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Student and professor use of publisher test banks and implications for fair play

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ABSTRACT

This study examines whether student access to publisher test banks (PTBs) impairs the ability of PTB multiple-choice questions to distinguish between students who understand the material being tested and those who do not. We develop and validate a detection technique that can be used to detect students who use PTBs to memorize question-specific cues and correct answers. Results indicate that a significant number of students (48 percent) use PTBs and that use results in a performance advantage (approximately 30 percent) on exams. Results indicate that student use of PTBs may significantly impair the ability of a professor, who uses PTBs to create in-class exams, to distinguish between students who understand the material and students who do not understand the material. Results serve to inform professors who were either unaware of student access to PTBs, or who were unaware of the extent with which student access to PTBs can impair fair play in the classroom. We discuss the pedagogical implications that arise from our findings and provide some insight about how fair play may be restored in the short- and long-run.

1. Introduction

In-class multiple choice exams (exams) are commonly used to assess students' understanding of course material (Bergner, Filzen, & Simkin, 2016).[1] Baldwin (1984) identifies two criteria for judging the efficacy of multiple-choice questions: (1) the difficulty of the question; and, (2) question discrimination. The second criteria refers to a professor's ability to use the results from a multiple-choice exam to distinguish between students who understand the material being tested and students who do not understand the material being tested. In this paper, we focus on student access to and use of publisher test banks, since student use of publisher test banks may impair question discrimination.

When a professor adopts a textbook for classroom use, the publisher often provides the professor with a supplemental, copyrighted test bank which contain multiple-choice or problem based questions and answers. For a variety of reasons, professors may rely on these publisher test banks (PTB) to create exams. What professors may not realize is that students have access to these same PTBs. Savage and Simkin (2010) were the first to note that students could gain access to PTBs through email sharing if they were willing to pay a nominal fee. Since Savage and Simkin's (2010) paper was published, student access to PTBs has only grown thanks to the internet. Students now have anonymous access to PTBs online, for free. Appendix A provides a list of Google search terms that yield either paid or free access to PTBs.[2]

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[1] We use the term in-class multiple choice exam to refer to any multiple-choice exam that is given in a single class, during a common testing hour, or a multiple-choice exam given in a testing center.

[2] Google search terms are more reliable in identifying websites than universal resource locators (URLs) since URLs continually change as publishers pursue legal challenges against websites that provide access to PTBs.

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Since students and professors have access to the same PTBs, we ask an important research question: Can student use of PTBs impair the ability of a professor to rely on student performance on in-class exams created from PTB multiple-choice test questions to distinguish between students who understand the course material being tested and those who do not? Before we can answer this research question, we first have to understand how students might use the publisher test bank (PTB) to prepare for in-class exams.

2. Student use of publisher test banks

Professors and publishers encourage students to use a variety of study aids to enhance students understanding of course materials (Bell, Simone, & Whitfield, 2015; Dunn, Saville, Baker, & Marek, 2013). Students may use PTBs as study aids to improve their understanding of course material. If students use PTBs to improve their understanding of course material, then student use of PTBs would not impair the ability of a professor to rely on student performance on in-class exams created from PTB multiple-choice test questions to distinguish between students who understand the course material being tested and those who do not. Students who use PTBs to improve their understanding of course material may identify the correct answers to PTB questions, not just because they have seen the question before, but also because they understand the material being tested. Thus, students who understand the material being tested on the exam should score higher than students who do not understand the material being tested, regardless of how students gained their understanding of the course material.

CPA review courses provide individuals with practice questions. While these practice questions may be the exact questions used in previous exams when exams were released, similar in topic coverage, or even similar in terms of how they are written, the practice questions are not going to be the exact same questions that students see on the current CPA exam. When professors use a PTB to generate in-class exams, students using the same PTB have advance access to the exact same questions and answers (Savage & Simkin, 2010). Informal discussions with several students revealed that some students use PTBs to memorize question-specific cues and the correct answer. For example, assume the following hypothetical PTB question:

> The Cubs beat the Cardinals in game four to reach the NL Championship. In doing so, each player on the team received bonus compensation of $25,000. Assume that the player-taxpayer is in the 33% tax bracket and his paycheck received for the pay-period in which he received the bonus was $150,000 (including the $25,000 bonus payment). Compute the income tax withheld from the bonus compensation of the average player using the percentage method.
>
> A. $6,250
> B. $8,250
> C. $37,500
> D. $49,500
> E. None of the Above.

Assume the correct answer to this question is identified in the PTB as A. $6,250.[3] A student memorizing question-specific cues and the correct answer might focus on Cubs/Cardinals tax withheld and $6,250. Thus, the student can identify the correct answer, even if the professor scrambles the order of the answers.

Students who use PTBs to memorize question-specific cues and the correct answer can identify the correct answer to a PTB question because they have seen the question before, not because they understand the material being tested. The exam scores of students who memorize PTB questions will be similar to the exam scores of students who understand the material being tested. Thus, if students use PTBs to memorize question-specific cues and the correct answer, student access to PTBs can impair the degree to which a professor can use student performance on exams made from PTB questions to distinguish between students who understand the material being tested and those who do not.

3. Detecting students who use PTB to memorize question-specific cues and the correct answer

Armed with a better understanding of how students use PTBs, we developed a detection technique that identifies students who use PTBs to memorize question-specific cues and the correct answer. The detection technique has three steps: (1) create an in-class exam which contains multiple-choice questions from both the PTB and an alternate source, (2) administer the exam, and (3) use statistical analysis to identify students who use the PTB to memorize question-specific cues and the correct answer. We present the best practices for each of these steps below.

3.1. Exam creation

The first step of the technique requires a professor to create an exam that contains multiple-choice questions from both the PTB and an alternate source. While this approach seems relatively straight forward, professors should be mindful of two items when creating the exam: (1) question selection and (2) the percentage of questions taken from the PTB relative to the percentage of

[3] While the player's average tax bracket of 33% leads to a potential withholding of $8,250, the percentage method requires computation of the withholding using a flat rate 25%. The aggregate method may lead to a computation of higher tax withholding as the $150,000 salary would be annualized and taxed at the appropriate rate based on the annualized compensation. We refer the reader to IRS Publication 15, Section 7, Supplemental Wages for additional information regarding the withholding rules that apply to bonus compensation.