Maximizing Benefit of Peer-Feedback to Increase Feedback Uptake in Academic Writing

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Abstract: Revising text is an essential part of the writing process. Yet, inexperienced writers revise their texts too superficially. Peer-feedback has become a popular method to provide elaborate and timely feedback to students during writing. Though peer-feedback has shown promising results, studies also indicate that students have problems benefitting from feedback, resulting in a lack of feedback uptake and little revision. Students might need to be facilitated to make sense of feedback and reflect more deeply on it. The study investigated the effect of sense-making support on revision skills and feedback uptake. Altogether, 73 university students were assigned to a condition either with or without sense-making support. Results showed no effect on revision skills, yet results of content-analysis yielded a significant effect concerning feedback uptake. Students in the condition with sense-making support made less new errors and rejected more incorrect feedback. Sense-making support appeared to help students to some extent to maximize benefit from peer-feedback.

Keywords: peer assessment, feedback uptake, academic writing

Introduction

Writing well is a challenging task for students. One central part of becoming a good writer is to understand the importance of revision. Revision relates to any changes writers make during writing (Fitzgerald, 1987). Engaging in revision practices can have substantial impact on the quality of a written text as well as on learning. During revision writers re-organize ideas, integrate new ideas with existing ones to produce a coherent line of argument (Fitzgerald, 1987). Problem detection and problem correction have been identified as crucial sub-processes for revising a text. During problem detection, gaps are identified between the intended text and the meaning of the text produced so far. During problem correction, the writer needs to decide what should be changed in the text, how to make desired changes and how to instantiate those changes in the text (Flower, Hayes, Carey, Schriver, & Stratman, 1986; Hayes, 2004).

Students' problems to revise texts

Revision is generally a difficult process (Scardamalia, Bereiter, & Steinbach, 1984). Especially inexperienced writers tend to accommodate too little time for revising a text in its draft state (Allal & Chanquoy, 2004) and revise text superficially (Hayes, Flower, Schriver, Stratman, & Carey, 1987; Proske, Narciss, & McNamara, 2010). The first step, detecting a problem is harder for students than for expert writers. Students have a less clear goal in mind representing what the text should convey. Furthermore, students have problems to read their text from the perspective of the reader considering their audience. In addition, students follow less elaborate writing criteria than expert writers (Graham, McArthur, & Fitzgerald, 2007). Yet, to identify a problem or an error, a writer needs to have knowledge about criteria for good writing including knowledge about typical writing errors. The second step, correcting a problem is still challenging even if the problem is detected. Fixing errors is not an automated process for inexperienced writers but a challenge on its own. As students lack those skills that are important for revision, they need help to become aware of problems in the text and need to receive suggestions how to correct the text (Hayes, 2004).

Peer-feedback in academic writing

Peer-feedback has become a popular method in learning. The following activities belong to the overt activities typically included in peer-feedback: First, the assessee creates a product (task performance). Next, it is the assessor's turn to provide feedback (feedback provision). Subsequently, the assessee needs to make sense and form a coherent picture of feedback (feedback reception). Lastly, the assessee revises his or her own product based on feedback by the assessors (revision) (Kollar & Fischer, 2010). Receiving and providing feedback from peers has been shown to be very effective and it has considerable advantages in comparison to feedback from an instructor (e.g., Topping, 1998). Peer-feedback does not only complement instructors' assessment (e.g.,

Hammer, Ronen, & Kohen-Vacs, 2010; Zariski, 1996), it can be also provided more timely and frequently than feedback from an instructor (Falkichov & Goldfinch, 2000). There has been a shift in research on peer-feedback from merely focusing on the reliability and validity aspects towards viewing peer-feedback as a social process. Providing and receiving peer-feedback can be inherently understood as a collaborative activity holding rich learning opportunities for both the assessor and assessee (Falchikov & Goldfinch, 2000).

Especially in courses focusing on writing, peer-feedback can help students become better writers and to gain understanding about subject-matter (Falchikov, 1986; Roscoe & Chi, 2007). During writing, a student receives comments from a peer describing the reader's perspective, pointing out writing errors, making suggestions on how to revise the text. Assessors can help assessees to detect problems, which is a central sub-process for successful revision (Hayes, 2004). Though it is agreed that problem detection is necessary, it is not sufficient for correcting a problem. After a problem is detected, the assessee still needs to decide what to do with the feedback in order to revise effectively. An assessee has various options: Either the feedback is rejected because the problem pointed out is perceived as too trivial or too difficult to correct, resulting in no revision. Or the feedback is considered to be relevant. As a consequence the assessee fixes the detected problem thereby revising the text (Hayes, 2004).

Assessees' problems to leverage from peer-feedback

There is clear evidence that students have problems to leverage from feedback. Students hesitate to use feedback or feedback is rejected upfront without considering the information it contains (Boero & Novarese, 2012). Van der Pol and colleagues (Van der Pol, van den Berg, Admiraal, & Simons, 2008) call this problem a failure of feedback uptake. Feedback uptake is the ability to make use of feedback in such a way that it leads to changes in the text. In other words, feedback uptake relates to revisions that are made based on feedback. For student writers, feedback uptake is important, because without considering feedback, students might struggle to detect errors by themselves. Therefore we believe an important question to ask is: Why do assessees fail to benefit from feedback during writing? Research on peer-feedback indicates several problems that might prevent feedback uptake (e.g. Gennip, Segers, & Tillema, 2010; Nelson & Schunn, 2009).

One problem concerns the limited knowledge how to handle feedback and the information it contains. Students may not know how to use feedback for the purpose of problem correction because as inexperienced writers they do not have a model of how to work through the problems systematically. Expert writers have the ability to represent detected writing problems in a means-ends table that helps to correct problems with a systematic procedure which novice writers are lacking. Doing a means-ends analysis, expert writers have a better understanding what actions need to be taken to correct problems and to successfully revise texts (Hayes, 2004; Newell & Simon, 1972).

Another problem concerns reflection of received feedback. Assessees do not sufficiently engage in reflection on their own. Yet, reflection has been identified as a crucial aspect for the process of acquiring knowledge and new skills (Zimmerman, 1989). During peer-feedback reflection is especially important for students taking the role of the assessee. Reflecting helps assessees to maximize potential benefits from feedback. Reflecting consists of several processes including (1) planning, (2) monitoring and (3) evaluation (Schraw, 1998). Those processes are central for reflecting on feedback. Planning includes understanding one's own knowledge of feedback. This involves that assessee knows how information contained in the feedback (assessors' intentions) relates to the meaning conveyed in the text (assessees' intentions). Monitoring includes keeping track of feedback that is agreed upon and feedback that is rejected. Evaluation includes judging which feedback is rejected and which feedback will be used for improving the text.

Supporting the assessee to benefit from peer-feedback

When integrating peer-feedback in instruction both problems, (1) limited understanding of how to represent problems in a means ends table and (2) lack of reflection on feedback need to be considered. Integrating peer-feedback alone might not be sufficient to ensure feedback uptake. Instructional support might be needed for learners' learners to benefit from peer-feedback to succeed in feedback-uptake. Combining peer-feedback with instructional support might maximize effects of feedback in terms of feedback uptake. Instructional support should tackle the mentioned problems: First, assessees should be facilitated to represent problems as part of a means-ends table. Doing so should help students to represent the relation between detected problems and actions that need to be taken to fix a problem in the text. Second, assessees should be supported to reflect more deeply on feedback. Similarly to learning protocols (Berthold, Nückles, & Renkl, 2007), assessees should write down their reflections on previously presented peer-feedback. Support should instruct the assessee to think about whether the feedback was understood, whether there is a gap between the assessor's intentions and the

assessee's intentions, whether feedback is considered to be used and how it will be used to improve the text. In other words, instructional support should encourage the learner to make sense of feedback.

There is substantial evidence that taking the role of the assessor by providing feedback and assessing products created by peers, leads to learning gains (Topping, 2003). Yet, there is little empirical evidence that taking the role of the assessee that is to receive feedback leads to learning gains as well (Van der Pol et al., 2008; Cho & MacArthur, 2010; Kluger & DeNisi, 1996). This study focuses on supporting the assessee. In our study, we explore whether instructional support, in form of sense-making support helps assessees to maximize benefits from feedback. Based on our assumptions, we expected that sense-making support improves assessees' revision skills (Hypothesis 1). Since revision skills were subdivided in problem detection and problem correction, we hypothesized that both sub-skills will improve if sense-making support is provided. Furthermore, we expect that sense-making support will facilitate feedback uptake (Hypothesis 2). Since feedback uptake was conceptualized as changes that assessees make based on received feedback, we assumed that students incorporate more feedback-based revisions in the text.

Study design

Participants

Altogether, 73 students (12 male, 61 female) from a German university participated in the study. Students studying towards a degree in education served as participants. The mean age was 23.37 (SD=3.37). They were enrolled in introductory and advanced courses in education. Participation was an obligatory part of their regular class activities, however no grades were given for the writing activity. Participants were randomly assigned to one of two conditions: Sense-making support condition SMS+ (N= 34) and no-sense-making support condition SMS- (N= 39). Conditions differed only concerning presence of sense-making support.

Learning materials

Students participated in an online writing activity. The task was to write an essay of 550-650 words on the question "How can a mother optimally support the identity formation of her child". As background information, students received an excerpt of a text from Erikson (1984) on identity formation. The task was accompanied by peer-feedback.

Description and implementation of sense-making support (independent variable)

Sense-making support was delivered during feedback-reception in a MS WORD-document. Students in the SMS+ condition were asked to use the document during peer feedback reception. The document included a table with seven columns (see Figure 1). Sense-making support aimed at encouraging participants to reflect on understanding the feedback involving planning, monitoring and evaluation of feedback. The first column was listing each feedback comment (column 1). Students were instructed to list each feedback comment using the copy/paste function. Participants were asked to judge each comment in the list concerning understanding (column 2), agreement (column 3), and impact on text (column 4) and to indicate how the comments will impact their text (column 5), organization (column 6) and relevance (column 7).

1	2		3		4		5	6	7
Copy your received comments into this column.	I understand the comment.		I agree with the comment.		I am going to use this comment		I will improve my essay by doing the following:	Done	Mark the three most important comments with an X.
	Yes	No	Yes	No	Yes	No		✓	
Comment 1	☐	☐	☐	☐	☐	☐		☐	
…	☐	☐	☐	☐	☐	☐		☐	

Figure 1. Sense-making support table

Procedure: Online-writing activity with peer-feedback

The online-writing activity was conducted during a period of two weeks (see Figure 2). The learning platform Moodle was customized for the online-writing activity (Moodle, 2013). We followed the structure of the peer-feedback phases identified by Kollar & Fischer (2010) focusing on the role of the assessee.

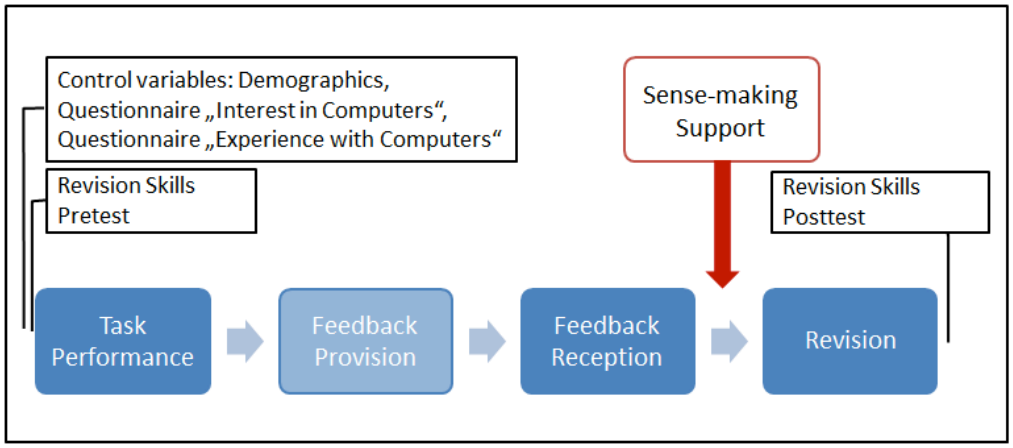

Figure 2. Online-writing activity with instruments and peer-feedback phases

During task performance, students received instruction and background information to write the essay (see Table 1). Students were asked to upload the essay as WORD document. Feedback provision was secluded because all participants received feedback from tutors but they did not provide feedback themselves. During feedback reception, participants received peer-feedback. During revision, the essays including feedback comments were made available and participants revised their essays. Afterwards, participants uploaded their revised documents to Moodle. Participants were guided through each phase on a step by step basis. Each phase became active, when the previous one was completed.

Table 1: Online-writing activity including times for peer-feedback phases

Peer Assessment Phases	Time on task (min)
Task Performance	120
Feedback Reception	10
Revision	80

As described above, all participants took the role of the assessee. Participants were informed that the feedback was given by a peer. However, in order to control for variance of feedback quantity and quality, feedback was given by trained tutors. Peer-feedback included 12 comments for each participant. Each comment referred to one error in the text. It included a standardized description of the error and a suggestion how to revise it (see Figure 3).

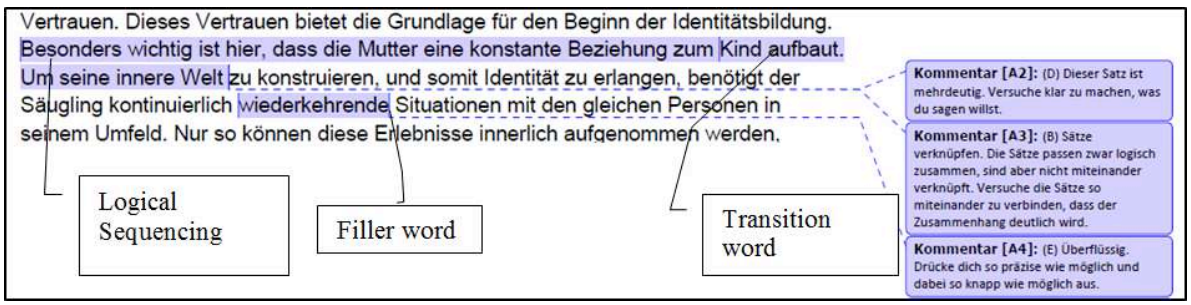

Figure 3. Examples of highlighted comments

Each comment identified one out of 5 writing errors related to Sequence/Logic of Argument, Transition Words, Nested Sentences, Direct/Clear Reference and Filler Words. The content of a comment was structured such as: “This sentence is hard to read. Rephrase it in order to make it more readable”. Each student received two comments per writing error (10 comments all together). Additionally, two incorrect comments were included, because peer-feedback is prone to be erroneous. Feedback was given in the WORD documents using the commenting function of MS Word. For each writing error we highlighted the relevant portion of the

text. For filler words we highlighted the word itself, for missing transition words we highlighted the last word and the first word of the adjacent sentences. For the remaining criteria we highlighted the whole sentence.

Feedback was provided by trained tutors following a rigorous procedure. First, tutors read an essay in order to get an impression of the intended statement and logical structure of the essay. Next, the essays were re-read and commented on focusing on one writing error at a time. Tutors read each essay at least six times. Each error was commented with a standardized comment for each writing error.

Measures and instruments

Control measures and treatment check

We controlled for uneven distribution in the conditions taking into account demographical information, experience with and interest in using computers. In order to see whether sense-making support was used as intended, we analyzed participants' attendance to the sense-making support table.

Revision skill (pre-posttest)

Revision skills were assessed using counterbalanced pre- and posttest versions. The pre- and posttests assessed two distinct skills related to academic writing: problem detection and problem correction. Problem detection was assessed with an erroneous text and participants were asked to highlight and label errors in the text. The maximum score was 20 points. For problem correction, participants had to correct errors in text sections. Errors were related to the writing errors described earlier. The highest score that could be achieved was 22 points.

Feedback uptake

Feedback uptake was assessed by measuring feedback-based changes in the text and correctness of changes after feedback was received. Below, we refer to feedback-based changes, that is, only changes that were made based on received feedback.

Table 2: Description and reliability of feedback uptake variables

Feedback uptake variables	Description	Agreement %	Kappa
Successful change	Any change that resulted in an improvement of the text.	87,3%	.66
New error change	Any change that erroneously created a new mistake instead of correcting one.	91,3%	.47
Incorrect comment change	Any change that was made based on an incorrect feedback comment.	90,1%	.82

All dependent variables were measured at the individual level. For all analyses, coders were unaware of the treatment conditions. 25 % of the texts were coded by a second coder. Coders' percentage of agreement was between 87% and 91% (see Table 2).

Results

Reported results can vary with respect to number of participants, because not all 73 participants finished all relevant stages.

Control measures and treatment check

We controlled for uneven distribution in the conditions taking into account demographical information, experience with and interest in using computers. Participants in both conditions showed no substantial differences regarding prior experience with computers ($F(1, 71) = .02$, $p = .88$) and interest in computers ($F(1, 71) = .46$, $p = .50$). In order to check whether sense-making support was used as intended, we analyzed participants' attendance to the sense-making support table. We were interested, whether the participants (N=34) attended to each of the columns particularly columns three, five and six.

Out of 10 feedback comments, participants noted to understand 85.9%, agree on 61.8% and use 70.3% feedback comments (see Table 3). For every comment we have also captured whether the particular comment was used or not, therefore we were able to relate the comments that were used to the comments that were reported to be used. We found that participants actually used 93.6% of the comments they indicated to use. Out

of the 2 additional erroneous comments, participants noted to understand 82.5%, agree on 41% and use 47% feedback comments However, they only used 75.5% of the comments they indicated to use. Based on these results, it appears that participants have used sense-making support for the purpose of reflection.

Table 3: Means and standard deviations for participants' attendance to sense-making support table

	Feedback comments (10)			Additional erroneous feedback comments (2)		
	M	*(SD)*	*%*	*M*	*(SD)*	*%*
Column 3: "I understand the comment"	8.59	(1.84)	85.9	1.65	(.60)	82.5
Column 5: "I agree with the comment"	6.18	(8.57)	61.8	.82	(.80)	41.0
Column 6: "I am going to use the comment"	7.03	(5.85)	70.3	.94	(.78)	47.0
Actual usage of feedback comments for revision	8.0	(1.65)	80.0	.85	(.70)	42.5

Effect of sense-making support on revision skills

The low number of participants resulted from a combination of corrupted files and participants that did not take part in the last phase of the online activity in which the posttest was conducted. An ANOVA showed no significant differences between both conditions regarding revision skills $F(1, 48) = .1.81$, $p = .18$. Descriptively, problem detection scores increased from pre to post in the SMS+ condition, while in the SMS- condition, problems detection scores decreased (see Table 4). Problem correction did not change from pre- to post test.

Table 4. Means and standard deviations for revision skill

	SMS+ (N=20)				SMS- (N=31)			
	Pre		Post		Pre		Post	
	M	(SD)	M	(SD)	M	(SD)	M	(SD)
Problem detection (PD) (max. 20 points)	7,76	(4,023)	8,80	(4,029)	9,54	(3,144)	8,84	(3,284)
Problem correction (PC) (max. 22 points)	16,73	(3,118)	16,19	(3,270)	16,72	(2,976)	16,58	(2,355)
Revision skills (PC+PD)	25,27	(5,423)	24,88	(6,192)	26,72	(4,531)	25,54	(4,207)

Effect of sense-making support on feedback uptake

A one-way multivariate analysis of variance (MANOVA) was conducted to determine the effects of sense-making support on feedback uptake with the variables successful change (SC), new error change (NC) and incorrect comment change (IC). Results showed a significant effect, Wilks $\lambda = .85$, $F(1, 71) = 3.99$, $p < .01$, $\eta 2 = .15$. Separate ANOVAs for the feedback uptake variables were then conducted to the corresponding MANOVA. Results showed that the average score of successful change, $F(1, 71) = 1.81$, $p < .18$, $\eta 2 = .03$ was not different between conditions. Yet, results showed that the feedback uptake variables, new error change, $F(1, 71) = 6.58$, $p < .01$, $\eta 2 = .09$ and erroneous comment change, $F(1, 71) = 4.14$, $p < .05$, $\eta 2 = .06$ were higher for students in the SMS+ condition than for students in the SMS- condition (see Table 5).

The changes above relate to feedback-based changes. We also analyzed the amount of changes that were unrelated to feedback. Apart from feedback-based changes, students engaged in very little revision. Therefore results on revision apart from feedback-based changes are not reported.

Table 5. Means and standard deviations for feedback uptake

	SMS + (N=34)			SMS- (N=39)		
Revision types	M	(SD)	Percentage of uptake	M	(SD)	Percentage of uptake
Successful change (SC)	5.06	(1.67)	50.6	5.59	(1.7)	55.9
New error change (NC)	1.03	(1.09)	10.3	1.72	(1.19)	17.2
Incorrect comment change (IC)	.85	(.70)	42.5	1.21	(.77)	60.5

Conclusions

In this study, we explored instructional support that aimed at helping the assessee in the context of peer-feedback. Particularly, we looked at the impact of sense-making support to increase revision skills and feedback uptake during writing. Statistically, sense-making support did not affect revision skills in terms of problem detection and problem correction (hypothesis 1). Results showed increased scores for problem detection in the SMS+ condition and an improvement from pre to posttest. Yet, one can only speculate whether this increase was due to our variation or whether it was by chance because the differences were not significant. It is possible that because of the low sample size, we were unable to detect hypothesized effects. Future studies should aim at larger number of participants per condition. In both conditions (SMS+ and SMS-), we can see that students engaged very little in problem detection. Yet, it seemed easier for student to do problem correction. One reason for low scores on problem detection can be explained by the peer-feedback that was given. Peer-feedback has the purpose of providing the writer with information on problems in the text thereby helping with problem detection. Peer-feedback might inhibit students to do problem-detection themselves, because there is no need for assessees to detect problems. Future studies should look at how we can support students in problem detection when integrating peer-feedback in instruction.

Sense-making support appeared to affect feedback uptake only to some extent (hypothesis 2). Students in the SMS+ condition showed only on two out of three feedback uptake variables significant better scores. Students receiving sense-making support made less new errors. From the treatment check analysis, we saw that over 90% of the feedback comments that students indicated to use, were actually used in the text to make successful changes. We can conclude that students indeed used the sense-making support table as a way to do a means-ends analysis (Hayes, 2004). Students in the SMS+ condition seemed to relate the errors that were pointed out in the feedback to the actions that need to be taken to improve the text. We can infer that working with sense-making support and using the provided sense-making support table to systematize how to use the feedback might have helped to avoid making erroneous changes in the text. Furthermore, students used less incorrect feedback comments for text changes. These results indicate that sense-making support helped students to reflect on given feedback and to think more deeply which feedback to use for text changes (Schraw, 1998). This picture seems to be confirmed by the treatment-check results. Though we could see that students did use erroneous comments, they did so much less frequently than using the correct feedback. Working with sense-making support might have helped to become more aware of which comments were correct and which ones were not. Students in the SMS+ condition made as many successful changes as students in the SMS- condition. One reason why sense-making support was not effective regarding successful changes might be the extra work load that students in the SMS+ condition needed to deal with. It is possible that spending time with sense-making support might have taken away time that students in the SMS- condition could fully spend for making feedback-based changes in the text. Future studies should make sure not to overburden the assessee to leave sufficient time to make changes and to do revision.

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