

Crime in the Classroom Part IV: Conclusions

David N. Harpp

Department of Chemistry, McGill University, Montréal, Québec H3A 2K6, Canada; david.harpp@mcgill.ca

Cheating on exams has been an issue for instructors and administrators since the beginning of formal evaluations in schools. The problems are well-publicized but not frequently addressed to effect change. An important illustration of a set of cheating incidents was described in a recently published series of front-page articles in *The Dallas Morning News* (1). Their remarkable, in-depth analysis provided proof of extensive cheating in numerous Texas high schools on state-mandated tests. Such problems are not unique to Texas; some California schools (2) are experiencing challenges with cheating events, as are others overseas (3). In recent years, this *Journal* and others have published a number of articles concerning this topic, generally focused on multiple-choice exams (4).

Because exams often determine the future of those taking them, it is inevitable that cheating will be a strong temptation for many students. A social scientist, Donald Campbell, warned about such tests over thirty years ago. “Campbell’s law” emerged and it states,

“The more any quantitative social indicator is used for social decision making, the more subject it will be to corruption pressures and the more apt it will be to distort and corrupt the social processes it is intended to monitor” (5). Said more simply, “The higher the stakes, the more likely people are to cheat” (1).

There are two main concerns regarding exam cheating: detection and prevention. At present, there are several well-documented programs that quite accurately flag pairs of students who have engaged in extensive copying during a test (4b, 4d, 6). As a result of our own efforts designing detection programs for multiple-choice tests, this university mandated a series of regulations concerning the use of these types of exams in 1990. The rules require that multiple versions of each exam (mid-term or final) be utilized. For final exams, the gymnasium is used for many tests and here, either version alternation or “stripe” seating (different subject matter exams in alternating rows still employing alternating versions in the row) is employed.

For a given exam, the most secure arrangement involves different versions (ABABAB) distributed down one row with versions CDCDCD in the adjacent row. Alternation of this distribution pattern ensures that each student is surrounded by a different version of the exam, essentially eliminating the potential for any traditional exam-copying by proximal observation.

A further, important precaution that is also required is that students be assigned seats prior to the scheduled mid-term exam; in the case of this university, seats are usually posted ~10 minutes before the start of the exam.

Two years after the institution of the multiple-choice exam regulations, the seats in most classrooms on campus were labeled. Maps of the rooms (7) were produced enabling instructors to copy and paste the student names from the class list into spreadsheets depicting suitable room spaces, making scrambled seating easy to carry out. Under these conditions, an instructor is

rarely required to ask clusters of students to “spread out” as such seating efficiently delivers clearly-defined seat distribution.

All completed multiple-choice tests (mid-term and final exams) are then evaluated for copy detection every year.¹ This task is performed using a program developed in-house and has been described in detail previously (4b, 4d). The essential features of the program are that the answers for all possible pairs of students taking an exam $\{[N \times (N - 1)]/2$, where N is the number of students} are compared with attention to two statistical features, probability and exact errors in common, (4b, 4d). Indices have been developed over the past years that flag unusually similar exam pairings. In virtually every case, students whose behavior produced flagged pairs of exams were seated adjacent to each other, a corroborative fact recorded in the seating records.

Anti-cheating regulations at this university have been in place for the past 17+ years. Results over that period clearly demonstrate that they are effective in minimizing cheating incidents in multiple-choice exam settings. When we first evaluated a variety of exams taken both at this university and at several U.S. and Canadian institutions, detectable copying used to average ca. 5% of a given class.

At present, institutional monitoring¹ of all exams flags fewer than 0.1% of all of the exam takers for cheating. Copy detection evaluation of all multiple-choice tests (mid-term and final exams) is carried out each year. Essentially this means that in over 150 multiple-choice exams (both mid-term and final) in a semester involving 31,000 students, ~20 pairs (of a possible ca. 2 million pairs) are flagged on average, in contrast to several hundred that would have shown up without these exam rules in place.² Each situation is independently evaluated for proximate seating and other circumstances.

There are occasional problems different from simple copying of answer sheets. They arise from such adventures as a student sequestering a calculator during the exam with stored answers in a washroom for a partner (4f). Other more sophisticated possibilities permitting exam collusion include text-messaging and other wireless communications. Nevertheless, similarities between exams are detected using our program regardless of the cheating mechanism; to date, there has not been a notable increase in the number of detected cheating incidents, suggesting that text-messaging and other electronic forms of collusion have not yet become prevalent.

Finally, careless exam arrangements created by instructors or proctors can enhance the likelihood of copying during tests. Part of this problem is certainly professor or teaching assistant apathy in not creating an examination atmosphere where students have at least one empty seat to each side. New instructors to this university who are unfamiliar with the regulations are another cause for unsafe exam procedure. This problem can be overcome by annual reminders of such regulations as well as a policy for the Scantron grading service to refuse to grade exams that are only in single version form.

Conclusions

There is no doubt that by minimizing the most obvious opportunities for students to copy from each other during an exam, we create a fair evaluation environment for our students. This is reflected in the fact that in the past 17 years, we are not aware of any negative comments from students concerning these exam regulations. In fact, students routinely report that they are pleased that the rules are in place.

We are unaware of other academic institutions using such mandated regulations for copy-prevention but can confidently maintain that they are not difficult to put in place and have a positive effect on student and faculty life. In addition to improving academic integrity, the number of unpleasant incidents involving cheating has been greatly reduced.

Notes

1. In 1999, the McGill University Senate agreed that the results of this program can be used as evidence of exam copying for possible use in prosecution. While this feature of our regulations might be problematic to implement in other institutions, having school-wide adoption of the measures described here is a matter of persuasion with the appropriate school agency that administers exam procedures. Inasmuch as these types of exams are a significant measure of validation of the degrees we award, to not try to effect these types of exam-safety measures is to continue to permit the intellectual playing field to be significantly uneven.

2. For instance, an exam of 301 students has 5150 unique pairs ($301 \times 300/2$) and typically for this size group, before instituting these procedures, there would be ca. 6–10 pairs (12–20 students) depending on “clusters” of mutual copiers. After careful evaluation of the circumstances of each flagged pair, a decision would be made with respect to disciplinary measures.

Acknowledgments

The author thanks McGill University for continued vigilance and support of academic integrity with special credit to Alan Shaver, Morton J. Mendelson, Jane Everett, Linda Jacobs-

Starkey, and Debra Simpson. I also thank Karen Harpp (Colgate University) and James Hogan for helpful comments.

Literature Cited

- Hacker, H. K.; Benton, J. The Dallas Morning News. <http://www.dallasnews.com/sharedcontent/dws/dn/education/stories/060307dmmethowwedidit.3cf3278.html> (accessed Mar 2008).
- Asimov, N. San Francisco Chronicle. <http://sfgate.com/cgi-bin/article.cgi?file=/c/a/2007/07/08/MNG9FQT2QO1.DTL> (accessed Mar 2008).
- Bexley Times. <http://www.bexleytimes.co.uk/content/bexley/times/news/story.aspx?brand=BXYOnline&category=news&tBrand=nrthblondon24&tCategory=newsbxy&itemid=WeED11%20Jul%202007%2017%3A32%3A24%3A563> (accessed Mar 2008).
- (a) Deal, W. J. *J. Chem. Educ.* **1984**, *61*, 797. (b) Harpp, D. N.; Hogan, J. J. *J. Chem. Educ.* **1993**, *70*, 306. (c) Tamine, J.; Quigley, M. N. *J. Chem. Educ.* **1993**, *70*, 845. (d) Harpp, D. N.; Hogan, J. J.; Jennings, J. S. *J. Chem. Educ.* **1996**, *73*, 349. (e) Rizzuto, G. T.; Walters, F. J. *J. Chem. Educ.* **1997**, *74*, 1185. (f) Harpp, D. N.; Hogan, J. J. *J. Chem. Educ.* **1998**, *75*, 482. (g) Charlesworth, P.; Charlesworth, D. D.; Vician, C. J. *J. Chem. Educ.* **2006**, *83*, 1368. (h) Nathanson, C.; Paulhus, D. L.; Williams, K. M. *Contemporary Educational Psychology* **2006**, *31*, 97.
- Campbell, D. T. *Assessing the Impact of Planned Social Change*; Western Michigan. <http://www.wmich.edu/evalctr/pubs/ops/ops08.pdf> (accessed Mar 2008).
- (a) Frary, R. B.; Tideman, T. N.; Watts, T. M. *J. Educ. Stat.* **1977**, *2*, 235. (b) Wesolowsky, G. O. *Journal of Applied Statistics*, **2000**, *27*, 909.
- McGill University. <http://www.mcgill.ca/pia/plans/exam> (accessed Mar 2008).

Supporting JCE Online Material

<http://www.jce.divched.org/Journal/Issues/2008/Jun/abs805.html>

Abstract and keywords

Full text (PDF)

Links to cited URLs and JCE articles