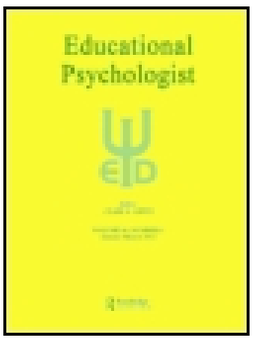

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Providing the Instructor's Notes: An Effective Addition to Student Notetaking

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This review investigates the relative effectiveness of externally provided lecture notes, personally recorded notes, and a combination of the two. Findings indicate that students' own notes are generally incomplete and, therefore, inadequate for reviewing the lecture. Consequently, students who review a detailed set of lecture notes from the instructor generally achieve more on exams than do learners who review their own notes, while learners who review both sets of notes perform best of all. Teachers can also facilitate student learning by providing partial outlines (or skeletal notes) for notetaking prior to the lecture. The additive effects of receiving both partial notes before the lecture and full notes afterwards are unknown but logically beneficial. The paper concludes with instructional implications for increasing the review function of both externally provided and personally recorded notes.

Research investigating the process of notetaking is mixed (see Hartley, 1983; Kiewra, this issue pp. 23–32 for reviews), indicating that notetaking during lectures is occasionally no more effective than not recording notes if notes are not subsequently reviewed. Notetaking may be ineffective because of the often incomplete notetaking styles of college students. Quantitative assessments of critical lecture ideas contained in students' notes range from 11% (Hartley & Marshall, 1974) for some freshman students to 70% for a group of juniors in education (Kiewra, 1984a). Other studies that have investigated the percentage of critical lecture ideas recorded also report findings within that range: Locke (1977), 62% for "A" students; Howe (1970a), 55%; Crawford (1925), 53%; Kiewra (in press-a), 30%; Hartley and Cameron (1967), 24%; and Kiewra (in press-b), 20%.

Although student notetaking is often brief and of questionable value, there is evidence that reviewing personal lecture notes leads to higher achievement than not reviewing notes (see Hartley, 1983; Kiewra, this issue). Thus, the process of recording notes appears somewhat ineffective, but the notes produced are valuable when they are reviewed. In fact, several studies have experimentally confirmed that the review of notes is more important than is the process of recording them (Carter & Van Matre, 1975; Fisher & Harris, 1973; Howe, 1970b; Rickards & Friedman, 1978).

Because of the generally incomplete notetaking behaviors of college students, the equivocal process function of notetaking, and the importance of review, perhaps it is best to supply learners with a set of notes prepared by the instructor rather than have them record and review personal lecture notes. Under such conditions, students would not have to divide their attention during acquisition between listening and notetaking and could subsequently review a far more complete set of notes than they would review typically.

What follows is an examination of two types of instructor's notes: full notes, which are distributed following the lecture and contain all of the lecture's main ideas and supporting details, and skeletal notes, which are distributed for notetaking prior to the lecture and briefly highlight only the lecture's main points. The relative effectiveness of instructor's notes, personal lecture notes, and a combination of two—with respect to factual and higher order achievement—is reviewed and implications for facilitating the review process are provided.

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Reviewing Full Instructor's Notes Versus Personal Lecture Notes

Several studies have compared the review potential of personal lecture notes and full instructor's notes under varying acquisition and testing conditions. Table 1 summarizes the methodologies and results of these studies.

Under immediate review and testing conditions, full instructor's notes are apparently interfering and, therefore, dysfunctional when compared with the review of personal lecture notes. On an immediate recognition test of factual information, following a review period, Kiewra (1984b) found that subjects who took and reviewed their own notes achieved more (93% correct) than did learners who took notes but reviewed the instructor's notes (71% correct) or students who only listened to the lecture and then reviewed the instructor's notes (79% correct). Similar findings, reported by Fisher and Harris (1973), also favored reviewing one's notes over reviewing the instructor's notes—especially when notes were recorded during the lecture. Apparently, reviewing the instructor's notes is more interfering for learners who have just recorded notes than for learners who have simply listened to the lecture.

Some investigations comparing the relative advantages of reviewing personal notes or full instructor's notes prior to a delayed exam have also found little support for the latter. Thomas (1978), Annis and Davis (1975), and Fisher and Harris (1973) have all found no apparent differences on delayed scores between subjects who review their own notes or the instructor's notes. In each case, however, the review period lasted only 10 minutes for exams delayed from 2 days (Thomas, 1978) to 3 weeks (Fisher & Harris, 1973). These factors perhaps neutralized the relative effectiveness of the review materials.

Reviewing the instructor's notes did produce higher achievement than reviewing personal notes when the review period lasted for 30 minutes and when the instructor's notes were of sufficient detail (Maqsud, 1980). Maqsud emphasized the importance of detailed notes, speculating that such notes are best for reviewing knowledge acquired during the lecture and for additionally supplying "new" lecture information that was originally overlooked or misunderstood. Unfortunately, Maqsud's experiment did not assess what was originally learned by notetakers and listeners independent of review. Without this contrast, the apparent delayed differences may simply have been due to the benefit of listening over notetaking during the lecture instead of the proposed benefits of reviewing the instructor's notes.

When this contrast was investigated by Kiewra (in press-b), Maqsud's interpretation (that apparent differences were the result of the type of notes reviewed and not the result of acquisition condition) was confirmed. Kiewra found that notetakers and listeners did not differ on an immediate test (without review) of factual information but that listeners who reviewed the instructor's notes achieved significantly more on the delayed factual exam than did notetakers who reviewed their own notes. The relative effectiveness of the instructor's notes was due (accordng to Kiewra) to their breadth and organization when compared with students' notes and to the delay between acquisition and review. Speculatively, a delay reduces the saliency of acquisition cues as information becomes assimilated into cognitive structure and, thus, makes the subsequent review of externally provided notes no longer interfering (as was true with immediate testing and review) but actually beneficial. Additionally, the provided notes simply contained more information directly relating to the factual test items than did students' notes. Naturally, the number of test-related ideas contained in notes is related to achievement (Crawford, 1925; Kiewra & Fletcher, 1984).

A subsequent study by Kiewra (in press-a) reconfirmed that the instructor's notes are a better means of external storage than are personal notes for a delayed test of factual knowledge. In fact, students who did not even attend the lecture but who subsequently reviewed the instructor's notes scored significantly higher (69%) than did students who took and reviewed their own notes (51%). Again, Kiewra observed that the instructor's notes were far more complete and organized than were students' personal notes.

Although differences in factual performance were apparent in all of Kiewra's studies (1984b; in press-a; in press-b) between students who reviewed their own notes and learners who reviewed the instructor's notes, in no case were there differences with respect to higher order learning (application, analysis, synthesis, and problem solving). This was probably due to the informational nature of the instructor's notes, which presented the main points of the lecture in an organized outline form but neither reformulated nor integrated the main ideas. Apparently, learners do not spontaneously go

beyond the information given despite directives to do so. Speculatively, maximizing higher order learning may depend upon providing learners with written or verbal directives that orient them to process the lecture and/or review materials at deeper levels of abstraction (see Kiewra, 1983; and Kiewra & Fletcher, 1984, for examples).

It is apparent that reviewing informational and complete instructor's notes for a sufficient duration prior to a delayed exam leads to relatively higher factual performance than does reviewing personal notes, but reviewing both sets of notes often leads to higher achievement than does simply reviewing one or the other (Annis & Davis, 1975; Kiewra, in press-a; Maqsud, 1980; Thomas, 1978). Personal lecture notes, although generally incomplete, are apparently an effective additional source of review because they are well recalled. In fact, students will recall proportionately more of their own notes than those provided by the instructor (Thomas, 1978). This advantage is explained by the theory of encoding specificity (Thompson & Tulving, 1970), which suggests that the best retrieval cues (or notes) are those that were present at acquisition. This notion was supported in a study in which learners recalled elaborations that were consistent with elaborations recorded during notetaking (Barnett, DiVesta, & Rogozinski, 1981). Thus, one's own notes should better cue associated ideas from the lecture than do notes that are externally provided. This theoretical notion implies that effective review materials should, ideally, include a set of notes recorded by the learner. However, despite their retrieval cue value, personal lecture notes are generally too brief to serve independently as a review source. As evidenced, achievement is highest when learners review personal notes in combination with the full instructor's notes.

Providing Skeletal Notes for Notetaking

It is conceivable that student notetaking on skeletal outlines can ultimately provide a review source that combines the structure and detail of the full instructor's notes and the retrieval cue value of personal lecture notes. Skeletal notes are a deliberately incomplete form of the full instructor's notes. Distributed prior to the lecture, they present the lecture's main ideas in an organized form with spaces for learners to detail or embellish those points throughout the lecture.

The limited research on skeletal notes generally suggests that taking notes on a skeletal outline is a more effective means for acquiring lecture information than is standard notetaking. In naturalistic experiments conducted over several classroom lectures both Collingwood and Hughes (1978) and Klemm (1976) found that students who took notes on skeletal outlines achieved more on classroom examinations than those who took notes without the partial outlines.

A more comprehensive examination of skeletal notes was made by Hartley (1976), who, based on seven naturalistic experiments, reported the following results and conclusions:

1. Students given skeletal notes take less (about half as many) notes than those not provided these notes, yet the handout group recalls significantly more.
2. Subjects given skeletal notes that contain less information and more space will take more notes than will subjects given full notes that contain more information and less space for notetaking.
3. When information on skeletal notes is equal, but the amount of notetaking space is varied, the students given skeletal notes with more space take more notes.
4. Students provided with skeletal notes recall more than subjects who take personal notes or subjects who are provided with a complete set of the instructor's notes prior to the lecture.

The aforementioned studies imply that skeletal notes are a more effective means for acquiring lecture information than notetaking without a partial outline. Theoretically, skeletal notes are effective because they provide an advance framework or organization (Ausubel, 1968) that permits learners to perceive the structure and content of the lecture as it progresses. Also, students' notetaking is guided; they are aware of what content is important and deserving of their attention and elaboration. Finally, skeletal notes may provide a relatively effective means for review because of their cueing capabilities (Thompson & Tulving, 1970). The main points listed in the skeletal notes are likely to serve as effective cues for recalling the embellishments that the learners supply and vice versa. Unfortunately, the literature is silent to the review benefits of skeletal notes relative to personal notes or full instructor's notes. According to Kiewra, no study has

Table 1
A Summary of Findings Among Studies Manipulating Acquisition and/or Review Conditions

Author(s)/ Date of Study	Acquisition/Review Conditions · Take Notes/ Review Own Notes TN/RN	Take Notes/ Review Instructor's Notes TN/RI	Take Notes/ Review Both TN/RB	Take Notes/ No Reivew TN/NR	Listen/ Review Instruc. Notes L/RI	Listen/ No Review L/NR
Kiewra 1984b	*	*		*	*	*
Fisher & Harris, 1973	*	*		*	*	*
Thomas 1978	*		*		*	*
Annis & Davis, 1975	*	*	*	*	*2	*2
Maqsud 1980	*		*		*	*
Kiewra in press-b	*		*	*	*	*
Kiewra in press-c	*				*	

1. Took notes on an outline and reviewed them.
2. Instructor's notes were made available while listening.
3. A control condition that did not take notes or review.

Not Attend/ Review Instruc. Notes NA/RI	Not Attend/ No Review NA/NR	Other(s)	Immediate Testing	Delayed Testing	Interpretation of Results
			Factual & Higher Order		Factual percentage scores were as follows: TN/RN (93); L/RI(79); L/NR(75); TN/RI(71); TN/NR(58)
			Free Recall & Multiple Choice	3-weeks Objective Posttest	Immediate Test: TN/RN > L/RI > TN/RI > TN/RN > L/NR
					Posttest: No significant differences.
*		1		2-days Free Recall	No significant differences.
		3		2-weeks Objective	Results were in the following direction. Follow-ups were not conducted. TN/RB; TN/RN; TN/RI; L/RI; L/NR; TN/NR; control.
				1-week Free Recall	TN/RB > L/RI > TN/RN > L/RN
*	*			2-days Factual & Higher Order	Factual Test: TN/RB = NA/RI = L/RI > TN/RN > TN/NR = L/NR = NA/NR
					H.O. Test: No significant differences.
				2-days Factual & Higher Order	Factual Test: L/RI > TN/RN
					H.O. Test: No significant differences.

exclusively and systematically examined the review potential of these different notes by comparing what is first learned during the acquisition phase of instruction (prior to review)—after one merely listens to a lecture or records notes with or without a skeletal outline, versus the review phase of instruction—after one reviews complete notes, skeletal notes, personal notes, or some combination.

Summary and Conclusions

Students who receive lecture notes provided by the instructor for review generally achieve more than do students who review their own notes prior to a delayed factual exam. Students who review both sets of notes, however, usually perform best of all, indicating that personal notes—although often relatively incomplete—are of additional value. In fact, students recall proportionately more of their own notes than the instructor's notes. Consequently, personal notes should not be replaced by the instructor's notes for review; optimally, both should be reviewed.

To maximize the value of personal lecture notes, instructors can provide learners with partial outlines prior to the lecture for notetaking. Notetaking on partial outlines generally leads to higher achievement than does standard notetaking. Theoretically, skeletal notes provide an advance organization, focus attention on the critical ideas, guide notetaking, and provide effective cues for retrieval.

Although it is reasonable to assume that providing students with skeletal notes prior to lectures and with detailed notes following lectures will maximize achievement, most instructors are probably unable or unwilling to offer structure at both acquisition and review. There are alternate means for guiding learning.

Instructors who provide learners with only detailed notes for review following lectures can additionally facilitate student notetaking by lecturing at slower rates (Peters, 1972), providing cues for notetaking (Moore, 1968), and by writing important information on the board (Locke, 1977). Alternatively, instructors who provide only skeletal notes prior to lectures can similarly facilitate learning by following the suggestions mentioned above for maximizing notetaking, and by designing skeletal notes with ample space for notetaking (Hartley, 1976). Finally, instructors can explain to students the advantages of having additional notes to review and consequently encourage them to gather and to integrate extensive review materials from multiple sources (e.g., teachers, fellow students, books, and notetaking services; see Kiewra, 1984c).

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