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Main article

Why use multiple choice questions with excess information?



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ABSTRACT

The examinations administered by accounting instructors, professional certification examiners, textbook writers, and preparatory accounting software all routinely include multiple-choice (MC) questions with excess (yet related) information. Despite their widespread use, little is known about how MC questions with excess information (hereafter, MCE questions) affect student test performance. Based on an empirical analysis of the tests of 374 students in two introductory accounting classes at a single university, we found that average performance was lower on MCE questions than non-MCE questions, but was sensitive to the overall difficulty of the tested concept. We also found no significant difference in the power of the two question types to discriminate – both types appeared equally competent in differentiating between low- and high-performing students. Although accounting professors may wish to use MC questions with excess information for a number of other reasons, we found that MCE questions, as used in the present setting, do not appear to better discriminate student understanding relative to non-MCE questions.

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1. Introduction

Many reasons motivate the widespread use of multiple-choice (MC) questions on accounting exams, including convenience (the ability to grade, record, and return tests quickly both in class and online – see, for example, [Apostolou, Blue, & Daigle, 2009](#)), the ability to cover a wide range of material within

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a single exam (Collier & Mehrens, 1985), and because these questions comprise the majority of the points on the most frequently taken professional certification exams (AICPA, 2015). In this research note, we study how multiple-choice questions with excess information affect student performance.

We define “multiple-choice questions with excess information” (hereafter MCEs) as questions where the stem contains both the information needed to answer correctly and additional information that, although appearing to be relevant to the question’s concept, should be ignored. Accordingly, we refer to MC questions that do not contain any excess information (i.e., the stem contains only the information needed to answer the question) as “non-MCEs.” This definition fits the concept of many MCEs found in professional and accounting examinations, yet to our knowledge, it has not been studied. We discuss this concept formally in the second section of this paper, including contrasting the definition with well-known question flaws such as “window dressing.”

There are many reasons why accounting educators might want to include MCEs in their classroom examinations. In this study, we focused on two reasons: “difficulty” and “discrimination.”¹ Thus, our study falls primarily in the realm of item analysis within the broader field of psychometrics (Nunnally & Bernstein, 1994; Reynolds, Livingston, & Willson, 2009).

Reynolds et al. (2009) suggest that item difficulty is an important characteristic of assessment. If test questions are too easy or too hard, the exam may lack *validity* (i.e., be unable to adequately assess knowledge of the material). Thus, one reason MCE questions may be utilized by exam preparers is to adjust the difficulty level of the exam. Our first objective of this study was to determine whether MCEs are truly more difficult questions by examining the percentage of correct responses relative to paired non-MCE questions.

In addition to variation in difficulty, MCE questions might be better discriminators – i.e., might better distinguish between those who understand the material and those who do not (Reynolds et al., 2009). This concept is different from “difficulty,” as two tests can have different levels of difficulty but perform equally well at distinguishing superior students from poorer ones (with a difference only in the level of the score). Thus, how well a test question discriminates is useful to accounting instructors wishing to include high-quality questions that separate knowledgeable students from those with imperfect knowledge.² Consequently, our second objective was to determine whether MCEs better discriminate among students than paired, non-MCE questions.

We found consistent results using two separate experiments. MCE questions were more difficult for students (measured as percentage of correct responses). However, we found that the difficulty of the tested concept affects the degree to which excess information affects performance. When examining question discrimination (using the point–biserial correlation), we found no significant difference between MCEs and their non-MCE counterparts. In other words, in these two experiments, MCE questions were no better at differentiating superior students from poorer ones, relative to non-MCE questions.

In the next four sections of this paper, we review the literature and develop our hypotheses, describe our research method, and present our results. In the final section, we summarize the study, discuss some limitations, and offer suggestions for future research.

2. Literature review and hypothesis development

2.1. Background

The basic structure of an MC question includes the question statement (the *stem*), followed by several choices. These choices include the correct response and a number of incorrect responses (*distractors*).

¹ Other reasons may include (1) the desire to assess student understanding at higher levels of cognition than the rote recall characteristic of many non-MCE questions, (2) the belief that MCEs might better prepare students for the professional certification examinations they may take, and (3) the belief that MCE questions enjoy better *structural fidelity* – i.e., better reflect the skill sets required to perform accounting tasks on the job. While these are all testable hypotheses, they would require vastly different research designs and are beyond the scope of this paper.

² McMillan et al. (1989) use the term *discrimination* to describe the ability of a question to discriminate between students. We emphasize that discrimination is a term that applies to the question, with the result being that the question can better identify students with a higher level of knowledge from those with a lower level of knowledge.

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