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The Computer as Means of Communication for Peer-Review Groups

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In a scientific-writing course, 15 of 54 students used a review-supporting computer program, PREP-EDITOR (PREP), to communicate with their peers about drafts. In an exploratory study, 10 students were interviewed regularly: 5 used PREP and 5 met face-to-face to exchange comments on drafts. The study showed that use of PREP did not increase time spent on various writing activities. The PREP group reported a large number of computer-related problems, whereas the non-PREP group reported more difficulties with assignments and course organization. It appeared that the technology was omnipresent in PREP users' perception of the course. The system of computer-mediated peer review has many of the drawbacks of "distance learning," but because networks are increasingly used by collaborating authors, we should teach our students how to use them sensibly.

coauthoring composition instruction computer-assisted writing instruction computer-mediated communication evaluation research peer review PREP-EDITOR

COMPUTER-MEDIATED SMALL-GROUP WRITING

Opting for Collaboration[1]

The literature on computer-assisted collaborative writing and writing instruction suggests a wide range of reasons why teachers want their students to write collaboratively. Some of these articles (often citing the work of Bruffee) seem to value collaborative writing because it represents collaborative learning; their goal is, in the first instance, pedagogical. They believe learning in general should take place in an environment that enhances active involvement of students: Collaborative writing groups provide such an environment in a challenging instructional situation. For others (often quoting Bakhtin), the main value of collaborative writing seems to be didactic: These teachers want to make clear to their students that producing written language is communicative. By definition, writing is a social act, part of and contributing to an existing, complex universe of communicative acts. Furthermore, many teachers want to make their students more aware of the process (sometimes conceived as a sociocognitive process, sometimes as a group or organizational process) that to a certain extent determines the outcomes of writing efforts (Flower, 1989; Forman, 1992).

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[1]Probably due to the association of the term *collaboration* with World War II Nazi sympathizers, or *collaborateurs*, who worked with the Nazis in occupied countries, the word seems to have a more pejorative connotation in Europe than in the United States. Nevertheless, we decided to use the term, in line with most articles on the subject of small-group writing (instruction), in this journal.

As teachers of written communication for groups of Dutch students (varying in number from 30 to 200) in technical and social science departments at the University of Twente, the incentive to introduce collaborative writing was pragmatic and, perhaps, rather prosaic. We had to decrease the teacher:student ratio because of budget cuts, but at the same time, we wanted the quality of our courses to remain stable. We also wanted to increase the number of times students received feedback on their work because various studies suggest that both peer and teacher feedback enhance revision and that subsequent revision positively affects the quality of writing (Fitzgerald, 1987). Acknowledging many of the good reasons for collaborative writing previously mentioned, one of our policies since 1989 has been to have students work in peer groups for almost all required writing assignments.

DEFINING COLLABORATION

Although terms such as *peer-group feedback* and *collaborative writing* have become familiar, it is not always clear how authors use the terms. Farkas (1991) defines collaborative writing in professional or organizational settings by identifying four basic forms, two of which (jointly composing and acting as secretary for a group) he judges somewhat marginal or less often practiced. The other two forms, more directly relevant to this study, are (a) two or more people contributing components of a document and (b) one or more people reviewing and/or editing the document.

For most of our assignments, we ask students to review and/or edit their peers' documents in the broadest sense—Collaboration Type B in Farkas's terms. They engage in a process of collaborative detection, diagnosis, and solution of writing problems. We monitor groups with feedback instructions that draw attention to such issues as audience analysis, outlining as a blueprint for text and as a basis for negotiation about the content, document structure, argumentation, genre conventions, tone, and style. We assume that most students have command of lower order skills (spelling and grammar) well enough to detect problems of this kind without feedback instruction. In the course described later, we also asked students to contribute components to an already existing document—Collaboration Type A in Farka's terms.

PROBLEMS IN COLLABORATIVE WRITING GROUPS

We can see many good reasons to have students working in small writing groups; the method, however, has its problems and drawbacks. Studies of college- or university-level students present two categories of problems: small-group-process problems and writing-process problems.

Problems in Small-Group Processes

Forman (1990) states that two characteristics set student writing groups apart from other groups. First, they are informally organized and nonhierarchical compared to most corporate groups. This characteristic certainly applied to our student groups. Second, they are immature in the sense that they often have not worked together before the current class project. In a study of managers using an electronic message system, Forman (1987) found that group maturity enhances the group's ability to use such systems effectively. It seems, therefore, an important characteristic to consider in a study of computer use. Our students had worked frequently in small groups before the course and, at least in some cases, in the same group composition as in our course. As Forman does not define group

maturity precisely, it is difficult to say which of the problems we expected to see could be caused by group immaturity.

Marx (1990) mentions another problem of peer review in writing instruction. Students are reluctant to write frank and comprehensive critiques because they want to protect friendships and ensure social status. In our courses with peer groups, we observed that at least some of the students perceived peer critique as an attempt to outsmart each other or to degrade a well-meant trial instead of as a support in a process of negotiating meaning and function of communication or optimizing a text.

Problems in small-group processes can surface at any stage of the writing project, for example, as conflicts about differences in motivation or work style, or lack of appreciation for each other's work (Forman & Katsky, 1986). Problems like those described are not unique; they can occur in all types of small groups, but they are more likely to occur in an educational setting.

Problems in Writing Processes

A second category of problems mentioned by Forman and Katsky (1986) are writing-process problems. These problems can surface, for example, as misconceptions about the writing process that lead to insufficient time for negotiating about the assignment or for revising. In other cases, the group writing in itself can lead to problems in the form of conflict about text ownership or inconsistency in style and jargon in the resulting report.

From our other courses, we knew both types of problems were likely to occur at least in part of the groups. One of the problems we observe quite often in our courses is that a student receives feedback that, in our view, is adequate and appropriate, but the student does not use it for a subsequent revision. Reluctance to carry out suggested changes can be caused by small-group problems (e.g., not acknowledging a peer's authority), by misconceptions about the writing process (e.g., a shallow conception of the revision task), or even by factors in the instructional situation (e.g., procrastination). Whatever the reasons, if we observe any of these phenomena, we make comments on the hard copy of the text, we observe such groups more closely in required face-to-face meetings, and as teachers, we consider intervening in the group's process. Although we cannot avoid the problem, we feel that we have an approach that can prevent it getting out of hand.

Use of Computers in Collaborative Writing

Several authors claim that computer use enhances the beneficial effects of collaborative writing pedagogy (Handa, 1990). The increasingly available local-area and global networks provide platforms for coauthoring or exchanging text versions and communicating about them. Before assessing claims about computer use in collaboration, we should distinguish between various types of computer use across two dimensions: *synchronous/asynchronous* and *local/distributed.* In a synchronous setting, students coauthor or communicate in real-time (like a telephone); in an asynchronous situation, they send messages or text versions and receive responses at a later time (like a letter). Students also may have opportunities to meet face-to-face (local) in addition to their computer conversations or they may be located at geographically widely dispersed places (distributed). Both the beneficial effects and the problems associated with computer use in collaborative writing are related to the type of computer use analyzed.

It is important to consider the kinds of claims made about use of computers for collaboration. Computers are seen as beneficial for collaborating writers as they are associated with a reduction of prejudiced communication patterns on the basis of gender,

ethnicity, age, and other status-influencing characteristics of the participants (Selfe, 1992; Selfe & Meyer, 1991). Use of computers for collaboration can overcome geographical distances (Forman, 1987). In our view, these effects can be expected to occur only when students meet exclusively on computer networks (distributed). Because this situation was not the case in our course, we had no reason to expect these effects.

Others claim that because computer dialogue about text is written instead of spoken, students are forced to formulate comments in a discourse mode closer in form and substance to their goal—the written text—than oral responses or face-to-face interaction (Batson, 1988; Mabrito, 1992; Marx, 1990). These claims primarily relate to asynchronous use of computers; there is ample evidence that synchronous conversations are at least a hybrid form of discourse. They have, for instance, the casualness and repetition of speech but the focus and permanence of writing (Forman, 1987; Sirc & Reynolds, 1990). In our course, the computer was used asynchronously, so one could expect effects on the quality of the written comments.

But again, a principal reason for us to explore the computer as a collaborative writing tool was somewhat prosaic: We felt that computer-mediated group writing might become the dominant professional writing practice, particularly when drafts of a document need to be revised (Debs, 1991; Forman, 1987). The increase of networked workplaces made us feel that both we and our students needed to experience using the technology and to explore its assets and its limitations.

PROBLEMS IN COMPUTER-SUPPORTED COLLABORATIVE WRITING

Observations of thoughtful teachers and researchers prepared us for some of the limitations and problems we could expect in our course. Somewhat contradictory to Forman (1987), Jorn and Duin (1992) found in a case study of one group of collaborating student writers that the computer was used for exchanging draft and factual information and that face-to-face interaction was used for questioning, clarifying, elaborating, revising, and accepting or second-guessing statements of other group members. In a similar vein, Marx (1990) observed that, with or without a local-area network, students writing to peers often rely upon conversations in and out of class to complement critiques. These observations suggest that if students are free to choose, they might prefer face-to-face interaction for exchanging their comments—the type of collaboration we aimed at in our computer-mediated course. We expected that introduction of the computer as a communication means could make students reluctant to discuss comments with peers.

Forman (1987) and Sproull and Kiesler (1988) draw attention to the fact that use of the computer as a communication platform seems to reduce social context cues. It appears to make audience analysis more difficult, with inappropriate tone and usage as the result. Although this applies to situations where computers were used as an electronic messaging system, one wonders whether it applies to networked peer-review situations as well. If so, computer use can be considered counterproductive in a course aimed at expanding students' sense of audience.

From the point of view of a teacher, Marx (1990) notes that perhaps the greatest caveat for computer-mediated peer critiquing is the danger of losing individual classroom authority. In his course, scheduling was so rigid, due to the way the technology was integrated in the course, that he often felt teachers had no opportunities to respond to classroom events, for example, spending extra time on a topic of particular interest. He

uses the image of "the tail wagging the dog." However, use of communication technology does not necessarily lead to extra student time spent on assignments (Duin, 1990).

On the basis of previous experiences, we knew implementing computers in a course obeys Murphy's Law.[2] Particularly in the first years of computer or software use, implementation problems can be a weighty argument against computer use (Geest, 1991; Schwartz, Geest, & Smit-Kreuzen, 1992).

THE AIMS OF THE STUDY

The purpose of this article is to share our explorations of computer-supported collaborative writing. In our investigation, we were guided by the following three questions:

1. Does use of a review-support program influence writing processes of students working with peer-group feedback?
2. What kinds of problems have been experienced by users of such a program (both students and teachers)? Do the problems coincide with those observed by other teachers and researchers?
3. Does a review-support program provide a sufficient means of communication for collaborating writers?

To investigate these questions, we compared two groups: One group (n = 15) was learning in a distance-education situation with a computer program (PREP-EDITOR, discussed later) as their communication means and the other group (n = 39) was meeting biweekly face-to-face to exchange and receive feedback. From each group, we took a sample of five students, representing five peer groups, who were interviewed biweekly by a research assistant.

We refrained from measuring effects on the quality of the texts produced. Assessing an increase in text quality is very complicated in itself. But demonstrating a causal relation with the medium of communicating peer feedback is almost impossible when one does not want to create an artificial learning environment. Although we realize that this study's scope and the robustness of its design are limited, we believe we offer here some empirically grounded indications for making decisions about using review-supporting communication programs as instructional tools.

OUTLINE OF THE STUDY

The Course

The course (40 hours) focused on scientific report writing. It had three instructional objectives:

- providing systematic, audience-oriented and process-oriented approach for designing and structuring texts;

[2]Helen Schwartz (Schwartz, Geest, & Smit-Kreuzen, 1992), speaking from her long experience of implementing computers in writing instruction, claims that using computers forces the teacher to become a St. George-type of hero: She has to go out to fight draconian problems all the time, due to her decision to use computers.

- teaching scientific report writing skills (which students need in their educational program and in their future professions); and
- reviewing and formulating feedback, with the support of feedback instructions.

All assignments derived from a case description of a small province-town authority that asked the students, as specialists in an educational research and consultancy firm, to conduct a study and give advice about school policies for elementary-school students of immigrant background. An existing report was altered slightly to provide research data students needed for their report. The actual assignments were:

1. Write three versions of an assignment statement, audience analysis, and an outline for a report.
2. Write a foreword and an introduction for the "real" report provided.
3. Write a summary for the "real" report provided.
4. Write a letter to accompany the final report to the local authority that commissioned it.
5. Replace a textual annex of the report by a flow chart with accompanying explanation.

Students worked in groups of three. For Assignments 1 and 5, each student first produced a version that was critiqued by their two peers and then was revised by the author before it was handed in to the teacher. For Assignments 2, 3, and 4, each student produced a first version; then, one of the students acted as editor to make up a second version based on the three drafts. Both the first and second versions were critiqued and revised before a final product was handed in.

In addition, students revised and expanded the text of the "real" report by adding titles and headings, rewriting passages for style and readability, inserting references to source material or to figures in the text, formulating conclusions, and so forth. Additions and revisions were critiqued by peers and, afterwards, checked against a model provided by the teacher.

The Participants

Fifty-four students in their third year of study in Educational Science and Technology took the required course in written communication skills in the autumn of 1993. Fifteen volunteered to use an innovative computer program, PREP-EDITOR (PREP), as a platform for providing texts to their peers and for giving and receiving feedback. The other 39 students received hard copies of their peers' text versions, wrote feedback on them, and elucidated their comments in compulsory, biweekly, face-to-face meetings. The teacher was present for consultation during these sessions. Students were used to working in small groups because it is a common practice in their program. Students chose their own peers to work with.

The PREP users mentioned their interest in using computers and innovative software as one reason to volunteer; another reason mentioned was the release from the biweekly face-to-face meetings. The complete group comprised 12 male students, of which 5 volunteered to use PREP. Because the PREP group was self-selected, it can by no means be considered a representative sample of the complete student population.

All students had received introductions in computer use (both Apple Macintosh and IBM/compatible DOS) in their course of study. Most worked on computers regularly and the majority owned personal computers. The course assignments were all produced with a

word-processing system. Some PREP users seldom worked on Macintoshes, although others were proficient with the system.

The Software: PREP-EDITOR

PREP-EDITOR is a computer program under development, designed and developed by a team from Carnegie–Mellon University (Neuwirth et al., 1992; Neuwirth, Kaufer, Chandhok, & Morris, 1990; Neuwirth & Wojahn, in press). The program is meant to enhance and support collaboration among student writers. Metaphorically, the program can be seen as providing margins to a text; the developers call it a text spreadsheet because sections in the margins are linked to sections in the original text. Reviewers can create margins to write, draw, or speak comments in. Comments can be linked to particular pieces of the text to be critiqued. Figure 1 shows a typical screen image of PREP-EDITOR.

The program also offers possibilities for "redlining," that is, flagging differences between text versions. The program is a Macintosh application, but a translating facility offers the possibility to import files from an IBM/compatible DOS working environment. As one can expect when working with a program under development, we experienced initial problems due to bugs, particularly with files imported from an IBM/compatible DOS environment.

A minimal, task-oriented manual, providing only the information necessary to fulfill assignments, was provided for PREP users. At set hours, assistance was available in the computer lab. In our course syllabus, we neither made suggestions about seeking additional communication with peers or printing versions of texts nor provided suggestions to avoid these courses of action.

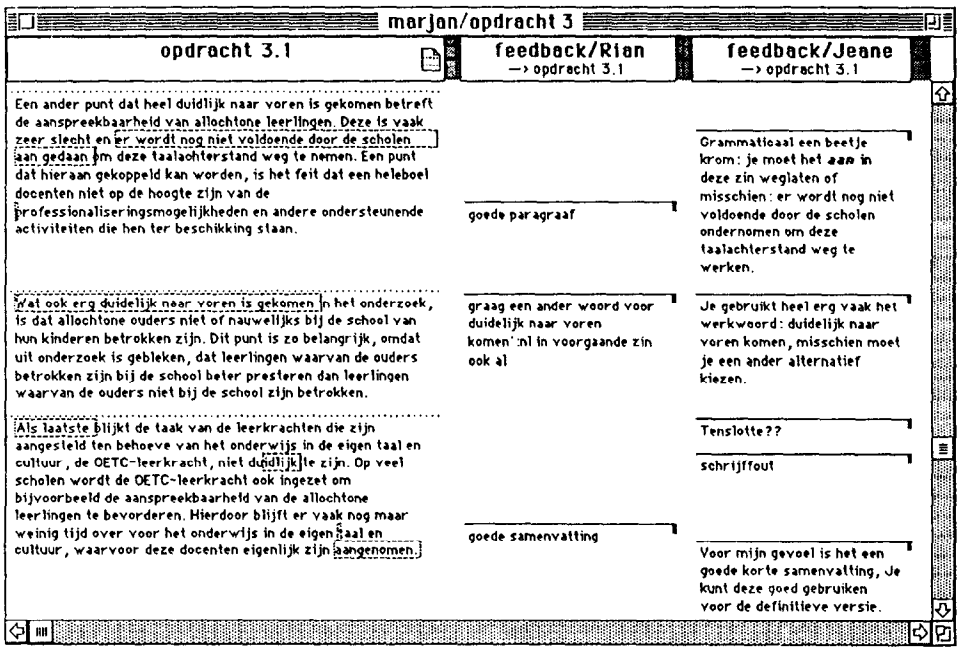

Figure 1. Screen image of PREP-EDITOR with text and comments.

The Study

The study explored differences between two groups: one group (n = 15) learning in a distance situation used PREP to exchange text versions, feedback and revisions and the other group (n = 39) exchanged paper versions of the text and met face-to-face for feedback. From each group, five students from different peer groups were selected randomly. The 10 respondents agreed to be interviewed in 45-minute sessions every 2 weeks by a research assistant about the nature and duration of their course-related activities, additional communication, and problems experienced. Their responses in the prestructured individual interviews form the data base for the findings reported here.

FINDINGS

Effect on Writing Processes

We explored the issue about computer use affecting the writing processes of respondents by analyzing the time spent on various writing activities. We assumed that using PREP-EDITOR would take extra (learning) time, although all students were well-versed with computers. The non-PREP group was required to attend biweekly meetings for exchanging feedback. This was not the case for the PREP group. The respondents' self-reports, prompted by interview questions, were our source of information. Completion of assignments required:

- composing and writing draft versions;
- giving feedback on peers' drafts;
- exchanging feedback; and
- revising, supported by the feedback received.

In Figure 2, we depict the time spent on these activities by the 10 students we interviewed.

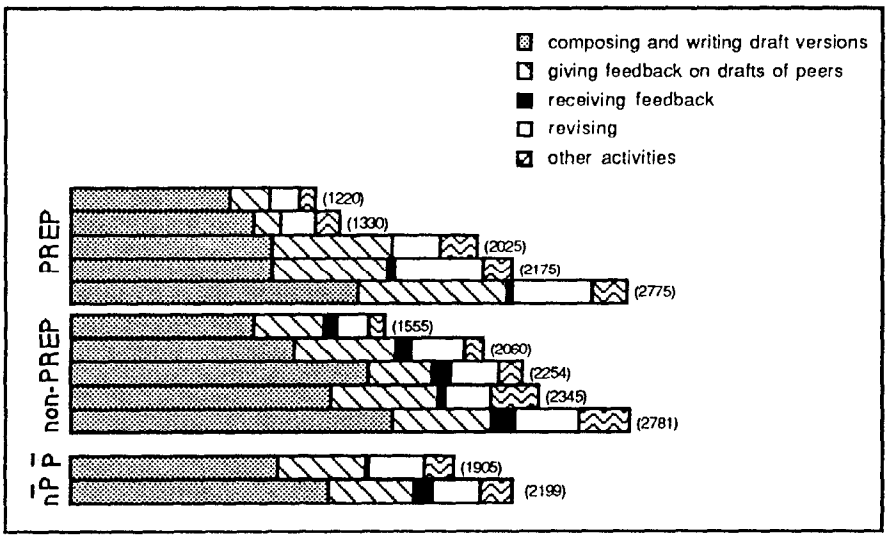

Figure 2. Time spent on various writing activities.

TABLE 1
Mean Time (in Minutes) Spent on Receiving Feedback and Revising

	Condition	
Problems	PREP	non-PREP
Receiving feedback	9	85
Revising	281	239
Total	290	324

Figure 2 shows that individual differences between respondents were considerable, compared to the group mean difference. The mean total time of the PREP group was 1,905 minutes and in the non-PREP group it was 2,199 minutes, a difference that was not statistically significant (Mann–Whitney: $p = 0.31$). We wondered whether the required biweekly meeting for the non-PREP group accounted for the unexpected similarity. Table 1 shows the average time, in the biweekly meetings, respondents of the two groups spent receiving feedback on their texts, discussing, and subsequently revising them.

Again, we found no significant difference between the two groups in the time factor, both when we take the total time for receiving feedback and revising together and when we examined revising separately (Mann–Whitney: $p = 0.69$; $p = 0.84$, respectively). We were tempted to conclude that PREP is so transparent, as both a computer program and a writing tool, that using it increases neither the writer's workload nor the cognitive load. Although the time measures suggest this, the claim is contradicted by the scope of the problems mentioned by the respondents.

Dominance of Technology

We wanted understanding of the problems respondents experienced, so we asked an open question about problems in every interview session. Table 2 shows the nature and number of the problems reported; the table does not indicate the seriousness of the problems. The PREP group reported more problems with regard to the software used, access to the

TABLE 2
Number and Nature of Problems Mentioned

	Condition	
Problems	PREP	non-PREP
With technology	28	5
Other	12	46
Total	40	51

computers, and other computer-related issues than the non-PREP group.[3] So, although PREP appeared to take no extra time, the respondents definitely had problems with the program.

The non-PREP group complained quite often about course design, the schedule, and assignments. Contrary to the PREP group, they met with the teacher and had direct access to additional information if things were unclear. Nonetheless, the PREP group working with exactly the same design, deadlines, and assignments reported fewer problems with those issues. Could it be that the technology was so dominant in the course that PREP users "forgot" to complain about other issues that caused problems? Or did they perhaps overlook their own problems because there was no teacher around to make them sensitive to the complexity of the assignments? The distance character of the PREP-supported course precludes the possibility of a well-informed guess for answering these questions. And this is exactly what we felt to be one of the hardest problems to tackle as teachers: How to keep in touch with what is happening in small groups if the only thing you can see are the groups' products (drafts and comments). We felt we lagged behind in information if students had problems that perhaps were not recognized as such by them or that they preferred not to report to us directly. The problem appears to be inherent in all distance learning situations but was exacerbated by the use of written discourse (on screen) for communication with the teacher.

Sufficient Means of Communication?

In addition to the earlier observation, as teachers we felt we had too little contact with students to prevent part of their problems. We wondered whether the fact that respondents sought additional communication indicated that somehow the computer-mediated communication did not work well enough for them. In the interviews, we asked students to report any communication apart from the sessions on screen (for the PREP group) or the biweekly required meetings (for the non-PREP group). Table 3 summarizes the number of times respondents sought additional communication and the topics of the contacts.

Both groups used additional contacts for group organization, such as fixing or changing dates for deadlines. Beside that, the PREP group clearly needed more contacts than the non-PREP group. Uncertainty about schedules and complex assignments, a major source of problems for the non-PREP group, were fixed by the PREP users by consulting peer-group members instead of the teacher. They also consulted their peers when they had problems operating PREP; although technical and instructional assistance was available at set hours, only about one third of the PREP users showed up with questions.

Can we conclude that the members of the PREP group felt more on their own in the course and, on the whole, succeeded in finishing the course in a teacher-independent way? We would like to answer this question positively, but we can't: We observed more than the average amount of problems in the PREP group. We saw one student (out of 15) dropping out; we saw students who repeatedly failed to make their texts available in time for their peers or failed to provide feedback; we had many students who exceeded

[3]In the course's beginning, especially, files created on an IBM/compatible DOS system caused problems. Even though the import of IBM/compatible DOS files was supported, that feature appeared not to be tested as intensively as other features, perhaps because the program is being developed in a completely Macintosh environment. In an upgrade of PREP-EDITOR, provided by the developers, the problem was solved to a large extent.

TABLE 3
Topics and Numbers of Additional Communication Events

	Condition	
Problems	PREP	non-PREP
1 Small group organization	8	10
2 Course design, assignments, schedule	11	2
3 Working with PREP	10	-
4 Providing feedback on texts	6	0
5 Explaining given feedback	4	1
6 Asking teacher for information	2	0
7 Explaining own texts	1	0
Total	42	13

deadlines for handing in their papers. And in many cases, we did not hear about problems that caused the dropout, the missing commitment, or the unmet deadline.

Interesting to see is the considerable number of times PREP users used the telephone, brief notes, or face-to-face meetings to give feedback on their peers' texts and explain the feedback they gave on screen. PREP has been designed exactly with these activities in mind. The respondents, however, appeared not to be completely satisfied with PREP as a means of communication for these activities.

Printing

An additional form of communication, not mentioned yet, was by means of a printed copy of a document. Students in the non-PREP group distributed printed copies of each assignment to each peer and, after revision, to their teacher; they wrote their feedback on the paper copy. So, this group had to make quite a lot of prints—in sum 61 different text versions, often printed in two or three copies. In addition to these required prints, two respondents printed one particular assignment out for their own records and one respondent made text files of her feedback and handed a printed copy to her peer. Compared to this amount of printing, the PREP group printed less—and for other reasons. They printed 23 text versions, often one copy, and mentioned the following reasons to print:

- to read, check, and revise their text before they hand it out to peers;
- to read texts of peers in order to give feedback (sometimes first on paper then on screen);
- to keep a hard copy of all assignments;
- because they had no access to a computer terminal in the lab at the time they wanted to work;
- because the manual did not support flow-charting (required in Assignment 5) sufficiently; and
- to read the feedback received (but only in the first week).

Three respondents made prints regularly, one respondent once, and the last respondent never made a print.

We think that our respondents found out for themselves what researchers have observed about revising on screen: It is hard to detect problems in long texts on small screens (Haas & Hayes, 1986). When revising on screen, writers tend to look at more local text problems (Van Waes, 1992). Because we required our respondents to pay attention explicitly to commenting and revising on a global text level, they felt they needed printouts. We think we can support a task perception of revision being much more than proofreading by suggesting to students that they evaluate texts in hard copy.

DISCUSSION

We interviewed students in a scientific-writing course to find out about the possibilities and limitations of the program PREP-EDITOR, a review-support program, as a means of communication in a peer-group-feedback course design. We also wanted to compare the problems reported in the literature about computer-supported collaborative writing with experiences of our students.

This study cannot answer a question we all would like to see answered: Do students give better feedback or write better texts when they give and receive feedback with the computer as a means of communication? Efforts to assess the influence of word-processing systems on revision behavior and resulting text quality demonstrate quite clearly the complexity of the issue of quality in relation to the computer tool (Bangert-Drowns, 1993; Barker, 1987; Hawisher, 1989). But we can give you our preliminary perception as teachers, and this derives primarily from the comments respondents made, not from the texts they produced.

We had the impression that student feedback in PREP was more extensive and more carefully worded than in paper copies. When commenting on text ourselves, we noticed that the process of critiquing the text (with the computer) was not much different from what we were used to doing on paper copies. We liked the facilities to edit comments and used those extensively. We seldom used the facility to give spoken comments because of lack of computer memory. Respondents who received such oral computer-mediated comments liked it but more as a gadget than as an alternative. As in our traditional courses, most students used the critique to improve their texts considerably, but some did not profit from it.

The interviews suggested that use of the PREP program (instead of biweekly face-to-face meetings) did not take extra time for the respondents, though they were certainly confronted with the "teething troubles" of a prototype in development embedded in a newly designed course. Although students selected themselves for PREP use, not all were proficient on Macintosh computers and this caused problems and time loss. Our conclusion is that, provided students are skillful computer users and the program runs on the platform they generally use, time is not an argument against using PREP-like programs for exchanging feedback. Use of PREP did not affect the time spent on various writing activities as far as we can see.

But time is not a good argument for deciding whether the program was a sufficient means of communication as it was used: asynchronously and distributed. Both the number of times respondents sought additional contact with their peers and their printing behavior suggests that, in itself, the communication by means of the computer was not enough. They wanted synchronous communication (like telephone calls) when confronted with a problem or when settling dates. For these issues, the PREP users relied on their peers, though the non-PREP users relied on the teacher. And they wanted paper copies to

detect text problems both in their own texts and in those of peers. We decided that the next time we use a program like PREP-EDITOR we will give students more precise indications of when to use the program and when to use other means of communication. However, we are somewhat cautious to encourage our students to meet face-to-face and to use hard copies for reviewing the text. Does that mean, therefore, that we renounce using PREP for some of the reasons we offered for using it in the first place?

One of the things we wanted to find out by means of our explorations was whether the problems we observed coincided with the problems observed by other teachers and researchers. It proved difficult to answer this question on the basis of data we collected in this small-scale study. Although we certainly had the impression that groups were not working optimally, we had little understanding of the PREP-users' group situations as they rarely approached us about their experiences. Only in a post-course evaluation did some students hint at insufficient argumentation in the feedback they received, lack of overview of documents, and the previously indicated access and technical problems.[4] We feel we were confronted with student problems only when and if products did not meet our expectations, and we think our students have the right to demand more teacher intervention, for example, when the small-group processes are causing problems.

Making up a balance of costs and benefits of the course, we conclude that use of PREP as a platform for our small-group writing course tipped the scales to the negative, even if we don't take implementation problems into account. This negative judgment has more to do with dissatisfaction with a system of distance learning than with the software per se. It also is caused by technical problems, such as limited access time for students and slow computers. But, in a way, the question of whether we should use such programs will be outdated before we can answer it on the basis of rational arguments: With increasing pace, people *are* using networks to collaborate on writing tasks. We suggest that future articles about computer-mediated writing should focus on developing design criteria from the perspective of a writing expert. The central question then should become *how* writers can collaborate optimally in such a writing environment rather than *why* they should do so.

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[4]At that time, they mentioned as advantages the facilities to edit comments, to integrate comments in the text, and release from the required meetings.

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