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A Behavioral Perspective on College Teaching

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Much of the subject matter learned in college, particularly during the first two years, is taught in relatively large classes with text and lecture as the primary source of the information being learned. If students make effective and prolonged contact with these sources, they can acquire extensive verbal repertoires in many areas of knowledge. Unfortunately there are many other activities that compete for the typical student's study time. Several factors are often cited as variables that will support study behavior in competition with other activities, but the only powerful one available to the teacher is the exam grade, as it is related to the course grade. However, unless exams are clearly related to appropriate study behavior, require thorough and extensive coverage of the subject matter, occur frequently (preferably no less often than once a week), and are also clearly related to the course grade, even this factor will not generate prolonged and effective study behavior. Effective college teaching is essentially a form of aversive control, but if done properly the aversiveness is quite mild, and such aversive control can be responsible for the development of large and valuable intellectual repertoires.

There are a number of college students who learn very little from their courses. Most of these students spend almost no time studying their textbooks, and if they even attend lectures they typically do not spend much time outside of class studying lecture notes. It is customary to locate the problem within the student as a lack of intellectual ability, a lack of motivation, or possibly both. An alternative approach would inspect the environmental contingencies that are supposed to maintain class attendance and effective out-of-class study. What follows is an analysis of these contingencies and some suggestions for improving them.

AN IMPORTANT TYPE OF COLLEGE TEACHING

This analysis is not directed at laboratory courses, seminars, skill courses such as in fine arts or in sports training, nor courses that are *experiential,* or aimed primarily at such goals as personal growth, effective interpersonal skills, etc.; nor is it aimed at courses with very small enrollments (15 or less) irrespective of content or goal. I am primarily concerned here with courses having fairly clear instructional goals related to a specific content or subject matter area, and with a class enrollment of 40 or more.

At universities with ten thousand or more students, a large proportion of most students' formal education takes place in such content courses. In the sciences and humanities most of the introductory and quite a few of the upper level courses are of this type. Such instruction is also quite common in business and education courses, less so in engineering and fine arts.

These content courses are often required as a part of the major or minor, or semi-required in that they are part of a small set from which the student must select one or more. Text material covering most of the content is usually available, and the instructional methodology consists largely in assigning such text material, supplementing it with lectures, and assessing the students' learning with some form of in-class examination, typically given more often than twice a semester but seldom as often as once a week.

Students have to learn from the text by abstracting out main points, organizing and outlining, practicing solving problems, classifying examples, making up original examples, making up and an-

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swering test questions, etc. They must also learn during lecture and from studying notes taken during lecture, which they reorganize, outline, memorize, etc. just as with the text material.

I know that some professors and some students consider such courses to be necessary evils, at best, brought on by mass education, but I don't share that view. This type of course, when it generates effective study, is responsible for a great deal of learning. It is in such courses that students learn much of what is already known in a field. They acquire extensive and often fluent repertoires which permit them to begin talking and thinking about the subject matter in the same way that professional experts talk and think. These courses are sometimes criticized for not teaching creativity or how to obtain new knowledge, but only how to *parrot back* old knowledge. However, for most scientific and professional areas creativity requires an extensive familiarity with what is already known—an extensive knowledge base about which one can be creative. Creative and innovative use of a subject matter can be more easily addressed in later courses with smaller enrollments or in graduate school.

Digression on Differences Between College and High School

A heavy reliance on texts and lectures as source material is in sharp contrast with teaching practices in many high school courses where class discussion, individual and group projects, homework, and other activities constitute a significant basis for the learning that takes place. Related to the dependence on texts and lectures is the use of exam scores as the main basis for the course grade in college. High school course grades are often based on a variety of activities, including attendance and class participation, with exam scores sometimes being less than half of the course grade basis. Some entering college students who earned rather high grades in high school may be quite ineffective at studying texts and lecture notes and at taking exams over such material. It is important for college counselors to be sensitive to this cause of poor performance in seemingly well educated entering freshmen. Another important difference between high school courses and the type of college content course dealt with in this paper is the requirement for many hours per week of outside class study, as described below. In college, homework is not just an occasional inconvenience, it is where most of the learning takes place. It is my impression that these three important differences between college and high school are seldom properly emphasized in freshman orientation programs.

STUDENT MOTIVATION

At many colleges and universities students are advised that to obtain a passing grade—a grade of C—for typical lecture courses they will be expected to spend about two hours outside of class for every hour in class. Thus, for a three-credit-hour lecture course they would be expected to spend nine hours each week, three in class and six in outside study. I don't think our own undergraduate catalog makes any such statement, but I consider it a very reasonable expectation, and have always taught my courses accordingly. This outside study requirement is sometimes referred to as the *two-for-one* rule and is based on a full semester load consisting of 12 to 15 credit hours. The result is a student work week of 36 to 45 hours, for what could be called mediocre academic accomplishment. For grades of B or A the work week may well become 50 hours or more, assuming that all of one's courses are content lecture courses as described above. In actuality, most students do not take 12 to 15 hours of such courses each semester, and some students with favorable educational histories are able to achieve at a high level in less time than described above. However, it is not unreasonable for a student who wants high course grades to either put in more time or take fewer courses. This is clearly not the nine-to-five work week considered reasonable in some kinds of employment, but the student is not working for someone else.

Now let us ask what might motivate students to spend a large portion of their waking hours attending classes and studying academic materials outside of classes. The main problem is that there are many other activities that compete for the student's time. A good case can be made (to the student, at least) that the college setting is an appropriate place to acquire repertoires other than academic ones—leadership, organizational, and interpersonal skills, for example. For many students it is also a rich source of entertainment in terms of concerts, plays, movies, social gatherings, and athletic events as participant or spectator. And of course television programs may be as readily available in college as they were when the student was in high school. Social relations involving companionship, romance, sex, even marriage compete with studying for a course. And for those students who are already married, the demands and pleasures of family life require a moderate amount of maintenance time. What variables are available to motivate the study necessary to master three to five college course contents during a semester instead of engaging in other attractive or demanding activities? The motivational variables usually mentioned can be grouped into several classes, as follows.

Intrinsic Interest in the Subject Matter

Because of a favorable social and intellectual background or unusually effective lecture or text material, some students find contact with a particular topic sufficiently rewarding in itself that they are happy to have the opportunity to spend the necessary time studying. However, I seriously doubt that this factor can play much of a motivational role. There are two main difficulties. Very few students will find many of their content courses of sufficient intrinsic interest to maintain the necessary amount of study time. Many topics are somewhat interesting to most students, but such interest is usually satisfied with far less contact than is required by the instructor for even barely adequate accomplishment. In addition this factor is unfortunately susceptible to postponement as contrasted with the competing activities, where *seize the moment* is the relevant attitude. The spontaneous social gathering, the unexpected dating opportunity, scheduled athletic events, all must be taken advantage of at the time they become available, but the aspects of the text that make it intrinsically interesting will be available and just as interesting at a later time.

Approval and Disapproval from Significant Others in the Study Setting

The reactions of parents play a significant role in motivating the study behavior of some high school students, but this influence is greatly weakened when the student moves away from home. Even for those still living at home, school work becomes less subject to effective scrutiny and evaluation by parents as a result of the new topics being studied and the parents' inability to accurately understand the contingencies affecting the student at college. Roommates might provide appropriate approval and disapproval but are not likely to react in such a way as to subject themselves to any form of aversive countercontrol. Thus not much can be expected from this factor, and in any case it is not one that the instructor has any control over.

Social Reactions of Others to the Repertoires Acquired Through Study

Praise and admiration for displaying one's newly acquired knowledge may be available from the instructor in class, from other students in the same class, or from other people in the academic or nonacademic environment. The instructor has some control over this variable within the class situation but not much when there are 40 or more students in the class. The approval of others, in or out of class, is not under instructor control at all, and for most content courses such approval is pretty skimpy and not tightly related to mastery of the assigned material. It is hard to imagine a student giving up an attractive social activity or an interesting entertainment for fear of

having to temporarily forego this type of approval.

Short-Term Advantages to Oneself from the Newly Acquired Repertoire

Some things learned in college courses have relatively immediate practical value—as when an automotive engineering course facilitates repair of one's own car. Or the things learned, as in an economics course, may permit a better understanding of a puzzling political or economic situation. Many of the content courses, however important for their contribution to further learning in the same field, provide relatively little of this kind of short-term payoff. Even when they do, the payoff is not likely to support much sacrifice of attractive competing activities, and in any case is not closely related to the details of the study assignment nor under much control by the instructor.

Long-Range Payoffs

Getting a degree and a good job, going to graduate school, contributing to the improvement of the human condition, etc. are events that are sometimes cited as possible sources of motivation for studying. Future possibilities of this sort may well have played a role in students' and parents' decisions regarding college attendance, and the general importance of such events would seem to contribute to their strength as possible motivators. However, their temporal remoteness works in the opposite direction. Even more critical is the impossibility of relating such events to the details of a weekly study assignment—it is easy to believe that one can contribute to the human condition even if one doesn't really understand a particular graph in the textbook. Also these long-range payoffs suffer from the same susceptibility to postponement as intrinsic interest—one can probably get almost as good a job on graduating if instead of studying tonight one takes advantage of an unusual social opportunity and studies tomorrow night. Instructors should certainly direct students' attention to such future possibilities when appropriate, but my experience doesn't suggest that this type of motivator plays any appreciable role in maintaining daily and weekly study.

The Course Grade

Now we come to the one motivational factor over which the instructor has considerable control, and which is easily related to the details of the study assignment. It is also a factor of considerable strength, as evidenced by the intensity of study activity occurring immediately before a major exam. Some instructors will assert that grades do not actually serve as effective motivators for many of the current crop of college students, and this issue will be addressed later. But first a few comments about university grading practices.

UNIVERSITY GRADING PRACTICES

A university is a place where students acquire repertoires that are of value to them and to society. It is generally considered to be the responsibility of the university to assess the extent and quality of the student's accomplishment and to provide a record of this accomplishment, the academic transcript. This record becomes important when the student attempts to qualify for a further educational opportunity or for employment. In some cases the agency or institution offering the further opportunity will perform some assessment—give a specially prepared examination or conduct an interview—but most of the assessment is considered best done by those who taught the student. (This involves some conflict of interest, of course, since the educator's assessment that most of the students failed to accomplish anything would certainly raise questions about the adequacy of the university.) It is certainly possible for a person to acquire a professional, intellectual, or technical repertoire without the aid of an educational institution, but most graduate schools and employers do not readily accept the task of assessing the extent or quality of such self-made repertoires.

Course grades are assigned according

to two quite different principles, referred to as *norm-referenced* and *criterion-referenced* grading. A grade that reports the student's standing in the course relative to the accomplishments of the other students is norm referenced. An instructor uses norm-referenced grading when giving the grade of A to those students who received the top ten percent of the exam scores. Criterion-referenced grading involves grade assignment according to an absolute standard, irrespective of the performance of other students. Giving the grade of A to those students who obtain 90 percent of the available exam points is criterion-referenced grading. In practice these two grading principles are seldom seen in a pure form. An instructor using a norm-referenced approach may still refuse to give the top ten percent an A if the overall class performance seems below the usual level experienced by that instructor, or may exceed the ten percent A assignment if the class seems unusually effective. Likewise, an instructor using a criterion-referenced approach may adjust the absolute criterion downward if it seems that an exam was inappropriately difficult when other evidence implies good effort and accomplishment by the students.

At this point it will be useful to consider the often discussed notion that an emphasis on grades fosters an undesirable form of competition among students. It is important, first, to distinguish between two kinds of competition which can be called *vicious competition* and *friendly competition.* Competition is vicious when an increase in one student's course grade will result in a decrease in another's; it is friendly when anyone who achieves at a certain accomplishment level will receive the grade appropriate for that level. It is quite clear that norm-referenced grading—grading on a curve—is a vicious competition contingency, because if only the top ten percent of the class receives an A, students improving their performance and moving into that category bump other students out. Criterion-referenced grading is a friendly competition contingency because each grade is assigned to anyone who achieves at that level (gets a certain number of points related to exams, papers, etc.), irrespective of how many other students achieve at that level. With criterion-referenced grading there is, of course, the competition related to having the highest point score, or having a higher score than some other particular student, but this is not the type of competition that makes students rejoice in the misfortune of other students or refuse to help others for fear of lowering their own course grade. For this reason as well as others, I believe that criterion-referenced grading is the only appropriate form of grading for college academic performance.

To return to grading practices, various scales are used with the most common being a five level A, B, C, D, and E system, or an eight level scale of A, BA, B, CB, etc. (sometimes recorded as A, B+, B, C+, etc.) In general the larger the number of steps in the scale the more precise the information being reported, up to the point where the precision becomes unreasonable given the relative crudeness of the measurement system. I suspect that an eight level scale is about as precise as is appropriate for most classroom grading practices. When considered as a motivational variable, an eight level scale is superior to a five level scale near the end of the term. The value of further study increases when it leads to an advance to the next letter-grade, and this remains available longer with an eight level scale.

THE PROCRASTINATION SCALLOP

Studying for a college course exam is like many tasks where a certain amount of work must be completed before a relatively inflexible deadline, and where the quantity and quality of the work completed determines the value of some subsequent event—in this case, the grade earned on the exam. And as with many such tasks, the work could be done at any time during the interval between the announcement of the task and the deadline but typically does not occur until near the end of the interval and then with increasing frequency. This pattern of be-

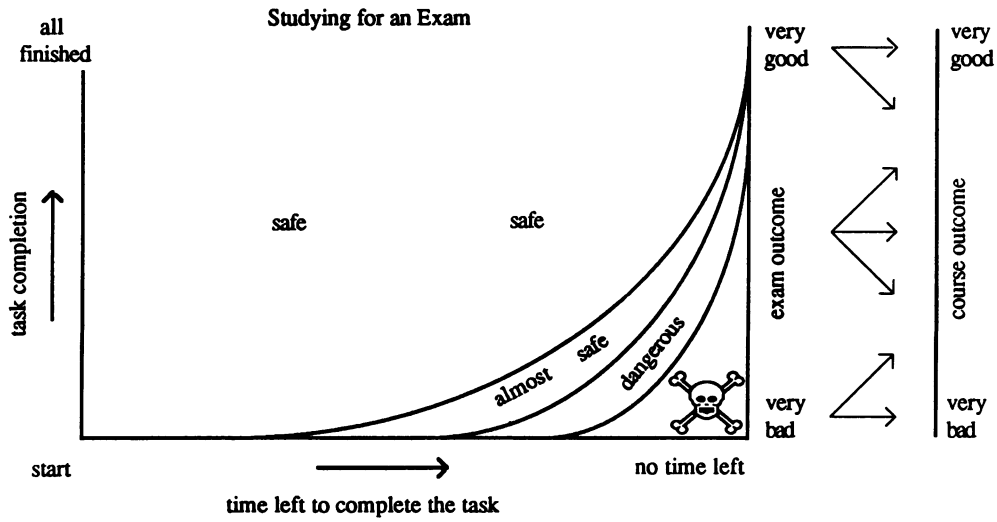

Figure 1. The Procrastination Scallop.

havior is sometimes erroneously referred to by behavioral psychologists as a *fixed-interval scallop,* implying the same functional relations between behavior, time, and reinforcement as seen with fixed-interval schedules of reinforcement. The pattern is similar, but the controlling relations are quite different.

For the students in my courses the task consists of studying a text and lecture notes in conjunction with study objectives, preparing further study materials (flash cards, notes of various kinds, etc.), and rehearsing or working with these materials until they are well learned. The diagram above portrays this situation as a task-completion/time-passage space. At the beginning of the study interval—immediately after finishing the last exam—the student's situation is represented by the bottom left corner. Working toward completing the task moves up; time passage moves to the right. At the end of the interval (at the time of actually writing the exam) the vertical location (how much of the task was completed) determines the value of the outcome (the exam score). The importance of the exam score, in turn, is largely a function of its relation to the overall course grade given at the end of the semester.

Task completion and time passage together determine the aversiveness of the situation at any point in the interval relevant to the task. To have completed most of the task and to have a good deal of time left before the end of the interval is safe or nonaversive. But to have completed very little of the task and to have very little time left is a condition that is dangerous or aversive, and which generates escape behavior. Usually the only relevant form of escape under these circumstances is to work on the task, that is, to study for the exam. The usual reinforcement for such studying is a change in one's status to a less dangerous condition with regard to the task–time relation. A number of details are relevant to the dynamics of this environment–behavior relation and these will now be considered.

Competing Activities

As mentioned above, we can usually assume that a number of opportunities or demands regarding activities other than studying will be superimposed on this situation. I will also assume that if studying has any intrinsic reinforcement value, it does not compete effectively with the reinforcing value of the other behaviors, either because of its relative weak-

ness, or because the other opportunities and demands are much less postponable. These assumptions mean that studying the subject matter of the college course will not ordinarily occur to a sufficient degree to develop the mastery required by the instructor unless the studying is relevant to course credit and to the course grade.

Course Grade Importance

Secondly, if the course grade is of little importance to the student, then the possibility of receiving a low exam score will certainly not function as a basis for aversive control, and studying as a form of escape behavior will certainly not compete with behavior related to other sources of reinforcement.

The Relation Between Exam Grade and Course Grade

Even if the course grade is important to the student, any one exam grade does not determine the course grade by itself but only in combination with the grades on the other exams and/or other assigned course activities. This is the implication of the diverging arrows on Figure 1 leading from the exam outcome to the course outcome. The exam outcome influences the course outcome but doesn't completely determine it, a factor responsible for an unavoidable reduction in the effectiveness of a low exam grade as a basis for aversive control. The student can believe, and not incorrectly, that a low score on the exam being studied for can possibly be compensated for by a high score on a later exam. This source of vagueness is enhanced when a large portion of the course grade depends on some end-of-semester activity such as a comprehensive final exam or a term paper. However, in many college courses there is a good deal of additional vagueness in the relation between exam outcome and course outcome that results from the instructor's general failure to precisely specify the basis for the course grade. Another source of vagueness is the use of a norm–referenced or relativistic grading system where the exam and course grades are not only based on the student's own performance but also depend to some extent on the performance of other students in the course.

The Relation Between Studying and the Exam Grade

In order for the potential exam grade to motivate completing the task before the time runs out, the relation of task completion to exam outcome must be a strong one. If failure to complete a sizable portion of the task does not result in a bad grade, or task completion does not result in a good grade, then studying as escape behavior will not be strong, nor will task progress function as a form of reward for the various aspects of study behavior. The most common difficulty here is the instructor's failure to be sufficiently clear about the relation of text and lecture material to the exam content—usually out of fear that with a more specific assignment the student would learn what was specified but would not learn all the other things that would have to be studied if the exam content could not be anticipated. Such specification may also be withheld on the grounds that part of the scholar's repertoire consists of bringing order out of chaos, and having to deal with the instructor's vague assignments is a good opportunity to acquire this skill. Students are often heard to say that in some cases they studied extensively and received a low grade and in others they studied hardly at all and received a high grade. They will say that they have no idea where the exam questions came from, or that topics that were barely touched in lecture and hardly mentioned in the text constituted a significant portion of the exam. Of course, some of this complaint is rationalization for poor performance due simply to insufficient or ineffective study, but as an ex-student I find myself quite sympathetic to such complaints. In some cases the only thing that saved me was the instructor's strict adherence to a norm-referenced grading system where no one learned what appeared on the exams, but

those who did least worst received high grades.

In my courses, and in those of some of my colleagues, students are provided with weekly study objectives—statements identifying essential parts of text and lecture material. These function to define the study task, making it possible for the student to know at any point what remains to be studied, and when to quit studying because the task has been accomplished. Some study objectives identify relatively explicit definitions, facts, principles, etc. but quite a few are related to more complex kinds of knowledge, such as being able to apply some concept or principle to a novel situation, identify or classify examples, generate original examples, explain the point being made by a text example, etc.

Digression on Lecture Content and Class Attendance

For large-enrollment content courses, lecture attendance is closely related to how essential the lecture material is for doing well on the exam, not as is widely believed, how interesting or inspirational the lectures are. Of course, other things being equal, more interesting lecturers command better attendance than those who are less interesting, but it is easy to overemphasize this factor. Because there are usually pretty good textbooks for such courses, the basic problem for many instructors is how the lecture material should be related to that presented in the text. One popular, but I believe inappropriate, approach—based on the belief that many of the students will not study the text, or if they do will not understand it —is to provide in lecture essentially the same information that is in the assigned text readings. This renders the lectures unnecessary for students who can understand the text, and the text unnecessary for those who attend and make good use of the lectures, and it greatly reduces the amount of material that can be adequately covered in the course. Much better is to provide detailed study objectives which guide the students' contact with the text—indicating what is important from the instructor's perspective—and which contain instructor-prepared supplementary material that clarifies and expands on inadequate or especially difficult sections in the text. With such an approach the lectures can then provide more recent subject matter developments, elaborate further on especially difficult text material, add material that the instructor believes is important to a thorough understanding of the subject matter but which is not covered at all in the text, and so on.

However, it is not reasonable for a very large portion of the course content to be available only as lecture material. Adequate text material can be found for most specific-content courses at the freshman or sophomore level, and too heavy reliance on lecture results in a reduced content and is too dependent on students' note taking skills. If essential material is not available in text form then the instructor should write it. It should, of course, be clear by announcement and by practice that much that is in the text will not be covered in lecture but will nevertheless be covered on exams. (The world of scholarship depends on the written word. College students must be effective readers and studiers when they come to college, or they must quickly acquire these skills, or they should not be able to obtain a college education. If they can, the college education doesn't amount to much.) It should also be clear, again by practice as well as by announcement, that any material presented in lecture that is not in the text will be on the examinations. Lecture attendance under such conditions is generally quite satisfactory, and not for artificial reasons.

Task and Time Monitoring

The student's task monitoring and time monitoring, of course, also determine the aversiveness of the situation and thus the frequency of the relevant escape behavior. If the task is vaguely described by the instructor, or vaguely understood by the student, the current situation will not function as an accurate source of aversive control, with the usual error being that

the student underestimates the amount of work left to be completed. Similarly if the student's time assessment is inaccurate—the usual error being to overestimate available study time—the situation at any point in the assign-study-test cycle will not be as aversive as it should be. Even with accurate monitoring many of us have a significant tendency in the direction of unrealistic optimism, resulting in our being slightly to moderately late in completing most tasks. Weakness in these skills is of importance, however, only at the beginning of exposure to a well managed motivational system: The system, itself, will automatically develop adequate task and time monitoring after exposure to several assign-study-test cycles.

To summarize, the threat of receiving a lower grade than is acceptable will usually generate appropriate exam study behavior, but not if any of the following conditions prevail: (a) the course grade is unimportant to the student, (b) the relation of exam grade to course grade is unclear, or (c) the relation of studying for the exam to the exam grade earned is unclear.

Now back to the claim, often heard, that many students are simply not motivated by grades. Such a claim is undoubtedly based on instructors' experiences, but before taking this claim too seriously we should first eliminate evidence that is confounded with the second and third deficiencies described above. My experience has been that very few students are willing to take a low grade when the contingencies are properly arranged.

Students do poorly in college for two main reasons: inadequate intellectual repertoires and ineffective motivational contingencies. The present analysis deals only with motivation. Even when the detrimental conditions listed above are not present, students with grossly defective intellectual skills will not be easily successful. However an effective motivational system can go a long way toward supporting the automatic development of better intellectual skills. The same is true with respect to self-management—control by long-range contingencies as opposed to excessive influence by the pleasures, and pains of the moment. Self-management skills develop as a result of personal experience and instruction by others, but this development depends to some extent on a relatively stable environment. Most students already have some tendency to study rather than to play when it is appropriate, and if doing so generally has good results, and if failing to do so generally has bad results, self-management skills automatically improve. Repeated exposure to an effective and reasonable assign-study-test cycle can play an important role in generating and maintaining effective student behavior and would seem especially important at the freshman and sophomore level.

Before drawing some general conclusions it is necessary to comment on exam coverage and exam frequency. For motivational purposes any student who masters only a small proportion of the assigned material should systematically and inevitably fail the exam, and students who master most of it should always receive high exam grades. Exam coverage insufficient to accomplish these goals greatly weakens the effectiveness of the exam as a motivational basis for studying rather than doing other things. If students correctly believe that they can skip studying any of the assigned material and still get an acceptable grade, many will do so. It may be possible to show that an exam which covers only a moderate sample of the assigned material will nevertheless function as an adequate assessment device, but this is irrelevant to the motivational issue. For motivational purposes the student must correctly believe that failure to complete even a small portion of the assigned study task will inevitably lead to an appropriate lowering of the exam grade and ultimately the course grade.

With respect to exam frequency, my goal is to generate six or more hours of effective out-of-class study every week. When I give an exam every week, and when the exam covers most of the assignment, such study does take place. I have been teaching this way for about 20

years and there is no question in my mind that it produces the necessary study by most of the students. What if I gave an exam every three weeks? I use one-hour essay exams and it is quite clear that if I gave such an exam over three times as much material it would have to be a much smaller sample of the material assigned. This would result in a less accurate measure of accomplishment, and would constitute an instigation to omit some part of the assignment because of the distinct possibility that it would not appear on the exam. But more important, if it takes six or more hours to master a week's assignment, then it should certainly take 18 or more hours of out-of-class study to master a three-week assignment. The nature of the procrastination scallop described above strongly suggests, and experience verifies, that sufficient fear to generate study in competition with other activities will only be present during the last week of a three-week period, and it is absurd to suppose that students will systematically put in 18 hours studying for a single course during any one week. What happens is that instructors lower their standards so as not to fail too large a proportion of the students—they do not expect 18 hours of outside study for an exam over a three-week assignment. Even less do they expect 30 or more hours of study for an exam given after five weeks of instruction with no previous exams. Under such conditions there develops a strong tendency to favor norm-referenced grading and give high grades to the best students, even though they didn't learn very much. How about examining with only a midterm and a final?

Since exams are seen as the most aversive aspect of college learning, it has been suggested that a system involving weekly extensive-coverage exams would be highly unpopular with students, but I have not found this to be the case. The *idea* is unpopular, but on course evaluations most students strongly praise the system, correctly identifying the weekly exams as being responsible for generating extensive and well-paced study. Students who can be identified as highly effective—those who are earning grades of A and BA—seem especially satisfied with such a system, saying that they very much appreciate knowing exactly what they have to study (as a result of having the detailed weekly study objectives), being able to thoroughly master small units of work, and being induced to spend much more time studying than with many of their other courses.

CONCLUSIONS

1. It is unrealistic to consider sources of motivation other than exam and course grades to be of much importance in generating study in the typical content course.

2. Exam grades, course grades, and what they represent can function to motivate a more than adequate commitment to out-of-class study if three important conditions are met: (a) the course grade is important to the student, (b) exam grades are closely related to course grades, and (c) studying is closely related to exam grades. (The instructor has little or no control over the first, but is completely responsible for the other two.)

3. To meet these conditions: (a) exams must be extensive and must occur quite often; (b) assignments must be quite specific as to the relation between text and lecture material and exam content; and (c) weekly exams must contribute in a large way to the course grade, that is, final exams, term papers, etc. cannot contribute too much to the course grade.

4. There are three popular notions about college teaching that I believe are quite incorrect for the type of course I have been considering, and when taken seriously, impede the development of effective instructional systems. The first is that if you teach properly the students will find learning both fun and easy. Not true, for two reasons: intensity and assessment. Learning new things is often enjoyable but seldom so under conditions where a great deal must be learned in a relatively short time. The college student taking several content courses will have to spend over 40 hours a week attending classes and studying outside of class. But as described above such a student is also physically, socially, and eco-

nomically prepared to participate in a great many other available activities of a kind that require little or no effort and are either intrinsically interesting or achieve ample extrinsic reward. Students will often find themselves saying something like "I can't do it now because I have to study." Turning down many attractive opportunities in favor of, at best, moderately interesting textbook and lecture study is essentially aversive. And in addition to the intensity, college learning is the kind of activity that is not taken for granted, but rather is formally assessed. Spending time and effort trying to accomplish something with the distinct possibility that when it is assessed the result will be disappointing is also an intrinsically aversive situation. The aversiveness is, of course, tolerated because of the long-range value of the repertoires being acquired, but the value of the remote end doesn't completely eliminate the aversiveness of the more immediate means to its achievement.

The second false notion is that grades should not be emphasized. Not true! Grades are the primary motivative variable, which means that current standing in the course and progress toward a final grade should always be clear and frequently brought to the student's attention. With the current ready availability of microcomputers and spread sheet programs an instructor can easily provide students with a weekly printout showing their past and present performance along with that of the other students, providing a projection to their final course grade, and indicating how they must perform on remaining course activities to achieve any particular course grade. I provide this type of weekly information, and it is always well appreciated. On course evaluations many students write in that they wish all their instructors gave them such information.

The third false notion is that good teaching consists primarily of good lecturing. Of course it is important for lecture material to be interesting and valuable for learning the course subject matter, but lecture presentation is only a small part of the total activity. It is much more important for the instructor to have an effective instructional system involving clear study objectives over both text and lectures, frequent well-designed exams and an exam environment that renders any form of cheating relatively useless, appropriate remedial opportunities for students who experience occasional poor performances, and so on.

5. Effective instruction, as implied above, is labor intensive. The notion that a content-course system that generates effective intellectual repertoires in 40 or more students can be managed and continuously updated by spending little more than the time required to present three one-hour lectures a week is way off the mark.

6. Perhaps in a more general sense it would be useful to conclude as follows: The world runs on fear. College learning is largely under aversive control, and it is our task to make such control effective, in which case it becomes a form of gentle persuasion.