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ABSTRACT

This review of the literature examines the effectiveness of instructing students in various test-taking strategies, particularly in reference to multiple choice questions. Among findings reported are that while test-wiseness strategies may be taught, these strategies have limited generalizability across exams and learners who proactively process information, such as test items, are more likely to understand and recall what they learn. Specific strategies validated by the literature for multiple choice tests include: (1) the length of a multiple choice option often signals its correctness; (2) avoid items using the words "always" and "never" (inclusionary language); (3) avoid grossly unrelated alternatives; (4) pay attention to grammatical clues; (5) choose the mid-range answer; (6) use deduction on the item; (7) be aware of similarity or oppositeness; (8) adopt the appropriate level of sophistication for the test; (9) consider the purpose of the test constructor; (10) make efficient use of time; (11) use error avoidance strategies; and (12) utilize deductive reasoning strategies. (Contains 30 references.) (DB)

Research on Multiple-Choice Questions: Implications for Strategy Instruction

Laura M. Stough

Introduction

Multiple choice tests are one of the most common ways we have of evaluating student achievement at the college level. In studies comparing academically successful to academically unsuccessful students, it has been found that high performers demonstrate a greater knowledge of effective test-taking skills and that they use learning strategies that lead to a deep, rather than to a superficial level of encoding (Bruch, Pearl, & Giordano, 1986). Studies on test-taking strategy instruction with students with learning disabilities (e.g., Deshler, Alley, Warner, & Schumaker, 1981; Hughes & Schumaker, 1991; Scruggs & Mastropieri, 1986; 1988) have also shown that these students benefit from test-taking strategies.

There exists considerable controversy over the effectiveness of test-taking strategies and the best way to instruct them. Weinstein (1988) suggests that instruction of these strategies within a metacognitive framework will promote transfer and application of these strategies across different academic situations. The length of time spent on instructing test-taking strategies seems to be of importance: In a 1985 meta-analysis of 24 programs which taught test-taking skills to elementary and secondary school students, Samson (1985) found that training programs which lasted five weeks or longer produced significantly greater results than did shorter programs. However, Dolly and Williams (1986) found that, while test-wiseness strategies may be taught, these strategies have limited generalizability across exams. Their results show that these strategies are effective only when applied to items which are susceptible to test-wiseness strategies.

Test-wiseness

Previously, research on students' responses to multiple choice questions has come from the field of item response theory and from the analysis of individual test items. These techniques allow us to evaluate the quality and difficulty of items on exams along and give us a glimpse into what item alternatives or concepts are most difficult for students. Test-wiseness or strategic test-taking encompasses a slightly tangential, if related field.

The idea of "test-wiseness" was originally discussed by Thorndike (1951) and thought to be a variable which could possibly affect test reliability. Thorndike considered test-wiseness to be a general and lasting cognitive factor in that the manner in which an individual responded to tests affected her scores across content areas. Given this view, test-wiseness can be seen as part of any test score. However, Thorndike considered test-wiseness to be part of the *error* in an individual's test score. Currently, researchers in the area of test-wiseness have differing views. Scruggs & Lifson (1985) argue that test-wiseness is a large source of variance that is commonly found in tests and that it is not related to general intelligence, stating "the influence of test-wiseness has been greatly overestimated." Conversely, Green & Steward (1984) see test-wiseness as simply an artifact of one general cognitive ability. They view it as a highly developed reasoning ability which is combined with both general and specific experience. Other investigators (Dolly & Williams, 1986; Evans, 1984) believe that test-wiseness is not a general ability, but that it is cue specific given the nature of individual items.

Weinstein (1988) uses the term "test-taking strategies" to refer to the concept of test-wiseness. As in the definition of test-wiseness, an individual

who employs test-taking strategies is expected to get a higher score on a test than an equally able individual who does not employ test-taking strategies. Farr, Pritchard, & Smitten (1990) have found that students approach a test in three different ways; by employing reading strategies, by using an overall approach to the test task and by using test-taking strategies. However, few investigations indicate what kind of strategies are significantly related to increased test performance. Research from the field of reading (Anderson & Armbruster, 1984; Nist & Kirby, 1989) suggests that underlining and annotations may facilitate comprehension while reading test questions. Other investigators have found that changing answers (Hanna, 1989), a low level of anxiety (Covington & Omelich, 1987), and using an outline before studying (Mannes & Kintsch, 1987), may aid test performance. In a study of the type of test markings that college students made on a multiple choice exam, Kim and Goetz (1991) found that item elimination marks are significantly correlated with high test scores. Stough (1992) found that, following a test-taking strategy instruction intervention, the variety and frequency of several types of test markings increased. In general, results from the metacognitive literature suggests that learners that proactively process information, such as test items, are more likely to understand and recall what they learn.

Instruction of Strategies for Use on Multiple-Choice Items

Most skill-based instructional programs that focus on test-taking strategies tend to give "common sense" suggestions rather than verifiable strategies to students. However, there are a number of consistent findings from the research on instructing test-taking strategies which have clear instructional implications. Dolly and Williams (1983, 1986) have found that

not only can cognitive strategies be taught to students, but they are effective in raising students' scores on multiple-choice exams. The following are types of strategies which have been found to be helpful to students on multiple-choice items:

Test-Dependent Strategies

Cue-using strategies

1. The length of a multiple choice option often signals its correctness. (McMorris, Brown, Snyder, and Pruzek, 1972). Given the choice among several options, if a student is unsure of which to chose, and one of the options is significantly longer (say twice as long), the longer option tends to be the correct one. This strategy is not as effective if the option is one or two words longer than the other distractors, but the immensely long distractor does tend to be correct.

2. Avoid items using the words "always' and "never" (inclusionary language). These options tend not to be correct.

3. Avoid grossly unrelated alternatives (Gibb, 1964). These also tend not to be correct.

4. Pay attention to grammatical cues. Grammatical indicators of plurality, tense or appropriate following vowel can clearly indicate the correct option.

5. Chose the mid-range answer (Dolly & Vick, 1986). The correct choice will most often be one of the two middle values when all four options can be numerically ordered.

6. Use deduction on the item. The correct choice will often contain a repetition with variations of words or ideas which appeared in the

stem of the item. In addition, each option may contain logical relationships to other options which can cue correctness.

7. Similarity/Oppositeness. The correct choice will be one of two items which imply the oppositeness of each other or one of two similar but slightly different options.

Intent Consideration Strategies

1. Adopt the appropriate level of of sophistication for the test. Consider the other items on the test. What level of detail and discrimination is expected? Students who are aware of how they will be tested on course content score higher than students who do not (May & Thompson, 1989).

2. Consider the purpose of the test constructor. Students should consider the emphasis given different content in the course. If the instructor also is responsible for constructing the exam, students may benefit from recalling the amount of time the instructor spent on particular content. If the instructor emphasized particular points during the lecture it is likely that this information will be tested on an exam.

Test-Independent Strategies (Scruggs and Lifson, 1985)

1. Time-use strategies. These include working quickly and efficiently and saving more difficult or time-consuming items for last. Students should quickly preview their exam, be aware of how much time is allowed for the exam, and plan their time accordingly. Marking an item to return to it later seems to be especially helpful when an item is difficult.

2. **Error avoidance strategies.** These types of strategies include attending to directions, marking answers carefully, and checking all answers. When a student has the opportunity to go back over his or her test they should do so since, in the process of going through the exam, they might have been cued about the correct answer to an item previously unclear to them. On multiple-choice exams where they are expected to "bubble-in" correct answers on a scantron sheet, they should double check that they have indicated the correct response.

3. **Guessing strategies.** In the case that the student cannot determine the correct answer to an item, and there is no penalty for an incorrect answer, he or she should always guess. However, if they are able to eliminate any incorrect options, this greatly enhances their chance of answering an item correctly. Crossing out incorrect options seems to significantly increase a student's chance of answering an item correctly.

4. **Deductive reasoning strategies.** These include eliminating items known to be incorrect, which again may be aided by physically marking out incorrect options. A study by Annis (1986) found that high-achieving undergraduate students more thoroughly considered the alternative answers for each question. Eliminating incorrect answers, rather than simply choosing the correct answer might aid the student in doing so.

Choosing items based on an analysis of the relation among items is another deductive strategy. For example, one out of two options which are similar to each other tends to be correct, especially when one of the options seems to imply the correctness of the other. The use of content information from other test items and options can also aid a

student in deducing a correct option- which is another reason why marking items to return to them later is a useful strategy.

Researchers investigating answer changes on objective test items have consistently shown the preponderance of changes to be from *wrong to right* (Schwarz, McMorris & DeMers, 1991; Crocker & Benson, 1980; Payne, 1984). Most students report that they change answers either because of rereading or rethinking an item. In addition, answer change seems to be particularly effective in answering moderately difficult or difficult items correctly (Stough, 1992). However, low test scorers do tend to use this strategy ineffectively (Schwartz, et al., 1991), changing answers more frequently and less successfully.

Some test-takers tend to have "positional response bias," which means that they tend to choose early options on items, which may or may not be due to not thoroughly reading each item (Fagley, 1987). Students should be aware that they are not positionally biasing their responses.

A Final Word of Caution

There is no substitute for content knowledge. Although Bangert-Drown, Kulik and Kulik (1983) found in a meta-analysis of 30 studies that 25 of these demostrated a positive effect of test-taking instruction on performance, the average effect was only about .25 of a standard deviation, which is small by conventional standards. Instructional effects are, not surprisingly, usually related to the length of the instructional program. The minimum effective length of instruction across programs is approximately three hours.

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