Overcoming Student Procrastination within an Environment Where Academics Is Only Half the Experience

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Abstract

Cadets at the United States Military Academy not only complete a Bachelor's of Science in four years, but they also balance it with a full-time military job, extracurricular activities and sports. These academic and non-academic requirements lead many toward procrastination in the completion of assignments. The restructuring of course workload among in-class and out-of-class events offers the ability to reduce overall workload for students and implement active learning without sacrificing learning objectives for a course. This paper will address indications demonstrating procrastination, techniques encouraging continuous learning and completions enabling proactiveness. Analysis is obtained from many engineering and non-engineering students across several engineering courses and semesters. Preliminary results verify improvement not only with grades but also with feedback and results in follow-on courses.

Key Words—student procrastination, course workload, grade distribution, study habits

Introduction

Many students learn new materials in different methods. Some require a *crawl, walk* and *run* approach. Some require more visual versus verbal styles. Others still may require multiple aspects and iterations to the same problem to achieve understanding—intuition versus sensing. It may not be as simple as the scope of the topic from sequential to global or vice versa. The Learning Styles[1] survey from North Carolina State University will help provide a benchmark for comparison and also shows that not all students are the same despite a small population for this classroom research.

The primary course of focus is Introduction to Electrical Engineering (EE302), which is comprised mostly by Electrical Engineering majors in their first semester in this major. Because of the small population under research, several semesters were examined. Students enrolled in Fall 2007, the first semester the author teaches the course, were the benchmark for any improvements made to the course. The original course percentage breakdown is available in Table 1. As shown, 84% of the total grade was assessed during scheduled class and laboratory time. Since attendance was mandatory, few would miss any of the in-class graded events. This prompted a focus of short-term preparation since quizzes, exams and the term-ends were all scheduled events, while assignments were less emphasized because they were simple, time-demanding, worth few points and provided with solutions at a later time.

To overcome this procrastination in this course, the author proposed two objectives: shift points from in-class to out-of-class events and reduce the total number of events. Later offerings of EE302 in Spring 2008, 2009 and 2010 are used as the basis of comparison and effectiveness of the aforementioned adjustments. Some of the adjustments were also introduced into other courses, Introduction to Electronics (EE362), and Military Electronic Systems (EE450), to

provide further comparison and analysis. EE362 is the follow-on course to EE302, while EE450 is the final electrical engineering sequence course offered for non-engineering majors.

Background

In EE302, throughout the course students were taught using the *crawl, walk* and *run* methodology which capitalized on the Thayer method and an Army approach to training[2,3,4]. They were introduced to the *crawl* phase during preparation using their syllabus, textbook and provided instructor notes—which were from a previous instructor in the course—for each lesson. During the *walk* phase, the students received a lecture—a third perspective—on the material and performed in-class exercises as a class with the instructor. Finally, during the *run* phase, the students performed daily problems, homework sets and preliminary laboratories after discussion of the topics. Additionally, final assessments of learning were made with quizzes and exams.

The Learning Styles survey provided the author a composite structure of the students within the course, while it provided the students with self-assessment of how they learn. All students, including the instructor were required to complete the survey and provide a copy to the instructor for review.

Periodically throughout the course, student feedback in the course came in three areas. First of all, verbal and written feedback was provided on the current topic of the course as well as immediate grading of the quizzes during the class. This provided the students the opportunity for quick self-assessment of current topics recently completed and provided linkages to the new topic. Written feedback was collected at the end of a major block of lessons. Secondly, laboratory reports required comments on the benefits of the laboratory and any suggested improvements. Finally, the end-of-course survey provided overall feedback for the course and specific aspects of the course.

In follow-on semesters the author introduced additional means of feedback and alterations to the point distribution. These provided additional sources of information and confirmation of further improvement to the learning of the students.

Analysis of these surveys and performance measurements yielded results corresponding to changes in the course point distribution, reduction of assignments, graded feedback and incentives over several semesters.

From the author's experience during undergraduate and graduate studies, many professors employed various techniques to assess final grades. At the United States Military Academy, grade scales are fixed, and students need to achieve criteria for a certain grade, i.e. curving of grades is at a minimal. This gave a focus between the instructor and student to achieve a realistic assessment of performance. During a semester at the Air Force Academy, several courses had assignments and final grades adjusted to a standard normalized curve regardless of actual performance. This gave an impression of equality across many semesters and depended on the number of students in a course and performance was relative. During graduate studies at the University of Southern California, every course had a grade scale, where many assignments and final grades were curved. This gave a relative grade, bell-curved, at the end, making

intermediate assessments difficult. In a time-intensive environment, additional unknowns to a student's grade cause anxiety and unpredictability which can hinder encouragement to self-learning and motivation. The courses under research remain without curves which allow accurate reflection of interim and final course grades.

In Lowman's[5] book, he pointed out that students need to be motivated to encourage learning outside of the classroom. Immediate evaluation of quizzes and exams allow students to see the benefits of continual preparation and reinforcement of materials which provide motivation and encouragement to complete out-of-class assignments. The *carrot and stick* approach may initially provide a short term effect, especially in the beginning of the course, but not for the duration of the course. This approach can initially enforce the criteria and expectations in the course, but it still needs to provide the opportunity for students to seek the benefit and an opportunity to improve their grade.

Point distributions for each semester of EE302 are shown below in Table 1. Workbooks consisted of Lesson Study Guides, In-Class Exercises (ICE) and daily Study Problems (SP). Study guides provide lesson objectives, reminders, and links for additional references on material covered during that lesson. ICEs are problems completed in conjunction with the lesson lecture which included class participation. Again, the lesson preparation, lecture and ICEs create the *crawl* phase. The ICE solutions were posted prior to the beginning of the lesson so students had the opportunity to perform an additional check on learning during the preparation phase. SPs are textbook problems that reinforce the lessons topics and objectives when the student completes them after the lesson. The SPs create the *walk* phase. SP solutions were posted about one day after the lesson to provide the student with the opportunity to attempt the problem without looking at a solution first. Finally, the quizzes, exams and laboratories created the *run* phase. They are time-limited, graded events and without the assistance of posted solutions. Later semesters would reduce the number of large quizzes and exams and replace them with homework sets, reduced SPs and smaller quizzes or 5-minute "pop" writs. These changes reduced the quantity of instructor-imposed, time-limited events to some student-imposed ones.

Category	Fall 2007 % (Qty)	Spring 2008 % (Qty)	Spring 2009 % (Qty)	Spring 2010 % (Qty)
Workbook @ 20/10 pts	6 (3)	3 (3)		
Homework @ 10/30 pts		9 (9)	15 (5)	
Quizzes @ 20 pts	20 (10)	12 (6)		
Daily Writs @ 5 pts			5 (10)*	5 (10)*
Prelabs/Labs @ 30-50 pts	6/6 (4/4)	6/8 (4/4)	8/12 (4/4)	14/16 (4/4)
Project Demo/Report @ 25-50 pts	2(1)/4(1)	2(1)/4(1)	5(2)/5(1)	5(2)/5(1)
Instructor @ 60/50 pts	6	6	5	5
WPRs @ 100 pts	30 (3)	30 (3)	20 (2)	20 (2)
TEE @ 200-300 pts	20 (1)	20 (1)	25 (1)	30 (1)
Events In-class	84 (20)	76 (16)	72 (10)	81 (10)
Out-of-class	16(8)	24(17)	28(10)	19 (5)

Table 1. Point Distributions and # of Events where *Writs are considered 1 event in total

Again, there were two major changes in the curriculum for the three semesters of the course under research. In Spring 2008, the author added homework sets which did not have posted solutions to encourage out-of-class study and assist in maintaining course knowledge. This was essentially a non-time dependant *run* phase event. In Spring 2009, the author reduced the total number of graded events as a measure to decrease the out-of-class workload of students. The total work of students would be decreased, and this allowed a further benefit to students to improve time management, self-discipline and continued self-learning. Furthermore in Spring 2010, the author again reduced the number of assignments by removing the homework sets and shifting points back to in-class events. Optional, daily study problems were available for the students to practice and verify learning.

All assignments were individual, graded events, whether in-class or out-of-class. Due to the two major changes in the curriculum, the shift in point distributions was to encourage students to spend more time on out-of-class assignments which may contribute to more time spent on course review and preparation, thus reducing procrastination.

Method

Procedure. Each student enrolled in EE302 completed and submitted a copy of the learning styles survey with their first homework assignment. This information is compiled along with the end-of-course surveys to provide a benchmark for comparison to course performance and course point distribution assessments. In Fall 2007, the students acted as the control group since this was the authors first semester as an instructor and did not want to change the course. Later offerings of the course would employ course point redistributions and additional surveys (i.e. time and minute papers) for comparison to course performance.

One incentive the author began in Fall 2007 was to give bonus points for early submission of assignments. While standard late policy was 10% per day, the author gave one point per day early with individual limits or negated if incomplete. In Spring 2009 the author changed it to 5% per day, with a maximum of 10%. This provided a bonus to being proactive about planning ahead, and thus improving time management. In Spring 2009 an additional incentive relating to time was to require a redo of any assignment that was graded as a D or F, without considering late penalty assessments. The redo was averaged with the original submission to a maximum of 70%, where late penalties would not be negated. The incentive was to reduce incompletes while increasing grades and performance.

At the end of each semester, students complete end-of-course surveys and provided some feedback on laboratories. In Spring 2009, students also completed minute papers following a Written Partial Review (WPR) or Mid-Term and time surveys on a lesson basis.

The immediate review of graded events depended on the type of event. In Fall 2007 and Spring 2008, all quizzes, WPRs, workbooks and laboratories (preliminaries and experimental portions) were reviewed in class upon return to the student so any shortcomings in the class were addressed prior to continuing with new topics. In Spring 2009 with the removal of quizzes and the addition of daily writs, they were immediately reviewed as a class which provided a review of previous lessons and a link into the current lesson. Since these were 5-minute "pop" quizzes

given every four lessons, minimal lecture was used to take and review them. This also provided an opportunity for review of material prior to the discussion of new topics.

Sample. In Fall 2007 there were 38 students enrolled in the course comprised of 26 Electrical Engineering (EE) majors, five Engineering Management (EM) Majors and seven Naval Exchange students. In Spring 2008, there were 24 students enrolled comprised of only EE majors. In Spring 2009, there are 24 students enrolled comprised of 22 EE majors and two EM majors. In Spring 2010, there are 19 students enrolled comprised of 13 EE majors and four EM majors. There are basically two groups of students: EE majors and non-EE majors. The separation is based on the number of previous and concurrent courses in EE, timing of prerequisites and time separation between these courses. For example, the EM majors only take a total of three EE courses, while EE majors take 18 EE and non-EE required courses as an EE major. Therefore grade comparisons are relative to other courses taken at the academy.

Referring to Tables A1 through A4 in Appendix A, the majority of the students are visual. The textbook, class examples and exercises, demonstrations, and assignments all contributed to enhance this learning category. Daily lessons, handouts, notes and additional links online still contributed to those more in need of the verbal category. All classes seem to be balanced between the other three categories of learning models, so a balance between in-class and out-of-class graded events, lecture and preparation, course progression with linkages to other courses all provided a complementary balance.

In Spring 2009 with time sheets, data shown in Figure B1 in Appendix B, there seems to be an inverse correlation between the amount of time spent out of class and grades received in the course. With the course completed there is a 0.15 correlation (at 50% lessons and 32% course graded there was a 0.39 correlation) between the amount of time spent out of class and current percentage score in the course. This would seem to correlate those with better time management skills have better grades. Among grades of EE majors, currently 3.87 GPA (versus 3.49 incoming) in Spring 2010, 3.30 GPA (versus 3.04 incoming GPA) in Spring 2009, 3.54 (versus 3.15 incoming) in Spring 2008, and 3.29 (versus 3.03 incoming) in Fall 2007 there seems to be similar amount of grade improvement. In EE362 during Fall 2008, which were those that took EE302 in Spring 2008, there was a 0.07 correlation between time spent out of class and grade received in the course. Again, this emphasizes the importance of time management for the student.

Based on end-of-course survey in Fall 2007 (n=31) and Spring 2008 (n=16) there is a recurring theme of how time needs to be spent in this course. There is a positive impact of doing ICEs, at the perception of the student. Therefore, encouraging students to complete SPs and homework sets would further benefit performance on class material and exams.

A minute paper in Spring 2009 following the first and second WPR consisted of four areas. Each one required a positive and/or negative comment, and may provide more than one. They were the WPR, unannounced writs, homework sets with the workbook and the course in general.

The WPR was three lessons later than previous semesters, so it contained three more lessons of material. However, the length and point value of the WPR remained the same where some of the

questions were changed to reduce some repetition and encompass the additional topics. The reason for this change was a reduction in the graded events for the semester, so the number of WPRs was reduced from three to two as shown in Table 1. Comments are in Table C1 in Appendix C.

Daily writs this semester replaced periodic quizzes. Previously, quizzes were 20 points, or 2% of the total course grade, and took 15-20 minutes to complete. There were 10 in Fall 2007 and six in Spring 2008 to offset the addition of homework sets. Daily writs were not necessarily every day, just the potential during any lesson to help encourage preparation of the material. It provided minimal impact to the grade. The writs were five points and five minutes long, and were reviewed as a class immediately following the writ prior to continuing with the new lesson. A total of 10 are administered throughout the course. Previously, this was used in EE362 which contributed to an improvement in homework assignments and WPR performance. The questions were based on previous lessons, while a bonus question related to the new lesson. Comments are in Table C2 in Appendix C.

In Fall 2007 there were only workbooks consisting of ICEs and SPs which were submitted prior to each WPR. In Spring 2008 with the addition of homework sets, there were three homework sets corresponding to each workbook. The homework sets were mostly three problems in length covering three lessons of material due every one to two weeks. Since this increased the burden in time for assignments, SPs and homework sets were provided digitally written out, so the students no longer were required to neatly, write out problems. In Spring 2009 the homework sets were reduced to five, thus twice as long to cover the material in lessons covered and number of problems, while the workbook portion of ICEs and SPs became bonus points. Overall, the course reduced the required workload but the students have to improve time management of their workload. Comments are in Table C3 in Appendix C.

Finally, general course comments were requested. The overall workload for the course and number of graded assignments were reduced. Comments are in Table C4 in Appendix C.

However, there are some negative indicators about these changes. Fewer, bigger assignments have a bigger impact on overall course grade despite a shift in course point distribution. There is also an increase in the number of late, incomplete and not submitted assignments which compound the effect. In Spring 2010, with the removal of homework sets, there are fewer assignments, and a reduced amount of indicators. Previously, a majority of these indicators were contained within homework sets, which contributes to an improved 2010 semester. A summary across the course iterations is below:

Category	Fall 2007 (n = 38, # = 13) # (%)	Spring 2008 (n = 24, # = 22) # (%)	Spring 2009 (n = 24, # = 16) # (%)	Spring 2010 (n = 17, # = 16) # (%)
Late # / Days	50(10.1)/103	18(3.4)/43	46(13.1)/108	1(1.0)/1
Incomplete #	109(22.1)	40(7.6)	36(10.2)	0(0)
Early # / Days	25(5.1)/39	88(16.7)/143	39(11.1)/62	21(38.9)/40
Redo Required/Done	51(10.3)	60(11.4)	28(9.8)/14(50.0)	0(0)/0

Table 2. Late, Incomplete, Early and Redo Assignments Comparison

Throughout the Spring 2009 semester in EE302, time sheets were kept. Figure B1(a) in Appendix B shows the average amount of time, rounded to the nearest 10 minutes, that each of the 24 students averaged per lesson. There was an overall average of approximately 55 minutes. As shown, there is a clear disparity between the two sections, with only a corresponding 3.8% difference in course grade average. This may indicate the amount of time management capability between sections.

Furthermore, Figure B1(b), a plot of average time spent on each lesson, clearly shows the correlation of increased time spent out-of-class based on major graded events.

Materials. All students completed the Learning Styles survey as part of the first homework assignment. Course point distributions were provided at the beginning of each semester in the course memorandum and on the course website. Individual point assignments were posted online, informed multiple times in class, and during return of graded events. Laboratory comments for improvement were required on all laboratory submissions. Time sheets were completed with attendance tracking at the beginning of class. Minute papers were completed on index cards during class with open questions and possible answers. Course surveys were collected and analyzed after course completion.

Findings

Looking at a majority of the results, it seems that many of the students tend to look at the short-term of completing assignments (i.e. procrastination), regardless of the time requirement. Students tend not to manage their time properly to complete tasks by pieces at a time, but rather as a whole. When looking at the overall workload of the course, reducing the number of graded events seems to benefit the student. However, distracters of other requirements from other courses, academic and military, military duties and athletics have prompted many courses to minimize the total number of graded events on their students. In other institutions, this may be similar to their corresponding extracurricular activities, work and sports.

Over the course of a semester, many course events overlap, and students with poor time management skills cannot complete events concurrently, because multiple assignments cannot be completed at the same time. If all courses had more, smaller requirements, they would more easily fall into the *2-for-1* rule in preparation for each lesson of each class. To do this, instructors have to help encourage completion with interim grades for larger assignments, or just make assignments smaller or easier.

In EE302 the author presented a plan on lesson one and made several reminders throughout the course. Specifically, the author advised to spend about one hour in preparation before a lesson consisting of the text assignment with review of provided notes and ICE problem. The class lecture reviews and highlights some of the topics, practices them with ICEs and clarifies any questions or confusion from the text. The students should then spend their second hour after the lesson completing SPs and the homework problem for that lesson. This is an opportunity to confirm the concept individually. Also, if a problem arises, it can be addressed in the next lesson prior to covering a newer concept. Using this technique each student would use their two hours

for each lesson, but in a more, effective approach. Additionally, when writs arise, they are better prepared. When WPRs arise, they have already spent much time preparing between lessons, and may only require a review before the exam. However, many students do not see this benefit until after a couple of graded assignments and the first WPR. Essentially, some students took the *stick* instead of the *carrot* approach.

Referring to Table 2, more, smaller assignments seem to be more beneficial and reaffirm previous observations. From Fall 2007 to Spring 2008, students reduced their penalties associated with late and incomplete assignments by 66% regardless of a 69% increase in graded assignments with only an 8% redistribution of points. Furthermore, the students had a 227% increase with early submission of assignments. Despite an 11% increase in the number of Ds and Fs on assignments, the course GPA of EE majors increased by 0.21 versus their incoming cumulative GPA. The instructor had also provided similar feedback both semesters in reviewing graded events when they were returned to the students.

In Spring 2009 in EE302, reducing the number of events and overall workload, thus increasing point values for individual events, shows negative impact to performance in the course. There is over a 260% and 22% increase in the number of late and incomplete assignments relative to Spring 2008 students. Additionally, the number of early submission had also decreased 30%. However, the number of Ds and Fs only increased 5% between Spring 2009 versus Spring 2008, while only 11% versus Fall 2007. These numbers for Spring 2009 continue to be similar to Fall 2007 considering late, incomplete and early submission of assignments, which seem to have negated the benefits of Spring 2008 with more, smaller graded events. So far in Spring 2010, with the reduced assignment load, there is a significant increase in early submission and only one late or incomplete.

Despite this performance shift and a 0.14 course GPA increase versus the incoming cumulative GPA in Spring 2009, this demonstrates reduced performance at this point in the course. This is in comparison to previous semesters that had a 0.17 increase in Spring 2008 and 0.03 decrease in Fall 2007, concerning only EE majors. Even though the results seem good with the increase in late and incomplete assignments of the Spring 2009 result that produces similar results to Spring 2008, the redo policy for Ds and Fs have directly and indirectly boosted results by about 0.1 GPA which again offset the Spring 2008 instituted benefits with an increase in workload.

Fewer, larger graded events cause an increased impact on overall grades and provide less opportunity for students to recover from any shortcomings in a timely manner. Despite the reduced overall workload, increased bonus points from workbooks and redo policy, the students' performance decreased due to a lack of time management. Additionally, with fewer events in this course that coincide with other courses, these "usually require students to choose among competing activities (many of them inherently more pleasurable for the typical student than schoolwork)"[6] In completing this semester, continued feedback of results to the students may provide additional incentive to manage their studying more effectively and once again increase their performance. Additionally, the grade distribution of students this semester seem to be more bi-modal between the higher and lower end, while the previous semesters the students tended to remain under a normal distribution curve. The bonus incentives resulted in an increase of the class average based on percentage, but not on GPA, because there are more grades that exceed

100% that provide no benefit to a GPA increase. Spring 2010 currently has a 94.2% average, while Spring 2009 had an 87.1% average, Spring 2007 had an 86.5% average and Spring 2008 had an 88.9% average. Partly contributory to Spring 2010's higher grade is the incoming GPA of the students. Furthermore, the first midterm exam was completed with an 84.8% average which significantly reduced their course average at this point. The reduction of required assignments has hindered the student's ability to complete an exam satisfactorily within a time limit due to lack of practice. This was also demonstrated in EE462 Electronic Design this semester based on the first midterm exam and the removal of homework sets within the course. Again, this data reinforces the need for time management among students. These curves of final course grades are shown below:

(a)

(b)

(c)

(d)
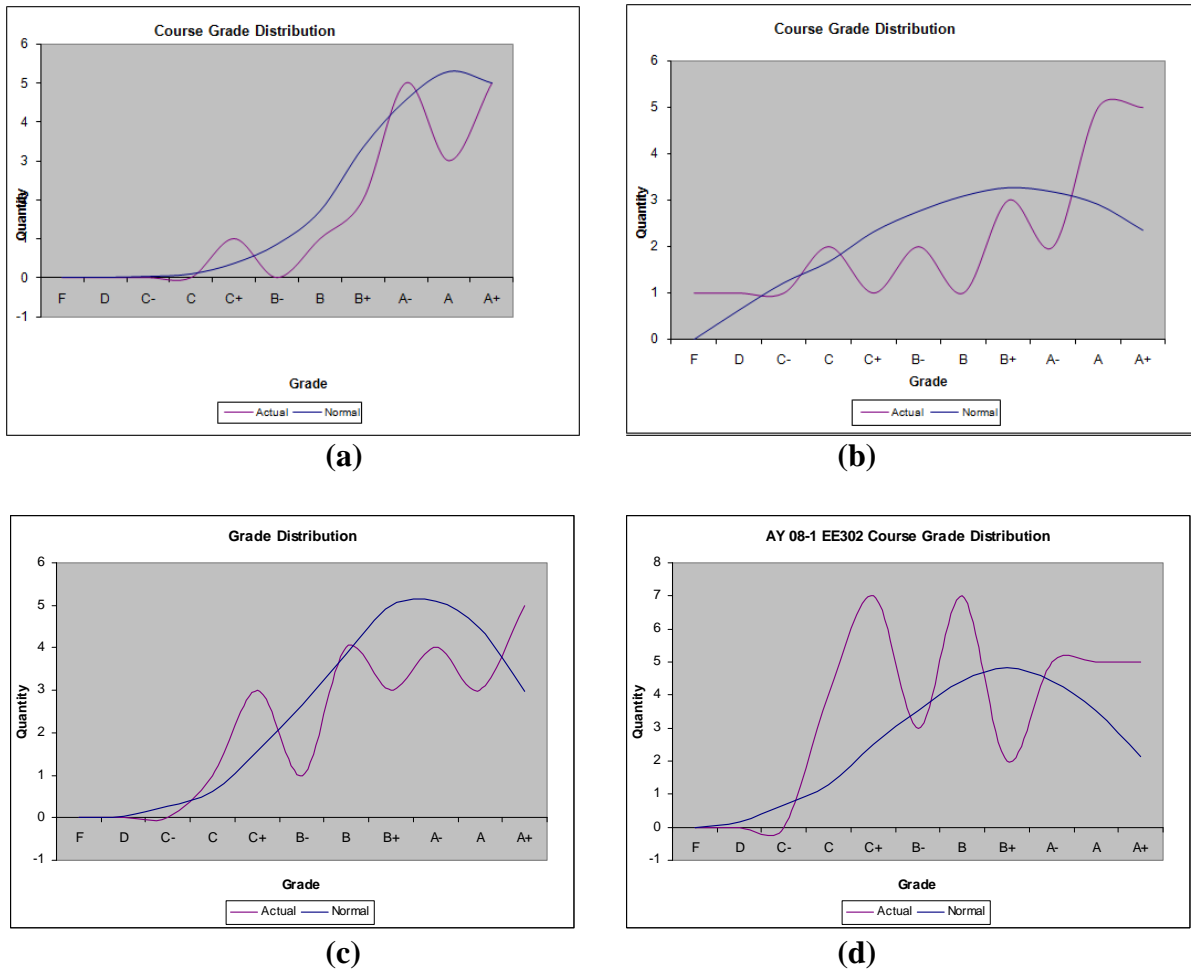
**Figure 2. Final Grade Distributions: (a) Spring 2010 as of 26 Mar 10
(b) Spring 2009 (c) Spring 2008 (d) Fall 2007**

Conclusion

Due to the short-term studying habits of the students, a curriculum seeking to improve student performance needs to address this attitude. In Spring 2008, an increase in the number of assignments, which were smaller, better fit this student model and demonstrated a significant performance increase. Additionally, this same group of students continued this performance into

EE362, the follow-on course to EE302, and further into EE462, which both followed this same model. Their performance continued to exceed previous iterations of the course. However, with the change in Spring 2009 to fewer and larger graded events, and less work overall, performance significantly decreased again to Fall 2007 levels because it conflicted with the student model. Without reducing the quality of graded events, the short-term studying habits of the students need to correspond to the course model; otherwise the course must conform more toward the student model of studying and preparation. If the students do not conform to the standards of a course, the course must conform to the habits of the students. If the quality or standards of a course are reduced to meet continued GPA goals, the goal to increase self- and active learning of students is degraded not just in this course, but assist in the propagation into follow-on courses. The benefits of time management need to be reinforced; a shift to more, smaller, required assignments supports this goal, as well as, continuous learning.

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Appendix A—Learning Styles Survey and GPA of Students

Category (-/+)	Class Average	Number Each	GPA	Course GPA
Active/Reflective	-2.57	10/4		
Sensing/Intuitive	-5.71	13/1		
Visual/Verbal	-5.57	11/3		
Sequential/Global	-3.86	12/2		
Grades EE (n=26)			3.03	3.00
Grades EM (n=5)			3.14	3.00
Grades Navy (n=7)			3.66	3.86

Table A1. Learning Styles Survey Fall 2007 (n = 14)

Category (-/+)	Class Average	Number Each	GPA	Desired GPA	Course GPA
Active/Reflective	1.08	9/15			
Sensing/Intuitive	-0.25	14/10			
Visual/Verbal	-6.25	23/1			
Sequential/Global	0.08	12/12			
Grades EE (n=24)			3.24	3.77	3.42

Table A2. Learning Styles Survey Spring 2008 (n = 24)

Category (-/+)	Class Average	Number Each	GPA	Desired GPA	Course GPA
Active/Reflective	-1.40	9/6			
Sensing/Intuitive	-3.00	13/2			
Visual/Verbal	-6.60	15/0			
Sequential/Global	-1.67	10/5			
Grades EE (n=22)			3.04	3.65	3.30
Grades EM (n=2)			2.14	n/a	1.84

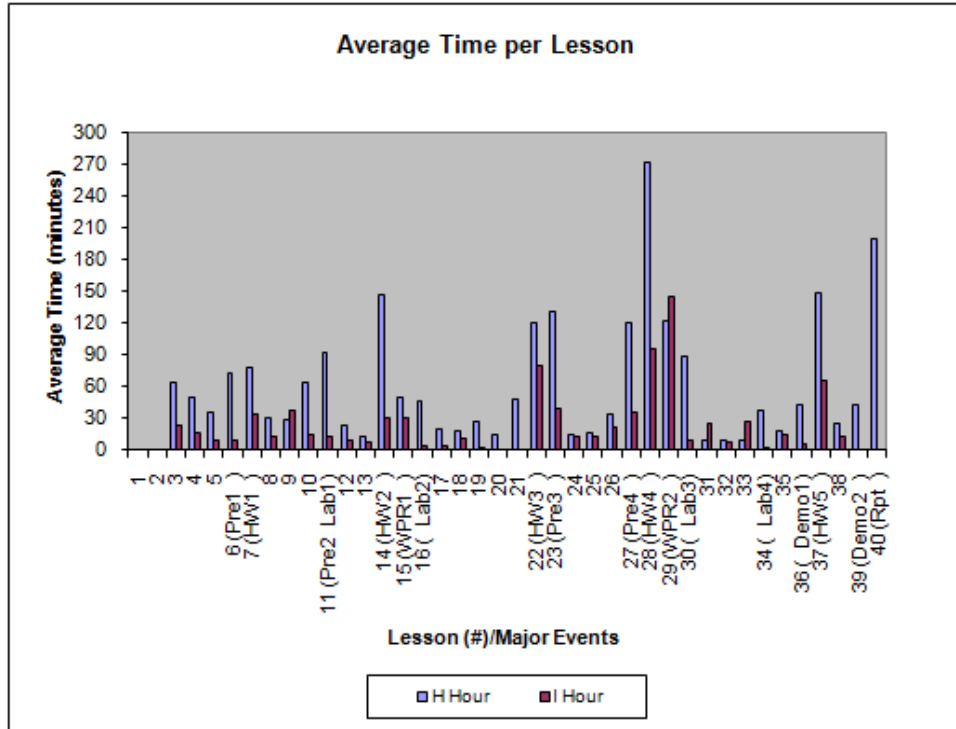**Table A3. Learning Styles Survey Spring 2009 (n = 15)**

	GPA	Course GPA
Grades EE (n=13)	3.49	3.87
Grades EM (n=4)	3.17	3.42

Table A4. Grades only for Spring 2010 as of 26 Mar 10

Appendix B—Time Sheet Statistics
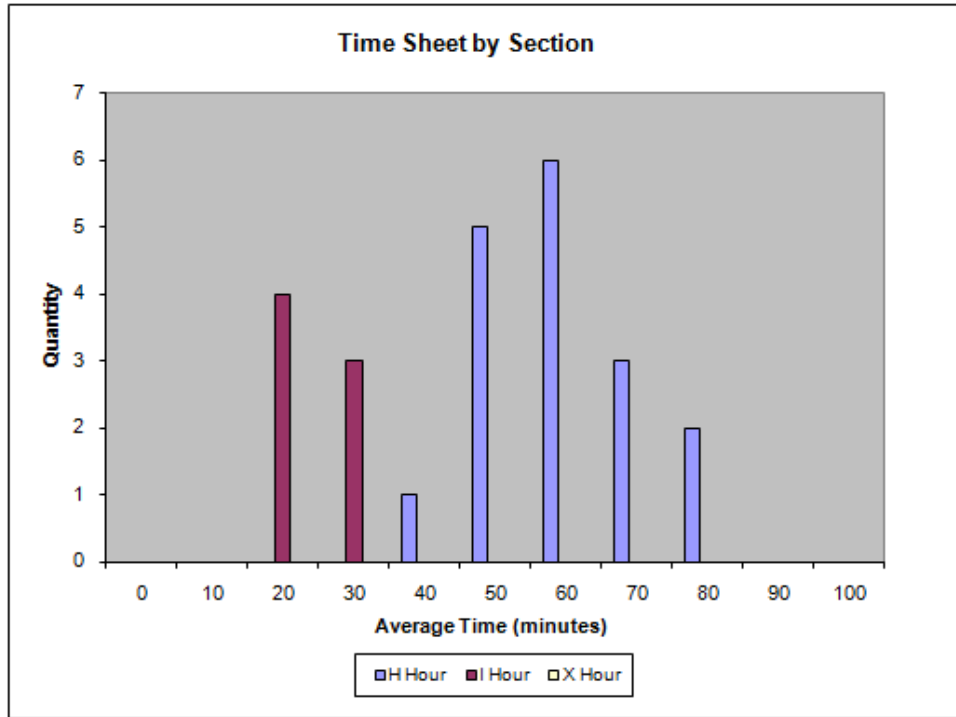
(a)

(b)

Figure B1. Spring 2009: Average time preparing for each lesson (a) by student (b) by lesson

Appendix C—Minute Paper Results

Comment	# (n = 26)	# (n = 25)
Time crunch/too long/too hard/not straight forward	6	5
Able to complete in time/right level of difficulty	13	14
Student preference to solve problem	1	
Not answered	1	4
Similar to HW/harder than ICEs, SPs, HWs	3	1
Wanted to tell what method to use to solve	1	
More concepts & less problems	1	
Wanted Ref. Card versus FEE Handbook		1

Table C1. WPR minute paper comments

Comment	# (n = 25)	# (n = 27)
Forced preparation	5	3
Good Assessment of lessons	10	8
Just right/No Changes	4	2
Brings grade down/simple mistakes/time crunch/announced instead	4	7
Only the basics/Easy Points	2	2
Do at the end versus beginning of class		2
Not answered		3

Table C2. Daily Writ minute paper comments

Comment	# (n = 27)	# (n = 31)
No change	2	4
Workbook as bonus good	7	4
Helps/forces to learn the material	10	13
Too many problems/a lot of work	4	3
Make due even earlier before WPR to study	1	
Homework much harder than ICE and SP	2	3
Workbook should be required, not bonus	2	
Not answered		4

Table C3. Homework minute paper comments

Comment	# (n = 22)	# (n = 24)
High workload of requirements	4	4
No change/good instruction	7	12
ICEs help/no boards	5	1
Not enough covered in class/some steps skipped/some topics covered too fast	4	3
Online resources are good	1	
Slow progression of material	1	
Not answered		3
More Application of topics		1

Table C4. Course minute paper comments