperley , 2007; Gao *et al.* , 2018; Wu , 2019 ) . In other words , received feedback is a cognitive guide and a social motivator.

In order to achieve all of those functions , however , the feedback needs to be cognitively and motivationally well structured. In particular , it should include: 1) being specific about particular learner behaviors that are problematic ( rather than being vague or very general ) ; 2) identify the nature of the problem; 3) include constructive advice for improvement; 4) explain the nature of the problem or suggested revision; and 5) be encouraging yet clear that improvement is needed ( Hattie & Timperley , 2007; Patchan *et al.* , 2016 ) . Indeed , studies of peer feedback find these particular elements are important in peer feedback to produce revision and learning ( Hattie & Timperley , 2007; Lu & Law , 2012; Patchen *et al.* , 2016 ) .

These aspects show why structure ( that is easily included in online peer assessment ) and training are useful for peer feedback. Rubrics and comment prompts can encourage students to include all these important aspects. Training on how to provide good feedback should specifically attend to each of these elements of well-structured peer feedback.

Anonymity in peer assessment is also important because it allows students the social freedom to identify problems ( Guardado & Shi , 2007; Wu , 2019 ) ; in non-anonymous peer assessment , students are more

likely to provide very short, positive-only feedback that is missing most of the key aspects of well-structured feedback (Lu & Bol, 2007). However, anonymity must be accompanied with accountability pressures (like back-evaluations) that force students to take their reviewing task seriously and include these aspects (Patchan *et al.*, 2017).

## 2.2 Learning from Giving Well-Structured Feedback

Actively involving learners in learning tasks is often recommended best practice, especially in contexts where learner engagement is low and very passive (Chi & Wylie, 2014). However, a key element of active learning is that it is cognitively engaging (or constructive) in disciplinary-relevant ways (Chi & Wylie, 2014); that is, activity for activities' sake are not helpful to learning. Thus, just as the components of well-structured feedback are important to the receiver's learning, the structure is also helpful to the feedback provider's learning, especially with inexperienced writers such as English learners (Peregoy & Boyle, 2001; Min, 2005).

Finding and identifying problems helps students practice detecting problems. Problem identification is found to be more important for reviewer learning (Cho & MacArthur, 2011; Lu & Law, 2012), perhaps because reviewers are involved in more highly cognitive demanding activities when identifying problems (Lu & Law, 2012). Interestingly, it is easier to see problems in documents/objects produced by others than in one's own documents because learners often "see" what they meant to produce and not what they actually produced (Flower *et al.*, 1986). Thus, peer feedback may be an easier context in which to practice skills related to repairing errors because errors are more easily detected.

Figuring out constructive solutions involves a search for possible solutions and their evaluation, which helps to broaden the learner's repertoire. Sometimes students may not be able to respond to the comment without solutions on how to improve even when they have understood the problem (Price *et al.*, 2011). Proposing constructive solutions helps reviewers solve the problems in their own writing (Zhang *et al.*, 2017).

In a related way, explaining problems and solutions forces the learner to test their understanding and potentially deepen it; explanations are generally considered very helpful for learning (Gielen *et al.*, 2010). Comments including explanations have been found to be associated with students' understanding of peer feedback and their willingness to act on it positively (Gielen *et al.*, 2010; Huisman *et al.*, 2018). Explanations are thought to be even more important than feedback accuracy for learning (Gielen *et al.*, 2010), perhaps because explanation promotes mindful cognitive processing (Bolzer *et al.*, 2014).

Attending to others' motivational levels via mitigation language or other such strategies also can help scaffold the learner's own emotional regulation in terms of dealing with negative feedback in productive rather than avoidant ways. Mitigating praise is found to soften criticism, decrease the potential effects of negative feedback on students' self-esteem, confidence and motivation, and increase the likelihood of feedback implementation (Young, 2000; Cho *et al.*, 2006). For example, in trying to motivate others, students may be practicing reframing criticism into challenges.

Well-structured feedback affords students the opportunity to use the rubrics and thus deepen their understanding of the rubrics, which are not commonly noticed by students when receiving teacher feedback. Since well-structured feedback is important for the provider's learning, anonymity, accountability pressures, and training are just as important for the provider's learning as for the receiver's learning.

## 2.3 Relative Ability of the Feedback Provider: Being in the Persuasive Zone of Competence

### 2.3.1 Relative competence and performance

Peer feedback is often connected to Vygotsky's (1978: 86) theoretical construct of the ZPD (Zone of Proximal Development), which refers to "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem-solving under adult guidance, or in collaboration with more capable peers". A ZPD can be created and applied to "any

situation in which , while participating in an activity , individuals are in the process of developing mastery of a practice or understanding a topic” ( Wells , 1999: 333) . Connecting to peer feedback , when students give feedback to their peers , this task is typically around or just beyond their own abilities. Thus , it may be relatively obvious why giving feedback to peers is useful for the provider. Indeed , peers consistently report high levels of learning from the feedback-giving task ( Lundstrom & Baker , 2009; Cho & MacArthur , 2011; Kaufman & Schunn , 2011; Schunn *et al.* , 2016) . Indeed , Lundstrom and Baker ( 2009) found that students benefit more from providing feedback than receiving feedback. One explanation for the finding is that “reviewers often determine what aspects of writing that the peer review will focus on and most likely provide instruction for the writer that falls within their ( the reviewer ’ s ) ZPD ” ( Lundstrom & Baker , 2009: 38) .

In spite of the various benefits derived from reviewing , people may ask: can students of lower

proficiency make useful contributions in peer feedback? This question highlights the problem of the relative ability of the feedback provider , and here is where the blind-leading-the-blind metaphor is invoked. To understand why the metaphor is wrong , it is important to know a long-standing idea from linguistics related to competence-performance gaps ( Brown *et al.* , 1996) . Competence refers to what an individual knows and is able to do under ideal circumstances , whereas performance refers what that individual does under more typical circumstances. There can be many complexities and variations of this distinction in different contexts ( Glaesser , 2019) . In the writing instruction context , competence includes a person ’ s knowledge of writing and ability to recognize accuracy/incorrect responses , whereas performance is a person ’ s ability to write an essay. Usually , a learner is able to recognize correct/incorrect performance well before they are able to consistently perform the task themselves; this difference is the competence-performance gap , which can be bridged by assisted practice. “There

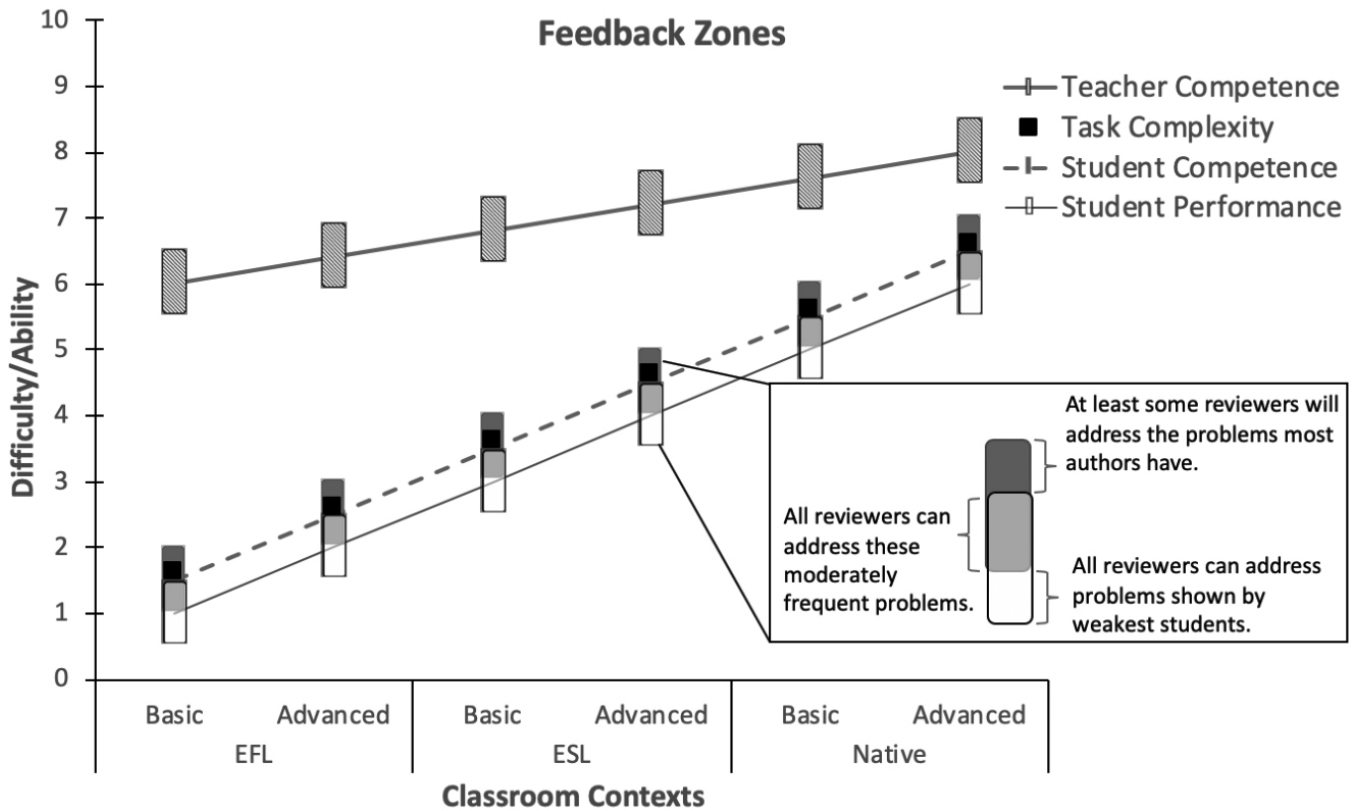


Figure 1 The developmental feedback zones of peer assessment for students in different classroom contexts: approximate levels of student competence and student performance relative to each other and relative to task complexity and teacher competence.

are many domains of human activity where people are expert at appraising existing objects , sometimes in a highly sophisticated way ,but are themselves incapable of producing objects of the type in question” ( Sadler , 1989: 139) . For example , five-year-olds are able to evaluate the accuracy of addition strategies before they are able to consistently apply accurate strategies ( Siegler & Crowley , 1994) . Art criticism and literacy criticism are typical examples as well.

Turning to the case of peer review , students will regularly know certain actions are errors even when they still make those errors themselves. Thus , students often can accurately judge the work of their peers even though themselves have not yet mastered the task. The key is that the task be in the right zone , that is , focused on skills students are just beginning to master ( rather than well beyond their competence as well as being beyond their performance) . Prior research found that lower proficiency students not only play the role of feedback receiver , but also feedback provider ( Yu & Hu , 2016; Yu & Lee , 2016) . Yu and Lee ( 2016) found that lower proficiency students provide peer feedback on different aspects of writing , and most of the feedback improved group members’ draft quality. This finding is further supported by Yu and Hu ( 2016) , who found that higher

proficiency EFL students could also benefit from lower proficiency peers’ scaffolding feedback on their writing.

To make this point concrete , consider the graph shown in Figure 1. Learners at different levels of proficiency with English tend to be given tasks of different task complexities ( see the dark squares in the graph) . For example , a student in a basic EFL class will be given short sentence writing tasks , whereas students in a more advanced EFL class will be given the tasks of writing a paragraph. Students in more advanced English courses will work on multi-paragraph or extended research paper writing tasks. Other features of the task complexity can also vary ( e. g. , word frequency , expected speed of response) .

Within each classroom context , students will typically vary in competence within a relatively narrow range , and students at the higher competence levels within that classroom context will just be able to fully recognize accurate responses in the given task. This range of competence within the group is represented with the blue bar. Students will similarly vary in performance levels ( shown with white bar) , in which the top of the bar just barely reaches the task square , but the average student performance level will be lower than the average student competence level. Thus , even the lowest ability

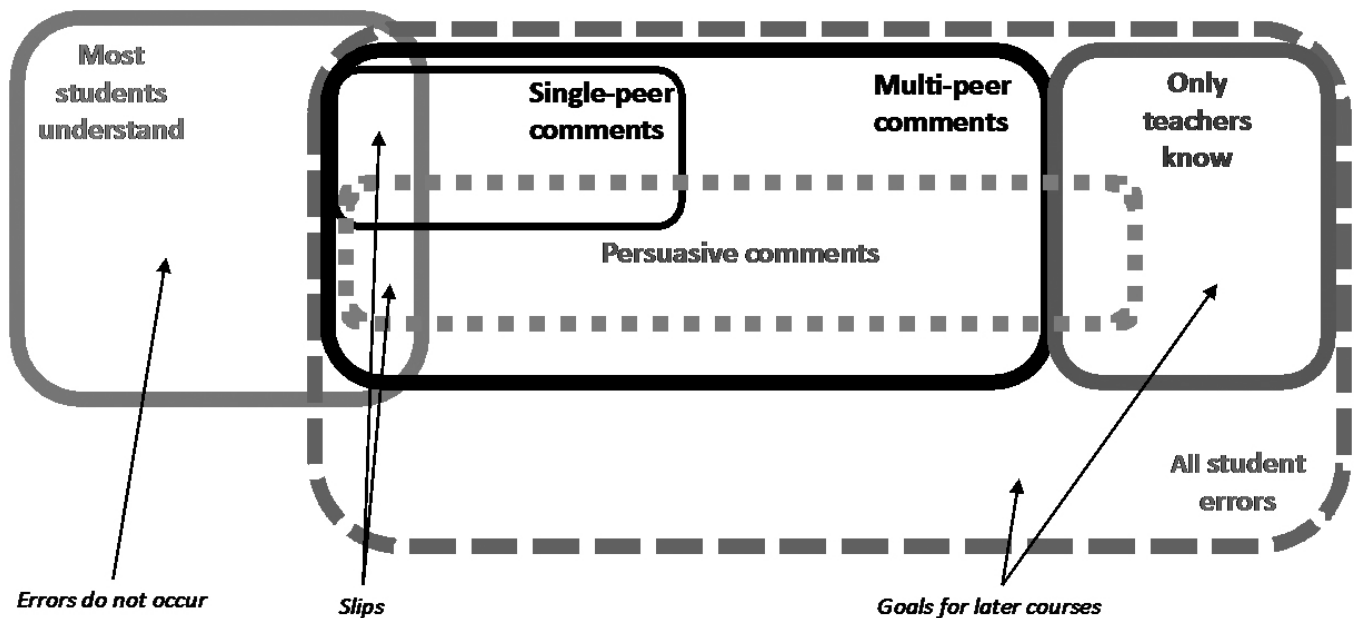


Figure 2 A Venn diagram showing the relative overlap among writing skills most students understand , error students make , comments made by single peers or groups of peers , comments only made by teachers , and comments that persuade students to revise.

students within a given classroom context will still have competence levels that are similar to the performance level of the highest ability students within that classroom context. That is, peers are generally in what we call a zone of sufficient competence (i.e., the overlap of the two bars). Note that teachers will have competence levels that are much higher than those of their students, even though they are also slightly varying across teachers within a context and by language teaching contexts (see green bar).

### 2.3.2 Persuasive comments coverage

Another way to consider the situation is from the perspective of learning rather than document editing. In professional situations, people seek to produce documents that are error-free; proof-readers must find all the errors, and high competence people are the best ones to find all the errors. In a learning context, there is no real need to produce a document that is completely error-free. The learner can be overwhelmed by too much feedback, and some issues may be beyond a given learner at a given point in time. For example, during practice sessions, a coach will focus their feedback on a particular skill rather than pointing out all the flaws or areas needing improvement (Ericsson, 2006). In addition to considering amount of feedback, a coach considers which areas of improvement are plausible for the learning, again harkening back to Vygotsky's Zone of Proximal Development. Multi-peer feedback has the potential to be in the area of "persuasive comments" (see Figure 2), that builds on Vygotsky but also considers issues of expert blindspots (Nathan & Petrosino, 2003).

Within a given class setting, most students will already have mastered certain issues (shown with the green ellipse for mastered areas in Figure 2), which establishes which errors tend not to occur. The errors that do occur (large red area) consists of a few slips (errors within skills supposedly mastered) along with many areas representing skills not yet mastered. A single peer (dark gray area) can comment on a range of issues, covering most of the slips and a few of the errors related to the skills not yet mastered. Multiple peers (light gray area) will comment on a broader range of issues, covering all of

the slips and many more of the skills not yet mastered.

It is important to recognize that even the multi-peer group will not recognize all of the errors. There are some errors that only a teacher has sufficient competence to recognize/suggest useful revisions. And there are potentially a range of problems that even the teacher of the given class does not point out (either because they cannot or because they choose not). Either way, these errors are left for later assignments or later courses.

Finally, there are the issues that students are persuaded to address from within the comments received (shown as the smaller orange area of "persuasive comments" in Figure 2). Comments within this area of persuasive comments are more likely to be addressed because these are the issues students are ready to understand. Further, feedback from multi-peers appears to be especially persuasive (Cho & Schunn, 2007; Gao *et al.*, 2018). Thus, although some of the unique teacher comments will produce revision and learning, the teacher comments on topics that are unlikely to be made by peers are perhaps best to be left for later courses because students are unlikely to successfully respond to and learn from these comments. The point is not that students never understand teacher comments; rather, the point is that teacher comments that are well beyond what peer students are capable of making (i.e., out of their zone of competence) are also not likely to be used. Thus, such errors might be best left for later courses as well. In sum, multi-peer comments are effective not because they address all problems but rather because they efficiently address comments that are in the persuasive zone.

## 2.4 Empirical Studies of Student Ability in EFL/ESL Peer Review

A number of peer feedback studies in EFL/ESL classes have examined how relative language abilities within the class might influence how students provide and utilize peer feedback. Allen and Mills (2016) found that higher proficiency EFL students provide more suggestions than their lower proficiency counterparts, and lower proficiency students made fewer meaning-related revisions upon receiving peer feedback. By contrast, Wu (2019) found that low proficiency and high proficiency EFL

students are not different in the amount of feedback and feedback quality, but instead differ in feedback types. One explanation for the different results may be different feedback procedures. For example, in Wu's (2019) study, students were paired and peer feedback was conducted anonymously, whereas in Allen and Mills (2016), students self-selected partners and peer feedback was conducted non-anonymously. Non-anonymous review allows knowledge of the reviewer to bias use of the feedback. Indeed, student perceptions of relative proficiency were found to influence student giving and utilizing peer feedback (Allen & Katayama, 2016; Hu & Lam, 2010).

The influence of student ability on peer feedback may also vary in different contexts because of other aspects of the feedback procedures. In writing instruction, peer feedback can be conducted anonymously with the help of well-designed rubrics and accountability measures so that students can provide quality feedback and focus their attention on feedback content rather than feedback provider (Patchan *et al.*, 2017).

### 3 Conclusion

Peer review is a reciprocal process in which students learn from both providing and receiving feedback. Building upon Vygotsky's Zone of Proximal Development, it can be expected that students will improve their writing competence during peer feedback through assisted practice within their ZPD. In a given peer feedback task, because of the competence-performance gap, all students, whether of relatively higher or lower proficiency within the class, can identify some problems and provide valuable feedback. Further, in the reciprocal process of providing and receiving feedback, students restructure their knowledge and practice their writing skills.

As with all student-centered practices, there is still an important role for teachers. Peer feedback is a complicated process in which many factors mediate student learning such as student beliefs about peer feedback, motives and goals for peer feedback, feedback training (Yu & Hu, 2016; Yu & Lee, 2016), writing

knowledge, and anonymity (Wu, 2019). To maximize the learning potential in peer feedback, peer review training should be conducted. During the training, teachers may discuss the significance of positive attitudes towards peer review, the benefits of peer feedback for both student writers and reviewers (Hu, 2005; Yu & Lee, 2016), develop and explain well-designed rubrics, and present what quality feedback is and what the essential elements are. With such teacher supports, students can provide informative and helpful feedback with important components in it. During peer review, teachers should consider how to motivate students to engage with peer feedback, direct students' attention to feedback content (Yu & Hu, 2016; Wu, 2019), and create "an atmosphere of mutual respect in which feedback is allowed to flow freely from writer to reader and vice versa" (de Guerrero & Villamil, 2000: 55).

This paper has emphasized the bilateral nature of peer feedback process in which both higher and lower proficiency students can provide scaffolding feedback on writing and promote learning in their ZPDs. Future work is needed taking a longitudinal approach to explore how students' competence-performance gap is narrowed over time when a series of peer feedback tasks are conducted, especially since the ways in which students provide feedback is likely to change with practice. Also, research and instructional design is needed to understand how to best enlarge the Zone of Persuasive Comments presented in Figure 2, such as new algorithms for matching authors and reviewers based on their strengths and weaknesses in online peer feedback system. □

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收稿日期: 2019-03

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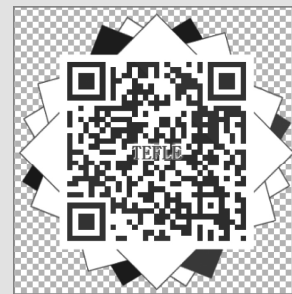
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