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ABSTRACT

A study investigated the impact of task definition on students' revising strategies to determine whether college freshman writers could revise globally if instructed to do so and if those global revisions would result in improved texts. Data were elicited from 38 students enrolled in two entry-level college writing courses. Participants, randomly assigned into two groups, were asked to revise a text evidencing both global problems such as poor organization and poor adaption to audience concerns and local problems such as errors in spelling, punctuation, diction, and agreement. One group was given eight minutes of instruction on how to revise globally, and the other was simply asked to make the text better. Results revealed that the texts written by students who received the instruction were significantly better in quality and included significantly more global revision. Results also revealed that the improvement affected the treated population generally rather than just a small part of that population. Findings suggest that the change in task definition allowed students to tap revision skills that they already had available. (Two figures of data are included; two appendixes containing the text and directions used for revision are attached.) (YEH)

Center for the Study of Writing

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John R. Hayes

July, 1990

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CENTER FOR THE STUDY OF WRITING

Abstract

This study investigates the impact of task definition on students' revising strategies. Our primary aim was to determine if freshmen students could revise globally if instructed to do so and if those global revisions would result in improved texts. We asked two groups of freshmen to revise a text provided by the experimenters; one group was given eight minutes of instruction on how to revise globally, and the other was simply asked to make the text better. The texts written by students who received the instruction were judged both to be of significantly better quality and to have included significantly more global revision. Further, the improvement appears to affect the treated population generally rather than just a small part of that population. Thus, at least for these college students, the change in task definition allowed them to tap revision skills that they already had available.

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REDEFINING REVISION FOR FRESHMEN

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When students have trouble revising, teachers must consider several possible sources of difficulty. First, students may have trouble because they are missing essential revision skills. In a protocol study, Hayes, Flower, Schriver, Stratman, and Carey (1987) found that college freshmen often lacked the skills necessary for them to detect problems in their texts. For example, students often read the following sentence several times: "In sports like fencing for a long time many of our varsity team members had no previous experience anyway." One of these students not only failed to find any fault but actually commented favorably on it, saying, "Freshmen would like that." Further, Scardamalia and Bereiter (1983), working with fourth, sixth, and eighth grade students, and Bartlett (1981), working with seventh and eighth grade students, report that even when students do detect problems in text, they may lack the skills necessary to detect and fix them. For example, Bartlett (1981) found that students attempting to fix one type of ambiguity succeeded in less than 60% of cases. Lack of skills needed to detect and fix both local and global problems is perhaps the greatest difficulty the student faces. Overcoming this difficulty typically requires students to engage in extended training and practice.

A second potential source of revision difficulty has been discussed most extensively by Scardamalia and Bereiter (1983). They suggest that even if students have all of the necessary low-level skills required for revision, they may not have the executive procedures required to coordinate those skills. Thus, although students may have the skills to deal one at a time with issues of syntax, diction, or audience, they may not be able to handle them simultaneously. For example, students might fail to attend to the interests of their audience because they are completely absorbed in dealing with problems of grammar or word choice. Scardamalia and Bereiter (1983) applied a method they developed called "procedural facilitation" to help students coordinate revision skills. To facilitate the revision process, the researchers provided 30 fourth grade, 30 sixth grade, and 30 eighth grade students with cards which reminded students of evaluations they might make or tactics they might employ. The cards contained statements such as "People may not believe this," "I think this could be said more clearly," and "I'd better give an example." As students revised sentence by sentence, the cards helped them to remember to address both local and global issues. For each sentence, they were first to choose the most relevant cards, and then, where appropriate, to revise.

Scardamalia and Bereiter (1983) reported that these elementary and middle school students had little trouble in mastering the procedure and generally reported that the cards helped them to think about their writing; however their revisions were not better in overall quality than their original text. Thus, it seemed that procedural facilitation did help them to coordinate their revision skills. However, Scardamalia and Bereiter (1983) observed that when the students found problems, they lacked the skills required to fix them. Thus, the advantages provided by procedural facilitation in recognizing problems were not translated into improved text. Procedural facilitation, then, appears to be a promising way to help coordinate revision skills. However, unless all of the requisite skills are in place, it may not result in improved texts.

A third source of difficulty in revision, and it is this difficulty that will be the focus of this paper, is inappropriate task definition. By task definition we mean the writer's

understanding of what he or she is supposed to do when facing a writing task such as revision. When teachers assign revision tasks, they typically hope that the students will define revision in the same way they do, that is, that their students will set the same goals, make use of the same procedures, and apply the same criteria for success. However, considerable evidence suggests that many freshmen students define revision very differently from their teachers.

A number of studies indicate that more skillful writers approach the task of revision differently than do less skillful writers. Many researchers have found that inexperienced writers typically treat revision as a *local task,* that is, a task of changing words and sentences rather than of modifying the goals or organization of the text to meet criteria of the rhetorical situation. Stallard (1974) found that only 2.5% of twelfth grade students' revisions were focused above the word and sentence level. Bridwell (1980) also found that relatively few of twelfth grade students' revisions were above the sentence level. In contrast, more skillful writers treat revision as a *global task,* that is, one concerned with the purpose, the audience, and the overall organization of the text. This contrast is also seen in Sommers' (1980) study in which she found that freshmen college students "understand the revision process as a rewording activity . . . they concentrate on particular words apart from their role in the text" (p. 381). Again, as in Bridwell's study, experienced writers (e.g., journalists, editors, and academics) focused on global issues. Sommers (1980) notes that they "describe their primary objectives when revising as finding the form or shape of their argument" (p. 384). That is, she found that experienced writers have a second objective, "a concern for their readership," that went beyond making local changes. Faigley and Witte (1981) supported Sommers' conclusions by finding that expert writers were more likely to make global revisions and revisions that changed meaning than were either advanced students or inexperienced students. Most recently, Hayes, Flower, Schriver, Stratman, and Carey (1987) provided further confirmation for these observations in a protocol study of college freshmen and of experienced writers (writing instructors and writer-editors). They found that during revision the experienced writers were much more likely than freshmen to adjust the text globally to the audience's needs and the author's overall purpose. The freshmen, in contrast, tended to focus on changing individual words and sentences within the text.

Although it is clear that most freshmen approach the task of revision at a more local level than do more experienced writers, it isn't clear why they do so. One possibility is that freshmen have not yet acquired the skills necessary for handling global text problems and that they revise locally because they can't do otherwise. Another possibility is that freshmen have the requisite skills to revise globally but that they have an inappropriate task definition, that is, they have not defined revision as a task that requires attention to global problems. Results obtained by Matsuhashi and Gordon (1985) with basic college writers provide some support for this possibility. These authors found that students who were asked to "Add five things to your essay to improve it" did make more additions to their texts than students who were asked to "Revise your essay to improve it." Thus, these students had the ability to add to their text even though they normally did not do so during revision. The authors argue that for basic writers, any additions very likely constituted improvements to their typically spare texts. However, since Matsuhashi and Gordon (1985) did not evaluate the quality of the texts before and after revision, it is not clear that the additions actually improved the texts.

The present study was designed to answer the question, "Can freshmen carry out global revision successfully if they are instructed to do so?" To give a positive answer to this question we must demonstrate first, that students instructed to revise globally do more global revision than student simply asked to revise, and second, that students instructed to revise globally produce better revisions than students simply asked to revise.

The pedagogical attractiveness of modifying students' task definitions is that, if it works, it can presumably yield improvement quickly and cost-effectively. That is, it may cue students to use abilities that they already possess. However, if it is to work, the students must have both the underlying revision skills as well as the ability to coordinate those skills. Whether or not typical college freshmen meet these two conditions is by no means obvious.

Briefly, our study asked two groups of freshmen to revise a text provided by the experimenters. One group was given eight minutes of instruction on how to revise globally, and the other was simply asked to make the text better. Our primary aim was to determine if freshmen students could revise globally if instructed to do so and if those global revisions would result in improved texts.

METHOD

Participants

The participants in this study were 38 students enrolled in two entry-level college writing courses at Carnegie Mellon University. The students were enrolled in the colleges of Fine Arts, Engineering, and Humanities and Social Sciences.

Materials

The text to be revised was a 437-word description of the water treatment process (see Appendix A) intended to be used as a handout for high school students who tour a water treatment plant. The text, presented in 2 1/2 typewritten triple-spaced pages, included both global problems such as poor organization and poor adaptation to audience concerns and local problems such as errors in spelling, punctuation, diction, and agreement.

Procedure

The study was conducted in two writing classes during the ninth week of a sixteen-week semester. Half of the students in each class were randomly assigned to the treatment group; the other half served as the control group. The mean SAT verbal score for the control group (532.2) was slightly higher than that for the treatment group (514.4).

After giving brief instructions about the nature of the study, an experimenter (not the instructor for the course) asked the control students to go with another experimenter to a nearby room to complete the experiment. The experimenters read the same brief task instructions to both the experimental and control groups. These task instructions (see Appendix B) informed students that they would have 30 minutes to revise a short text about the operation of a water treatment plant so that it could be used as a handout for high school students who tour the plant. The instructions (see Appendix B) specifically cued students to revise so that the handout would be "clear, organized, easy to read, and free of errors." The instructions also directed students to mark deletions, additions, changes, and movements of text in standard ways such that a typist could easily retype their revised texts.

After reading these instructions and asking for questions, the experimenters reminded the students that they had 30 minutes to complete their revisions and instructed them to begin. The students were informed when they had 15 minutes and 5 minutes

remaining. For each of the experimental and control groups, the experiment was completed within the 50-minute class period.

Procedures for the two groups were identical except that an experimenter presented eight additional minutes of instruction to the treatment group on how to revise globally. The instructor told students in the treatment group that the instruction would help them with their revision by showing them differences in the way experienced and inexperienced writers revise. The experimenter illustrated the differences using overhead transparencies to compare revisions by an expert writer and a novice writer on a task similar to the task for this study. Major differences included:

- *basic approach*—The more experienced writer focused on improving the whole text; the less experienced writer searched through the text for errors.
- *basic procedure*—The more experienced writer read through the entire text to identify major problems before beginning to revise; the less experienced writer read through the text only once making changes sentence-by-sentence.
- *specific changes*—The more experienced writer addressed global issues such as audience, purpose, and overall organization; the less experienced writer eliminated spelling, wordiness and grammar errors.

The eight minutes taken by the special instruction of the experimental groups was approximately equal to the time it took to change rooms for the control groups.

RESULTS

Three separate analyses were conducted: a global revision analysis, a text quality analysis, and an error correction analysis. In all of these, the experimental treatment under which the revisions were produced was hidden from the judges.

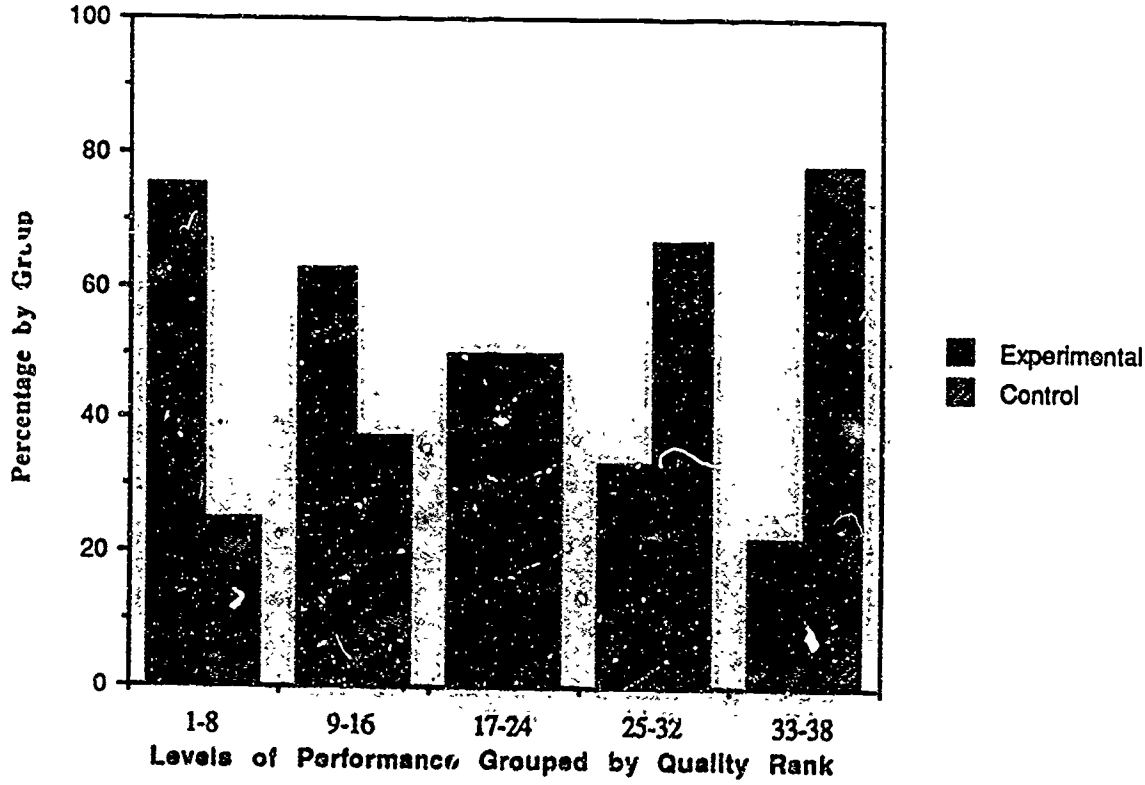
The global revision analysis was conducted to determine if the 8 minutes of experimental instruction had, in fact, led students to do more global revision. To make the revised texts easier for the raters to read, each text was retyped making all changes indicated by the writers. The retyped texts were spell-checked and proofread for accuracy against the writers' handwritten revisions. Two judges independently rank-ordered all 38 revised texts for the extent to which they incorporated global revisions of the original text. The reliability of the raters was evaluated in two ways. The Spearman rank order correlation between raters was .60, and Diedrich's (1974) top-quarter tetrachoric correlation yielded an adjusted agreement rate of .92. We used the Diedrich measure in addition to the Spearman rank order correlation because of the peculiar distribution of revision activities across participants. Some revisors change the original text extensively whereas others change it very little. Differences among the more extensive revisors are larger and easier to agree on than differences among the less extensive revisors. Thus, measures such as Diedrich's, that focus on the more extensive revisors, will typically yield higher and, we hope, more informative indexes of reliability than will measures, such as the Spearman correlation, which do not.

The global revision rankings averaged across the two judges were significantly higher for students in the experimental group than for students in the control group at the .008 level by Mann-Whitney test [U=90]. In fact, the seven highest ranks were all obtained by students in the treatment group.

To compare the quality of the revised texts, the second analysis compared the treatment and control groups for the overall quality of the revised texts. Two additional judges independently rank ordered the texts. The reliability of the raters was again evaluated in two ways. The Spearman rank order correlation between raters was .53, and Diederich's (1974) top-quarter tetrachoric correlation yielded an adjusted agreement rate of .86.

Similar to the results for global revision, the quality rankings, averaged across the two judges, were significantly higher for students in the experimental group than for students in the control group at the .012 level by Mann-Whitney test [U=94]. The six highest ranks were all obtained by students in the treatment group. In addition, the two dependent measures, global revision and overall quality, are strongly related. The Spearman rank correlation between the average global revision rankings and the average quality rankings was .805.

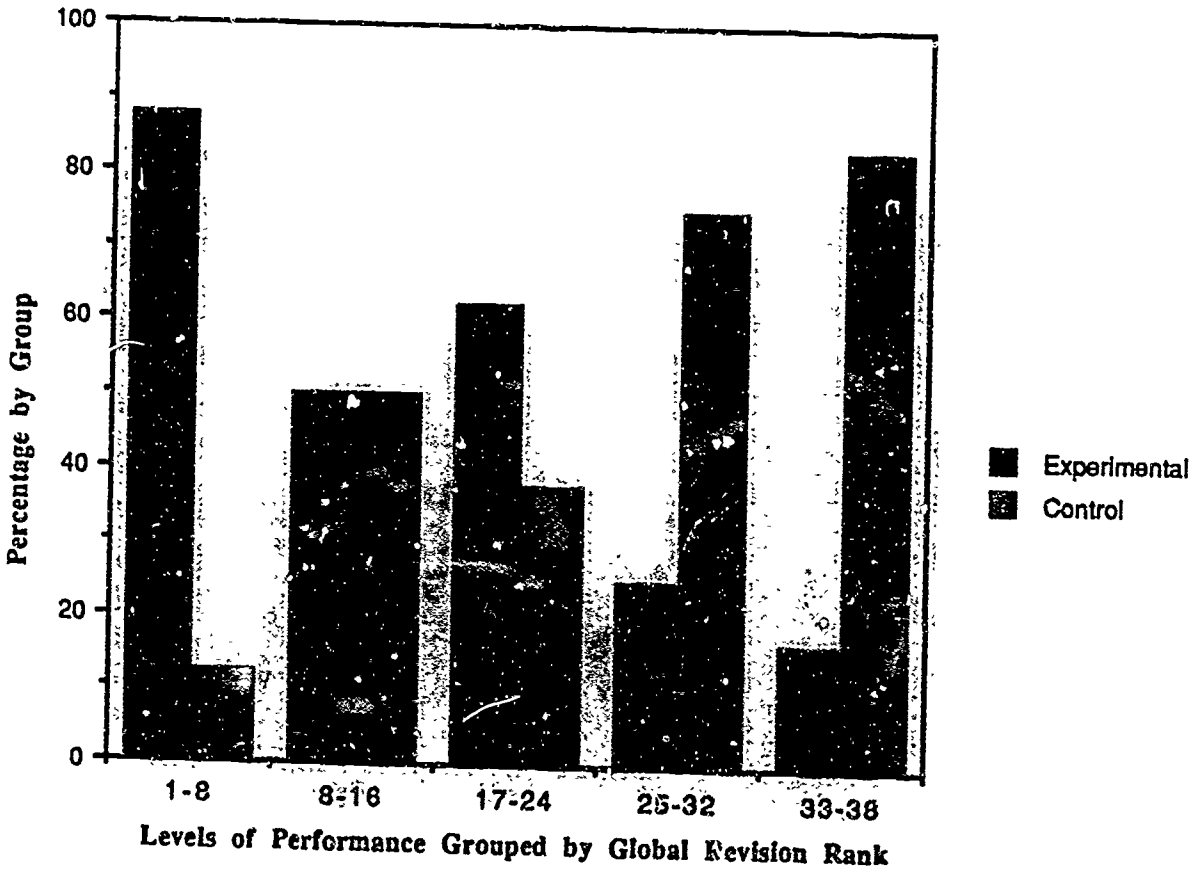
Figure 1: Quality for Experimental and Control Conditions



It is possible that the effect of the special instructions depended entirely on 6 or 8 participants who "get the message" while the rest are unaffected; that is, the performance of a few students in the treatment group could account for the significant difference between the two groups of writers. If this were the case, we would expect the treatment group to dominate the top rankings but to be relatively evenly distributed over the remainder of the rankings. To explore this possibility, we divided the 38 quality rankings into five groups: ranks 1-8, 9-16, 17-24, 25-32, and 33-38. Figure 1 shows that for quality rating, the proportion of participants in the treatment group declines steadily across the five ranks while the opposite is true for the control group. For example, in the highest-rated group

(ranks 1 through 8) 75 percent of the participants were in the treatment group. Moving to the right, the proportion of treatment group participants declines steadily and nearly linearly as quality decreases. Figure 2 indicates the same general trend for the global revision rating although the rate of decline across ranks for the experimental group is not as linear. While not conclusive, these results suggests that the instruction helped most of the participants in the treatment group to improve their performance rather than just a few.

Figure 2: Global Revision for Experimental and Control groups



The error correction analysis compared treatment and control groups for the numbers of word and sentence-level errors planted in the original texts that were not included in the revised texts. To conduct this analysis, a rater compared each of the revised texts (the participants' originals, not the retyped and spell-checked versions) against the set of planted errors and judged whether the error had been either corrected or eliminated. To establish reliability, a second rater followed the same procedure for a 20 percent sample of the data. With approximately 15 minutes of training, the raters reached a direct match agreement rate of .99. On the average, writers in the treatment group eliminated 10.3 errors and writers in the control group, 8.8 errors. However, the difference was not significant by one-way analysis of variance. Thus, although we might have expected the treatment group to focus more on global problems than on local ones, neither group eliminated significantly more of the planted errors from the text.

DISCUSSION

The most striking result of this study is that we were able to produce a significant increase in global revision and in revision quality with just eight minutes of instruction. Further, the improvement appears to affect the treated population generally rather than just a small part of that population. Thus, at least for these college students, our manipulation allowed them to tap revision skills that they already had available.

Although this is good news, our results must be qualified in several ways. First, we have observed students revising texts written by others. Whether our instruction would help people revising their own texts remains to be seen. Second, we believe that instruction to change task definition can be effective only if the participants already have certain fundamental revision skills and the ability to manage those skills. Since the results of Scardamalia and Bereiter (1983) and Bartlett (1981) suggest that these conditions may not be met in primary school students, it would be unwise to assume that results similar to ours could be obtained in the primary grades. Third, we have not shown that the results of our instruction persist. That is, we have not shown that the next time students in the treatment group revise, they will do it any better than the control group. We have shown, though, that the potential for doing better is there. And, even if a single presentation of the instruction has only transitory effect, that is not reason to be discouraged. Because the instruction is extremely inexpensive in instructional effort, students can be reminded frequently about global revision without great cost.

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Appendix A: Original Text
Lowell Water Treatment Facility

The following is a description of the process by which water from the Merrimack River is made potable at the Lowell Water Treatment Facility.

The Merrimack River water pumped by an intake station contains various particals. Chlorine is added to the water to kill all pathogenic (disease-causing) organisms before the water is conveyed to the static mixer, which blends the constituents to a specific degree of uniformity, In addition, chemicals like NaOH and $Al(OH)_3$ are added; the former adjust the water pH to a satisfactory level, which is needed for the treatment process; the latter acts as a coagulant. Coagulation is reduction of net electrical repulsive forces at particle surfaces. This process is required to facilitate flocculation in the next step.

Flocculation is when particals are aggregated by chemical bridging between particals in order to increase there weight and size, and makes the next state—sedimentation—possible.

Sedimentation is the removal of solid particals from a suspension through gravity settling. The liquid that has not been flocculated is run out to sludge lagoons and stored there. The Merrimack's water is brown because of various particals; the method used to clear it is sedimentation. The settling particals in sedimentation are the ones that sink down due to their weight. Nonsettleable particals and other impurities are removed by rapid sand filters, which are extremely complicated. Their action can be described as consisting of a combination of straining, flocculation, and sedimentation together.

The next step takes place in the activated charcoal filter where odor is removed from the water by a vegetable carbon that has been heated in a special atmosphere consisting of the components of CO_2 and steam.

The fluoridation and post chlorination are done in the clear well. The amounts of fluoride added is one unit of fluoride per 1,000,000 units of water; it is required for dental care. Chlorine is re-added to the water after treatment has been completed to kill any remaining surplus pathogenic organisms. After this stage, water is potable and is transported and conveyed to pipelines.

The entire process takes about 31 hours: 1/2 hour in the intake station and static mixer; two-and-a-half hours in the flocculation basin; 4 hours in the sedimentation basin, 24 hours in the filters and clear well.

As the major water treatment plant in the region, the average daily production is 14 million gallons (MG), of which 12 MG is for consumption and 2 MG is for storage. The plant supplies water not only to Lowell but to neighboring communities like Chelmsford, Tewksbury, and Dracut.

Appendix B: Directions

Your task for the next 30 minutes is to revise a short text about the Lowell Water Treatment Plant so that it can be used as a handout for the high school science students who tour the plant. When you've finished, the text should be clear, organized, easy to read, and free of errors. Keep in mind that it will be used as a handout for high school students.

Any changes that you make in the text should be clearly marked so that a typist could easily retype the text making your changes. The text that you will revise has been triple-spaced to give you room to make changes; you will also find blank paper in your packet should you need it. Please use the following system for marking changes:

Deletions: To delete something from the original text, place an X through it.

Additions: To add something to the original text, write it in close to its position in the text and mark the exact position with an arrow. Should you wish to insert something that you have written on the blank paper into the original text, please place it in brackets (i.e. [ ]) and number it (i.e. #1). Then simply place [#1] at the appropriate place in the original text.

Changes: To change wording, spelling, punctuation, or capitalization mark out the appropriate word(s) or punctuation with an X and add the new word(s) or punctuation near the change.

Moves: To move something in the original text, place brackets [ ] around it and use an arrow to indicate where you wish it to be placed.

Please do not turn this page until instructed to do so.

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