

# Implementing Guided Note Taking to Improve Student Learning of Energy Saving Construction Techniques

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## Abstract

Understanding energy saving construction techniques is a critical component of Construction Design—a technology-based, sophomore level course in which students prepare construction drawings for an individually prepared residential project and a team-prepared commercial project. This course is a requirement for one of the two programs in our department, Architectural Engineering Technology, and an elective for the second program, Construction Management Engineering Technology. Construction Design, like many other lecture laboratory courses, is conducted in a computer laboratory—a setting that has more distractions than the traditional lecture room and therefore not the optimal venue for student note taking. Note taking, per Piolat, increases both students' attention in class and their performance on tests, but it can also interfere with students' efforts to comprehend lecture content.<sup>1</sup> In a separate study Kiewra reported that students typically record only about one-third of the important points in a lecture.<sup>2</sup> The goal of this paper is to show that guided note taking—faculty generated partial notes that students actively complete during a lecture—improve students' comprehension in a lecture laboratory setting. In addition, this study furthers the author's research in innovative pedagogy. Two Construction Design courses in the spring of 2011 were each given the same lecture on energy saving construction techniques. The control group produced their own notes, while the test group was given a set of guided notes on the class topic to complete during the lecture. Both groups were then given the same test for the same time duration. The statistically significant outcome of this study will provide faculty with an understanding of the relative benefit of providing guided notes to their students.

## Introduction

Students take notes to capture the information presented during a lecture and to use while studying to prepare for examinations. Note taking during a lecture aids student learning and understanding. Per Lange, the act of note taking helps students process information, establish connections and make sense of course topics, tasks that they would not be able to do as easily by only listening without note taking or viewing an outline.<sup>3</sup> A number of research studies have found that taking notes during lectures improves student performance on tests and is associated with higher final grades.<sup>4</sup> Piolat stated that note taking increases both students' attention in class and their performance on tests, however it can also interfere with students' efforts to comprehend lecture content.<sup>5</sup> In a separate study, Kiewra reported that students typically record only about one-third of the important points in a lecture.<sup>6</sup> To combat this problem and to provide more time for student engagement through listening and discussion, many professors are posting their full lecture notes on course websites such as Angel™, Blackboard™ or Moodle™, or producing them as handouts distributed in class. Students generally prefer this method to traditional note taking<sup>7</sup> as it gives them a measure of confidence about succeeding in the course<sup>8</sup> and perhaps because they are used to accessing information quickly via the internet. However, Murphy et al<sup>9</sup> and Weatherly et al<sup>10</sup> have shown

through separate studies that students with access to professor-produced lecture notes obtained lower final grades than those without access to the same notes. In addition, separate studies have shown that instructor-provided notes have led to student procrastination in learning activities, hindered students taking notes in class<sup>11</sup> and were even associated with an increase in student absenteeism.<sup>12</sup> The middle ground between student-produced notes and instructor -provided lecture notes is partial faculty-provided notes or guided notes. This paper will provide a brief background of guided notes, a comparison of student comprehension following use of guided notes versus that following use of student-prepared notes and the relative benefits of faculty providing guided notes to their students.

### Background:

Guided notes are an instructor-produced form, guide or incomplete framework<sup>13</sup> based on the lecture topic that prompts students to fill in key concepts in blank spaces designed into the notes while the professor is teaching. This form of note taking prompts the student to be engaged in the topic during a lecture rather than trying to expedite their transcription of what the instructor is saying, passively holding a completed instructor provided handout,<sup>14</sup> or planning to download the full lecture notes prior to the exam. Research has shown repeatedly that students learn more when they are actively involved in the teaching-learning process.<sup>15</sup><sup>16</sup> Per Davis, “Researchers report that students who receive partial notes perform better on exams and earn higher course grades than students who receive a full set of notes.”<sup>17</sup> In addition, students preferred partial notes over full notes.<sup>18</sup>

Guided notes can be effectively incorporated into the lecture format by:

- Preparing or converting current lecture modules, based on course objectives and accreditation standards, into a format that maintains relevant background and removes key concepts to be completed by the students during the lecture
- Providing consistent cues such as numbers, bullets, blank lines, and asterisks so that students know where, when and how many key points or concepts to write or draw
- Providing ample room for students to handwrite/draw the missing information
- Adding background and follow-up sources such as assigned readings, review exercises and quotes on the lecture topic
- Copying the guided notes copied on hole punched paper and distributing the notes at the beginning of the course or at the beginning of each lecture.

### Methodology

A group of 28 Construction Design students was divided into 2 groups of 14 (n=14 for each group). The test group was given a 3 page set of guided notes on the lecture topic “Double Stud with Spray Foam Wall Construction.” These notes were an outline of the lecture with 2 diagrams and 35 blank areas to be completed by the student during the lecture. The test group was surveyed on their familiarity with guided notes. All students in the test group responded that they had never used guided notes prior to this lecture. Both groups were surveyed as to whether they had any knowledge of double stud wall construction methods and all students in both groups responded in the negative. The control group was instructed to prepare their own set of notes during the lecture. Both groups were informed that following the lecture, they would be

given a test on this lecture topic and that that the test would be part of their final grade for the course. Both groups were then given the same lecture that was outlined in the guided notes. The diagrams as shown in the guided notes were shown and explained to the class – one was projected onto a screen and the other was drawn on the classroom dry-erase board.

Immediately following the lecture, both the test and control groups were given the same examination for the same duration. The examination tested the student’s memory of the main topics of the lecture – the 35 blanks in the guided notes.

Results:

<b>Student #</b>	<b>Guided Notes Group Scores</b> (out of 35 max points)
1	18
2	24
3	19
4	24
5	25
6	26
7	29
8	30
9	24
10	25
11	25
12	29
13	31
14	28
<b>Mean</b>	<b>25.5</b>

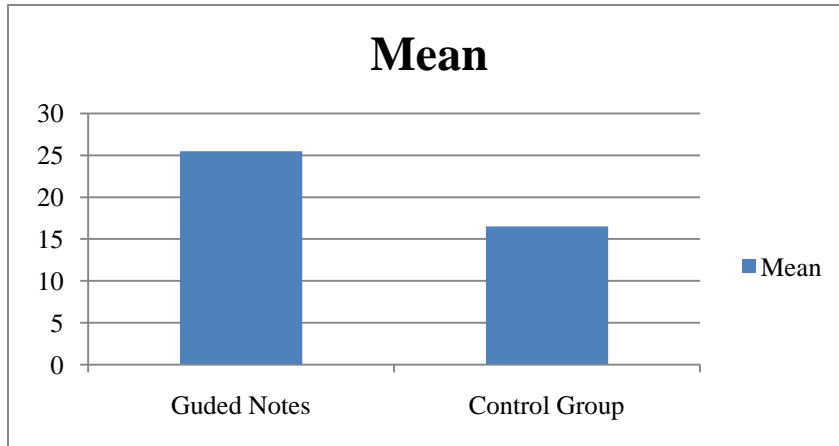
<b>Student #</b>	<b>Control Group Scores</b> (out of 35 max points)
1	15
2	16
3	17
4	22
5	11
6	20
7	14
8	13
9	16
10	20
11	15
12	12
13	23
14	17
<b>Mean</b>	<b>16.5</b>

Welch's t-Test (Unequal Variances)

	<i>Guided Notes</i>	<i>Control Group</i>
Mean	25.5	16.5
Variance	14.42	13.19
Observations	14	14
Hypothesized Mean Difference	0	
df	26	
t Stat	6.41	
P(T<=t), one-tail	4.33E-07	
t Critical, one-tail	1.71	

## Assessment of Data:

The results show that  $t(6.41)$  is greater than  $t\text{-crit}(1.71)$  showing a statistically significant result.



Guided Notes = 25.5 average out of 35 points maximum (72.85%)

Control Group (student produced notes) = 16.5 average points out of 35 points (47.14 %)

The guided notes group achieved an average test score of 25.71% higher than the test group.

## Benefits of Using Guided Notes as per Barbetta et al <sup>19</sup>

The incorporation of guided notes into a lecture benefits students in the following ways:

- Students do not have to decipher what to write and how to organize their notes during a lecture.
- Students have increased opportunity to listen and participate in the lecture.
- Students write the key points which reinforces comprehension.
- The structured active responding required by guided notes improves the accuracy of student note taking.
- Instruction with guided notes increased the quantity and quality of in-class questions.
- Having more accurate notes increases confidence in asking questions.
- Guided notes provide a standard set of notes to prepare for exams, increasing the likelihood that students will study the right things.

## Conclusion:

The test result of this experiment shows that the use of guided notes improved student retention by a group average of 25.71%. Further study with a larger sample size is recommended.

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