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A Noncoercive, Menu-Driven Grading Scheme

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An unpleasant aspect of the traditional lecture course and grading scheme is the coercion created by mandatory, rigidly scheduled homework and examinations. The consequent lack of control engenders anxiety and avoidance behavior in students, which interferes with an effective learning process (1-4). One response to this situation is the Keller Plan (5-13), which provides a self-paced, individualized program without deadlines or one-shot evaluations. Such approaches have not, however, significantly displaced the traditional lecture-exam structure (14). The reasons for this include inherent grade inflation (11), deterioration of student-faculty interaction (12), diminution of student curiosity (12), and lack of objective improvement in student performance (11). Another attempt to remove evaluation traumas is credit/no-credit grading. Multiple problems, however, preclude its widespread use: the difficulties of outside transcript evaluation, loss of motivation, and lack of teacher-to-student feedback (15). A different

approach to reducing the coercive aspects of the grading process developed for use in both undergraduate and graduate courses is described in this paper.

I have used a versatile point system for grade assignments that allows students to choose the type of performance to be evaluated. Table 1 presents the typical menu presented to the students at the start of classes; this specific one has been used in our junior-senior undergraduate inorganic chemistry course (enrollment ~50). Obvious variations of the menu choices can make this scheme applicable to both more and less advanced level courses (it has been repeatedly used, for example, in a graduate special topics course). The versatility of this menu-driven grading scheme is clear. The student retains the control of choice, timing, and level of effort, while the instructor controls the quality evaluation.

There are no specific options required from the menu and, within a broad range, no specific point distribution mandated. Students are initially incredulous at this, since even the exams themselves are optional. The beauty of menu-driven grading, however, is that the vast majority of students still opt to take exams and still study to perform well on them of *their own choice* as part of *their* coursework strategy. Similarly, exam performance becomes only one portion of the overall evaluation of achievement. In one semester of the undergraduate inorganic chemistry course, the observed distribution of effort was 7.46 homework sets/student out of 11 (i.e., 68%), 1.50 critical reviews/student, 0.33 term papers or research proposals/student, 2.94 citation or author searches/student, 0.94 bibliographies/student, 0.23 class presentations/student, 1.23 departmental seminar attendances/student, and 2.90 hour exams/student.

With the menu-driven scheme, the instructor may maintain very high standards without adversely affecting class morale. The following policy statement, for example, has been used to good effect:

The level of sophistication of presentation, term papers, etc., is expected to increase as the semester progresses; grading criteria will *also* become more sophisticated. Thus, early submission is strongly encouraged. The criteria applied to any one piece of work may well be tougher than you have previously encountered. This is intentional and will be applied evenly to all.

The grading criteria can be quite stringent; on the average, submitted material received only half of the maximum possible points allotted in the Table 1 menu. The distribution of final grades is set by the instructor based on the total point distributions. It is helpful, however, to set a point total that will *guarantee* an A, while noting that totals below that level may also receive A's depending on the class's performance. With the point scheme shown in Table 1, 400 points in a semester is a very high but attainable goal. In one semester of a junior/senior undergraduate inorganic course, for example, 19% received ≥ 400 points, and in fact the lowest A had only 366 points; the B range was 351-261; the C range was 242-208;

Table 1. Point System Menu

Description	Maximum Earnable Points ^a
<i>Written Projects</i>	
1) Weekly Homework	15 each
2) Critical Review of Literature Article (recent relevant article chosen by instructor); 500-1000 words	30 each (limit of 3)
3) Term Paper (possible topics chosen by instructor); >2500 words, >20 references.	150
4) Mock Research Proposal (N.S.F. format, possible topics by negotiation); 2000-2500 words	150
<i>Bibliographic Projects</i>	
5) Citation Search of assigned article	10 each (limit of 2)
6) Author Search of assigned author	10 each (limit of 2)
7) Term Paper Bibliography (full citation including title and library call number; no patents or theses; all papers within past 3 y); >30 citations	30 (limit of 1)
<i>Oral Presentations</i>	
8) Class Presentation on Text Material (20 min)	50 (limit of 1)
9) Attendance of Departmental Inorganic Seminar (1-p. write-up on why, what, and how)	5 each
<i>Examinations</i>	
10) Three 1-h exams (each covering 1/3 of lectured material)	100 each (limit of 3)

^a No double credits. Term papers, critical reviews, etc., must be on separate topics. To receive an A, at least 120 points must be earned before the second exam. All work must be received no later than the last day of class.

and the D range 195–180. The overall grade distribution ran a B– average (2.8/4.0).

The intent of this grading scheme is multiple: first, to reduce the coercive elements of traditional grading; second, to allow the instructor to set extremely high standards without provoking undue student hostility; third, to allow each student greater flexibility in scheduling his or her effort; and fourth, to broaden the experiences associated with and evaluated during the course. By allowing the student to plan his or her own effort in a nonmandatory fashion, a major coercive aspect of grading has been removed. Furthermore, the element of interstudent competition is greatly reduced. Students no longer see themselves as earning their A on the back of someone else's C. Each student has his or her independent goals set by him- or herself and evaluated by the instructor on its own merits. By setting a point value for a *guaranteed* A at a very high level of effort, the instructor sets a very high standard for the students, but also allows moderation to a more realistic standard for the determination of the final grades. The flexibility in timing permits students to make their own priority decisions and increases their sense of control. Finally, by drawing in a variety of different experiences to be part of the menu scheme, the course better reflects the reality of a practicing chemist than does the traditional lecture-exam format.

The potential disadvantages of the menu-driven scheme may include greater paperwork for the instructor and lopsided distribution of student effort. The greater effort required by the instructor, in fact, is rather minimal. Preselection of articles and authors for student review limits the range of literature with which the instructor needs to be familiar. The use of a microcomputerized spreadsheet can greatly facilitate bookkeeping. Of greater concern is the possibility of an unfair evaluation of a student based on an uneven distribution of effort. However, the broad limits set in the Point System Menu minimize this possibility. It may bother some instructors that the exams are not required. As noted earlier, however, students nearly always take the exams anyway. In general, the menu scheme provides an even distribution of effort with a broader range of student activities than does traditional grading.

To evaluate the impact of the menu-driven grading scheme, a Likert scale survey was given to a class of junior and senior undergraduates ($n = 48$). The results are shown in Table 2.

Table 2. Student Preference Survey Results

1) Compared to the traditional format of grading based solely on midterm and final exams and homework, I prefer
10% traditional; 74% point system; 16% neutral.
2) I work harder under
16% traditional; 55% point system; 29% neutral.
3) I find these grading formats to be (1 = inflexible . . . 5 = flexible)
1.71 traditional; 4.55 point system.
4) I find these formats to be (1 = very coercive . . . 5 = noncoercive)
2.23 traditional; 3.58 point system.
4) On an absolute scale I rate these formats as (1 = poor . . . 5 = excellent)
2.51 traditional; 3.74 point system.

This poll is clearly limited in scope and at best only semi-quantitative. Nonetheless, it clearly highlights the advantages of the menu-driven grading scheme and its effect on student morale. The menu-driven scheme is the preferred choice by each of the following criteria: relative student preference, absolute ranking, student effort, flexibility, or coerciveness. It is most striking that students preferred the menu-driven scheme to the traditional grading format by greater than seven to one!

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