Knowledge Features of Peer Response Process

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Abstract: There is no doubt that peer response facilitates learning. Yet, the knowledge features in the process of peer response still need further identification. In this paper, we identify four knowledge features of peer response process through the connections of early grades' writing revision. In a suburban elementary school in northern Taiwan, a class of second grades participated the intervention of peer response on writing revision. Students reviewed the drafts from classmates and gave comments. After receiving comments from peers, writers went back revising the drafts. The result finds four knowledge features of peer response in early grades' writing response process. Moreover, early grades benefit more from the the knowledge that they learn from the peer response process than the knowledge from peers' explicit comments. Such findings have shed light on extending the knowledge of peer response process.

Keywords: knowledge features, peer response, writing revision

1. Introduction

Peer response have considered helpful to improve learning through social interaction with peers. Thus, the knowledge, experience, suggestions sharing from peers are reasonably considered as explicit knowledge resource. Mostly, research that adding the element of peer response attributed the improvement to peers' tutoring, response, or supports. It is plausibly right, but seems to over-generalize the power of peers. Indeed, peers' power is unneglected in the process of peer interaction, while it is risky to jump to the conclusion that peers' support is the only reason of individual success in the peer interaction context.

Before distinguishing the reason of individual's success in the peer response context, the knowledge features that channeling in such contexts should be identified ahead. How students gain knowledge or in what ways that facilitate their knowledge acquisition have been concerned and investigated for the researchers of education in decades. Specifically, some researchers (Dienes & Perner, 1999; Willingham & Goedert-Eschmann, 1999) considered that knowledge can be explicitly and implicitly learnt or gained. Generally, implicit learning refers to the learning that is unaccessible and non-verbalized performance, which can only be inferred through intact clues. Explicit learning, in contrast with implicit learning, refers to the learning that is accessible and could be verbalized by the participants, such as knowledge that can be recalled in the tests. Berry & Broadbent (1988) further indicated that implicit learning would happen when target knowledge was revealed without indication of the purposes. They conducted experiment to show the subjects certain learning materials and did not request them to learn or memorize it. Afterward, students were able to implicitly apply the learning on the following tasks. It can be considered that the appearance of learning materials can also cause implicit learning.

Since we bring the issue of social interaction in into implicit and explicit learning, the influence source of students' knowledge learning needs to be further considered. Harris, Graham, and Mason's (2006) study drew the conclusion that second grade students' writing performance were able to improve under the condition of Self-Regulated Strategy Development (SRSD) and also benefit from peers' support. In their study, students' were explicitly instructed self-regulation strategies. Meanwhile, with the addition of peer support in this study brought "incremental" effect on students' writing. Though they attributed students' performance to self regulation and peers' support, they failed to further investigate whether individual student's writing increment was resulting from individual change on the peer-supported process. Thus, drawing from the knowledge sources and the knowledge representation, we identify four knowledge features to help clarify the knowledge in the peer response process.

In this study, we refer to the definition of previous studies about explicit and explicit knowledge. For the definition of explicit knowledge, we consider it is either visible or fit the purpose of telling; for the implicit knowledge it is considered as either not visible or the purpose of telling varies (referring to Berry & Broadbent, 1988).

- Explicit peer knowledge (EPK): Peers' knowledge is visible and the receiver takes and applies it in the appropriate context.
- Implicit peer knowledge (IPK): Peers' knowledge is visible but the it has been known by the receiver ahead. Hence, peers' knowledge is no longer as a new but serves as a implicit reminder to the receiver.
- Explicit self knowledge (ESK): personal knowledge is visible but it is the only connection of one's own following performance.
- Implicit self knowledge (ISK): personal knowledge is not visible but it affects one's following performance. It is considered the influence of involving in the learning contexts.

To exam the potential of knowledge features in peer response process, we conduct the intervention of peer response on second grade students' writing revision. The purpose of this study is to identify the knowledge features through connecting students' writing revision with the receiving and giving comments. While in the nature of learning writing, we choose early grades for their possibility of developing the social support on achievement motivation and learning (Rohrbeck , Ginsburg-Block , Fantuzzo , & Miller, 2003). Besides, in order to fulfill the peer response interaction of students' writing revision, personal laptop connecting to the pre-designed writing system is necessary to facilitate comment exchanging and writing revision.

2. Method

2.1 Research context and procedure

The present study is conducted under an authentic classroom learning context. It is an ongoing project conducting on eight classes of second grades in a suburban elementary school in northern Taiwan. Each class contains about 30 students. All participants are native speaker of Chinese. Students in the school began using tablet PC with keyboard to do web-based learning tasks (Chinese typing tasks, math learning tasks, reading and writing tasks) from the first grade. In the regular writing task, students need to generate four stories or essays on the Drawing and Writing System (Liao & Chan, 2013) during the semester. To facilitate the process of peer response on writing, a sub-system was built upon the Drawing and Writing System, named Writing Response System (Wang, Hsieh, Liao, Shih, & Chan, 2013). Each students can give and receive comments online through this system. When revising the writing, the system allows students to check peer comments at the same time. Last, this system also provides scaffolding prompts for students to use during giving feedback.

In this paper we selected a class of second grades to give intervention of peer response on writing draft for initial trial of peer response on writing revision; we intend to see how students initial response on such activity. To help students effectively improve writing, the intervention of peer response for writing revision was arranged in December, 2012. The intervention were processed without interfering regular writing tasks. During the intervention, Students had already completed two drafts, which titled *A day of Father* and *Firework*. Before the intervention, a ten minutes mini-lesson was provided to teach students the essentials of group peer response (how to review and give comments on peers' drafts, the appropriate matters to orally share thoughts with group members, and how to revise personal draft according to receiving comments) for writing revision.

Before the intervention, students were arranged as groups (about four student as a group). The intervention was firstly reviewing drafts of group members and giving comments through Writing Response System. Second, writers in each group orally read the self-draft and group members gave comments typing on the Writing Response System. After all group members shared and received comments face-to-face, each student went back to the draft and revise it.

2.2 Data collection and analysis

In order to investigate the knowledge features through the connection between writing revision and the comments, all revision logs and giving and receiving comments are saved on the Writing Response System. For the revision logs, writers are able to click "save" after they change any part of the draft. It represents as different versions of change. For example, when one student have three revision logs, it means the student have three saved versions of the the same writing. Hence, the researchers are able to identified the parts that are revised and further connecting to comments.

For the comments, students also save them as soon as they type it on the comment section. After the intervention, the researchers examine each comment and exclude invalid ones (no words and symbols, duplicated comments, making jokes or misusing the prompts). On the other hand, since the comments from the second grade students were simply containing one unit idea, unlike older students that may carry more than one unit idea in the comments (Cho & Cho, 2011), each comment is taken as carrying one unit in this study. Further, data is organized by each student. That is, each writer have the records of giving comments, receiving comments, and revision logs. After data is organized, the researchers triangulate revision logs with comments.

The procedure of connecting the revision logs and comments is described as follows. First, every revision logs and comments are listed in accordance with each student. Second, revision parts are identified from each log. Third, writers' giving and receiving comments are reviewed one by one to see whether they could connect to the revision logs. According our hypothesis of knowledge features, we identify the connecting types revision and comments enclosed with description of each types in Table 1:

Table 1: Knowledge features identifying from the data.

Explicit peer knowledge: Connecting to **receiving** comments	
Description	When revision connects to the comments explicitly receiving from peers (peers' knowledge about writing) suggesting to the revision contents.
Example	[Original version] 小明趕快打電話請消防車請消防趕緊到現場。 Ming urgently called the firefighter and asked them to come right away. [Revision log] 小明趕快打電話**請 119** 請消防趕緊到現場**消防隊很緊張的說：別急！別急！我會盡快趕到的。** Ming urgently called **119 to** the firefighter and asked them to come right away. **The firefighter said nervously: Clam down, I will get there as soon as possible.**
	[Receiving comments] 我覺得你對角色的描述可以再仔細點像是，字太少了。 I suggest you describe the characters precisely, you need to write more.
Implicit peer knowledge: Connecting to Giving & Receiving comments	
Description	When the revision connects to the comments both given **from the writer** to group member and those **from peers** suggesting to the revision contents. Both giving and receiving comments can be connected to the revision logs. It fits the feature of implicit peer knowledge because the receiving comments (peer knowledge) is similar with the giving comments (the writer has known). Thus, the receiving comments serve as an implicit reminder the the writer of what s/he has known about writing.
Example	[Original version]爸爸教導我的方式比較嚴格，他常說：「事不過三」，事情犯錯只有兩次機會，第三次犯錯就會處罰。 The way Dad teaches me was strict. He often say "three and out." You are only allowed to make the same mistake twice and will get punished in the third time. [Revision log]爸爸教導我的方式比較嚴格，他常說：「事不過三」，事情犯錯只有兩次機會，第三次犯錯就會處罰**，所以我最多只有做到第二次。** The way Dad teaches me was strict. He often say "three and out." You are only allowed to make the same mistake twice and will get punished in the third time**, so I only make it twice**.
	[Giving comments]我覺得你故事內容太少，像第三篇和第四篇，內容只有一點點。 I think the content of your story is insufficient. For example, the content of the third and fourth paragraph are few. [Receiving comments]字太少。 The amount of words is insufficient.
Explicit self knowledge: Connecting to **giving** comments	
Description	When revision connects to the comments (background or learnt knowledge about writing) explicitly giving to group members but afterward the comments as a reminder to affect his/her

	own revision (one's own performance). The comments may not be directly suggesting the same but similar problems.
Example	[Original version] 他趕快拿起手機，打 119 告訴消防隊。 He grabbed the phone and called the firefighter. [Revised log] **小新**趕快拿起手機，打 119 告訴消防隊 **Sin** grabbed the phone and called the firefighter.
	[Giving comments] 你的字有些打錯了。 Some words in your draft are wrong.
Implicit self knowledge: Connecting to neither comments	
Description	When the revision (one's following performance) connects to neither giving nor receiving comments. It is inferred that the writer is influenced by the peer response process.

3. Results and Discussion

The purpose of this study is to identify the knowledge features of peer response process in the context of early grades writing revision. For connecting the revision and the comments, the analysis results is focused on the students who revised the writing drafts.

3.1 Overview of the results

In order to identify peer response knowledge features through observing how early grades act in peer response on writing revision, we observed their overall performance on two interventions. Specifically, we found that the revision results from each students can be separated as revising and not revising the drafts. Hence, we divided the data into the groups of Revising Writing Students (RWS) and No-Revising Writing Students (NRWS) (Table 2). On the other hand, among all the comments collecting from students, we found that some comments were meaningless or duplicated. Hence, we decided to exclude from the analysis. For the invalid comments, one may consider the possibilities of including them into analysis. The reason we did not adapt them in the analysis was for their complexity. As mentioned in the section of data collection, the invalid comments were those with no words and symbols, duplicated comments, jokes or misusing the prompts. The cause of giving these kinds of comments might be because students' personality, the misuse of the system, or classroom cultures. Although we agree that these factors may influence peer response activities, such extension is beyond our purpose of investigation of peer response on writing revision. Thus, we only analyzed the comments that referring to the writings. Further, the comments divided as comments giving to peers and receiving from peers. Generally, students performance on the second intervention improved (see Table 2).

Table 2: Descriptive information of all students data.

Groups	Interventions / Comments	*A day of Father*			*Firework*		
		N (%)	M	SD	N(%)	M	SD
RWS	Number of RWS	14			23		
	Original giving comments	86 (100%)	6.14	6.71	114 (100%)	4.96	4.04
	Filtered giving comments	34 (40%)	2.31	1.38	85 (75%)	3.70	2.53
	Original receiving comments	79 (100%)	5.64	4.36	124 (100%)	5.39	3.81
	Filtered receiving comments	34 (43%)	2.43	1.02	84 (68%)	3.65	2.60
NRWS	Number of NRWS	13			4		
	Original giving comments	92 (100%)	7.08	9.79	23 (100%)	5.75	6.18
	Filtered giving comments	43 (46%)	6.14	3.54	12 (52%)	3.00	0.82
	Original receiving comments	99 (100%)	7.62	7.52	13 (100%)	3.25	0.50
	Filtered receiving comments	36 (36%)	5.14	1.59	12 (92%)	3.00	0.82

*Revising writing students (RWS), students who revised their drafts; No-Revising writing student(NRWS), students who did not revise their drafts.

3.2 Knowledge features: the connection between revision and comments

Since we intend to investigate the connection between revision and comments to identify the knowledge features of peer response, the data of revision logs is firstly presented (see Table 3). Overall, the amount of revision logs improves more than two times (from 44 to 106 logs). For the revised words, it varies from 408 to 1049 words. Both the giving and receiving comments increased two times as well.

Table 3: Descriptive information of the writing draft revision.

Writing topics	*A day of Father*			*Firework*		
	N	M	SD	N	M	SD
Revision logs	44	3.14	1.92	106	4.61	3.59
Revised words	408	29.14	37.98	1049	45.61	44.78

We connects the revision logs and all comments. The results of connection of writing revision with comments are presented in Table 4. As mentioned previously, the connection between revision and comments are coded as four knowledge features. For EPK, which affected writers' revision from peers' suggestions, the percentage decreased from 40 to 19. For IPK, it affected writers' revision from both prior knowledge and peers' suggestions, is increased from 16 percent to 23 percent. For ESK, which affected students' revision from prior revision knowledge, there were only 7 percent of the logs in the first peer intervention, while it increased to 26 percent in the second intervention. It shows that writers' giving comments became more relevant to the self-draft revision. For ISK, it reveals 37 percent at the first writing while slightly decreased in the second writing (32 percent).

First, EPK in the data is considered that students' revision benefit explicitly from peers' knowledge though peers' comments. The percentage of revisions connecting to peers' comments reduces in the second peer response activity. It may imply that the writer learn the revision knowledge from peers' comments at the first draft revision but it reduces for the limits of early grade peers' revision knowledge. Hence, writers benefit less from peers because peers can give few newer knowledge in the second draft resulting from their insufficient revision knowledge.

Second, IPK is shown that the revision increasingly connected in the second draft. It can be interpreted that writers have gained more knowledge about writing from first intervention. In the second intervention, writers have obtained more knowledge than in the first intervention. Thus, in the process of checking peer comments, the peer-provided writing revision knowledge serves as a reminder to the writers of what they have learned. Consequently, writers' prior and obtained knowledge are retrieved and implicitly guiding them to revise their writings.

Table 4: The connecting of writing revision with comments.

Writing topics (interventions)	Connecting to Receiving comments (EPK)	Connecting to Giving & Receiving comments (IPK)	Connecting to Giving comments (ESK)	Connecting to no Comments (ISK)	Revision logs
	N (%)	N (%)	N (%)	N (%)	N (%)
A day of my dad	17 (40%)	7 (16%)	3 (7%)	16 (37%)	43 (100%)
Firework	20 (19%)	24 (23%)	27 (26%)	34 (32%)	105 (100%)

Third, ESK is referred that students' revision benefit explicitly from writer's own knowledge though the comments this writer gave to others. The comments that connecting to comments the writers giving to peers increase in the second draft revision. It may be interrelated as the writers acquire the revision knowledge through the peer response process and apply the skills in the second draft revision.

Fourth, ISK considered that students' revision benefit implicitly from the peer response on writing revision itself. From the analysis result, the revision connecting to no comments decrease only 5%, indicating that about one thrid of revisions were not referred to author's and peers' comments. It can be implied that early grades perform similar trend of writing revision preference to older students.

In summary, the peer response process helps early grade students develop implicit self knowledge. In addition, students benefit from the implicit self knowledge more than the explicit peer knowledge. Peers' comments play a weaker role was because of the lack of newer knowledge that early grades can provide in the second peer response intervention. Last, peers' comments implicitly stimulate writers' knowledge through the whole peer response process. Writing revision through the influence of prior knowledge and peer knowledge enables students to retrieve the revision knowledge and practicing it on the drafts.

3.3 Conclusion

The purpose of this study is to identify the knowledge features in the process of peer response. Specifically, we design a context of early grades' writing revision facilitated by peer response. From the result of data analysis and discussion, we identify four knowledge features from the connection between writing revision and peer comments, which are explicit peer knowledge (EPK), implicit peer knowledge (IPK), explicit self knowledge (ESK), and implicit self knowledge (ISK). It is concluded that early grades learned writing revision knowledge from the provided scaffold prompts, peers' comments, and the peer response process. Moreover, early grade students benefits more from the peer response process (ISK) than from peers' comments (EPK). Thus, for early grades, giving comments may play a major role of constructing knowledge through interaction while the comment itself may only play a minor role in the revision performance.

The identification of the knowledge features of peer response process makes it clear that students in the peer response process benefit from different knowledge sources. Researchers of related studies should start concerning the knowledge channeling in the process of peer response and clarify how students get improved by. Eventually, the picture of knowledge features in peer response learning can be completed.

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References

Berry, D. C., & Broadbent, D. E. (1988). Interactive tasks and the implicit-explicit distinction. *British journal of Psychology, 79*, 251-272.

Cho, Y. H. & Cho, K. (2011). Peer reviewers learn from giving comments. *Instructional Science, 39*, 629-643.

Dienes, Z., & Perner,J. (1999). A theory of implicit and explicit knowledge. *Behavioral and Brain Sciences, 22*, 735-808.

Harris, K. R., Graham, S., & Mason, L. H. (2006). Improving the Writing,Knowledge, and Motivation of Struggling Young Writers: Effects of Self-Regulated Strategy Development With and Without Peer Support. *American Educational Research Journal, 43*(2), 295-340.

Liao, C. C. Y., & Chan, T. W. (2013). Exploring a Self-generated Drawings Environment to Facilitate Children's Writing and Storytelling, *Proceedings of the AECT International Conference on the Frontier in e-Learning Research 2013.* Taiwan: National Central University & AECT.

Rohrbeck, C. A., Ginsburg-Block, M. D., Fantuzzo, J. W., & Miller, T. R. (2003). Peer-Assisted Learning Interventions With Elementary School Students: A Meta-Analytic Review. *Journal of Educational Psychology, 95*(2), 240-257.

Wang, S.-L., Hsieh, Y.-T., Liao, C. C.-Y., Shih, C.-Y., & Chan, T.-W. (2013). Exploring the Capability of Second Grade Students in Peer Response on Writing Revision. In Wong, L.-H. et al. (Eds.), *Proceedings of the 21st International Conference on Computers in Education.* Indonesia: Asia-Pacific Society for Computers in Education.

Willingham, D. B., & Goedert-Eschmann, K. (1999). The relation between implicit and explicit learning: Evidence for parallel development. *Psychological Science, 10* (6), 531-534.