DO COLLEGE STUDENTS LEARN BY CORRECTING MISSED EXAM QUESTIONS?

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ABSTRACT

This study determines the learning benefit of correcting missed exam questions. The results show that in addition to exams being an assessment tool, they can also be used as a tool for student learning. The availability of this information will provide help considering design, development, and improvement of traditional assessment methods for student learning.

KEYWORDS: Student learning, Assessment, Exam

INTRODUCTION AND OBJECTIVES

The mission of the university is to guide students in learning specific fundamental principles for life-long learning. Assessment methods, such as exams, test the student's understanding of the material and provide feedback to students and professors (McKeachie, 1999). However, given that exams provide an impetus for students to study the class material, they typically only evaluate the student's knowledge at the time the exam is given. The typical lifecycle of an exam ends after it has been corrected by the professor and returned to the student. Risley (2007) observed an exam lifecycle similar to what we have observed: 1) Student takes exam, 2) professor grades exam, 3) professor returns graded exam, 4) student looks at grade, sees what they missed, checks to make sure points were added correctly, 5) places exam in notebook, maybe never to be looked at again until time to study for the final exam. Few students take the time to determine why they missed a question and to work the problem or answer the question correctly. Factors such as student procrastination and busy exam schedules frequently lead to last-minute studying behavior, which may question the efficacy of exams as a tool to help students with knowledge retention. Thus, there is a need to explore whether student learning could be enhanced by modifying the traditional lifecycle of exams.

Light (1990) interviewed thousands of students to determine the qualities of the best courses they had taken at the university. In his study, students expressed that one of the characteristics of the highest ranked courses includes "the opportunity to revise and improve their work before it receives a final grade, thereby learning from their mistakes in the process" (Light, 1990, pp. 8-9). This finding is supported by Bain (2004) who suggests it is important to give students multiple chances to demonstrate their comprehension when administering an exam. Thus, one alternative to the traditional exam lifecycle would be to allow the student to review the

graded exam material, correct their missed exam questions, and return them to the professor for re-grading. Although some studies have addressed the usefulness of correcting missed exam questions (Risley, 2007), to our knowledge, no study has assessed the learning benefits of this alternative exam lifecycle.

The objectives of this study are to (1) identify student perceptions of correcting missed exam questions and to (2) compare the learning benefit of this alternative method to the traditional exam lifecycle that ends with the professor returning the exam. Our study will assess whether correcting missed exam questions assists a student in better understanding the required course material. We include subjective and objective measures of student learning. Student learning is measured subjectively by assessing students' perceptions about their learning of the material, while the objective measurement determines the students' overall performances resulting from the traditional vs. the alternative exam lifecycle. The availability of this study's information will be useful in considering design, development and improvement of traditional assessment methods for student learning.

RESEARCH METHODOLOGY

Study Design

Students enrolled in various classes at Arkansas State University and California Polytechnic State University San Luis Obispo were selected to participate in a regrading study to assess the value of correcting missed exam questions on student learning. Students were placed into the regrading or non-regrading sample based solely on whether the class they were enrolled in

offered this option during that semester/quarter.* Thus, the entire class in a particular semester/quarter was either in the regrading or non-regrading sample. Students in the regrading sample were notified at the beginning of the semester/quarter that they would have the opportunity to correct missed questions on the exam and return them to the professor to be regraded. If the regraded questions were solved correctly, the student could receive up to half of the missed points for each question that was redone correctly. For example, if a student missed 5 points on a question worth 10 points, they could earn back 2.5 points if they correctly answered the question before returning it for regrading. Students were required to return the exams for regrading by the next class period; late papers were not accepted.

Students in the non-regrading sample were not told anything about this alternative learning method. However, word travels among students between semesters/quarters such that students in the non-regrading sample often asked if regrading would be offered to them. Response to these students was simply that it was not being offered that particular semester/quarter.

The regrading survey was distributed to the students at the end of the semester/ quarter that they had the opportunity to correct the missed exam questions and submit the corrections for regrading. Similarly, the non-regrading survey was distributed to students at the end of the semester/quarter during which they did not have the opportunity to correct the missed exam questions.

* While Arkansas State University follows the semester system, California Polytechnic State University is based on the quarter system.

Survey Design

In this study, a written survey was used to collect college student data (18 years or older). The survey included questions regarding student demographics, perceptions about the opportunity to correct missed exam questions, and their perception about their own learning. To carry out a complete investigation of the issue, this study was administered with two different student samples with different sets of surveys. Thus, a regrading survey and a non-regrading survey were designed. The students with the non-regrading survey served as the control group, since their assessment methods were based on the traditional lifecycle of an exam and they did not receive the incentive points to make the corrections to their missed exam questions, although some students may have likely corrected missed exam questions on their own accord. Thus, survey questions were based on the hypothetical situation of having the regrading opportunity. The questions in the non-regrading group were very similar to the regrading survey, in order to allow for a detailed comparison by question.

Data Collection

The written survey was administered at Arkansas State University from Spring 2006 until Fall 2007.[†] In addition, data was collected at California Polytechnic State University, San Luis Obispo during Fall 2007. This cross-state administration allowed for interesting comparisons, especially considering the geographic, demographic, and cultural diversity of the two universities.

The survey participants attended lower and upper level agricultural science courses and agribusiness courses. Subjects were selected based on the class in which they were enrolled and

[†] Data of the Spring 2008 semester/ quarter is currently collected. The analysis will appear in a later version of this paper.

their participation in this study was voluntary.

The first sample is the regrading group, since it was collected from students who had the opportunity to re-submit the answers to missed questions from their course exams for re-grading. The regrading group consisted of 189 students. The second sample underwent the traditional exam lifecycle. This non-regrading group consisted of 52 students[‡] and it served as the control group.

RESULTS

This study employed five types of variable groups: 1) demographics; 2) study habits; 3) method of correcting missed exam questions, 4) test anxiety and preparation; and 5) post-exam learning.

Demographics: Several demographic variables may impact student learning such as age, gender, marital and employment status, year in school, and the university attended. Table 1 shows that the average age was very similar in the regrading and the non-regrading group, with 22 years in the regrading group and 21 years in the non-regrading group.

Study habits: In order to assess the general study habits of the students, questions about the number of credit hours during the semester/ quarter, number of hours worked, and number of hours studied were included. Furthermore, the survey asked whether the student typically does the required class readings and whether the class is required for their major. Table 2 shows that 48% of the students in the non-regrading group and 42% of the students in the regrading sample typically do the required readings for class. The majority of students in both samples stated that

[‡] Additional data using the non-regrading survey will be collected during May 2008. With this additional data, the sample size of the control group will be about 110 students.

the classes were required for their major, with 94% in the non-regrading sample and 91% in the regrading sample. The average number of credit hours per semester/ quarter was similar in both treatment groups, with about 14 credit hours per semester/ quarter. However, the number of hours worked differed widely, with a mean of 32 hours worked per week in the non-regrading group and a mean of 23 hours worked per week in the regrading group. The greater average number of hours worked per week in the non-regrading group reflects that the control group survey has only been administered to students at Arkansas State University to this point, where the typical undergraduate student works on the farm or even a fulltime job while seeking a university degree.

Method of correcting missed exam questions: The survey included questions about whether the students took advantage of the opportunity to correct missed exam questions and how they corrected these questions, such as working with other students, visiting the professor during office hours or using the book/ notes. In the regrading group, 87% of the students stated that they corrected their exams for regrading. The non-regrading group answered the hypothetical question of whether they would have corrected their missed exam questions if regrading had been offered. In this group, 78% of the students stated that they would have taken advantage of the opportunity to have their exams regraded after making corrections. Figure 1 shows the method that students in the regrading group used to correct missed exam questions. Of all students in the regrading sample, 93% used their notes and books for correcting their missed exam questions. Our survey suggests that the re-grading activity supports active and collaborative learning, since 79% of the students worked together to solve the questions they missed on the exams. Furthermore, 40% of

the students visited the professor during office hours to get help with regrading. Only 17% of students utilized other students' exams to correct their missed exam questions.

Test anxiety and preparation: In addition, the survey assessed whether the opportunity for regrading eased test anxiety or altered the study efforts for the exam. Both student samples had positive perceptions about having the opportunity to correct missed exam questions. Figure 2 shows that 78% of the regrading group felt less text anxiety with the opportunity to regrade their exams, and 82% of students in the non regrading group stated that the opportunity to regrade their exam would have alleviated anxiety regarding test taking. However, the incentive to obtain more points through regrading was an important motivator. More students in the regrading sample took the time to correct missed exam questions when they were rewarded with additional points for doing so as opposed to the students in the non-regrading sample who were not rewarded directly with points. Figure 3 shows that 57% of students who had the opportunity to regrade said that they would not have done so if no points were awarded for correcting their missed exam questions. When asked a similar question, 78% of the non regrading group said that they would correct a missed exam question if they felt it would enhance their learning of the material. Thus, students tended to be idealistic in what would motivate them to make test corrections, yet realistically, they appear to be more concerned about their grades than they are about learning.

Post-exam learning: Both surveys included questions about students' retaining the class material after the exam in order to assess the benefits of the alternative exam lifecycle for student learning. We collected subjective learning measures, such as their perceptions, in addition to

objective learning measures, such as their final course grades with vs. without the regrading option. As figure 4 indicates, 86% of the students in the regrading sample felt that regrading their tests was very useful and caused them to learn from their mistakes, where only 44% of the non-regrading group said that they learned from their mistakes. All students had the opportunity to make corrections to learn from their mistakes, but only the students in the regrading treatment had the extra incentive of gaining back points missed on the semester/quarter exams. Although students indicated that they learned from their mistakes, an objective comparison of final exam grades will need to be conducted to quantify whether or not their learning was realized and whether it was sufficiently long term to score well on the final exam.

Limitations: A few limitations should be pointed out here. Given that the sample sizes of the regrading vs. non-regrading group are still small, the results of the study are not sufficient yet to clearly establish student learning by regrading. Thus, current results should be regarded as preliminary. However, both sample sizes will become larger over time, as this project is still ongoing and more data of both samples will be collected. It could also be argued that through regrading a mere inflation of the students' grades may occur. Risley (2007), however, found that only about 18% of his students who participated in a similar regrading activity received a higher semester/quarter course grade. His students, however, only had the opportunity to submit one of three exams for regrading. In his study, the students had to choose which exam they would like to submit for regrading. Thus, we might expect a greater percentage of higher grades from our regrading sample due to the fact that they had the opportunity to submit all of their semester/quarter exams except the final exam, for regrading.

Regrading does require a heavy time commitment for both the professor and the students. However, the additional time students will spend on correcting their exam and working on class material may be beneficial, as this repeated exposure to the material may add to their learning.

Given that the regrading option is not offered on the final exams of both treatment groups, a comparison by final exam grades will show insight into student learning. Further data collection will continue on a more detailed level, including a greater number of courses to be evaluated. Additional information about student learning will be collected by repeating questions from the semester/quarter exams on the final exam.

CONCLUSIONS

This study constitutes a unique contribution to the existing literature because it evaluates whether altering a traditional assessment tool, such as exams, to extend the lifecycle of an exam to include making corrections, can enhance student learning. Although based on a limited sample, the results show that the opportunity to have corrected exams regraded eased student test anxiety while adding to student learning as assessed by the students themselves. Furthermore, the survey suggests that the additional opportunity for students to go over the exam again to correct missed questions may help students to retain the information long term. The alternative exam lifecycle also revealed students' affinity for looking up correct answers and working together as opposed to visiting the professor for assistance. Students overwhelmingly indicated a positive attitude about having the opportunity to make corrections to missed exam questions for regrading. The results of this study show that in addition to exams being an assessment tool, they can also be used as a tool for student learning.

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APPENDIX: FIGURES AND TABLES

Table 1. Course Distribution and Time of Data Collection

Class	Time of data collection	Non-Regrading Group		Regrading Group	
		Respondents	Total class enrollment	Respondents	Total class enrollment
Soil Fertility	Spring 2006	-	-	18	21
Soil Sciences	Fall 2006	30	40	-	-
Soil Sciences	Spring 2007	-	-	13	14
Soil Sciences	Fall 2007	-	-	25	28
Agricultural Statistics	Spring 2006	22	22	-	-
Agricultural Statistics	Fall 2006	-	-	29	35
Agricultural Statistics	Spring 2007	-	-	25	35
Agricultural Marketing	Spring 2007	-	-	11	12
Global Agricultural Marketing	Fall 2007	-	-	34	44
Agricultural Economics	Fall 2007	-	-	34	41
Total number of students		52	62	189	230
Response rate		*84%*		*82%*	

Table 2: Demographics and Study Habits of the Non-Regrading and Regrading Groups

Variable	Non-Regrading Group (n=52)	Regrading Group (n=189)
Demographics		
Average age	21	22
Study habits		
Number of credit hours during the semester/ quarter	14	14.77
Average number of hours worked per week	32.13	22.57
Number of hours studied per week	2.35	2.92
Typically do assigned readings	48.07%	42.24%
Class required for major	94.23%	90.96%

Figure 1: Methods of Correcting Missed Exam Questions

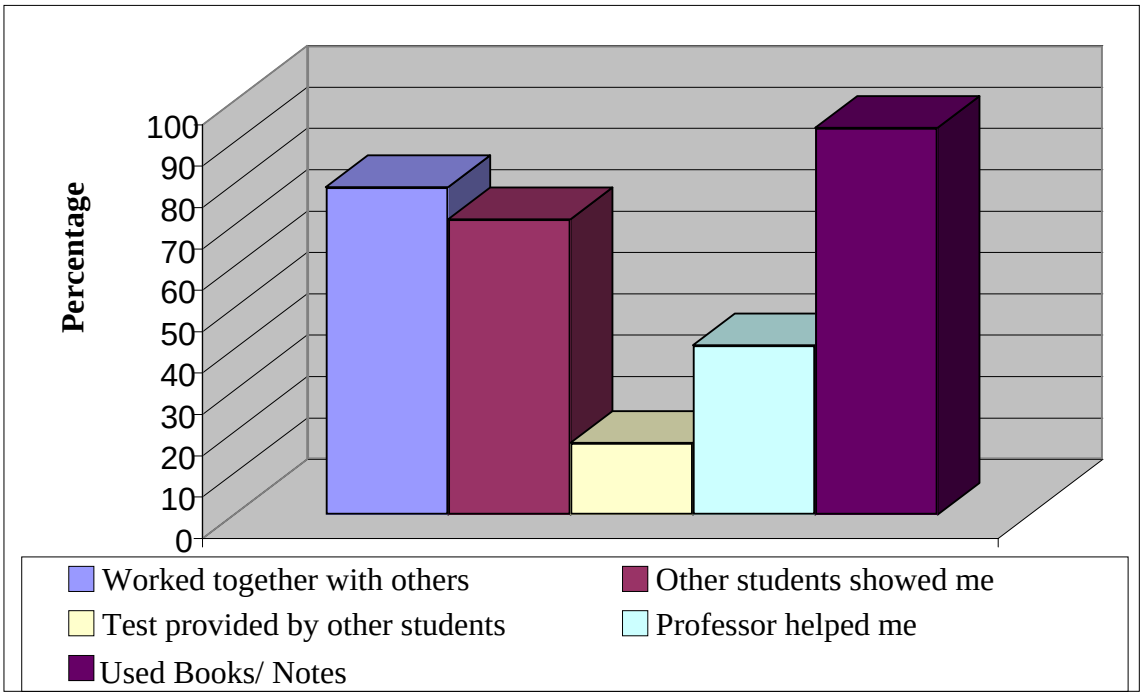

Figure 2: Test Anxiety in the Regrading Group

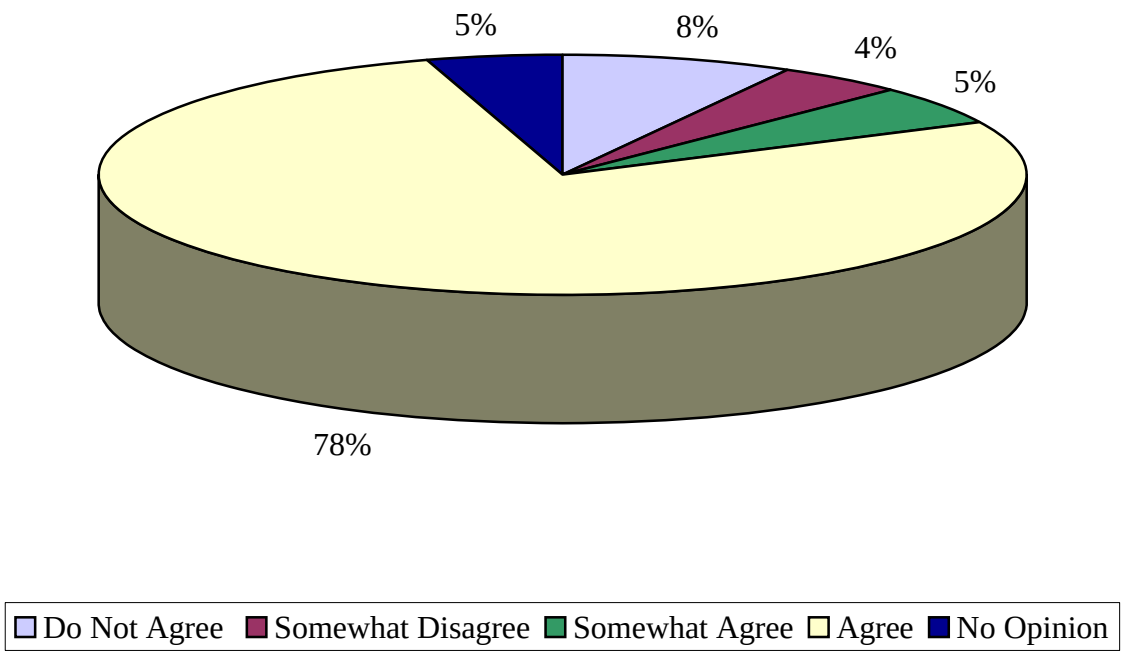

Figure 3: Test Anxiety in the Non-regrading group

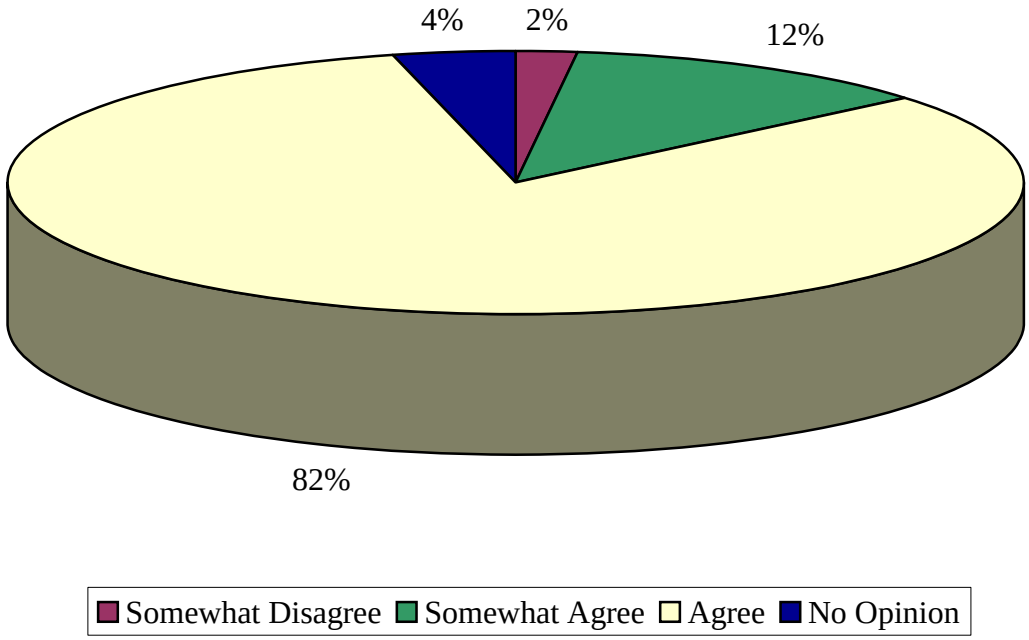

Figure 4: Learning from Mistakes in both groups