

*EFFECTS OF GUIDED NOTES VERSUS COMPLETED NOTES
DURING LECTURES ON COLLEGE STUDENTS' QUIZ PERFORMANCE*

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We compared the effects of guided lecture notes versus completed lecture notes on pre- to postlecture improvements in quiz performance across two sections of a college course. The results of a counterbalanced multielement design did not reveal consistent differences between the two note formats on students' mean quiz scores. However, fewer errors occurred on complex (analysis-level) quiz questions in the guided notes condition than in the completed notes condition.

DESCRIPTORS: college instruction, college students, guided notes, lecture notes, quiz performance

Although research on note taking suggests that review of accurate, thorough, and organized notes is associated with better quiz performance (Kiewra, 1987), many college students do not produce adequate notes during lectures. In a randomly selected sample of 40 students in an introductory psychology course, Baker and Lombardi (1985) found that most students recorded about 50% of the main ideas targeted in a lecture and less than 25% of other relevant material. Other investigators have reported similar findings (Hartley & Cameron, 1967; Howe, 1970).

As a solution to this problem, some researchers have recommended a modified form of instructor's notes called guided notes, which include consistent cues (e.g., blank lines) for students to record key points (Barbetta & Skaruppa, 1995; Heward, 1994). According to Barbetta and Skaruppa, guided notes have a number of potential advantages relative to personal (student-produced) note taking. These include reduction in errors associated with determining what to write, minimal writing requirements to allow more opportunities to

listen and participate, the provision of a standard set of notes for test preparation, and requirements for active student responding in completing the notes.

In one of the only studies to apply the recommendations of Barbetta and Skaruppa (1995) to a college classroom, Austin, Lee, Thibeault, Carr, and Bailey (2002) examined the effects of guided notes on the in-class participation and postlecture quiz performance of 27 students in an introductory behavior analysis course. Overhead transparencies that contained important lecture information (e.g., terms and key points) were used in both the guided-notes and no-guided-notes conditions of the multielement design. Unfortunately, evaluation of the effects of guided notes on student participation was obscured because of differences in instructor prompting across conditions. Despite the fact that differences in instructor prompts were weighted in favor of guided notes (ostensibly resulting in more active student responding in that condition), average quiz scores were similar across guided-notes and no-guided-notes conditions. Austin et al. hypothesized that immediate recall of factual information might be an insensitive measure of the effects of guided notes. As recommended by several investigators (Austin et al.; Kiewra, 1985; Lazarus, 1993), research is needed to examine the relative effects of guided notes on

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students' acquisition of different types of knowledge (e.g., application vs. recall of facts and definitions).

Additional replications are needed to determine the relative benefits of guided notes. Some researchers have proposed giving complete instructor's notes to students (Carrier, 1983; Kiewra, 1987; Williams & Eggert, 2002), which might yield benefits equal to or greater than guided notes (e.g., Kiewra, 1985). Completed notes may have advantages relative to guided notes with respect to response requirements (e.g., there is no need for point-by-point correspondence in written responses) and flexibility (allowing students to synthesize and supplement notes themselves). However, completed notes do not require active student responding, and students may not attend as carefully to critical aspects of presented material.

We sought to extend the research on guided notes by addressing these issues in two college classrooms. Specifically, we examined performance with guided notes versus completed notes (notes produced from PowerPoint® lecture slides that were identical to guided notes except that they contained the relevant information in place of blank spaces). We compared guided notes and completed notes with respect to performance on delayed quizzes involving items that required different levels of understanding (knowledge, comprehension, application, analysis).

METHOD

Participants and Setting

Forty-six graduate students in special education, psychology, and physical education participated in the study. Twenty-one students were enrolled in the evening section, and 25 students were enrolled in the afternoon section of an introductory behavioral research methods course taught by the first author (demographic information is available from the first author). The study was conducted during weekly class

sessions (2 hr and 15 min) over an 8-week period.

Procedure and Materials

During each session, the instructor delivered a lecture with PowerPoint® slides that supplemented the reading assignments. The first slide stated the objectives for the session. The second slide presented a question or problem that introduced the topic. The next set of slides presented material pertaining to the question or problem and addressed each of the objectives sequentially with definitions, explanations, examples, demonstrations, and questions. The final set of slides contained review questions corresponding to each objective to assess understanding of the material that had been presented. Tickets for a bonus point lottery at the end of class were awarded to students for comments that contributed to the topic and for correct responses to questions posed by the instructor. Choral responding and response cards were used for short-answer questions directed to the class as a whole.

Students obtained notes to use during the lecture from the instructor's Web site. Completed notes were identical to the slides used during the lecture except that they did not include custom animation (which displayed parts of slides sequentially, or other actions). Guided notes differed from completed notes only in that they contained blank spaces for writing key words or phrases shown in the lecture slides. Examples of completed notes and guided notes pages are shown in Figure 1.

Integrity of Independent Variables

One or two graduate teaching assistants checked the notes of 4% to 28% of the students during each class period ($M = 16\%$). The assistant recorded whether or not the student had the correct set of notes for that session. For sessions in which guided notes were used, the assistant also recorded the percentage of blank spaces that had been completed with the correct information. Of the students checked across

Sample Completed Notes Page

Criteria for a Good Measurement Instrument

- 3. Sensitivity
Detects small variations in the phenomenon



Sample Guided Notes Page

Criteria for a Good Measurement Instrument

- 3. _____
_____ small _____ in the phenomenon

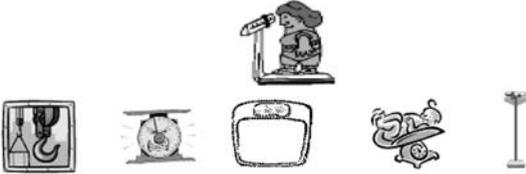


Figure 1. Example of completed notes and guided notes.

both sections, 93% were scored as having the correct notes, and 96% of the blanks were scored as having been completed with the correct information.

Quizzes

A 5-point postlecture quiz pertaining to material from the previous week's lecture was administered during the first 15 min of each class session. One point was allocated for each correct answer to a question (or part of a question when the question called for more than one discrete response). Prelecture quizzes that contained different but equivalent questions were administered separately before the delivery of lectures over the material. Although prelecture quizzes also contained questions for 5 points, students were told that they would not be penalized for incorrect answers, and errors would not affect their grade. Pre- and postlecture quizzes were counterbalanced across the two sections; the prelecture quiz questions for one section were used as the postlecture quiz questions for the other section. If a student missed a lecture, his or her quiz score for that lecture was deleted from the analysis.

All quiz questions required short answers and were directly related to the objectives specified for the session. Across all of the quizzes, 20% of the total points were for knowledge-level questions that required the student only to repeat information that had been presented (e.g., "What is the definition of observer drift?"). Twenty-three percent of the total points were for comprehension-level questions that involved stating an original example of a concept, stating the concept represented in an example, or explaining a concept in the student's own words (e.g., "Give an example other than one presented in class of two experimental conditions that might be compared when using a multielement design for the purpose of a parametric analysis"). Twenty-four percent of the points were derived from application-level questions that required the use of a method, rule, or principle to solve

a novel problem (e.g., "Calculate interobserver agreement for the observer records shown using the exact agreement method"). Twenty-nine percent of the points were for analysis-level questions that required knowledge, comprehension, and application to produce a solution to a problem with multiple parts (e.g., "State the type of interval recording procedure that would yield the most representative data for the continuous measure of behavior shown below"). Four percent of the total points were for synthesis-level questions that required an original product that could take multiple forms to meet specified standards (e.g., "Draw a graph of a changing criterion design with hypothetical data that illustrates the effectiveness of extra playtime as a reward in increasing the number of 'good sportsmanship' behaviors. The data should illustrate the three design considerations necessary for demonstrating experimental control."). This taxonomy is described by Vargas (1972). Scores on the seven postlecture quizzes constituted approximately 26% of each student's grade for the course.

Interscorer Agreement

The instructor and an assistant independently scored a mean of 28% of the quizzes each session. Answers to each quiz question were scored on a separate coding sheet to ensure independent recording. Mean item-by-item interscorer agreement across all quizzes was 92%.

The instructor and an assistant also independently classified the level of 100% of the quiz questions. Item-by-item interscorer agreement was 89%. Following classification of quiz questions, interscorer agreement on correct responses was calculated for each level of question. Item-by-item agreement was 96%, 85%, 94%, 93%, and 92% for answers to knowledge-, comprehension-, application-, analysis-, and synthesis-level questions, respectively.

Experimental Design

Guided notes and completed notes were alternated across lectures using a multielement

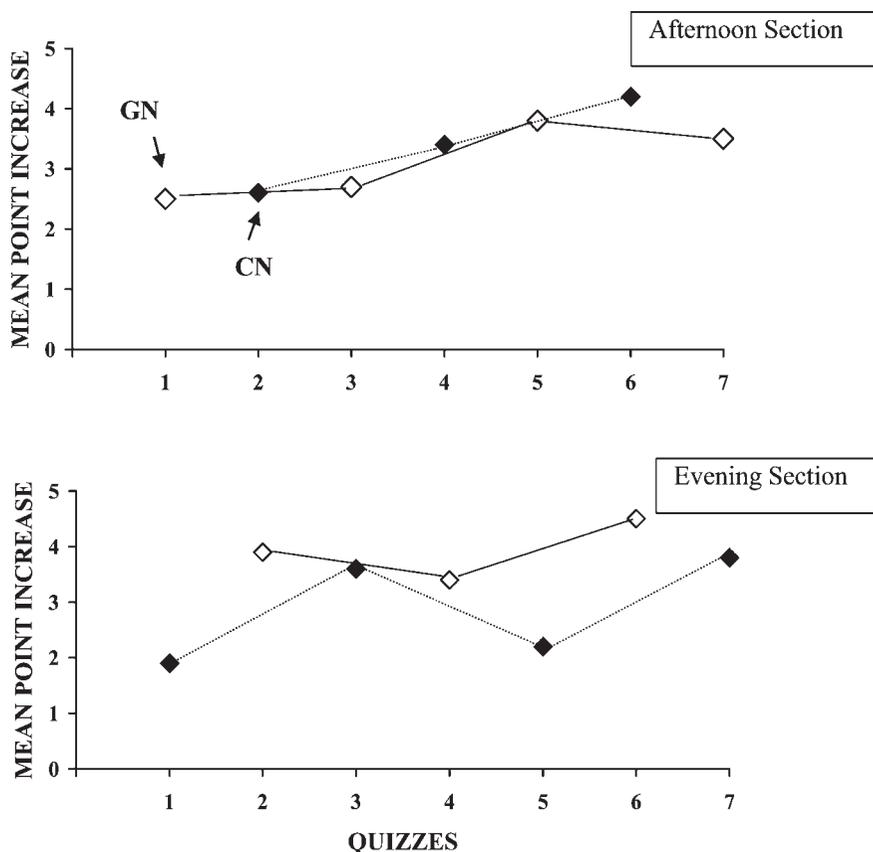


Figure 2. The mean increase in number of correct responses on quizzes across guided notes (open diamonds) and completed notes (filled diamonds).

design. The order of presentation was counterbalanced across the two sections. Thus, during any given week, one section used guided notes and the other section used completed notes. Guided notes and completed notes were also compared to prelecture quizzes over the same material.

Social Validity

Students were asked to anonymously complete a questionnaire at the end of the quarter. Students were asked to circle the number on a 5-point scale indicating the extent to which each of the note formats helped the student (a) to follow the lecture, (b) to study and review the material, and (c) to learn to take their own notes more effectively. Students also were asked to rate the extent to which they supplemented each

type of notes with their own notes, and the type of notes they preferred.

RESULTS AND DISCUSSION

We extended previous research on guided notes in several ways. First, we directly examined the active student responding component by counterbalancing the administration of guided notes and completed notes across two separate course sections. As shown in Figure 2, performance on the 5-point quizzes was similar in the two conditions with the afternoon section; the mean increase in number of correct responses relative to prelecture quizzes was 3.1 for guided notes and 3.4 for completed notes. The mean increase in quiz scores was more

variable, and somewhat lower with completed notes ($M = 2.9$) than with guided notes ($M = 3.9$) with the evening section. For both sections combined, the mean increase in quiz scores averaged 3.5 in the guided-notes condition (range, 2.5 to 4.5) compared to 3.1 in the completed-notes condition (range, 1.9 to 4.2). Individual and collective examination of results for high-performing and low-performing students (available from the first author) revealed similar patterns, suggesting that group means did not mask individual differences.

One possible explanation for the lack of notable or consistent differences between the effects of guided notes and the other note-taking formats on quiz scores in both Austin *et al.* (2002) and the current study is the inclusion of multiple instructional strategies. In the current study, the instructor used choral responding, response cards, and a bonus point lottery as strategies to promote active student responding (see Heward, 1994). As recommended by Kiewra (1987), Austin *et al.* incorporated pauses during lectures to permit time for note taking. Both studies used overhead transparencies or PowerPoint® slides that contained key words, definitions, and examples. Williams and Eggert (2002) hypothesized that visual cues and information provided on transparencies might equalize the note taking and exam performances of students with disparate abilities. These instructional strategies may have masked the relative benefits of using guided notes to supplement lectures. Thus, the generality of the findings might be limited to similar types of lectures.

It is also possible that multiple treatment interference accounted for the similar effects of guided notes and completed notes. Although this possibility cannot be ruled out, several features of this study may have minimized its likelihood, including clear discriminative stimuli that differentiated the two conditions (blank spaces for key words in guided notes) and the relatively slow alternation between note-taking

formats that were administered in a counter-balanced order (Barlow & Hayes, 1979).

Quiz performance in both note conditions was higher relative to the prelecture condition ($M = 0.47$; range, 0.09 to 0.85). However, our design did not allow determination of the extent to which this was attributable to the lectures, the notes, or the point contingencies. In fairness to the students, we informed them that they would not be penalized for incorrect responses on prelecture quizzes given that the material had not yet been presented in class. The fact that students nevertheless almost always attempted to answer the quiz questions (as opposed to leaving them blank) suggests motivation other than that associated with direct point contingencies.

Despite the increases in quiz scores achieved with guided notes and completed notes relative to the prelecture condition, further improvements were possible. A consideration, however, is that the format of the quiz questions (which required short answer essays or diagrams, for example) was more exacting than the multiple-choice format used by some investigators (e.g., Lazarus, 1993).

Another extension of previous investigations was the inclusion of checks to determine the accuracy of the completed guided notes. Given the note-taking difficulties of college students reported in the literature (e.g., Baker & Lombardi, 1985), examination of the extent to which students accurately complete guided notes seems warranted in order to draw appropriate conclusions. We found that over 90% of students (when checked) had correctly completed guided notes.

We further extended research on guided notes by analyzing the data for a sample of students to determine whether errors were more common for certain levels of questions (regardless of condition) and whether there were differences between guided notes and completed notes in errors for levels of questions. Data on 28% of the postlecture quizzes (those for

Table 1
Total Percentage and Proportion of Errors by Type of Question for Sample of Quizzes

Type of question	Guided notes			Completed notes			Total	
	<i>n</i> questions	<i>n</i> errors / (<i>n</i> questions × <i>n</i> students)	% errors	<i>n</i> questions	<i>n</i> errors / (<i>n</i> questions × <i>n</i> students)	% errors	<i>n</i> errors / (<i>n</i> questions × <i>n</i> students)	% errors
Knowledge	5	7 / 36	19	7	8 / 55	15	15 / 91	16
Comprehension	6	7 / 45	16	6	6 / 42	14	13 / 87	15
Application	9	12 / 86	14	9	17 / 93	18	29 / 179	16
Analysis	10	9 / 68	13	8	17 / 46	40	26 / 114	23

which interobserver agreement data were collected) were analyzed for each type of question by counting the number of points missed across all students and quizzes sampled and dividing the sum by the total number of points missed and earned. These data are shown in the total column of Table 1 (synthesis questions were excluded because of the low number of questions). The proportion of points missed was slightly higher for analysis-level questions (23%) than for the other levels (16%, 15%, and 16% for knowledge, comprehension, and application levels, respectively). There was a difference of only 1% to 5% between guided notes and completed notes in the percentage of points missed for each level of question except at the analysis level (see Table 1). Thirteen percent of the points for analysis questions were missed in the guided-notes condition compared to 40% in the completed-notes condition. Thus, although guided notes and completed notes produced similar results for factual questions, guided notes were associated with substantially fewer errors on more analytic-type questions. This suggests that the benefits of guided notes may be more apparent with complex material. Further replications of the effects of guided notes across different types of knowledge are warranted to establish the generality of this finding, especially given that the analysis was conducted with only a sample of the quizzes.

As with the participants in Austin et al. (2002), students in the current study reported a clear preference for guided notes over personal

note taking. Although none of the students in the current study reported a preference for their own notes, most stated that they “usually” supplemented both guided notes and completed notes with their own. Somewhat more students (59%) favored guided notes over completed notes, consistent with their reported perceptions of the note format that helped them to follow the lectures and to study the material; on a scale of 1 (*strongly agree*) to 5 (*strongly disagree*) mean ratings on those two questions were 1.8 and 2.0 for guided notes and 2.2 and 2.4 for completed notes. To the extent that students prefer reviewing some note formats to others, differences in performance may have been partially affected by the amount of time devoted to reviewing guided notes versus completed notes. Previous research has established the importance of reviewing notes in affecting recall of lecture information (Kiewra, 1985, 1987). As such, the continued use of delayed quizzes to measure performance may be preferable to assessments of immediate recall.

There was considerable variation in ratings of the extent to which students found guided notes and completed notes helpful in learning to take their own notes more effectively; mean ratings were 2.6 for both note formats. A question, therefore, is the extent to which guided notes or completed notes contribute to more effective note-taking skills in classes with other types of lectures, or conversely, whether they increase students' reliance on the provision of structured notes.

Overall, the results of our study support previous research showing that providing sets of organized instructor's notes (guided or otherwise) for students to review is both effective and liked by students (Austin *et al.*, 2002; Kiewra, 1985). In a course designed to promote systematic evaluation of the effectiveness of interventions in professional practice, the study illustrates that we practice what we teach.

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