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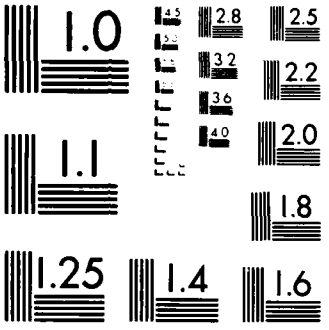

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TESTING AND GRADING IN PROFESSIONAL EDUCATION

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Summary

This paper discusses the role of professor in professional education and the testing and evaluation system needed to enhance students' mastery of subject material. The paper explains why competence based education is necessary in professional schools and why testing and grading must stress absolute level of knowledge rather than the progress of learning. Results from an experimental course were analyzed. By allowing students multiple chances to pass one quiz, we create an instructional environment that would enhance students' interest in the subject material. This method resulted in greater understanding of the subject material.

The Role of Professors

The role of professor in professional education is ambiguous. Is the professor here to facilitate learning or to act as a kind of secular St. Peter standing at the gates of Heaven, to eliminate, to see that the professions do not become overcrowded? Conventional wisdom dictates that professors should manage both roles. But the professor who on the one hand seeks the trust and confidence necessary to facilitate learning, and on the other hand uses his or her position to eliminate the student from the opportunities for learning may be accused of playing out a Dr. Jekyll and Mr. Hyde scenario.

The Purpose of Evaluation

Modern educational psychology recognizes these two different roles and distinguishes two fundamentally different functions of assessment and evaluation--namely (1) the function of prediction or selection, and (2) the function of evaluation of learning process that is a result of teaching. Typical grading practices have not kept these two functions separate, rather, they have often attempted to use the same grade for both purposes. The criticism that the professor is playing out a Dr. Jekyll and Mr. Hyde scenario is not totally unfounded.

At a time when grade inflation is under severe attack, and credibility of leatherette sheepskins is openly questioned[1], it will serve us well to maintain a distinction between these two functions of grading and evaluation in assessing the adequacy of education in professional schools. The most important task ahead for professors in professional schools is that of reinstating standards and reestablishing credibility with the public. Accomplishing the former will result in the latter. Of all the academic disciplines, the professional schools have relaxed their standards the least. It is logical then that this group could most easily become the initiating force in an effort to restore an academic meritocracy.

Factors Contributing to Grade Inflation

Two major factors are partially responsible for grade inflation. The first is a misconception about the role of education in professional schools. Many professors feel that they are hired to teach a subject and assess the gains each student makes in understanding the subject. The validity of this view depends on the purpose of education. One may differentiate the purpose of professional education from the purpose of general education. A distinctive feature of professional education is to equip students with an ability to use a specific body of knowledge in his profession. It follows that the function of prediction or selection, or the role of secular St. Peter, should be the primary concern of the testing and grading system in professional education. This type of grading system, however, tends to hamper students' learning process and accounts for the emergence of the second factor.

The second factor contributing to grade inflation is the professor's reluctance to use negative reinforcement for fear of alienating students. Educational psychologists recognized that while some degree of anxiety is necessary to learning, a great deal of classroom anxiety does not advance learning and might, in fact, deter it. In this period of ebbing academic standards, the professor who refuses to relax his grading standards may very well lead a student to conclude, as did the hero of Catch 22, that "my enemy is anyone out to get me."

To maintain or enhance a student's learning behavior, B.F. Skinner's theories[2], known as

positive reinforcement or behavior modification, call for the use of positive reinforcers such as good grades, recognition, and the like. However, using good grades as positive reinforcement for learning invariably leads to grade inflation and jeopardizes the academic meritocracy of professional schools, while using poor grades as an explicit or implicit threat tends to destroy some students' confidence and hampers their learning process. Being a professor in a professional school is like steering between Schylla and Charybdis.

Testing as a Part of Learning Process

The crux of the problem, in fact, lies in the testing and evaluation system used by a professor. Tests are used by most professors, if not all, to assess students' competency or to measure the result of teaching. What many professors overlooked is that testing can be an integral part of learning process. Testing and evaluation, no matter how it is administered, is of no pedagogical value unless accompanied by the possibility of trying again. The moment at which a student sees the inadequacy of his study is precisely the moment when real learning begins. The possibility of trying again enables students to realize that tests are not designed to get them or to punish them for their ignorance, but to help them overcome deficiency, thus minimizing the element of aversive stimulus.

Accentuating the positive is the major ingredient of the Skinnerian theory. According to Skinner', any behavior which is followed by positive reinforcement is more likely to occur again in the same or a similar situation. When a behavior is followed by an aversive stimulus, the behavior weakens. The basic principle behind these is quite simple: behavior is affected by its consequences. One can increase or decrease the future probability of a learning behavior by altering the ways in which instructional environment responds to that behavior.

All too often, however, professors in professional schools rely on the procedure of negative reinforcement to maintain and increase our students' behavior. We do this for several reasons, but probably the main reason is that it appears to us to be effective and widely used by other professors throughout the university. As a result of the explicit or implicit threats of poor grades or even failure, the student hands in his assignments and takes his tests. He may not be learning the important topics, but he does hang on and complete the requirements. It is widely recognized that negative reinforcement may result in immediate performance by a college student. It is most unlikely, however, that this desired behavior will last for very long.

The problems of applying the Skinnerian theory in professional education are that grade may skew upward and that "work and more work" is required, but the former is essentially the result of the latter. We should realize that what the theory implies is that we should create an instructional environment that would maintain students' interest in subject material so that they would motivate themselves to master the subject material. The need to stress mastery of subject material instead of the average amount of knowledge learned distinguishes the process of professional education from that of general education. A profession invariably stresses that its member possess the body of knowledge at a certain competency level. Our graduates must demonstrate that competency level before they are allowed to practice as a doctor, a lawyer, a CPA, or a professional engineer. It is logical to stress competency based testing and educational methods in professional education. In this context, the function of grading, or assessment of student performance, is to reflect a student's absolute level of competence in applying the knowledge in the learning process rather than to evaluate a student's learning that is a result of teaching, as distinguished earlier in this paper.

In summary, we can cite two reasons why testing and evaluation should be treated as an integral part of learning process. First, under the traditional testing practice, a student may not learn as much as his profession would have wanted. Second, the student will likely miss out on considerable positive reinforcement under the typical testing and instructional methods employed by professors in professional schools today.

The Experimental Design

The application of the Skinnerian theory may take various forms. The following is a description of a competency-based teaching method. It is from a hand-out given to all students enrolled in the intermediate accounting classes with which this method is experimented.

"This is a course through which you may move, from start to finish, at your own pace. You will not be held back by other students or forced to go ahead until you are ready. You move through the course at a speed commensurate with your ability and other demands upon your time. Because of the self-pacing, it is possible for some of you to complete the course before the end of the semester.

The work of this course will be divided into 8 units of content, you must take a quiz over a unit until you master the material at a predetermined competency level. There is no penalty for failure to meet this criterion, but you must restudy the unit and take another (different) quiz over the same material until you achieve the criterion. How fast you go is up to you. Whenever you feel you are ready, you take a quiz at the Accounting Lab. The final grade is determined by the number of units you have successfully completed during the semester.

It is better that you get too much testing than not enough, if your final success in the course is to be assured. The goal of this system is your mastery of each main area of the course. Failure to pass a quiz on the first try, the second, the third, or even later, will not be held

[illegible] the areas you do poorly on [illegible] understand them.

In addition to the instructor, the teaching staff of the course will include student assistants who have been chosen for their mastery of the material, for their motivation, for their maturity of judgement, for their understanding of the personal problems that confront you as a beginner, and for their willingness to assist. They will man the Accounting Lab, administer the quiz, and provide tutorial assistance."

The Accounting Lab was set up to allow the student to check his homework answers. Incorrect homework often prevents the student from grasping the details of the material, while long turnaround times for corrected papers provide corrections only after the student has lost interest in the material. The Accounting Lab enabled the student to correct each mistake he made in a quiz or in assigned problem through tutoring on the spot. The speed of correcting an error coupled with individualized tutoring enabled the student to better understand the material.

Analysis of Results

Exhibit I shows the results of the experiment using the system described earlier. The performance data were obtained from a comprehensive examination similar to the short form achievement test of the AICPA College Accounting Testing Program given to the students during the last class session. The test scores were not used in computing course grades. The sole purpose of the test was to check the value of the teaching method in an objective, quantitative manner.

It is obvious that students in the experimental sections outperformed their counterparts taught under the traditional lock-step method. The actual grade distributions revealed the varying effects of Skinnerian theories on three types of accounting students:

1) Top students' performance was not significantly affected by the change in instructional methods.

2) Students in the middle range appeared to comprehend much better when taught under the competency-based approach.

3) Students at the lower end of the class seemed to encounter greater difficulty under the competency-based method than under the traditional lock step system.

In addition, an open-end questionnaire was distributed to all students to determine their subjective feelings about the new teaching method. Student responses clearly reflect the effect of the Skinnerian theories of positive reinforcement and provide some logic behind the quantitative results. Some of the frequently mentioned feelings were:

"Failing a test is not as bad as I used to think, since it permits more discussion with the tutor and often helps sharpen the concepts involved."

"The repeated testing until a certain competency level is achieved requires me to go back and restudy the material I have not learned completely. Under the old system I would probably not take the time to go back and restudy the material."

"Quiz No. 1 points out weak areas for further studying. In other systems I would never bother to evaluate mistakes."

"This system encourages the student to strive for knowledge instead of credit for a diploma."

"The quiz is more of a progress evaluation than the normal test."

"It gives you confidence to know that you understand the material enough to pass the quiz the first time."

"The number of tests and the possibility of taking it over take much of the grade pressure off each test."

There are some negative effects, of course, primarily on those not very self-motivated. The negative feelings include the following:

"This system allows the lax student to fall behind more rapidly than a studious hardworking one."

"The multiple chances to pass one quiz are good incentives for learning the material thoroughly, but it does not encourage the student to keep abreast with the professor."

"I know some students tend to let down after they have achieved a certain (pre-set) grade."

Conclusions

In recognition of the experimental results presented above, one can observe that, among the positive aspects of competency-based testing method as compared with the traditional lock-step method, this method resulted in greater understanding of the subject material, it generated a greater feeling of achievement, it allowed students greater responsibility for their own education. By allowing students multiple chances to pass one quiz we create an instructional environment that would maintain students' interest in the subject material so that they would motivate themselves to master the subject material. Thus, grades are used as a positive reinforcer and they reflect an absolute level of competence or knowledge attained by the students. There is no need to relax grading standards. Students' responses to this testing method clearly bear these out.

The negative effect of competency-based teaching method on those not very self-motivated should be considered a necessary ingredient of

professional education, as a true program of professional education should separate the curious from the serious.

Exhibit I

Comparative Student Performance

Grades on Comprehensive Test	Traditional Method		Competency Based Method	
	Number	%	Number	%
90-99	7	11.7	9	11.7
80-89	11	18.3	25	32.5
70-79	11	18.3	11	14.3
60-69	12	20.0	9	11.7
50-59	7	11.7	7	9.0
Below 50	4	6.7	0	0
Withdrawal	8	13.3	16	20.8
Total	60	100%	77	100%
Mean*	71.2		77.5	
Standard Deviation	13.93		12.30	
Median	72		81	

*The difference for the means is highly significant at the 0.02 level on a t-test.

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