

Academic Integrity and Plagiarism

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Abstract

With the continual growth of online courses, academic integrity and plagiarism have come to the forefront. Instructors often use, over a period of several semesters, the same questions pulled from standard publisher test banks for use in their online course quizzes and exams without any alteration of question order or answer choices. This “lack of alteration” has resulted in the possibility of students sharing test answers with current and future students enrolled in the same online course(s). Changing question order and answer choices in test questions could be a possible solution to lapses in testing integrity and might decrease cheating on online tests.

Keywords: Exam, integrity, honesty, cheating, testing, multiple-choice, reordering, answers, choices, positions, proctoring.

Introduction

Academic integrity has been a concern to individuals involved in the teaching, management, and implementation of online courses (Trenholm, 2006-2007). The integrity of exams has been a concern for centuries, with Chinese examinees going to great strides to cheat on civil service examinations by using a cribbing garment to conceal essay materials (Brickman, 1961). Most recently, 21st century college students taking un-proctored online exams have cheated (Harmon & Lambrinos, 2008) because of the lack of testing security (Patterson, 2006).

Discussion

Academic Honesty Travis and Price (2005) stated a dilemma that faculty who use distance education technology are often faced with is academic honesty, especially with written examinations. Students can find written work electronically and manipulate it to make it their own or have other individuals, such as friends or relatives complete the work for them. The authors indicated that any written work included in web-based courses could be viewed as an enticement for students to be dishonest, causing faculty to consider the implementation of safeguards, many of which may not be completely effective. Read (2004) elaborated in his article about the misuse of electronic devices in the classroom. He indicated instances where some students would not tolerate cheating by their classmates. Such was the incident that involved a few graduate business students enrolled in an accounting course at the University of Maryland at College Park. Classmates charged fellow classmates with cheating on a midterm exam. The group of professors who taught the accounting course intentionally posted on a website a final exam answer key that contained incorrect answers to a multiple-choice exam containing 30 questions.

The proctored exam was given to approximately 400 students. During the exam, noises could be heard coming from some of the test takers' cell phones. After completion of the exam, the professors compared the false answer key to those of the test takers and found that 12 students most likely had cheated. Some of the 12 students who were accused of cheating admitted their guilt and stated they had found the exam answer key online using their cell phones. The remaining students were found guilty by the professors who taught the accounting course and other university students. All of the 12 students received a failing grade for the course. Suggestions to curtail cheating included banning electronic equipment such as cell phones during exams, creating multiple versions of a test, and a delay in posting test answers until all students had taken the exam. Nath and Lovaglia (2009) processed several cases at their university that involved students cheating on multiple-choice exams. They wanted to find a way to handle cheating in their classrooms.

Software was used that generated a numerical output list that identified each question a student missed and the incorrect answer that was chosen. When two students missed several of the same questions and picked the same incorrect answers, that pattern was considered to be evidence of possible collusion. Caldwell (2009) contended that cheating in higher education is rampant. He developed a ten-step model to guide universities wishing to implement an improved academic integrity program.

The ten-step model consisted of: (a) Articulation of a clear purpose and mission. Clear direction and commitment to an academic integrity program must begin with the top administrators of a university; (b) Orientation and training of faculty. The orientation and training of faculty concerning desired outcomes of an academic integrity program can be facilitated by sharing information contained in the academic literature; (c) Explanation and clarification of current policies. Widespread communication of all elements of an ethics program is an important part of establishing understanding and commitment to the ethics program; (d) Implementation of a realistic process for addressing violations; (e) Attainment of student ownership. By asking students to affirmatively pledge to support an honor code and to refrain from unethical conduct is perceived by many universities to personalize the individual responsibility of each student and thereby increase compliance; (f) Empowerment of students in education and enforcement. Clearly explaining university policies about plagiarism and carefully articulating the many types of inappropriate academic conduct are critical tasks in educating students and enforcing academic integrity policies; (g) Maintenance of dialogue with stakeholders.

Several scholars have suggested that an effective academic integrity program requires the shared commitment of faculty, administrators, the business community, and students working together; (h) Refinement of the ethics curriculum. Although the questions of how to teach business ethics and whether ethical behavior can be taught have been debated for many years, a growing body of evidence supports the idea that moral awareness can be learned and ethical decision making can be improved by training in business ethics; (i) Monitored enforcement and documentation of results. Monitoring enforcement and documentation of the results of the academic integrity process is a critical control function identified by leadership scholars as absolutely essential for ensuring effective implementation and follow-through; and (j) Evaluation of outcomes and communication of results. Thoughtfully assessing information gathered in the monitoring and documentation stage can lead to key improvements, and communicating results to stakeholders provides an opportunity for thanking participants, validating their efforts, and celebrating change (Caldwell, 2009).

Sileo and Sileo (2008) suggested that faculty need to help students: (a) learn how to properly conduct research, (b) identify what constitutes appropriate and inappropriate use of the words and ideas of others, and (c) understand where to go for assistance in writing at the university level. Further, Kennedy, Bisping, Patron, and Roskelley (2008) confirmed the importance of: (a) being clear with students about what constitutes inappropriate conduct; and (b) establishing control systems in the classroom that demonstrated that inappropriate conduct would be discovered and penalized. Faculty and administration leaders need to clearly explain the many types of academic dishonesty and communicate to students how they will ensure that conduct will be monitored.

In their study, they found that two thirds of the cheating cases involved students getting together on an exam and the other one third copying another student's paper without their knowledge. The university wanted a procedure that would discourage student cheating and at the same time create a learning experience opportunity for identified cheaters. Students who admitted to cheating were given an optional 15-page assignment that included a "...confession, restitution, and absolution combined with a study of deviance, social norms, and ethical behavior" (p. 5). The paper was graded on the level of a research paper, looking for detailed description, the number of resources, and the quality of the cited sources. Positive benefits of the optional assignment included inattentive students becoming more active class participants and the creation of an atmosphere that discouraged cheating (Nath & Lovaglia, 2009).

Young (2010) discussed in his article the problem of cheating that occurred among college students majoring in physics and engineering. At the Massachusetts Institute of Technology, a physics professor added a detection system to his online courses that looked for abnormal behavior patterns. The professor and his research team found in the first year that approximately 11% of homework problems were most likely copied. An engineering professor at California Polytechnic State University at San Luis Obispo surveyed students on their perceptions of cheating. The professor found that students thought that cheating included bringing a cheat sheet to an exam, but did not consider bringing a graphing calculator to class containing equations hidden within its memory to be cheating.

Face-to-Face and Online Testing

The use of web-based versus paper and pencil testing has offered a greater variety of possibilities in proctored settings (Ployhart, Weekley, Holtz, & Kemp, 2003), while unproctored testing has resulted in students cheating (Harmon & Lambrinos, 2008), leading to the possibility of creating centralized web-based testing centers (MacIsaac, Cole, Cole, McCullough, & Maxka, 2002). Patterson (2006) indicated that a challenge of web-based testing was test security. In order to minimize collaboration and cheating among students, a number of safeguards have been established, such as using a test question pool to randomly select a set number of questions, which would decrease the chances of any two students taking the same test or having the questions appearing in the same order on different tests. Khare and Lam (2008) suggested that an important point to consider about online examinations was to match the design and process to the purpose of the exam and to the culture of the institution. For example, instructors could have a multiple choice online exam with each question having only one standard answer and offer multiple versions of the exam to be held in examination centers to lower the occurrences of academic dishonesty.

A study was conducted to examine whether differences existed in student performance between online learners and face-to-face learners using course grade components that consisted of multiple choice and nonmultiple choice questions (Huh, Yoo, Jin, & Lee, 2008). Academic and demographic data were collected on 119 undergraduate students who took online and face-to-face accounting courses over a 3-year period. The study found that students with a low grade point average were better performers in face-to-face courses than in online courses and that older students also performed better in face-to-face courses. Otherwise, no significant differences in student performance were found when comparing online versus face-to-face learners (Huh et al.).

Virtual assessments, when compared to paper-and-pencil formats, offer several advantages, such as a guarantee of standardization through the automatic delivery of instructions by way of the technology being employed. These assessments allow materials to be provided within the virtual environment, are easier to administer, and could be a cost saver for institutions lacking resources (Clarke-Midura & Dede, 2010). Online courses tend to benefit a wide variety of students, but even more so nontraditional female students (Sullivan, 2001). A study using undergraduate university students was conducted to determine if gender played a role in mode of assessment. Two modes of assessment were used for the study: coursework and examinations consisting of exercises and multiple-choice questions. Findings indicated that females outperformed males on both modes of assessment. Study participants of both sexes did better on coursework than on the examinations (Woodfield, Earl-Novel, & Solomon, 2005).

Multiple-Choice Exams

A number of students have preferred a course in which some of the exams were multiple-choice because of the perception among both faculty and students that multiple-choice tests were to some extent easier than, for example, essay tests. Lawrence and Singhanian (2004) also observed that this preference might be a result of students feeling more relaxed while taking multiple-choice tests, leading to more positive classroom learning experiences. One of the advantages of multiple-choice testing is that these tests leave no room for vagueness and increase the number of items that can be sampled for a specific block of time. The multiple-choice format functions efficiently in the testing of specific facts or terms (Bloom, Hastings, & Madaus, 1971). Multiple-choice tests have played an important role in higher education, but in order to be useful, items should be explicit and well-constructed. Clear-cut instructions should also be given to the examinees (Burton, 2005).

Attali and Bar-Hillel (2003) explained that test makers tend to have the strong systematic tendency to hide correct answers, mainly in middle positions, and test takers have the tendency to seek correct answers in the middle positions. The authors found that test makers who composed tests made up of four-choice questions hid the correct answer approximately 70% of the time in the two middle positions. In addition, test takers who guessed on four-choice questions selected a choice from the middle with a 75-85% occurrence rate (Attali & Bar-Hillel). Haladyna and Downing (1989) analyzed 46 textbooks dealing with the topic of multiple-choice (MC) item writing. They discovered five major findings: (a) use a question or completion format, (b) utilize as many options as possible, (c) complex multiple-choice formats should be avoided, (d) an option of "all of the above" should be avoided or used in moderation, and (e) an option of "none of the above" should be avoided or used sparingly. Haladyna and Downing stated, "As more research is done on item writing, the taxonomy should be revised accordingly, and the use of the improved taxonomy should lead to better MC item writing and, subsequently, better tests" (pp. 72-73).

Reordering Answer Choice Positions on Multiple-Choice Tests

From the late 1970s to the late 1980s, educational measurement research has been focused more and more on the individual test item and not the test itself (Yen, 1989). Research involving item ordering at both the cognitive and statistical difficulty levels on multiple-choice tests might be important when studying test order effects (Newman & Kundert, 1988). Cizek (1994) investigated whether reordering item options (answer choices) on a multiple choice examination would significantly affect the difficulty level of items. If he found that reordering item options did not have any significant effect on the performance characteristics of the items, avoidance would not be necessary. However, if the practice did impact item performance, the practice should be approached with caution. The participants for the study were 759 graduate medical students gathered to take a certification examination. Part of the qualifying examination consisted of 20 multiple choice items, each with a projected visual. The participants would be able to view the visual for a specified time period, interpret the visual, review the answer choices, and select the correct choice for the visual that was projected.

A response booklet consisting of 30 choices was provided to the participants. Two versions of the response booklet were used, with the only difference between the two being scrambled answer choices. Having two versions of the response booklet allowed for direct comparison of almost identical items, with the only difference being the position of the correct response in one of the response booklets. This experimental design allowed each item to be constant while the position of options was controlled. With 30 choices available to participants in the response booklet, the unique characteristic of *distance* allowed the researcher to observe how the placement of correct responses might impact item performance (Cizek, 1994).

Study participants were randomly assigned to one of two groups: Group 1, consisting of 380 participants and receiving Form A (answer choices in order) of the response booklet, and Group 2, consisting of 379 participants receiving Form B (answer choices scrambled) of the response booklet. Group 1 had one participant randomly excluded for the remainder of the analyses. A *t* test was performed to check on the equivalence of ability for Group 1 and Group 2, based on their total score for the 200 item examination, with no significant difference in group mean scores observed. An *F* test using the ratio of variances indicated the likelihood of the group scores having equal variability (Cizek, 1994).

The outcome of the study indicated that 14 of 20 items on the Form B version of the response booklet had a lower *P* value compared to the Form A version. Four instances on the Form B version exhibited higher *P* values than Form A. Two items in Form A and Form B had *P* values that were identical. Plotting of Form A and Form B *P* value pairs revealed an almost perfect linear relationship between the two pairs, with a product-moment correlation of +.99. Large differences in *P* values ranging from -.02 to +.10 were noted in form-to-form performance (Cizek, 1994). Observed differences in difficulty level as a result of reordered answer choices were plotted against variations in item difficulty. Difference in *P* values for the correlated calculations for the item pairs indicated almost no linear relationship between changes of answer choice positions and item difficulty. Item difficulty level was not increased or decreased in regard to inserting a correct option later in the response list (Cizek, 1994). The researcher concluded that a small number of item pairs and the examination per group displayed a significant change in difficulty. Most of the item pairs varied little in difficulty among the forms. The study found that altering the position of a correct response in equated examinations was to be considered a dangerous practice. Comparisons would depend directly on assumptions in reference to the reason for changes in item difficulty. Therefore, altering the position of correct responses on an examination might be acceptable only in certain situations in which test scores were not used in educational decisions of great importance (Cizek, 1994).

Effect of Answer Choice Placement on Multiple-Choice Tests

A study was conducted to determine any possible effects when item order was changed on an objective test. The research involved 427 undergraduate student participants enrolled in a psychology course. Participants were randomly assigned to one of three multiple-choice tests with questions having four possible answer items. One test followed the topics as they were covered in the course; the second test had items blocked with covered topics in reverse order; the third test had items randomized by topic. All three test versions were administered simultaneously. Results showed no significant differences on how test items were ordered among the three test versions (Schmitt & Scheirer, 1977). Clark (1956) conducted a study over an 8-year period to determine if students preferred certain response positions in multiple-choice tests that contained five-choice items.

Dice were cast to avoid the possibility of repetitive right answers or special positioning of attractive distracters in the tests composed of approximately 500 items. A total of 5,540 students participated in the 8-year study. The study found that the fifth position of five-option multiple choice items was often disregarded with a possible reason being the pressure of time limitations (Clark, 1956). Cluskey, Ehlen, and Raiborn (2011) noted that to maintain academic integrity, some institutions require proctor supervision of online exams. But proctoring can be expensive. Student costs could include fees at testing centers, cost of the "Remote Proctor," time to find an approved proctor, and effort required to coordinate a time for the exam.

Institution costs could include staff salaries to administer a proctoring process, approval of proctors, and maintaining testing centers. The authors proposed a less costly, non-proctor alternative to promote academic honesty, using eight control procedures that enable faculty to increase the difficulty and thus reduce the likelihood of cheating by students. They labeled these control procedures Online Exam Control Procedures (OECPs). These procedures are: OECP-1 - offer the online exam only at one set time. OECP-2 - the online exam will be computer accessible (open) only for a very brief period of time, perhaps a short 15 minute window. OECP-3 - the sequence of exam questions should be randomized as well as, the answer choices for objective OECP-4 - exam questions are presented only one at a time. OECP-5 - design the online exam to occupy only the limited time allowed for the exam. OECP-6 - a limitation that most online learning systems automatically incorporate, which allows that a student can only access the exam one time. OECP-7 - require students to use a Respondus Lockdown Browser (RLB) to access online exams. RLB is a special Internet browser in which students are "locked" into the exam. OECP-8 - the final is that instructors should change at least one third of multiple choice/objective questions on each and every exam each and every term.

An experimental study was conducted at a state university using students enrolled in an educational psychology course for the purpose of investigating test item order intricacy, specifically, the effects of item difficulty order on the overall test reliability, difficulty, and discrimination (Brenner, 1964). The study was conducted over a period of two semesters, winter and spring of the 1961-1962 academic year. During each winter and spring semester, multiple tests were administered to the students. However, the author did not disclose the number of students used in his study. The tests during the winter semester were composed of 40 items in a multiple-choice format with four possible answer choices, all of which were randomized. The tests were administered to the students on the third, fifth, seventh, and ninth Mondays of the semester and had a 50-minute time limit. During the spring semester, the multiple-choice test items were arranged according to the level of item difficulty data obtained from the winter semester tests. The results of the study revealed no significant differences in the areas of difficulty and reliability, while in the area of discrimination, only one of the four experiments was significant between the .05 and .02 levels. Brenner concluded that ". . .to arrange items in order of item difficulty when constructing a power test to measure the attainment of facts and principles from a text" (p. 100) was not worth the time and effort for college instructors.

Number of Answer Options on Multiple-Choice Tests

A study was conducted by Delgado and Prieto (1998) to look at the effectiveness of four-option item tests and the impact of removing the worst option from the list. The study examined the most favorable number of options in the designing of multiple choice tests. The purpose of the study was to produce an improved item list with no expenditure to subject matter or to students. Computerized test versions were used in the study, one with four options and another with three options per item. A total of six tests was used, each consisting of 30 items. Study participants included 433 university students enrolled in an introductory psychology course. Out of the 433 participants, 241 took the four-option item test at the end of their first semester. Approximately one year later, the remaining 192 participants took a three-option item test during their first semester (Delgado & Prieto, 1998). Because none of the participant assignments to the three- or four-option test was made at random, the design of the data collection for the study was quasi-experimental. Demographic variables were not measured in an examination perspective. Student census data showed that students in subsequent years were comparable in age, gender, and general background (Delgado & Prieto, 1998).

A deletion procedure was established that recognized the worst option item from the four-item list. The noncorrect item selected most infrequently was then removed from the list. A Classical Test Theory methodology in which participants observed scores on a test was used as an estimation of the true score, was designed for test reliability indicators, item difficulty, and item discrimination.

With the removal of the worst option, difficulty indexes were to some extent increased. Calculations on each test form for mean difficulty on four-option items showed $p = .65, .59,$ and $.60$ (Delgado & Prieto, 1998). The study found the three-option format was as valid as the four-option format. No significant differences were found among test reliability, mean item discrimination, and mean item difficulty. The three-option format was the better alternative when considering the savings of time and energy. Noted benefits included the application of tests required less time, writing possible options became easier, and students felt less pressured in reading shorter items, resulting in time that could be used to work at a slower speed or to recheck their work (Delgado & Prieto, 1998).

Conclusion

Research related to online testing has raised a number of security issues such as authentication of the test taker and test results (Bartram and Hambleton, 2006). The International Testing Commission (ITC) found that as a result of the increased growth of Internet test takers, the globalization of testing, and a lack of provision for good training, an increase in bad practices may lead to psychological and educational testing being questioned. In order to avoid the possible misuse of the methodology of objective testing, adequate quality controls should be implemented (Bartram, 2001). Standard publisher test banks have often been used by instructors in their online courses over a period of several semesters without any alteration of question order or answer choices. This inaction has resulted in the possibility of students passing on the answers to quizzes and exams to current and future students taking the same online course. Continued growth of online courses brings to the forefront issues of academic integrity and plagiarism. Alternate test formatting by changing question order, answer choices, and key wording in some test questions could be a possible solution to lapses in testing integrity and might decrease student cheating on online tests (Francis & Aslinia, 2009).

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