

2006-1410: PREPARATION, ATTENDANCE AND NOTE-TAKING, HOW TO PROMOTE STUDENT BUY-IN.

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Preparation, Attendance and Note-taking,
How to Promote Student Buy-In.

Abstract:

In an ongoing attempt to improve undergraduate education, the college of engineering at North Carolina A&T State University organizes a group of core courses engineering educators to meet regularly to discuss and share ideas on class room issues. Three key factors were identified: preparation, attendance, and note taking will be studied and discussed their effect on students' ability to succeed.

Introduction:

Educators all agree that there are several key factors in a students' ability to succeed in the highly demanding Engineering curriculum. In an ongoing attempt to improve undergraduate education the Dean's office at North Carolina A&T State University organized a group of core topic engineering educators to meet regularly and discuss and share ideas on classroom issues. Three of those key factors are identified and will be discussed and studied at NCA&T.

First, preparation for class; we find that students who prepare for each lecture by pre-reading the material in their text will understand the lecture. This preparation is one that few students take seriously. There are diverse methods that can be used to encourage this before class preparation and a variety of these means will be discussed.

Attendance is the next step towards success. Students when they hear the information, process it, and write it in their notes they are already beginning to learn the information. Reinforcement of the information through review of their notes completes the learning process. However as much as educators realize the importance of attendance we must pass this opinion onto the students. Several different means by which attendance is recorded and then weighted will be discussed. Should one take attendance every class, should a professor call out the roll, should a roll be passed? While class size may dictate the method to a certain degree a professor has choices.

Finally, if the student is prepared and if they attend their lectures, note-taking also is a key part in their academic achievement. Taking notes is an activity that is rarely analyzed carefully, yet is worth inspection. We assume underclass students learned these skills in high school but the reality at NCA&T is that our diverse student body comes to college with very different backgrounds.

Ornstein (1994) believes that all students would benefit if teachers intentionally trained their students in note-taking techniques, especially the lower-achieving students. Research performed by Carrier & Titus (1981) proposes that the act of taking notes is significant because it 1) increases attention and concentration, 2) encourages students to process the material at a deeper level, and 3) provides a means of connecting new learning with prior knowledge.

As faculty and not wardens we have no means to force quality note taking but from experience we suggest several different methods such as the possibility of introducing lecture outlines as a way of helping students to structure their notes. While there is no single format for

taking notes that is ideal for each student, there are tips that can be given to students to help them in this task and accountability from faculty and students is a key.

All agree that in college classes, lectures are still the primary way faculty deliver information to students because they enable a lot of information to be presented in a relatively short period of time. The lecture will mean more to the students if they have looked over the material prior to the lecture. Therefore the paper will be divided into three sections, preparation, attendance, and note taking.

Preparation:

How do educators encourage their students to read ahead of time? One method used is available with the onset of Blackboard online system and the same options are available with Webassign systems. Many universities are employing the Blackboard software and if utilized it offers a convenient method to administer class pre-quizzes. The quiz is created in the test manager and then is deployed in the assignment area. Questions can be randomized, and time limits set. Once the test time is over the student is prevented from a re-take. The instructor announces the quiz the class time before and also announces it on the Blackboard front page. A typical quiz will be open from Monday at 9:00pm until Tuesday at 2:30 pm for a 3:00pm Tuesday class. We are aware that students may be working together on these but it is causing the students to open the book to the appropriate chapter ahead of the class lecture. Questions are kept simple and many times are straight from the text. Data is in the process of being taken but feed back from the students is positive and includes comments such as: “I like the pre-quizzes because that means that I actually have to read the chapter before taking them.”

 **Test Manager**

Add and modify Tests. After creation, add the Test to a content area and make it available. Results are recorded in the Gradebook.

 [Add Test](#)

Name	Deployed	Date		
<input checked="" type="checkbox"/> Chapter 3 Pre-Quiz	Assignments	January 11, 2006	Modify	Remove
<input checked="" type="checkbox"/> Chapter 4 Pre-Quiz	Assignments	September 6, 2005	Modify	Remove
<input checked="" type="checkbox"/> Chapter 5 Pre-Quiz	Assignments	January 11, 2006	Modify	Remove
<input checked="" type="checkbox"/> Pre-Class Quiz Chapter 8	No	October 13, 2005	Modify	Remove
<input checked="" type="checkbox"/> Chap 10 Pre-Quiz	Assignments	January 11, 2006	Modify	Remove

Figure 1. Sample Screen from Blackboard.

Attendance:

In the present study, the results of several engineering courses will be used to investigate the effect of both attendance and note-taking on the student’s academic achievement. These courses are (1) statics for architectural, civil, and mechanical engineering students (CAAE331, and MEEN335) as one section, and (2) statics and strength of materials for electrical and industrial engineering students (MEEN313) and finally (3) Materials Science for mechanical, chemical and industrial engineering students (MEEN260). Thirty one (31) architectural and civil engineering students, and twenty six (26) mechanical engineering students were in statics (CAAE331, MEEN335), and forty five (45) electrical and industrial engineering students were in statics and mechanics of materials (MEEN313).

Table 1 shows the distribution of the final grades, and the percentage of attendance for the two courses. Final grades were determined by five categories: Attendance (5%), ten quizzes (15%), ten homework (10%), three major tests (40%), and a comprehensive final exam (30%). Percentage of attendance was determined by dividing the number of classes attended to the total number of classes for the semester. As shown in Table 1, there is a strong direct relation between grades and attendance; students with higher grades have higher attendance record. Figure 2 displays graphically the strong correlation between attendance and final grade. Attendance must be checked at the beginning of class either by a graduate assistant or if classes are small enough by the Instructor.

Table 1: Final Grades-Engineering Mechanics I (Statics) for Architectural and Civil Engineering Students:CAAE331

Letter Grade	A	B	C	D	F	F	W	Total
No. of Students	4	7	5	2	5	6	2	31
Percentage %	13%	23%	16%	6%	16%	20%	6%	100%
Attendance %	98%	91%	86%	76%	62%	16%		

Final Grades-Engineering Mechanics I (Statics) for Mechanical Engineering Students:MEEN335

Letter Grade	A	B	C	D	F	F	W	Total
No. of Students	3	7	4	3	5	3	1	26
Percentage %	12%	26%	15%	12%	19%	12%	4%	100%
Attendance %	94%	88%	74%	68%	56%	9%		

Final Grades- Statics and Mechanics of Materials for Electrical and Industrial Engineering Students: MEEN313

Letter Grade	A	B	C	D	F	F	W	Total
No. of Students	8	10	6	7	7	4	3	45
Percentage %	18%	22%	13%	16%	16%	9%	6%	100%
Attendance %	90%	86%	81%	64%	48%	5%		

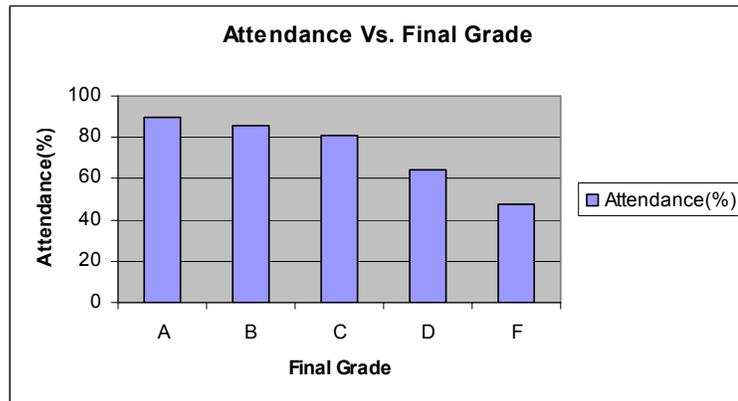


Figure 2: Graphical version of Effect of Attendance on the Final Grade (MEEN 313)

Students who failed the class (F) were placed in two different groups (see Table 1), the first group participated in all quizzes and exams but did not pass the course, while the second group stop attending the classes at early stage but failed to withdraw from the course.

Note Taking:

Lecture note-taking influences the academic success of students, and therefore, students will have to depend on their skills and ability to take notes in order to be successful in their college. Bakunas and Holley (2001), and Boon (1989) suggest that note-taking skills should be taught to students in the same manner that they are taught writing or computer skills.

Many college students arrive at college with inadequate study skills, and they do not realize the importance of note-taking and listening. It is important, therefore, that new students realize that the information presented in the lectures often comprise the main concepts of the course and such material most likely to be included on exams. More importantly, students should know that class attendance, note taking, reviewing notes, completing homework assignments, reading the textbook and reviewing notes and assignments all contribute to a student's academic success. See the recall curve in Figure 3.

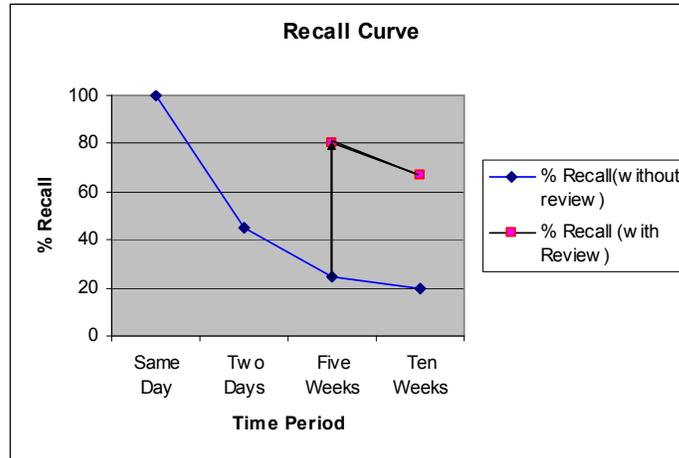


Figure 3. Memory and recall curve.

Armbruster (2000) reported that college students usually spend about 80% of class time listening to lectures. Unfortunately, students typically record only 20-40% of the important lecture ideas. In addition, approximately 80% of what is not noted is forgotten after two weeks.

Students cannot possibly remember all of the lecture's material, especially if the ideas are new. The primary reason to take notes, therefore, is to store information until there is time to learn it. It should be known that, taking notes is part of a process that begins before class (preparing ahead for the lecture), goes on during class (use active listening strategies during lecture to grasp the key points), and continues after class (working with the notes after class). Moreover, note-taking can boost achievement by:

- (1) Triggers basic lecturing processes, help the students rehearse the lecture content, and provide a gauge to what is important in the text.
- (2) Can help the students to remember parts of the material that were not included in the notes themselves, and can help the student to remember important points even before the students have studied the material formally.
- (3) Increases attention and concentration in class. Good concentration will enhance memory
- (4) Encourages students to process the material at a deeper level, and
- (5) Provides a means of connecting new learning with prior knowledge.

During the semester, students were advised to keep lecture notes in a large notebook, three-ring binder, to insert handouts and rearrange their own notes. Twelve students have used an engineering paper for their lecture notes. It was noticed that these students have more complete, accurate, and neat notes and sketches. In addition, Figure 4 shows that the performance of these students was higher than the rest of the class.

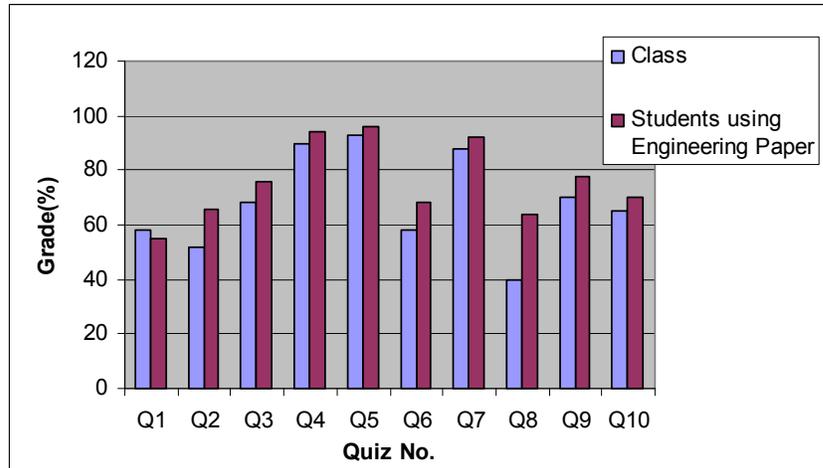


Figure 4. Correlation between use of engineering paper and regular paper on grades.

One of the methods to study the effect of note-taking on the students' performance was to determine the quality of notes for the courses mentioned above. The percentage of quality of notes was determined by the following items: Complete notes (lecture notes, handouts, homework, quizzes, and tests), accuracy, neatness, organize notes, using large notebook, write on one side of the page, neat sketches, using signal marks to indicate importance, and using grid or engineering papers and is displayed in Table 3. All notebooks were collected at the end of the semester, and analyzed as shown in Table 4, and in Figures 3 and 4. Strong correlation exists between grades and quality of notes.

Table 3. Rubric to determine the quality of notes.

Item	% of total quality
Complete	25
Accurate	20
Organize	15
Neat	5
Drawings	10
Margins	10
Marks	5
3-ring Binder	10

Table 4: Quality of Notes vs. Grade distribution for CAEE331 and MEEN335

Notes' Quality (%)	% of students with this final grade				
	A	B	C	D	F
90-100	57%	50%	23%	0%	0%
80-90	29%	29%	33%	0%	10%
70-80	0%	14%	0%	40%	20%
60-70	14%	7%	11%	0%	20%
50-60	0%	0%	33%	20%	10%
below 50	0%	0%	0%	40%	40%

As shown in Figure 5, students who pass the course take good notes, between 80%-100%. On the other hand, students who fail the class and/or D-students, take poor notes, below 50%. Figure 4 show that the majority of A and B students have notes' quality between 90%-100%. In Figure 5, students who used engineering paper for their notes (normally, high quality of notes) compared to each grade level. 3 out of 7 from grade "A", 5 out of 14 from grade "B", and 3 out of 9 from grade "C". It is clear that high achieving students take more and better notes than their peers. Their notes are neat, organized, accurate, and contain more detail including critical terms and examples.

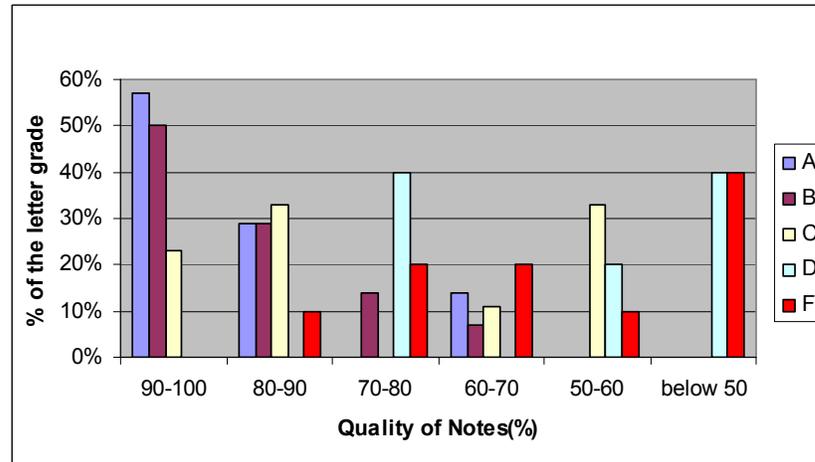


Figure 5. Quality of Notes vs. Grade Distribution.

In the past, attendance; note-taking; and, thus, performance for this course (static and mechanics of materials, MEEN313) were considered to be very low. In order to enhance the academic achievement of the student, some factors were considered. These factors include, but not limited to: adding attendance and quality of notes to be part of the final grade; student's preparation by posting materials online, and continuous course review. In addition, the following 10 items were repeatedly stressed at the beginning and during the semester:

1. Attend all lectures: Failure to attend will leave gaps in the student knowledge.
2. Be on time for class: Main ideas, normally, mentioned at the beginning of the class.
3. Prepare before class by reading from text, and assignments, and review previous notes: Lectures will make more sense, new concepts will be less formidable, and students will understand the lecture better.
4. Doing homework on time and reviewing previous notes helps orientate the student's thoughts to the subject in hand and makes listening and note taking easier.
5. Think how this topic relates to previous ones, or to other courses: Reading lecture notes will help students to link new ideas to familiar concepts and identify things they didn't quite understand
6. Keep lecture notes in a large notebook: Three-ring binder, for example, allows students to insert handouts and rearrange their own notes.
7. Keep all material from each course (lecture notes, notes from reading and other resources) together and each course separate from all other courses.

8. When taking notes, copy down everything on the board, and be alert to what is important. Use asterisks or other signal marks to indicate importance.
9. Write down and sketch the problem, each step in the solution using math/engineering symbols. Next to the major steps write down "in your own words" what you are doing.
10. Review the lecture at least before the next lecture.

A study of note-taking importance was also studied in the MEEN 260 Materials Science course. The semester began in the standard classroom method used by the Professor which included a combination of PowerPoint slides and board notes. The professor however noticed many students only passively watching the lecture. The first test was administered and grades evaluated. The results for Test 1, as shown in Figure 6, were not to the level of learning expected therefore a change was made. The average was a 57 and the standard deviation was 21. A class discussion was then held in which the value of complete notes was the topic. It was announced that each student's notes were to be taken up at the time of the next test and the quality graded. A detailed grade for the notes was not given as discussed for the previous courses but a 3 scale rank was used, excellent, adequate, or poor and a numerical grade given. All students turned in a set of notes and this in itself was a positive step. The grades on the second test went up as the average was a 66 and the standard deviation decreased to a 14. The greatest improvement was shown in the poorest performing student as shown in Figure 6. The playing field was more leveled as evident from the standard deviation decreasing from 21 to 14.

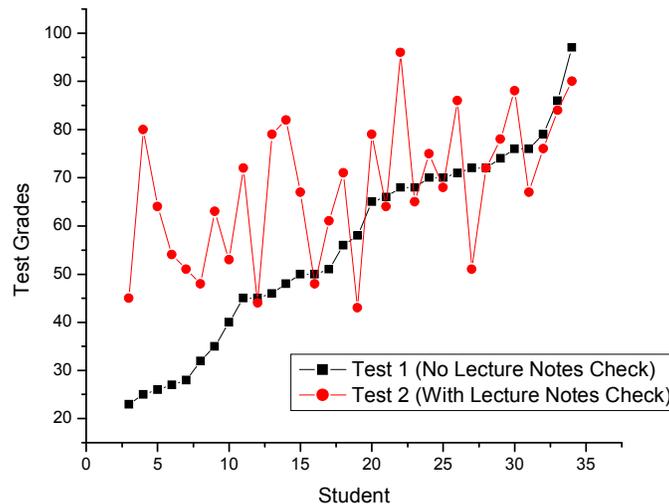


Figure 6. MEEN260 test grades for each student before and after the student notes were graded.

The importance of classroom management can never be understated. A successful experience for our students begins with preparation and as professors, the internet and online tools offers a means to encourage this preparation. Then we have shown more evidence that attendance is also crucial. Finally, the quality of good notes is noted for the most successful students. More importantly, attention to taking more complete notes can help the lower end students achieve greater success.

REFERENCES

Armbruster, B.B. (2000). "Taking notes from lectures." In R.F. Flipppo & D.C. Caverly (Eds.), *Handbook of college reading and study strategy research* (pp. 175-199). Mahwah, NJ: Erlbaum.

Bakunas, B. & Holley, W., "Teaching organization skills." *Clearing House*, 74 (3), 151-154. (2001)

Boon, O., "Note taking for hearing and hearing impaired students". In *Journal of Reading* 523-536 (March 1989).

Ornstein, A.C., "Homework, studying, and note taking: Essential skills for students". *NASSP Bulletin*, 78 (558), 58-70, (1994).

Carrier, C. & Titus, A., "Effects of note taking pretraining and test mode expectations on learning from lectures". *American Educational Research Journal*, 18 (4), 385-397, (1981).