

Student Centered Education

A Role for Student Centered Education in Promoting Academic and Scientific Integrity

Received for publication, May 23, 2011

Manuel João Costa‡

From the Life and Health Sciences Research Institute (ICVS), School of Health Sciences, University of Minho, Braga, Portugal

In addition to knowledge and technical or reasoning skills, students need develop a real and honest sense of professional integrity in Biochemistry and Molecular Biology (BMB). Knowledge and reasoning, technical skills, behavior and conduct are the five ingredients. Each ingredient is essential, no ingredient is less important than the others. However, the message conveyed to students by most BMB courses, through curricula content and assessment programs, is that knowledge and skills are what really matters. It is natural that BMB courses primarily expect students to understand the structure and function of molecules or how molecular networks function. It makes sense that practical classes in the laboratory primarily target the development of student skills. BMB examinations that count for decisions—pass/fail or honors—should put students' BMB knowledge to the test. However, we may be neglecting too much the education and training of students on academic integrity and on the development of a proper scientific conduct.

Many science courses make no explicit address to scientific (mis)conduct and academic (dis)honesty. Following our collegial culture, we entrust students to take responsibility for their learning and for abiding by the principles of academic and scientific honesty. Over time, the way students see and feel it, the culture in academic centers is tolerant to plagiarism and cheating. The bad news is that students are right. Comprehensive reports conclude that cheating as other forms of academic fraud are pervasive in higher education and may be “on the increase” around the world [1]. A previous column is indicative that BMB courses are not an exception to this rule [2]. BMB courses must do their part and play a role in changing this scenario. We must find space in our curricula to explain to students what are high standards of scientific conduct and devise strategies to reward the students with exemplar ethical conduct and identify and educate the substandard students. If we do not succeed in conveying the message that we value behavior and conduct, then

students—including top students—will probably not value those either. That may partly justify why we meet academic dishonesty from the students and in courses we least expect, as I ended up finding out in my institution.

Recently, I was faced with a plagiarized assignment—to an extent close to 60%—from a student enrolled in a PhD program. The sources were excerpts of papers published in scientific journals. Here and there, there were minor text changes, original words were replaced by synonyms and references to the original papers were sometimes added. Nevertheless, in general, the student took credit for what others had published. The student had successfully graduated, had written and defended a Master Thesis, and had been individually interviewed by an admissions Committee to enter the program. What was surprising in this case, was the course in which the assignment was due: a student selected two week course on the principles of scientific research, in which scientific conduct, plagiarism and fabrication in science are addressed, and the impacts of misconduct in science and in society are openly discussed in class through an analysis of cases that had lead to the withdraw of papers in top journals (for example [3]). The fraud was detected by plagiarism detection software. The student failed the course and is no longer in the program, but made it as far as a PhD program. As I wondered how many times had that student used plagiarism before, as undergraduate or as Master student, I came across a disturbing article.

A poignant narrative in the “The chronicle of Higher Education” [4] made me aware that there are professionals of cheating, who work in companies that write and sell assignments to students: “. . . You've never heard of me, but there's a good chance that you've read some of my work. I'm a hired gun, a doctor of everything, an academic mercenary. My customers are your students. . . .” So the case is no longer just that students themselves are plagiarizing parts of a paper from last year's edition of a course, or getting organized to conspire in collaborative cheating schemes like memorizing exams. Cheating has reached the point that students pay professionals, well enough to let them make their living out of cheaters. The idea that higher education is nowadays meal to such

‡To whom correspondence should be addressed. E-mail: mmcosta@ecsau.de.uminho.pt.

professional cheating parasites is disturbing. It certainly strikes hard at public trust in education. It certainly erodes the proper development of students into scientists, no matter how many metabolic pathways they may know or how good their skills are. So where does this leave the academy? Can we, BMB academics, do something about it?

The answer lies partially within the words of the same professional cheater: "Not one of my customers has ever been caught [4]." This means that teachers do not suspect that the assignments reflect the worth of the corresponding student author(s) to the point they feel it needed to be verified. Verification might be feasible in many circumstances: a student who is unprepared to write an assignment is probably at least just as unprepared to defend it. Therefore, discussing the assignments we get from students with the students themselves will probably make clear for us the ownership of the work and will make students responsible for what they learn and deliver in assignments. It will also create new opportunities for feed-back to students. This is a small step to centering education on students.

It is by engaging into discussions and by watching how role models reflect and deal with dilemmas that students learn the most about ethics and integrity. We must

bring those discussions to—large or small—classes, and value them in our curricula like we value content. Finally, we should strive to find valid strategies to reward excellence in academic conduct and penalize the opposite. These are simple and small seeds, but important for developing a different academy and, hopefully in the long run, for an ethically responsible scientific community of Biochemists and Molecular Biologists.

Acknowledgment—I thank Harold B. White, Department of Chemistry and Biochemistry, University of Delaware, Newark, for his comments on an earlier version of this article.

REFERENCES

- [1] Committee on Science, Engineering, and Public Policy (1995) On Being a Scientist, National Academies of Science, Washington, DC. Available at: <http://www.nap.edu/openbook/0309051967/html/R1.html>.
- [2] M. A. Eckstein (2003) Combating Academic Fraud: Towards a Culture of Integrity. International Institute for Educational Planning, Paris, France. Available at: <http://unesdoc.unesco.org/images/0013/001330/133038e.pdf>.
- [3] H. White (2004) Ethical Conduct in the Laboratory: Looking the Other Way, *Biochem. Mol. Biol. Edu.* **32**, 348–349.
- [4] D. Kennedy (2009) Editorial retraction, *Science* **311**, 335.
- [5] E. Dante (2010) "The Shadow Scholar—The Chronicle Review—The Chronicle of Higher Education". Available at: <http://chronicle.com/article/The-Shadow-Scholar/125329/>.