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Pre-Test Assessment in the Introductory finance Course

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ABSTRACT

The paper tests whether pre-tests, a non-graded assessment tool, can be used to improve student performance in the introductory corporate finance course. These pre-tests are essentially quizzes, but given on the material prior to it being covered in the class. The results confirm that the pre-tests improve student performance but that some issues remain which may hinder their implementation.

INTRODUCTION

Pre-tests are a non-graded assessment tool used to determine the pre-existing subject knowledge of students. Pre-tests can be used at beginning of a course to establish a subject knowledge baseline and then related to an end of the course exam to look at knowledge added. Pre-tests can also be used as a way to judge the depth of understanding of prerequisite material. A third purpose, the one explored here, is to test the students just *prior* to the material being covered in the course. Although counter-intuitive, the pre-tests are covering material that the instructor has not covered and that the student is not expected to know. The idea behind the pre-tests is to give the students an indication of material that will be covered and the depth of knowledge required, thus it serves a 'road map' for the topics. In addition, the instructor gets a quantifiable measure of the knowledge that students already possess for a particular topic.

In this paper we report the results of an experiment using this pre-test methodology in the undergraduate introductory corporate finance course. The course is required of all business majors and is (at least anecdotally) regarded by students as one of the most difficult business school courses. While there are standard prerequisite classes for the finance course it is still a course where the students differ, often widely, in their background knowledge and preparation. Since students differ in terms of their majors, work experience, and backgrounds they have differing levels of understanding of some material. For example, some students, particularly accounting majors, may already know the time value of money while many others will have never seen the topic. Also some students have a fairly thorough understanding of financial markets while others have had very little exposure to the markets. The pre-test give the instructor an indication of the overall background knowledge on each major topic covered plus the variance of that knowledge, allowing an instructor to adjust their presentations accordingly. This has an advantage over simply using class responses to judge background since some students may already have an understanding of certain topics, hence misleading the instructor into

thinking the class as a whole has a greater understanding of the material than actually exists.

THE PROCESS

Students in the introductory financial management course were used to evaluate the pre-tests. The main course material was divided into eight sections (e.g. time value of money, risk and return, capital budgeting, etc.) and a test was devised for each section. The tests varied somewhat depending on the topic but generally contained a handful of multiple choice conceptual questions and some open-ended problems. Angelo and Cross (1993) recommend that the tests contain a few questions that most students should be able to answer correctly and that technical jargon be avoided. A twenty point scale was used for the tests. The tests were given after a very brief (a few minutes) introduction to the topic in that section. Following the pre-test the tests were collected and a lecture on that material began. The corrected pre-tests were returned the next class section. While the pre-test score was not used to evaluate the students' course grades these scores were recorded. The students were then given class time to work on the pre-test questions at various points during the lecture. The students were encouraged (although not required) to work in small groups of two or three on the questions and afterwards the instructor would then work through the questions on the board. At the end of a particular topic a graded quiz (i.e. counting toward their course grade) was administered which, while different from the pre-test, was similar in terms of types of problems and material covered. This quiz was also on a twenty point scale.

RESULTS

The pre-test topics and mean scores are given in Table 1. The total number of students taking the pre-tests for various topics differs due to absences and withdrawals. The pattern of the mean scores is interesting in that it drops after early pre-tests and then rises again with later tests. It is hypothesized that this 'bowl shaped' pattern is due to the greater familiarity of more students to the material covered early in the course such as financial markets and time value of money. The rise in the later pre-test scores is attributed to some students working ahead on material simply to do better on the pre-tests - possibly as a matter of pride. This 'pride' hypothesis was not tested directly but was supported by comments in class evaluations.

The pre-test scores are compared to the graded quizzes that correspond to each topic. These comparisons are also shown in Table 1. The differences in the means are statistically significant for all of the eight topics at a 1% level. This result is not particularly surprising and it would be disheartening if there were not large differences after covering the material.

[Table 1 here]

To actually test whether the pre-tests are helping the students requires a comparison of the graded quiz results to the scores of a control group of students who did

not have the pre-test methodology. A separate sample (different sections of the same course taught by the same instructor) is used for this comparison. The students in these control classes had a standard format of lecture and problem sets (similar to the problems in the pre-tests) followed by graded quizzes that were similar in format and difficulty to the graded quizzes in the sections using the pre-tests. Essentially the only difference between the two groups was taking the pre-test. The comparison results are shown in Table 2.

[Table 2 here]

The results show that the students using the pre-test methodology preformed better on average with one exception than those using the standard pedagogy, significantly so in six of the eight topics based on t-tests for differences in means. However, it may be that even these comparisons are somewhat biased since the pre-tests may give an edge to those students in terms of giving them a better indication of what the actual graded quizzes may look like or the instructor may inadvertently prep the students with the pre-tests. It is also possible that the advantage for the pre-test students is short-term and may not survive after later topics are covered. Michaels (2006), for example, finds that the use of pre-tests does not predict final grades except at the top and bottom ends of the distribution.

To see if the pre-test effect is temporary or actual longer term learning the final exam scores of the students using the pre-test methodology were compared to the control group who had the standard format. The final exams were comprehensive and nearly identical for the two groups in terms of coverage and level of difficulty. The mean score for the pre-test group was 76.76 compared to a mean of 72.74 for the control group (a significant difference at the 5% level). In addition the correlation between the pre-test scores and the final exam score was 52% and from the graded quizzes to the final exam the correlation was 81%. It does appear that this pre-test methodology helps students master the material better than a standard methodology.

CONCLUSIONS AND CAVEATS

While the results are encouraging and show that the pre-tests can improve student performance there are some concerns to using this pedagogy. It is imperative that the instructor continually reminds the students that the pre-test scores do not count and that any score above zero means they are ahead on the material. As noted by Angelo and Cross (1993) one of the disadvantages of this methodology is the demoralization that is possible due to the low scores – which are inevitable since the material has not been covered. It is also possible that since the pre-tests are not graded the students will not take them seriously and just fill them out to get them over with. Hence it is important to point out that the pre-tests are designed to help them and that taking them seriously will help their actual scores and make studying more efficient.

The most serious concern for this methodology is the time factor. Both the amount of class time used for the pre-tests and the time to grading them are drawbacks. There are a number of ways this problem can be mitigated. First, the pre-tests can be designed so as

to minimize grading time, e.g. using multiple-choice questions. Another possibility, one currently being explored by the author, is moving the pre-tests to an on-line format. Most major publishers now offer on-line homework management systems or testing systems that can be used to run the pre-tests without using class time. Motivation to complete the pre-tests can be done by offering some nominal points for completion (regardless of the score). Although these concerns are serious the evidence suggests that the methodology can improve student learning and are worth consideration.

References

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Michael, M. "Using Pre- and Post-Testing in a Liberal Arts Mathematics Course to Improve Teaching and Learning", Kings College, 2006

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Table 1

Pre-Test and Graded Quiz Scores

Topic	Pre-Tests		Quizzes	
	Mean	N	Mean	N
1) Financial Markets	6.08	80	13.43	82
2) Time Value of Money	8.65	78	15.30	81
3) Risk and Return	5.79	79	12.94	81
4) Bond and Stock Valuation	5.38	76	13.88	77
5) Cost of Capital	5.74	76	14.29	75
6) Capital Budgeting	6.27	72	14.96	74
7) Capital Structure	7.44	69	15.39	73
8) Dividend Policy	8.13	72	16.20	72

All differences in means are significant at the 1% level. The number of students (N) varies due to absences and withdraws.

Table 2

Graded Quiz Scores for Pre-test and Control Groups

Topic	Pre-Test Students	Control Group
	Mean	Mean
1) Financial Markets	13.43	11.86*
2) Time Value of Money	15.30	13.75*
3) Risk and Return	12.94	13.02
4) Bond and Stock Valuation	13.88	14.91*
5) Cost of Capital	14.29	15.33*
6) Capital Budgeting	14.96	15.87*
7) Capital Structure	15.39	16.74*
8) Dividend Policy	16.20	16.91

* Significantly different at the 5% (or less) level