Voluntary use of online lecture notes: correlates of note use and note use as an alternative to class attendance

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Abstract

Note taking and note reviewing are essential college student learning activities. A large number of carefully controlled studies have evaluated student effectiveness in implementing each of these skills and have found that both can be improved by providing instructor notes. While the Internet now offers a practical method for providing notes, some instructors are reluctant to offer notes because they fear that students will use these notes as an alternative to class attendance. This study used data collected by the server and questionnaires to describe voluntary use of online lecture notes, to search for correlates of individual patterns of note use, and to investigate student use of notes as an alternative to class attendance. Students primarily printed notes and used these notes during class presentations. There was some evidence that note users performed better on examinations than students who did not use notes. Some students did admit to using notes as an alternative to class attendance, but a comparison between the examination scores of those who admitted to this practice and those who claimed never to use notes for this purpose showed no significant differences in performance. © 2004 Elsevier Ltd. All rights reserved.

1. Introduction

Note taking and note reviewing are common student activities associated with large lecture, introductory level, service courses. The pervasive nature of these activities and the assumption that such activities are a necessary part of the college learning experience have encouraged researchers to investigate how students go about taking and reviewing notes and how these activities might be improved. One identifiable body of work originated in the descriptive model of DiVesta and Gray (1972) and proposes that students potentially benefit from the process of taking and from the process
of reviewing notes. These processes were labeled as the encoding and external storage functions, respectively. The benefits of the encoding function are assumed to result from the cognitive activities involved in generating a personalized written record of the lecture. Typically, students must also contend with the lengthy gap between information presentation and evaluation. The benefit of having an external record to review during this gap is described as the storage function. The cumulative body of work attempting to explain the cognitive activities associated with these functions, to compare the relative impact of these activities on test performance, and to determine how individual differences (e.g., content area knowledge, working memory capacity) influence note taking and reviewing now includes more than 100 studies (Hartley, 1983; Kiewra, 1983, 1989).

There is evidence demonstrating the benefit of both the encoding and the storage functions of notes with the external storage function having a stronger impact on performance (Kiewra et al., 1991). While the relative contributions of the encoding and external storage functions can be differentiated in research studies, in practice the potential productivity of reviewing notes is often limited by the quality of the encoding function. If a note taker misses or misinterprets key ideas during encoding, the note taker starts at a disadvantage when reviewing these notes. Studies demonstrate a relationship between the accuracy or completeness of notes and performance. The notes taken by college students typically include less than 50% of the ideas presented (Kiewra, 1985a) and the amount of content recorded varies systematically with course performance (Hartley & Marshall, 1974; Locke, 1977).

A possible way to increase the benefits of the review of notes is to provide students a higher quality set of notes. Researchers have evaluated the value of providing complete notes and may describe this resource as instructor notes to imply where complete notes might originate in applied settings. In actual courses, students may also seek to supplement their own notes by reviewing the notes taken by a friend. Students reviewing complete notes demonstrate a performance advantage (Kiewra, 1985a, 1985b; Knight & Mckelvie, 1986; Palkovitz & Lore, 1980). In fact, Knight and Mckelvie (1986) were able to demonstrate that when a delay followed the initial presentation, students were better off reviewing complete notes without attending the initial lecture than attending the lecture and reviewing their own notes. Instructor notes potentially do more than fill in the gaps in notes generated by the note taker. Notes could be structured to demonstrate relationships that might not be obvious in even a complete transcript of the original presentation. For example, an outline or other systems for structuring core ideas would convey a relatively complete record of information and also demonstrate relationships among the core ideas (Kiewra, DuBois, Christian, & McShane, 1988).

Finally, the availability of quality notes may benefit the encoding function. The demands of recording notes limits the ability of some students to attend to lectures (Kiewra & Benton, 1988). Knowing that notes will be available allows struggling students more attentional capacity to devote to understanding ideas as they are presented. The students can listen without worrying about recording information. A variation of this approach would allow students to have notes before a presentation and to use these notes to follow along or to organize personal comments.

1.1. Online lectures notes for encoding and storage

The Internet provides a practical way to offer lecture notes to students. Online notes offer learners some options. Learners might print out such notes and bring the notes to class to decrease
the cognitive demands of note taking. Learners might also access the notes after the lecture and use the notes for review.

Popular presentations systems (e.g., Power Point – Microsoft Corporation, 1998) allow the material used in the classroom to also be saved as HTML documents for distribution on the Internet. Web based course management systems (e.g., Blackboard 5 – Blackboard, Inc., 2001; WebCT – WebCT Educational Technologies, 1999) offer multiple ways in which course notes can be offered to students. Students might download notes as word processor documents or view notes as web pages.

Easy access to notes may have some undesirable consequences. Because students would not have to come to class to generate their own notes or to pick up a copy of notes provided by the instructor, access to online notes may unintentionally encourage students to skip class (Ko & Rossen, 2001). Despite the demonstration that complete notes are a reasonable substitute for class attendance and personal notes (Knight & Mckelvie, 1986), most instructors probably view class attendance as desirable and would carefully consider offering resources that would reduce attendance. Whatever the possible benefits of using instructor notes during or after lectures or the potential dangers of using provided notes to avoid attendance, speculation about student behavior should not be used to guide decision making. Online notes provide students voluntary options and little is known about how many students will use online notes, how online notes are used, and if those who use online notes differ in identifiable ways from those who ignore this opportunity.

1.2. Student characteristics and online note use

The behavior of individual students in naturalistic settings obviously varies and is influenced by many specific student characteristics. When related to notetaking and note use, individual difference variables might involve either the capacity or the motivation to engage in desirable behaviors. Individual difference variables were included in the present study to investigate possible connections with performance and strategy variables. Some connections among individual difference and notetaking variables have been established. The quality of the notes taken by students is known to be influenced by existing knowledge of the subject area, working memory capacity, and learning style (Kiewra, 1989). These variables were not used here. It was not practical to collect data on working memory capacity or student knowledge relevant to individual lecture topics in the naturalistic, large group environment used in this research. The two individual student characteristics included in this study were selected because each was known to be a correlate of student performance in Introductory Psychology, each seemed to offer additional potential as a correlate of identifiable patterns of note use, and each could be conveniently measured in a group setting.

General student aptitude was measured with a reading comprehension instrument appropriate to a college population. Reading ability has been involved as an individual difference variable in studies of notetaking from text sources (Fox & Siedow, 1985) and is a known correlate of Introductory Psychology examination performance (e.g., Grabe & Sigler, 2002). A general aptitude variable is useful in this research in attempts to determine if those who are more likely to experience difficulty in the course will voluntarily take advantage of online lecture notes and if students of different aptitude use online notes in different ways.
This research included an instrument sensitive to individual differences in achievement goals because of the potential value of achievement goals in understanding the motivation of college students in Introductory Psychology. Achievement goals identify personal motives for achieving and are thought to influence how students approach learning tasks. Mastery and performance goals represent independent approaches to achievement. Mastery goals emphasize personal content understanding and skill improvement. Performance goals emphasize a normative orientation and focus on one’s capabilities relative to the performance of others (Ames, 1992). Harackiewicz, Barron, Tauer, Carter, and Elliot (1997, 2000) found some interesting differential consequences of achievement goals on college academic behavior. Variability in performance goals, but not mastery goals, was found to be significantly correlated with achievement in Introductory Psychology courses. In contrast, variability in mastery goals, but not performance goals, was correlated with the number of additional psychology credits taken after the introductory course. Measures of mastery and performance goals were included in the present study as a way to investigate possible differences in motivation associated with frequency and pattern of note use.

1.3. Overview of the present study

This study used a questionnaire and the record of student Web page requests to document the use of online notes in a large, Introductory Psychology course. Data on frequency and pattern of note use are related to course performance and to measures of aptitude and achievement goals. The descriptive data provide insights into the willingness of students to make voluntary use of online notes and are used to identify different strategies for using these notes. Questionnaire items asking students to estimate the frequency with which they used online notes instead of attending class are included to evaluate the concerns of instructors that providing notes will encourage students to skip class. Second, this research evaluates the hypothesis that conscientious use of online notes would be associated with higher examination scores. It was also anticipated that students who made the effort to first use notes to assist them while they listened to lectures would perform at a higher level than students who first examined the notes shortly before the examinations. The assumption guiding this hypothesis is that the availability of notes while listening to a lecture benefits encoding, but also results in a better record to improve review. Finally, this research uses certain individual difference measures in order to better understand the characteristics of those who uses the online notes. The emphasis in this research was on individual difference in achievement goals and general aptitude.

2. Method

2.1. Overview of setting and description of participants

This study involved a semester long course in Introductory Psychology taught at a moderate sized, mid-western university. While the course consisted of both lecture and small group experiences, only behaviors associated with the lectures and related examinations are addressed here. The course was broken into three segments consisting of 5 weeks of instruction and each ending with a 50 item, multiple choice question examination. Two, fifty minute lectures were given each
week. Two of the course segments covered 4 chapters of textbook material and the third covered 5 chapters. Lectures were used primarily to focus students on specific content within these chapters, provide an expanded explanation of the prioritized information, and offer additional applied examples or descriptions of relevant research studies.

A total of 183 students completed the course and potentially could have accessed the online notes. Analyses using course examination scores as the dependent variable sometimes involved fewer students because an occasional student was excused from an examination due to illness or for another valid reason. Students were provided the opportunity to complete the individual difference measures and the questionnaire in which they were asked to describe their use of online notes as a way to earn research participation points that could be applied toward their course grade. The number of students willing and available to complete these measures is provided as part of the description of the measures. Accessing the online notes did not generate extra credit points.

2.2. Measures

2.2.1. Achievement goals

Performance and mastery goals were assessed using the scales developed by Harackiewicz et al. (2000). Both the mastery and performance scales consist of 6 items. Students were instructed to indicate the degree to which they felt each statement was true of them using a 1 (not at all) to 5 (very true) scale. In keeping with the procedure advocated by Harackiewicz et al. (2000), the achievement goals questionnaire was administered 3 weeks into the semester. This timing is intended to allow some familiarity with the content of the course, but not with course examinations. The achievement goals questionnaire was completed by 152 students.

2.2.2. Nelson–Denny reading test

The composite score (vocabulary and comprehension) from the Nelson–Denny reading test (Brown, Bennett, & Hanna, 1981) was used as a measure of aptitude. The Nelson–Denny Reading Test was administered as part of a battery of instruments completed by volunteers from all Introductory Psychology courses to provide a pool of data for selecting students for other research studies. It was used in this research because it was available and because it generates strong correlations with examination performance. The correlations between the composite reading score and three examination scores all exceeded 0.50. One hundred and nine students completed this measure.

2.2.3. Online lecture note questionnaire

Students were given the lecture note questionnaire during the 12th week of the course. The first item asked students to categorize the frequency of their use of online notes or notes printed from the site as never, 1–5 times, or 6 or more times. Only those students indicating they had used the notes 6 or more times completed the rest of the questionnaire. The series of follow-up questions explored a variety of strategic issues associated with note use. The second item asked students to indicate the method by which they most frequently viewed online notes. The options for this item were online, from a personally printed version of the online notes, and from notes printed by another student. The third item asked students to indicate the frequency with which they had
obtained and used printed notes during class presentations. The response options were never, 1–5 times, and 6 or more times. The fourth item asked students to indicate the frequency with which they had used notes to review after class. The response options were again never, 1–5 times, and 6 or more times. The final item asked students to indicate the number of times they had used the online notes as an alternative to class attendance. The response options were never, 1–5 times, and 6 or more times.

The online lecture note questionnaire was returned by 126 students. Ninety-five students indicated they had used notes 6 or more times.

2.2.4. Course examinations

Student achievement data were gathered from three, 50 item, multiple-choice examinations. Examination items were both taken from the item database provided by the textbook publisher or prepared by the instructor. The examinations emphasized information presented in the lectures, but to encourage students to read the textbook, some items were included covering information not presented in lecture.

2.3. Online procedures and data acquisition

Access to the online notes was routed through a single entry page. This page served as the consent form for the study. Students were told that their participation was voluntary and were informed that the frequency and duration of their use of online notes would be recorded if they chose to continue. The entry page also required that the student enter a unique student identification number and this number was checked against a stored list before access was granted. Every page of notes was protected from unauthorized access and attempts to load a note page without providing the identification number routed the student to the entry page.

Students were familiarized with the online note system during the first course meeting and were also encouraged to request an individual demonstration from their small group discussion leader if necessary.

The online notes available to students were the same notes used during class presentations. The course moved through approximately one book chapter per week and the lectures to accompany each unit were supported by a series of 3–4 linked web pages. When a student moved from one Web page to the next, the server recorded the student’s identification number, the date and time (hour, minute, and second) of the response, and a unique page name.

While this system had the capability to record data from all note pages, only access data associated with the entry page for each unit were analyzed. This decision was made for two reasons. First, viewing time data were not used because many students reported printing notes. Differences in online viewing time data were thus not a meaningful indicator of student use. Second, because data were recorded only when students left a page and students would often quit the browser application after viewing or printing a note page without activating a link causing the data to be stored on the server, access data for all but the entry page for each unit were unreliable. Students had to move through the entry page to get to all notes for the unit so data associated with the entry page were an accurate indication that students had accessed
notes for the unit. There were five unique entry pages corresponding to the five chapters covered on the first examination. There were four entry pages for both the second and third examinations.

2.4. Data reduction

Some analyses involved comparison of note Users and Nonusers. Students were categorized based on the goals of forming roughly equivalent groups and generating groups with the largest size possible. The Nonuser group consisted of students who viewed no notes on a particular examination. On the first examination, Users were identified as students who had viewed notes from four or five units. On the second and third examinations, Users were identified as students who had viewed notes from all four units.

Several variables were created to examine when students used online notes in relationship to the date of the corresponding classroom presentation and the date of the examination. Data were included from the 135 students who viewed at least one note page. Two systems for categorizing note viewing were created. The first system identifies mutually exclusive variables describing the first time notes from a unit were examined. This category system included the variables: (1) Before – the entry page was viewed before the last lecture presentation for the unit was given, (2) Unique After – the entry page was first viewed after the last lecture for a unit was presented and more than two days before the examination, and (3) Unique Cram – the entry page was first viewed within two days of the examination. To allow comparisons across examinations, the number of unique accesses for each variable were divided by the number of units covered on the examination. The maximum combined value of the three variables associated with each examination could possibly sum to one.

The second categorization system allowed for the possibility that students might view notes multiple times. This system used the same three time periods, but identified how many entry pages had been accessed at least once during each period. Variables for this system are identified as Before, After and Cram. Before implies that the entry page for a unit was viewed before the last lecture for the unit was given. After implies that the entry page was viewed after the last lecture for a unit was presented and more than two days before the examination. Cram implies the entry page was viewed within two days of the examination. In this second system, the emphasis is on whether notes were accessed during a defined time interval rather than when notes were first accessed. To allow comparisons across examinations, the number of entry pages accessed during each time period was divided by the number of possible entry pages associated with the relevant examination. The maximum value for each of these variables was one.

2.5. Statistical analyses

Statistical analyses were defined as generating a significant result when $p \leq 0.05$. Mean differences associated with ANOVA procedures were interpreted using the Newman–Keuls post hoc procedure.
3. Results

3.1. Voluntary use of online notes

One hundred and thirty-five of 183 students made at least some use of the online notes.

3.1.1. Initial use of notes

The variables Before, Unique After, and Unique Cram describe when note users first viewed the notes associated with the several units of information covered on three course examinations. Means and standard deviations associated with these variables are provided in Table 1. An ANOVA procedure was used to compare the use of online notes across the three course examinations and the three categories of use within an examination period. The ANOVA produced significant main effects for examination, $F(2, 268) = 5.55, MSe = 0.046$, and time category, $F(2, 268) = 51.07, MSe = 0.20$. The interaction of examination and time category was also significant, $F(4, 536) = 4.44, MSe = 0.07$.

Post hoc analyses evaluating the significant main effects indicated significant differences in note use between the first and third examinations ($M$s 0.26 vs. 0.21) and between Before and Unique After and Unique Cram ($M$s 0.41 vs. 0.16 and 0.12). To interpret the significant interaction, means for the individual first viewing variables were compared across examinations. Fewer notes were viewed in the Before time period for the third examination than for the first or second examinations ($M$s 0.35 vs. 0.43 and 0.46). Fewer notes were viewed in the Unique Cram time period for the second examination than for the first or third examinations ($M$s 0.06 vs. 0.15 and 0.14).

3.1.2. Repeated note use

The variables Before, After, and Cram describe when note users viewed the notes associated with the several units of information covered on three course examinations. In this categorization system, students could be credited with viewing the notes from each unit once during the period of time associated with each category variable. Means and standard deviations associated with these variables are provided in Table 1. An ANOVA procedure was used to compare the use of online notes across the three course examinations and the three categories of use within an examination period. The ANOVA produced significant main effects for examination, $F(2, 268) = 8.70, MSe = 0.10$, and time category, $F(2, 268) = 23.34, MSe = 0.18$. The interaction of examination and time category was also significant, $F(4, 536) = 8.39, MSe = 0.08$.

<table>
<thead>
<tr>
<th>Note Use Variable</th>
<th>Examination 1</th>
<th>Examination 2</th>
<th>Examination 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>0.43(0.36)</td>
<td>0.46(0.41)</td>
<td>0.35(0.40)</td>
</tr>
<tr>
<td>Unique After</td>
<td>0.19(0.24)</td>
<td>0.16(0.26)</td>
<td>0.13(0.24)</td>
</tr>
<tr>
<td>Unique Cram</td>
<td>0.15(0.29)</td>
<td>0.06(0.20)</td>
<td>0.14(0.32)</td>
</tr>
<tr>
<td>After</td>
<td>0.34(0.34)</td>
<td>0.31(0.31)</td>
<td>0.25(0.32)</td>
</tr>
<tr>
<td>Cram</td>
<td>0.31(0.35)</td>
<td>0.10(0.25)</td>
<td>0.21(0.37)</td>
</tr>
</tbody>
</table>

Table 1
Means and standard deviations for online note use variables

Standard deviations are presented in parentheses.
Post hoc analyses evaluating the significant main effects indicated significant differences in note use between the first and both the second and third examinations (Ms 0.37 vs. 0.29 and 0.27) and between Before, After and Cram (Ms 0.41 vs. 0.30 vs. 0.21). To interpret the significant interaction, means for the viewing variables were compared across examinations. Fewer notes were viewed in the Before time period for the third examination than for the first or second examination (Ms 0.35 vs. 0.43 and 0.46). Fewer notes were viewed in the After time period for the third examination than for the first examination (Ms 0.34 vs. 0.25). Note viewing during the Cram time period differed significantly among all three examinations with second examination viewing the least frequent and first examination viewing the most frequent (Ms 0.10 vs. 0.21 vs. 0.31).

3.2. Associations among quantitative measures of note use, examination performance, and individual difference variables

The examination performance of Users and Nonusers was compared using ANOVAs. Students classified as Users outperformed Nonusers on the first and second examinations: First Examination, $F(1, 137) = 9.99, MSe = 41.2$; Second Examination, $F(1, 148) = 5.25, MSe = 46.4$. Group means for these two examinations were: First Examination – Users = 39.8 ($N = 77$) and Nonusers = 36.3 ($N = 62$); Second Examination – Users = 39.3 ($N = 75$) and Nonusers = 36.8 ($N = 75$).

ANOVA procedures were also used to compare Users and Nonusers on the individual difference measures used in this research. The only group difference involving the reading composite, mastery motive or performance motive variables were found on the first examination. Users had significantly higher reading composite scores on this examination, $F(1, 95) = 3.93, MSe = 331 (Ms 73.4 vs. 65.1)$.

An ANCOVA procedure was used to compare the examination performance of Users and Nonusers after accounting for differences in reading ability. Users performed better on the first examinations after accounting for differences in reading ability, $F(1, 93) = 7.68, MSe = 28.9$.

A series of ANOVAs were conducted to determine if when students first used online notes was related to test performance or the individual difference variables. Patterns of student use allowed the differentiation of approximately equal numbers of students who either focused on accessing notes before class presentations (Before) or who accessed notes immediately before examinations (Unique Cram). For the first examination, groups of note users were identified who had a score of more than 0.80 for Before and more than 0.60 for Unique Cram. For the second and third examinations, groups of note users were identified who had a score of 1.00 for Before and more than 0.50 for Unique Cram. ANOVAs using these categories as the grouping factor and examination score, reading composite, mastery motive and performance motive as dependent variables were completed. No significant differences were identified.

3.3. Questionnaire data describing use of online notes

Of the 126 students who completed the note use questionnaire, 95 indicated they had used the online notes at least 6 times. Only students who indicated they had used the online notes at least 6 times completed the rest of the questionnaire.
When asked to describe how they most frequently viewed online notes, 15% of these students indicated they most frequently viewed notes online, 82% viewed notes from material they had printed themselves, and 3% most frequently viewed notes printed by another student.

When asked to categorize themselves based on the frequency with which they made use of printed notes during class presentations, 20% indicated they did not use notes in this fashion, 38% indicated they had used printed notes during class presentations between 1 and 5 times, and 42% indicated they had used printed notes during class presentations 6 or more times. When asked to categorize themselves based on the frequency with which they had used printed notes after the corresponding class presentations, 19% of frequent note users did not use notes in this fashion, 48% indicated they first reviewed notes after class between 1 and 5 times, and 33% indicated they viewed notes after class more than 6 times.

Finally, students were asked to categorize themselves based on the frequency with which they had used online notes as a replacement for class attendance. As a context for these data, there were approximately 25 class sessions devoted to lecture presentations. Twenty-one percent of frequent note users claimed to have never used online notes as a replacement for class attendance. Fifty percent of frequent users indicated they had used online notes as a replacement for class attendance between 1 and 5 times. Twenty-nine percent of note users indicated they had used notes as a replacement for class attendance 6 or more times.

3.4. Using notes as a replacement for class attendance, course performance, and individual difference variables

Twenty frequent note users claimed to have never used notes as a replacement for class attendance and 28 users indicated they used notes as a replacement for attendance 6 or more times. ANOVAs based on these two groups and using cumulative examination performance, reading composite, performance motive and mastery motive scores as dependent variables were conducted. The only dependent variable generating a significant group difference was performance motivation, $F(1, 43) = 4.49$, $MSe = 14.4$. Those who claimed they did not use online notes as an alternative to class attendance had higher performance goal scores than those who frequently used notes as a replacement for class attendance ($Ms$ 24.0 vs. 21.6).

4. Discussion

It is essential that researchers establish causal connections between identifiable study behaviors and learning. However, while much can be learned about the potential of specific study tactics from carefully controlled, short duration experiments, such research can only serve as a starting point. In higher education, studying is largely voluntary and self regulated. The types of study tactics recommended and perhaps carefully taught in courses intended to help struggling students adapt to the rigorous demands of college courses are frequently ignored or inappropriately applied when students function on their own. Research on specific study tactics much be extended to include the long-term analysis of the use of such tactics in authentic course settings (Rothkopf, 1988).

The study tactics addressed by this research are note taking and note reviewing. A substantial body of research relevant to these activities exists and has been used to focus the present work. In
particular, research demonstrates that many college students are poor note takers and review activities focused on the resulting incomplete or poorly structured notes suffer as a consequence (e.g., Kiewra, 1985a). In addition, the demands of creating a quality written account of a lecture and comprehending the lecture overextend the attentional capacity of some students (Kiewra & Benton, 1988). In applied settings, providing students with notes to replace or supplement notes they might take themselves could potentially improve performance by freeing attentional capacity during presentations and by improving the quality of the record students have available for review.

The most fundamental goal of this research was to estimate the willingness of students to use online notes. Students had convenient access to these resources from many campus labs and potentially in their own living quarters. Of course, content covered by the online notes was also available in class and unless the students felt the online notes were serving some purpose there was no reason to make the effort to view them. The data stored by the web server provide the most accurate record of note use. One hundred and thirty-five of 183 students made at least some use of the online notes. The data provided by the questionnaire indicated that approximately 75% of students viewed online notes on at least 6 occasions.

When and how students make use of notes made available online was also determined. The most definitive conclusion available from the note viewing data was that most students make use of notes close in time to the date corresponding lectures are given in class. The server data clearly demonstrate that note use categorized as Before was much more common than note use categorized as After or Cram. These data in combination with questionnaire information indicating that most students print their notes (82%) and use these printed notes during class (42% on 6 or more occasions) provide a composite view of the most common use of online notes. Students print notes and bring the notes to class to support their own note taking and efforts to comprehend the lecture.

This research cannot establish causal relationships between individual differences, note taking behavior, and test performance because of the emphasis on voluntary student behavior. However, causal relationships have been established in many earlier laboratory studies. What this research offers is an ecologically valid determination of whether students will put themselves in situations that are consistent with the productive treatments demonstrated in controlled studies. Student behavior in applied settings should not produce data that contradict the findings of controlled studies. Data from two of three examinations demonstrated that note users performed at a higher level on course examinations than those who did not use online notes. Students who made use of the online notes on the first examination were also found to differ on the reading performance variable from those who did not use notes. This difference is worthy of further study because more carefully controlled studies have found that less able students were most likely to benefit from access to notes. It should be a concern that students who need support are less likely to seek it.

There were students who differed from the general trend of obtaining online notes for use during class and an effort was made to determine if different strategies produced different consequences. The examination scores of the students who first viewed notes immediately before each test were compared with the scores of those students who systematically viewed online or printed notes immediately before class presentations. No differences in examination performance, reading performance or goal orientation were associated with when students made use of notes.
One goal of this research was to address the concern that readily available notes will encourage students to skip class. The questionnaire data indicated that approximately 30% of frequent note users claimed to have used notes as a replacement for attending at least 6 classes. To determine if those who were most likely to skip class ended up performing at a lower level, the cumulative examination scores of this group was compared with the cumulative test scores of students whose questionnaire responses indicated they were note users, but had not used online as a replacement for class attendance. No difference in examination performance was discovered. It was demonstrated that those who used notes and did not skip class had higher performance goal scores. A performance goal orientation is associated with a greater concern for visible indicators of achievement such as higher grades and with a more competitive orientation (Harackiewicz et al., 2000).

It is important to recognize the missing classes can occur for many reasons and instructor resistance to providing notes would not be justified as a response to all of these reasons. An anecdote from this course provides one example. At the conclusion of the course, a student made a point of thanking the instructor for making online notes available and proceeded to inform the instructor that she had made it through the course without attending any lectures. It turned out she was attempting to graduate and was taking the Introductory Psychology class to meet a general education requirement. The Introductory Psychology lectures conflicted with the meetings of a required course in her major and the online notes provided an alternative for the student. Students may be ill, encounter conflicts because of changes in work schedules or travel because of athletics, feel the need to spend time on another course because of an assignment or examination, or simply just not feel like attending class. In at least some of these circumstances, class attendance probably had little to do with the availability of notes and access to notes would clearly be to the benefit of the student. If the connection between online notes and class attendance is a significant issue causing instructors to deny access to notes they could easily make available, further investigations attempting to associate note access with specific reasons for not attending class and with course performance should be conducted.

References


