AC 2012-4525: STUDY HABITS OF STUDENTS IN AN INTRODUCTORY-LEVEL CONSTRUCTION MANAGEMENT COURSE

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Study Habits of Students in an Introductory-Level Construction Management Course

Abstract

Introductory level materials and methods courses in Construction Management (CM) programs generally require students to acquire an enormous new vocabulary. This vocabulary includes terminology pertaining to the materials themselves, as well as terminology defining the construction processes using the materials. Courses such as these form a backbone of knowledge that is necessary in nearly every other CM course.

Students are often not prepared for the amount of self-directed studying they must do to be successful in this type of course, particularly as freshmen in college. This paper examines the self-reported study habits of 68 students enrolled in a freshman level CM materials and methods course. This paper presents some insights into how students study for exams and what resources they use (or do not use). The paper also presents preliminary findings indicating that many students appear to have a lack of accurate self-knowledge, defined as the ability to accurately judge one's level of knowledge, and a lack of self-regulation, defined as the ability to adjust one's behavior to ensure that acquisition of missing knowledge is successful.

Introduction

Introductory courses within an academic field of study are often challenging for first-year students. They are often required to acquire a new discipline-specific vocabulary – terminology that will be used throughout their academic and professional career – and they are often not prepared for the amount of self-directed studying they must do to be successful.

Students regularly overestimate their knowledge and abilities[1]. Accurate self-knowledge, defined as the ability to accurately judge one's level of knowledge, is necessary at the college level. Students must be able to recognize what they already know, but more importantly, what they do not know so they can take steps to ensure that their end knowledge meets instructor and course expectations[2]. Some students have this ability when they begin college, but many do not and need help acquiring this skill.

Related to self-knowledge is self-regulation. This is the ability to adjust one's behavior to ensure that acquisition of missing knowledge is successful[2]. An internal feedback loop is an essential part of self-regulation[3]. If the behavior does not result in the desired outcome, one must recognize that the behavior needs to change. Students with better self-regulation tend to have higher academic achievements[2, 3]. Like self-knowledge, self-regulation is a skill that some students need help acquiring.

We regularly see students in our classrooms who struggle, particularly in first-year courses. We see the student who receives a D or F on an exam who didn't study at all because they thought they already knew the information well enough (inaccurate self-knowledge). We also see the student with a similar grade who claims to have studied for hours. It is obvious to us that they

are not using a study method that works for them, yet they are not changing their methods (poor self-regulation).

Students also unreasonably expect that their assignment and test grades should reflect not just their achievements, but also the amount of time and effort they expend[4]. Yet they are spending less time studying than ever before[5]. Most colleges state that students should spend approximately two hours (or sometimes three) of studying outside of class for every hour they spend in class. This means six to nine hours of outside study time per week for a typical 3-credit course. A 2002 poll indicated that 63% of full-time freshmen spent 15 hours or less per week for all of their courses[5], a drastic amount less than what most faculty expect.

This paper examines the self-reported study habits of 68 students enrolled in a freshman level Construction Management materials and methods course. This paper presents some insights into how students study for exams: how much time do they spend and what resources do they use (or not use)? The paper also presents preliminary findings indicating that many students appear to have a lack of accurate self-knowledge and a lack of self-regulation.

Method

This project was carried out with a group of 68 undergraduate students in a 100-level construction management course entitled "Construction Materials and Methods" at Boise State University in the fall semester of 2010 (38 students) and the spring semester of 2011 (30 students). This course is required for construction management (CM) majors and minors and is a three credit course with 45 hours of classroom instruction. The course introduces students to construction methods and materials used on building projects, with three main objectives:
- Demonstrate knowledge of the methods and equipment commonly used to construct buildings including the foundation and framing systems.
- Identify and discuss the technical aspects of basic building materials such as steel, concrete, masonry, and wood.
- Utilize correct terminology and nomenclature associated with the materials, methods, equipment and building components found on building construction projects.

These objectives are divided into five topical areas for testing purposes: foundations and construction related math, concrete, masonry, steel, and wood and light gauge steel framing.

Of the 68 students enrolled in the course in fall 2010 and spring 2011, 39 had formally declared CM as their major, 3 had declared a CM minor, and 26 were non-majors/minors. Attendance at lectures was mandatory and 90% attendance was achieved.

The assessments for the course comprised five paper-based exams with multiple-choice, true/false, matching, and short answer type questions (16% each, with lowest score dropped, for a total of 64% of course grade), participation and attendance at lectures (6% of course grade), and a comprehensive paper-based final exam with multiple-choice, true/false, and matching type questions (30% of course grade). Comprehensive study guides and online study quizzes were made available one week prior to each exam. The five regular exams the students were preparing for consisted of between 40 and 48 questions with a mean of 43.7 questions and there were 150 questions on the final exam.

Data collection was accomplished through a brief one page questionnaire attached to the back of each student's exam. The questionnaire asked about the amount of study time spent for that exam along with the student's methods of study and what grade they expected to receive on the exam. Specifically, students were asked:

1. About how long did you spend studying for this exam (total time)?

    About _____ hours and _____ minutes

2. What did you do to study for this exam (check all that apply)?

    ☐ read textbook and/or handouts assigned
    ☐ made flashcards
    ☐ reviewed my notes and/or class slides
    ☐ took Blackboard quiz
    ☐ copied my notes
    ☐ wrote out answers to questions on study guide
    ☐ studied with friends – quizzing each other and similar
    ☐ other (please specify) _____

3. What grade do you think you will get on this exam?

    ☐ A
    ☐ B
    ☐ C
    ☐ D
    ☐ F

Results and Discussion

Over the two semesters studied for this project, each student took six exams and was asked to complete the questionnaire six times. As noted above, the first question on the questionnaire asked how much time they had spent studying for that particular exam. The overall response rate for this first question was 82.8%. Students indicated that they spent between zero and 15 hours of study time for a single test with an average of 3.1 hours. See Table 1 for additional data regarding the amount of study time that students self-reported.

Table 1. Hours of Study Time per Exam

	Fall 2010	**Spring 2011**	**Combined**
High	10.00	15.00	15.00
Average	2.82	3.46	3.10
Low	0.00	0.08	0.00
SD	2.09	2.38	2.24
Median	2.00	3.00	2.50
response rate	83.77%	81.67%	82.84%

It is likely that many students under- or over-estimated their actual study time. Students knew ahead of time that they would be asked this question, but they were not required to keep track of their time in any official way, which could cause inadvertent errors in their reporting. Some

students may also have deliberately chosen to inflate the number of hours of study time they reported, in an attempt to impress the instructor. The data do not indicate that this was a significant problem based on the relatively low average over the twelve exams, but there are likely a few students that misrepresented their time. An average of about three hours of study time in a week per course is consistent with the amount of study time students have reported in other studies[5], though it is less than what many faculty would expect.

The second question on the questionnaire asked students to report which study methods they used to prepare for the test they just completed. The overall response rate for this question was 84.8%. Figure 1 indicates the percent of students that used a particular study method.
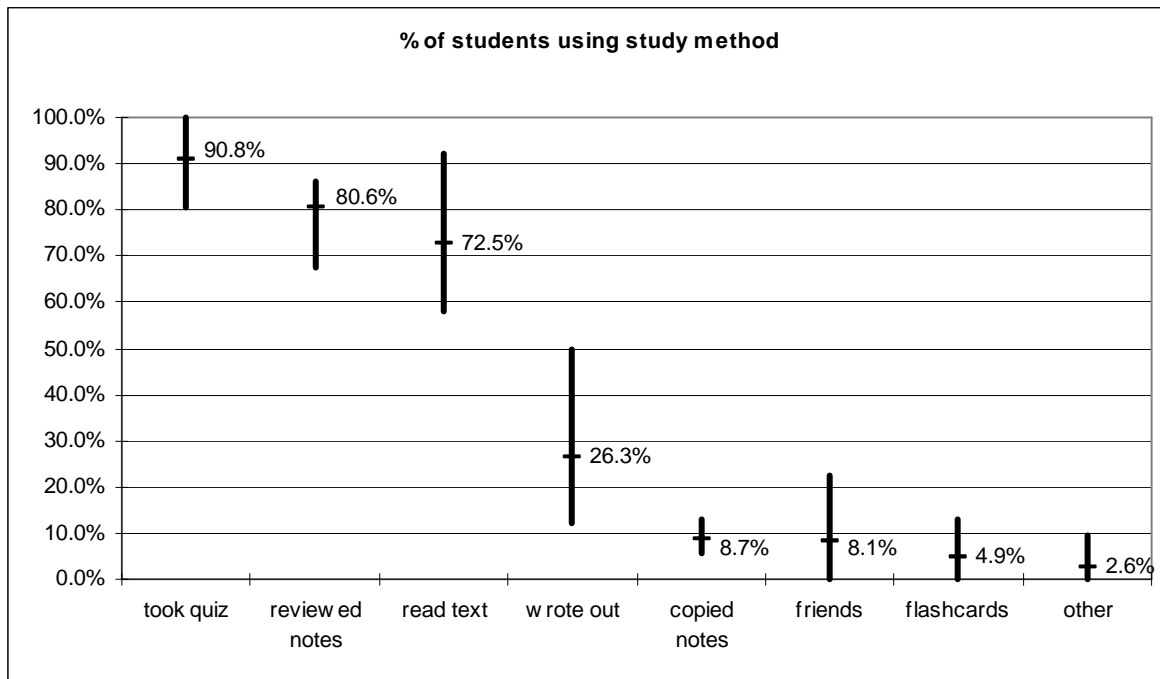
Figure 1. Percent of Students Using a Particular Study Method
(range and average over 12 exams)

Nearly all students used instructor-created Blackboard study quizzes that were made available to study for each exam. These quizzes were created for a separate research project and completion of each quiz was required for the Fall semester of 2010. Students in that semester self-reported an 88.1% usage. Because of the requirement to complete each quiz, it is reasonable to have such a high usage by students. However, in the Spring semester of 2011, the quizzes were not required and students self-reported a 94.1% usage, indicating that they found value in taking the quizzes, even when they were not a course requirement. For both semesters, student self-reports were quite accurate when compared with the data collected automatically by the Blackboard course website when students accessed the quizzes.

A majority of students used two traditional study methods: reading the text and reviewing class notes. This is not surprising and most instructors would expect these methods to dominate student studying. Noteworthy is the fact that for several exams only slightly more than half of

the students actually read the textbook when studying for an exam. Reviewing their own notes or class slides made available by the instructor fared only slightly better, though this is also something that most instructors would expect their students to do when studying for an exam.

The remainder of the study techniques were used with much less frequency. On average, about one quarter of the students wrote out answers to the questions on the study guide provided to them and less than ten percent reported using any other study methods, including copying their notes, studying with friends, and making flashcards.

The third question on the questionnaire asked students what grade they expected to receive on the exam they just completed. The overall response rate for this question was 83.1%. This data, compared with actual exam grades, provides a way to assess whether a student has accurate self-knowledge. Students accurately estimated their exam grade 54.6% of the time (185 times out of 339 estimates). They overestimated their exam grade 33.3% of the time (113 times out of 339 estimates), where 88 of those estimates were high by one letter grade (i.e., estimating an A and receiving a B), 23 estimates were high by two letter grades, and 3 estimates were high by three letter grades. Students actually underestimated their exam grade 12.1% of the time (41 times out of 339 estimates), where 3 estimates were too low by two letter grades and the remainder were too low by only one letter grade (i.e., estimating a B and receiving an A). Table 2 summarizes this information.

Table 2. Student Estimates of Exam Grades Compared to Actual Exam Grades

	Quantity	Percent
Estimate high by 3 letter grades	2	0.6%
Estimate high by 2 letter grades	23	6.8%
Estimate high by 1 letter grade	88	26.0%
Estimate accurate	185	54.6%
Estimate low by 1 letter grade	38	11.2%
Estimate low by 2 letter grades	3	0.9%
Total responses	339	100%

Fully one-third of the students inaccurately assessed their self-knowledge by ten percent or more on an exam they had just completed. This is a skill many students need help acquiring if they are to be successful in college, as well as in their careers.

Additionally, preliminary analysis of student exam grades indicates that many student need improvement in self-regulation, the ability to adjust one's behavior to ensure that acquisition of missing knowledge is successful. For this analysis of student self-regulation, poor self-regulation was defined as a student dropping two or more letter grades over a three exam time period. For example, for the first three exams a student may have received an A, B, and C grade, in that order. This is viewed as a student who lacks adequate self-regulation because they dropped from an A grade to a C grade. 51.5% of students (35 of 68) in the sample population experienced at least one drop of two letter grades or more over a three test span, with 6 students experiencing two such drops (8.8%) during the six exams they took over the semester. A majority of the plummets occurred within the first three exams (24 of 35 or 68.6%). Some of

those students then stabilized, but many others continued their grade roller coaster. In other words, some were gradually adjusting their behavior and consequently stabilized their exam grades, whereas others did not adjust their behavior. A more detailed look at this is necessary in order to evaluate what students changed in their study methods and how their grades changed in response to those behaviors. Future work will also look at why students sometimes choose not to change their behaviors.

Conclusions

The study described here was used to provide some insight into how students in a freshman level course study for exams. The data indicate that most of them do not study for a long time. In this project, the average was 3.1 hours per test. The data also indicate that they heavily favored online diagnostic quizzes, reading the text, and reviewing class notes and instructor slides when compared with other study methods. Based on their exam grade estimates, approximately one-third of students overestimated how well they did on an exam, indicating a lack of self-knowledge – they don't know what they don't know. Similarly, based on trends in their exam scores, students also struggle with the self-regulation necessary to have consistent exam grades – they don't know what to do to ensure that they learn what they need to.

The low amount of study time, the sometimes low use of even the favored study methods, and the lack of self-knowledge and self-regulation are all causes for concern. On the flip side, they can also be a call for new ways to engage students in course material and help them learn not only the course material, but valuable life-long learning skills as well.

Acknowledgements

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