

## Improving Academic Essays by Writing and Reading Peer Annotations on Source Documents

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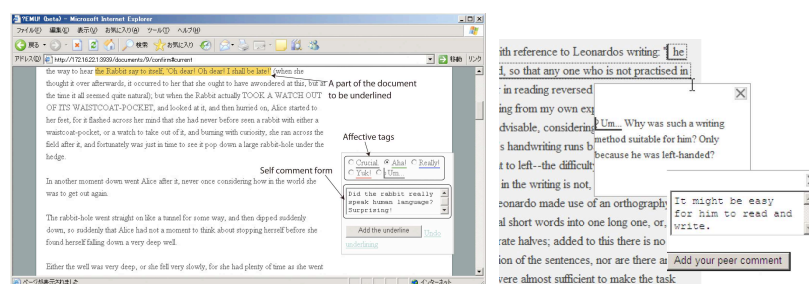
**Abstract:** We attempted to improve written arguments made by undergraduate learners of academic writing based on their intuitive and affective response to reading peer comments on source documents. To do so, we developed and utilized a previously developed CSCL environment called EMU (emotional and motivational underliner) for the addition, provision and review of annotations. The analysis of the learners' use of EMU implied that learners who wrote good essays tended to focus on annotations that used affective tags to express negative, sceptical and surprised attitudes toward the document, as opposed to comments in general; in contrast, low-scoring writers tended to apply equal attention to all comments.

### Introduction

The aim of the present study was to examine whether reading and writing peer comments on research documents acting as sources for academic essays (in other words, annotating those documents and reviewing annotations) promotes the development of students' writing in their argumentative essays. When students write essays, they review related documents, come to understand relevant issues, and produce positive or negative opinions toward arguments made in the documents. Then, they plan what and how to construct an argument.

Intervention in this process can potentially help students write better essays. To explore this possibility, Suzuki & Suzuki (2011) developed a Web-based collaborative environment, EMU (emotional and motivational underliner). The left side of Figure 1 shows a screenshot of EMU. The system provides students with a document to be reviewed. Students can freely underline and comment using affective tags (seen at the right of Figure 1). These tags were designed to naturally extract students' initial ideas when reading the material, and they have been found effective for students' own purposes in writing academic essays (Suzuki & Suzuki, 2011). These annotations are not only shared with peers, but can also be commented on by them. The centre of Figure 1 shows the input form for peer comments. The system provides many means for students to enhance their writing: externalizing their own ideas (Shirouzu, Miyake, & Masukawa, 2002), encountering different ideas, comparing others' ideas with their own, and providing comments on others' ideas (Cho & MacArthur, 2011).

We introduced EMU to an undergraduate academic writing class and analysed the access log to explore the relationship between the use of the system and the quality of the essays composed after the activity.



**Really!** Add this when you want to say “Really, that’s right,” or “Good!” (blue).  
**Aha!** Add this when you want to say “I haven’t realized this,” or “It’s great!” (green).  
**Yuk!** Add this when you want to say “Hey, that’s wrong,” or “It’s awful!” (red).  
**Um...** Add this when you want to say “You bet?” or “I don’t get it” (black with “?”).  
**Crucial.** Add this when you want to say “This part is crucial” (black).

Figure 1. EMU (left), input form for the peer comment (centre), and affective tags on EMU (right).

### Analysis

We analysed data from a class of 28 students learning academic writing. First, they read a document, and underline and gave ‘self-comments’ or SCs. Next, they read through others’ SCs and commented on them (‘peer comments’ or PCs). Finally, they composed an essay on the material.

The essays were rated on a five-point scale (1: *poor* to 5: *excellent*) by the authors themselves independently. Since the scores were highly correlated (Pearson’s  $r=.67$ ,  $t(24)=4.41$ ,  $p<.001$ ), we averaged these scores and divided the students into high-score (HS:  $n=12$ ) and low-score (LS:  $n=10$ ) groups by the median (3.0). Four students, whose score was exactly 3.0, were excluded from the analysis. We then examined differences in EMU usage between groups.

## Results and Discussion

In all, the students produced 315 SCs and 1,164 PCs for others' SCs. Two judges, who did not know the aim of the study, classified the SCs (correspondence rate: 95%) and PCs (correspondence rate: 90%) according to the following categories:

**SCP** (self-comment: pro) Comments that agreed with or were surprised by the content of the document.

**SCC** (self-comment: con) Comments that disagreed with the document or wondered about the underlined content.

**PCP** (peer comment: pro) Comments that agreed with or were surprised by others' SCs.

**PCC** (peer comment: con) Comments that disagreed with or wondered about the content of others' SCs.

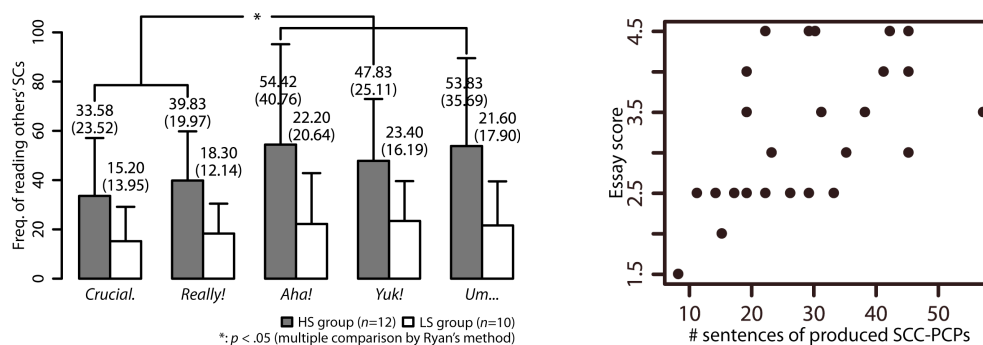


Figure 2. Frequency with which students read others' SCs by group and tag (left) and correlation between the number of sentences contained in the produced SCC-PCPs and essay scores (right).

The left side of Figure 2 shows the frequency with which students read others' SCs by group and affective tags. While students in the LS group tended to read others' SCs regardless of the affective tags, students in the HS group seemed to read the comments with 'Aha!' 'Yuk!' and 'Um...' tags more frequently than other tags. This tendency was statistically significant.

A distinct difference was observed in the number of PCPs toward SCCs (SCC-PCPs) between the HS and LS groups. Thus, we examined the correlation between students' essay score and number of sentences of produced SCC-PCPs, including the data of the students excluded above. The right side of Figure 2 is a scatter plot of this analysis, showing a positive significant correlation between SCC-PCP sentences and essay score (Pearson's  $r=.53$ ,  $t(24)=3.09$ ,  $p<.01$ ). This result implies that HS learners mainly focus on the SCs of others that show a negative attitude toward the document, and that they tend to add PCs that support such SCs.

Thus, the results show that HS learners tend to read others' SCs with affective tags such as 'Aha!' 'Yuk!' and 'Um...' more frequently than do LS learners. Moreover, HS learners tend to elaborate their own ideas by producing PCs commenting on others' SCs rather than just reading PCs from other learners. This implies that high-performance learners focus strategically on finding and evaluating issues in the documents as part of their problem-finding process.

In past research (Cho & MacArthur, 2011), in peer reviews of each other's paper drafts, learners who pointed out many problems and suggested many ideas for improvement of the drafts tended to compose a high-quality paper. These past findings and the results of the present study suggest that the ability to detect problems and suggest alternatives may be crucial skills in various phases of the academic writing process. By exploring the learning process of academic writing by high-performance learners in a CSCL environment, taking into account human cognitive mechanisms and the role of collaboration, we should be better able to improve the collaborative learning environment of academic writing and enable learners to compose essays that employ these learning techniques.

## References

- Cho, K., & MacArthur, C. (2011). Learning by reviewing. *Journal of Educational Psychology*, 103(1), 73–84.
- Shirouzu, H., Miyake, N., & Masukawa, H. (2002). Cognitively active externalization for situated reflection. *Cognitive Science*, 26, 469–501.
- Suzuki, S. V., & Suzuki, H. (2011). Reading for problematizing in essay writing activity with annotation and affective tagging. *Educational Technology Research*, 34(1&2), 153–163.

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