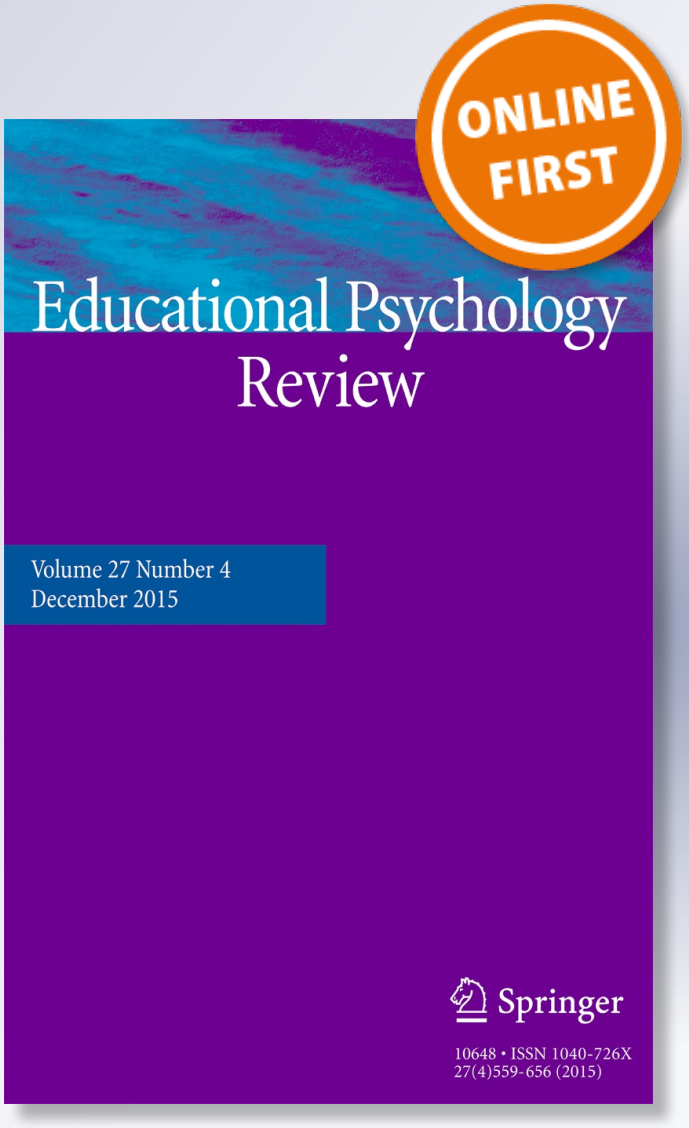
Note Taking on Trial: A Legal Application of Note-Taking Research

Kenneth A. Kiewra

Educational Psychology Review

ISSN 1040-726X

Educ Psychol Rev
DOI 10.1007/s10648-015-9353-z



Springer

Educ Psychol Rev
DOI 10.1007/s10648-015-9353-z

ESSAY

Note Taking on Trial: A Legal Application of Note-Taking Research

Kenneth A. Kiewra [1]

Abstract This article is about note taking, but it is not an exhaustive review of note-taking literature. Instead, it portrays the application of note-taking research to an unusual and important area of practice—the law. I was hired to serve as an expert witness on note taking in a legal case that hinged, in part, on the completeness and accuracy of handwritten meeting notes. Based on my own research and that of others, I rendered three opinions about handwritten notes: (a) They omit most of what is said, (b) they omit details, context, and essential qualifiers, and (c) they contain inaccuracies or vague statements. This article tells the story of how I came to investigate note taking, become an expert witness, and render those three opinions. It concludes with a call to investigate note taking in non-academic settings such as meetings and to uncover ways to boost and improve note-taking methods.

Keywords Note taking · Meeting notes · Expert witness

I began investigating note taking in 1979 as a graduate student at Florida State University spurred by an experience I had in a statistics course. The professor, Harold Fletcher, forbade note taking. He reasoned that if students were busy jotting notes, then they were not carefully listening to and thinking about the lesson. He also reasoned that most students recorded incomplete notes so they would not produce a full set of notes to review anyway. Professor Fletcher addressed both problems by supplying the class with notes at the close of each lesson. Most students were delighted with this arrangement. They could give their full attention to the lesson, rather than divide it between listening and note taking, and still have a good set of notes to review later as they prepared for tests. I was not among the delighted. I was a voracious note taker who filled pages with notes while most others jotted just a few lines. I preferred my own notes to those of Professor Fletcher because mine were nearly as detailed and more personalized.

✉ Kenneth A. Kiewra
kkiewra1@unl.edu

[1] Department of Educational Psychology, University of Nebraska, Lincoln, NE 68588-0345, USA

Published online: 22 December 2015

Because I could not overtly record notes in Professor Fletcher's class, I became a closet note taker. I sat in the back of the room and quickly scribed notes when Professor Fletcher wrote on the board or looked away. Sometimes I resorted to trickery. I would pretend that I was ill and cradle my head in my arms on the desk forming a small alcove for note taking. One time, while I was in this cradled position noting a statistical formula, Professor Fletcher surreptitiously crept up behind me. "Mr. Kiewra," he bellowed. "Are you taking notes in my classroom?" "Ah, no," I fibbed, "I'm writing a letter to a friend back home." "Oh, thank goodness," he sighed, "I thought you were taking notes."

This single experience jumpstarted my note-taking investigations. While in graduate school, I joined forces with Professor Fletcher, who served as my advisor, to conduct six note-taking studies and craft a literature review (e.g., Kiewra and Fletcher 1984). Following graduate school, I continued to investigate note taking up to the present while also branching out to investigate graphic organizers, notes in visual-spatial form (e.g., Jairam et al. 2012; Kauffman and Kiewra 2010; Kiewra et al. 1999), and eventually a study system I developed called SOAR that is dependent, in part, on the recording of detailed notes and graphic organizers (e.g., Jairam and Kiewra 2009, 2010). All of my note-taking investigations are education-based. For the most part, they examine how college students should record and review notes from lecture or text. So, imagine my surprise when an attorney from another state, representing an international energy company, contacted me about being an expert witness on note taking.

The case involved an energy company accused by a government agency of making false and misleading statements to potential investors. The evidence for these false statements, according to the government agency, was in the handwritten notes recorded by potential investors during investment meetings with the energy company's executive officer. My job was to review and report note-taking research that might cast doubt on the veracity of their notes. Note taking—likely for the first time ever—was about to go on trial.

In my trial preparations, I reviewed three sets of notes recorded by three different potential investors involved in meetings with the energy company's executive officer. One set was recorded during a group seminar, another during a face-to-face meeting, and the third during a telephone conversation. Although I examined these notes, I could not comment specifically on their completeness and accuracy because I did not have access to what was actually said in the meetings. Therefore, I relied mostly on published note-taking research to derive three opinions: Handwritten notes likely (a) omit most of what was said, (b) omit details, context, and essential qualifiers, and (c) contain inaccurate or vague statements. Convincing a judge of these three opinions would likely invalidate the meeting notes and hinder the prosecution's case against the energy company. What follows are my three research-based opinions that were submitted to the judge.

Opinion 1: Notes Omit Most of What Is Said

Handwritten notes are an incomplete account of presented information. High omission rates have long been reported. Crawford (1925) completed one of the first note-taking completeness studies. He examined the notes of more than 200 individuals attending seven different live presentations. From a total of nearly 5000 presentation ideas, individuals recorded 53 % of them vaguely or correctly. In other early investigations, Hartley and Marshall (1974) found that note completeness ranged from .5 to 25 % and averaged just 11 % of presented

information, and Locke (1977) found that across 12 presentations, individuals recorded an average of 52 % of spoken information.

During my career, I have conducted 16 experiments that have investigated the completeness of individuals' handwritten notes when information is delivered live, by video, or by audio recording. (Those studies are designated with an asterisk in the "References" section.) Across the 16 experiments, individuals captured between 20 and 70 % of the presented information in their notes. On average, across the 16 studies, individuals noted just 35 % of presented information. In 14 of the 16 studies, individuals noted less than 40 % of presented information.

Because notes in this legal case were recorded in both seminar and two-party settings (face-to-face and by telephone), I also reported on note-taking research particularly germane to these special conditions.

Notes Recorded During a Group Seminar

One set of notes submitted as evidence came from a potential investor during a group seminar led by the energy company's executive officer. During this approximately 1-h seminar, a PowerPoint presentation was delivered and a printed copy of the PowerPoint slides was provided. In addition, the presenter showed attendees geographic maps, and attendees asked several questions throughout the presentation.

I have conducted several studies with circumstances analogous to those for the group seminar. In one such study (Kiewra et al. 1987), my colleagues and I reviewed the handwritten notes of 55 adults who attended a live, nearly 1-h lecture presentation. On average, the individuals noted 37 % of presented information. This study is analogous with the group seminar because both involve a live presentation roughly an hour long and involve attendees with high incentive to record complete notes. Those in the research study were students preparing for an exam; those attending the seminar were investors seeking to make sound investment decisions. Based on these factors, it can be conjectured that the investor's notes were missing about two thirds of presentation information.

But, other factors might have lowered note completeness even more. First, the investor might have been distracted from the note-taking task by the maps being shown. Research by Maddox and Hoole (1975) confirms that individuals listening to a presentation stop recording notes when visual aids are shown. Second, the PowerPoint handout might have further curtailed note taking. Research shows that individuals given copies of a lesson's PowerPoint slides in advance of that lesson report recording fewer notes than those not given the slides (Nouri and Shahis 2008). Third, several questions were asked and answered during the seminar. Research confirms that individuals rarely take notes when others ask questions (Maddox and Hoole 1975). Fourth, the investor entered the seminar with high prior knowledge about the presentation topic. Research confirms that individuals who are familiar with a topic record fewer notes than those who are less familiar with a topic (Trevors et al. 2014; Van Meter et al. 1994). It has been speculated (Bothin and Clough 2012) that those with domain expertise record fewer notes than those with less expertise because experts are more confident that they will remember what was said. Taken together, these other factors might have lowered the investor's note completeness well below the 37 % completeness rate of individuals participating in the research study (Kiewra et al. 1987).

Notes Recorded During a Face-to-Face Meeting

One set of notes submitted as evidence came from a potential investor who met face-to-face with the energy company's executive officer. Unlike a seminar setting, a person involved in a face-to-face meeting is better able to control the delivery of information by pausing, asking for information to be repeated, etc. One study my colleagues and I conducted involved procedures that somewhat resembled those conditions (Kiewra et al. 1991b). In that study, individuals learning about a scientific topic were able to control the rate of a video-recorded presentation by rewinding, fast forwarding, or pausing the presentation. By doing so, the 8-min presentation was extended to 43 min, on average, among individuals watching it. Over this time period, and under ideal conditions, individuals recorded 64 % of presentation ideas in notes, omitting 46 % of ideas.

Research conducted in actual small group business-meeting settings confirms that individuals participating in these meetings record notes at a rate well below that found in the educational setting used by Kiewra and colleagues (Kiewra et al. 1991b). In one study (Bothin and Clough 2012), individuals attending meetings that were approximately 30 min in length recorded just 14 notes on average with each note capturing about 8 s of meeting material. This means that individuals recorded notes just 7 % of the time. A survey of note-taking practices in meetings across various professions (Kahn 1992) also confirms that meeting notes are incomplete. Based on these various findings, it is likely that the investor involved in the face-to-face meeting recorded notes that were largely incomplete.

Notes Recorded During a Telephone Conversation

One set of notes submitted as evidence came from a potential investor who spoke on the telephone with the energy company's executive officer. Under these exclusively auditory conditions, there are no provided images (such as maps or PowerPoint presentations) to distract. In addition, there is no need to keep eye contact, so greater attention to note taking might be possible compared to face-to-face conversations. I have conducted studies that mimic these exclusively auditory conditions. In one study, my colleagues and I (Luo et al. submitted) examined the handwritten notes of 29 individuals who recorded notes during a 15-min audio presentation on a topic in psychology. Those individuals recorded 36 % of presented material. In another study (Titsworth and Kiewra 2004), my colleague and I examined the handwritten notes of 30 individuals who recorded notes during a 15-min audio presentation on the topic of communication and found that individuals listening to the standard presentation without added cues recorded just 29 % of presentation details and 15 % of organization points that revealed the structure of the presentation. Thus, it is likely that the investor participating in a phone conversation meeting recorded notes of similar completeness.

Opinion 2: Notes Omit Details, Context, and Essential Qualifiers

Due to the high rates of omission in handwritten notes, I have investigated and reviewed the nature of those omissions. I have found that individuals who record notes most often omit details, context, and essential qualifiers necessary to fully understand the main ideas of a presentation.

Details

In one study, my colleague and I found that individuals recorded 63 % of a presentation's main ideas but only 33 % of all information presented (Kiewra and Benton 1988). The difference in the omission rate for main ideas and all information occurred because individuals failed to record many important details supporting main ideas. In that presentation, an example of a main idea was, "Learning hierarchies deal only with intellectual skills," and a supporting detail was, "Intellectual skills consist of rules and concepts."

In a related study (Kiewra et al. 1987), my colleagues and I also found that individuals do not capture most details in notes. Information presented during a lesson was classified into level 1–4 ideas. Level 1 ideas were the most main or superordinate ideas; levels 2–4 ideas were successively more detailed and subordinate. We found that individuals, on average, recorded only 37 % of all ideas. In terms of idea levels, they captured, on average, 91 % of level 1 ideas, 60 % of level 2 ideas, 35 % of level 3 ideas, and 11 % of level 4 ideas.

Research examining note taking during meetings also confirms that individuals' meeting notes capture key words but lack details (Kahn 1992; Whittaker et al. 2005). In the aforementioned study by Bothin and Clough (2012), meeting participants recorded details about meeting abstracts, decisions, action items, and problems just over half the time even though there were just 19 such points presented during the average 30-min meeting. In addition, there is limited consensus among meeting participants as to what is important and worth noting. Bothin and Clough also found that in only 8 % of cases did a cohort of four meeting participants all note the same detail. The researchers concluded that note taking during meetings is both limited and esoteric.

The prospect of missing details is integral in this legal case. For example, the investor noted that an area has great potential to deliver oil without noting details about what that potential is.

Context

In addition to omitting details, individuals often omit context from their handwritten notes. In one study that my colleague and I conducted (Titsworth and Kiewra 2004), we found that individuals listening to a presentation on various communication theories recorded just 15 % of contextual details that helped give meaning to what was recorded in notes. For example, an individual might have noted that, "self-disclosure is at the core of relationship development," without noting that this is an assumption of social penetration theory.

The prospect of missing context is integral to this legal case. In the example above, the investor did not note whose opinion it was that an area had great potential for delivering oil. It is unclear whether that was the speaker's belief or someone else's belief that the speaker was reporting. In another case example, the investor's notes indicated stock price increases but omitted that such increases were only possible if a certain amount of oil was produced. In a third example, the investor's notes indicated the price of oil in the ground but omitted the context that this figure was stated in response to a hypothetical situation: If you get reserves, what would they be worth?

Essential Qualifiers

Individuals also omit essential qualifiers from handwritten notes. In a study conducted by Maddox and Hoole (1975), for example, when the presenter spoke of "western coastal areas," note takers only recorded "coastal areas." As another example, when the presenter stated that,

"Malaria influences the distribution of population in South Vietnam," the qualifying phrase "South Vietnam" was commonly omitted.

Similarly, in a study of handwritten interview notes of managerial professionals, Schneider (2001) found that interview notes that she examined omitted many of the hedges in answers. For example, when asked about the performance of a teacher, an interviewee said, "I would think she does good work," but the notes of the interviewer said, "thinks she does good work," leaving off the important qualifier, "I would," which suggests that the interviewee supposes as opposed to knows.

The prospect of omitted qualifiers is essential to this legal case. For example, the investor noted that an oil field had the potential to produce two billion barrels of oil. That note, however, omitted the qualifier that this rate was only possible given a recovery rate of 500 barrels per square foot and the qualifier that this potential recovery rate was the estimate of a third party.

Opinion 3: Notes Contain Inaccurate or Vague Statements

Individuals often alter information when noting it. In one early study (Crawford 1925), it was found that 53 % of noted information was fully correct, 45 % was vague, and 2 % was inaccurate. In another study (Maddox and Hoole 1975), it was found that 61 % of note takers made one or more errors or inaccuracies in their notes and that most involved numerals. A third study (Johnstone and Su 1994) supported the nature of note-taking errors. It reported that individuals' notes contain inaccuracies and most occur when copying diagrams, numerical figures, and equations.

These studies are particularly relevant to the handwritten notes in this legal case because every single handwritten note that the government agency alleges reflects false and misleading information contains numerical figures allegedly presented by the executive officer.

The Outcome and Future Research Directions

Note taking never quite had its day in court; the case was settled out of court. My opinions on note taking, however, were read by the prosecution and by the judge prior to a settlement agreement, so perhaps those opinions had a decisive effect on the outcome.

Meanwhile, this case and my research-based opinions reported here make clear that there is opportunity and need to extend note-taking research beyond the classroom into non-academic settings (Hartley 2002). Presently, there is minimal research about the prevalence and effectiveness of note taking in settings such as business meetings (e.g., Bothin and Clough 2012), courtroom testimony (e.g., Fitzgerald 2000), counseling sessions (e.g., Hickling et al. 1994), and medical consultations (e.g., Dyer 1997). Hopefully, these and other non-academic settings where note taking is prominent will become avenues for future research.

As for note-taking practices, it is evident from the opinions rendered for this case that not much has changed since Crawford (1925) first investigated note taking. Individuals still record notes that capture and preserve just a small portion of presented information, and not always accurately. Although researchers have found several ways to improve the notes available to individuals, for example by providing (a) complete notes (Kiewra 1985a, b)—as Professor Fletcher did, (b) note-taking frameworks (Kiewra and Frank 1988), (c) organizational cues (Titsworth and Kiewra 2004), or (d) lecture pauses (Luo et al. submitted), researchers must also find ways to improve note taking when conditions lack note-taking support.

Compliance with ethical standards

Conflict of interest The author declares that there is no conflict of interest.

References

Items marked with an asterisk (*) are those by Kiewra and colleagues that investigate note completeness.

Bothin, A., & Clough, P. (2012). Participants' personal note-taking in meetings and its value for automatic meeting summarization. *Information Technology and Management, 13*, 39–57.

Crawford, C. C. (1925). The correlation between lecture notes and quiz papers. *The Journal of Educational Research, 12*, 282–291.

Dyer, C. (1997). Obstetrician accused of changing notes. *British Medical Journal, 314*, 1433.

Fitzgerald, J. M. (2000). Younger and older jurors: the influence of environmental supports on memory performance and decision making in complex trials. *Journal of Gerontology: Psychological Sciences, 55*, 323–331.

Hartley, J. (2002). Notetaking in non-academic settings: a review. *Applied Cognitive Psychology, 16*, 559–574.

Hartley, J., & Marshall, S. (1974). On notes and note taking. *Universities Quarterly, 28*, 225–235.

Hickling, L. P., Hickling, E. J., Sison, G., & Radetsky, S. (1994). The effect of notetaking on a simulated clinical interview. *Journal of Psychology, 116*, 235–240.

Jairam, D., & Kiewra, K. A. (2009). An investigation of the SOAR study method. *Journal of Advanced Academics, 20*, 602–609.

Jairam, D., & Kiewra, K. A. (2010). Helping students soar to success on computers: an investigation of the SOAR study method. *Journal of Educational Psychology, 102*, 601–614.

Jairam, D., Kiewra, K. A., Kauffman, D. F., & Zhao, R. (2012). How to study a matrix. *Contemporary Educational Psychology, 37*, 128–135.

Johnstone, A. H., & Su, W. Y. (1994). Lectures—a learning experience? *Education in Chemistry, 31*(75–76), 79.

Kahn, F. (1992). A survey of note-taking practices, Technical Report, Hewlett Packard Laboratories.

Kauffman, D. F., & Kiewra, K. A. (2010). What makes a matrix so effective: an empirical test of the relative benefits of signaling, extraction, and localization. *Journal of Instructional Science, 38*, 679–705.

*Kiewra, K. A. (1984). Implications for notetaking based on relationships between notetaking variables and achievement measures. *Reading Improvement, 21*, 145–149.

*Kiewra, K. A. (1985a). Learning from a lecture: an investigation of notetaking, review, and attendance at a lecture. *Human Learning, 4*, 73–77.

*Kiewra, K. A. (1985b). Students' notetaking behaviors and the efficacy of providing the instructor's notes for review. *Contemporary Educational Psychology, 10*, 378–386.

*Kiewra, K. A., & Benton, S. L. (1985). The effects of higher-order review questions with feedback on achievement among learners who take notes or receive the instructor's notes. *Human Learning, 4*, 225–231.

*Kiewra, K. A., & Benton, S. L. (1987). Effects of notetaking, the instructor's notes, and higher-order practice questions on factual and higher-order learning. *Journal of Instructional Psychology, 14*, 186–194.

*Kiewra, K. A., & Benton, S. L. (1988). The relationship between information-processing ability and notetaking. *Contemporary Educational Psychology, 13*, 33–44.

Kiewra, K. A., & Fletcher, H. J. (1984). The relationship between levels of notetaking and achievement. *Human Learning, 3*, 273–280.

Kiewra, K. A., & Frank, B. M. (1988). The encoding and external-storage effects of personal lecture notes, skeletal notes, and detailed notes for field-independent and field-dependent learners. *The Journal of Educational Research, 81*, 143–148.

*Kiewra, K. A., Benton, S. L., & Lewis, L. B. (1987). Qualitative aspects of notetaking and their relationship with information processing ability. *Journal of Instructional Psychology, 14*, 110–117.

*Kiewra, K. A., DuBois, N. F., Christensen, M., Kim, S., & Lindberg, N. (1989). A more equitable account of the note-taking functions in learning from lecture and from text. *Journal of Instructional Science, 18*, 217–232.

*Kiewra, K. A., DuBois, N. F., Christian, D., McShane, A., Meyerhoffer, M., & Roskelley, D. (1991a). Notetaking functions and techniques. *Journal of Educational Psychology, 83*, 240–245.

*Kiewra, K. A., Mayer, R. E., Christensen, M., Kim, S., & Risch, N. (1991b). Effects of repetition on recall and notetaking: strategies for learning from lectures. *Journal of Educational Psychology, 83*, 120–123.

*Kiewra, K. A., Benton, S. L., Kim, S., Risch, N., & Christensen, M. (1995). Effects of note-taking format and study technique on recall and relational performance. *Contemporary Educational Psychology, 20*, 172–187.

*Kiewra, K. A., Mayer, R. E., DuBois, N. F., Christensen, M., Kim, S., & Risch, N. (1997). Effects of advance organizers and repeated presentations on students' learning. *The Journal of Experimental Education, 65*, 147–162.

Kiewra, K. A., Kauffman, D. F., Robinson, D., DuBois, N., & Staley, R. K. (1999). Supplementing floundering text with adjunct displays. *Journal of Instructional Science, 27*, 373–401.

Locke, E. A. (1977). An empirical study of lecture note taking among college students. *The Journal of Educational Research, 77*, 93–99.

*Luo, L., Kiewra, K. A., Samuelson, L., & Kiewra, K. A. (submitted). Revising lecture notes: How revision, pauses, and partners affect note taking and achievement.

Maddox, H., & Hoole, E. (1975). Performance decrement in the lecture. *Educational Review, 28*, 17–30.

Nouri, H., & Shahis, A. (2008). The effect of PowerPoint lectures on student performance and attitudes. *The Accounting Educators' Journal, 15*, 103–117.

*Risch, N., & Kiewra, K. A. (1990). Content and form variations in notetaking: effects among junior high students. *The Journal of Educational Research, 83*, 355–357.

Schneider, B. (2001). Constructing knowledge in an organization: the role of interview notes. *Management Communication Quarterly, 15*, 227–255.

*Titsworth, S., & Kiewra, K. A. (2004). Spoken organizational lecture cues and student notetaking. *Contemporary Educational Psychology, 29*, 447–461.

Trevors, G., Duffy, M., & Azevedo, R. (2014). Note-taking within MetaTutor: interaction between an intelligent tutoring system and prior knowledge on note- taking and learning. *Educational Technology Research and Development, 62*, 507–528.

Van Meter, P., Yokoi, L., & Pressley, M. (1994). College students' theory of note-taking derived from their perceptions of note-taking. *Journal of Educational Psychology, 86*, 323–338.

Whittaker, S., Laban, R., & Tucker, S. (2005). Analysing meeting records: An ethnographic study and technological implications. In: *Proceedings of MLMI*, Edinburgh, Scotland, UK.