

The increase in quality of the students admitted was credited to increased attention given to the selection of applicants. The number of applicants had increased proportionally more than had the number admitted. Some of the respondents who reported a decrease in quality of graduate students mentioned their commitment to education of foreign students and their failure to be competitive with financial support of students.

Graduate Assistantship Support

Approximately one-third (32.8 percent) of the respondents reported increases in financial support of graduate assistantships. Most of the increases were used for raising stipends to counteract the effect of inflation rather than for awarding additional assistantships. Some respondents indicated that their stipend increases had failed to keep pace with inflation. About one-fifth (22.4 percent) of the respondents reported a decrease in the level of financial support of assistantships. In those departments in which assistantship funds have remained the same (44.8 percent), the funds are either being used for fewer assistantships to permit an increase in stipends, or the number and level of stipends have remained the same. In the latter case, the value of the assistantship to the student has decreased because of inflation. Several respondents reported a need for additional financial support and asserted that financial support of students and programs was the greatest deterrent to growth of enrollment in graduate agricultural programs. The effect of limited financial support of graduate students appears to be more critical at the doctoral than at the master's level. One respondent stated that their doctoral program was dropped because of an anticipated lack of funding.

Optimism for Graduate Education in Agriculture

Respondents were optimistic about the future of graduate education in agriculture. In view of the recent changes in the milieu of agriculture and education, 67.2 percent of the respondents expressed increased optimism for graduate study in agriculture. This outlook was supported by references to more and better applicants and to improved job opportunities. One applicant reported that the job opportunities for holders of bachelors degrees in agriculture were so good that recruitment of graduate students was difficult. Only 1.7 percent of the respondents reported a decrease in enthusiasm for graduate study in agriculture. The other respondents (21.0 percent) apparently found the recent influences on graduate study in agriculture to be counterbalancing and to cause them to maintain about the same level of optimism.

Summary

This study of 58 departments in Land-Grant Agricultural Colleges determined that during the past two to three years most admission committees have not changed the value placed on the various admission criteria. For those departments in which the value has changed, the trend has been to increase rather than to decrease the emphasis on the admission criteria. Those criteria that have been given pronounced increases in weight include the undergraduate grade point average and basic science

and mathematics courses. Also, letters of recommendation, GRE scores, and work experience have been given stronger consideration.

The increase in number of applicants has been great enough to permit admission committees to be more selective for quality while increasing the number of students admitted.

Approximately two-thirds of the respondents reported an increased level of optimism for graduate study in agriculture.

Acknowledgements

The author is grateful to the respondents who completed the questionnaire providing the information for this report.

Literature Cited

¹Elmer Gray. "Evaluation of criteria being used in the selection of students for graduate study in agronomy. *The Journal of the National Association of College and Teachers of Agriculture*. Vol. XVI, No. 4, pp. 99-102, 1972.

²Robert L. Jacobson. "Undergraduate averages dip for the first time in a decade." *The Chronicle of Higher Education*. Vol. XIII, No. 1, September 7, 1976.

³Gerald V. Lannholm. "The use of GRE scores and other factors in graduate school admissions." *Graduate Record Examinations Special Report*, Number 68-4, 1968.

An "Examination" Model Of Instructional Development

Richard L. Holloway

Abstract

Teaching and instructional development are systematic processes which should be examined at critical points. The examination model described outlines the critical points as (1) a preliminary evaluation to assess where you are, (2) examination of alternative design approaches, (3) examination of implementation strategies, and (4) evaluation/revision.

Instructional development is a process which many of us undertake with the clear intention of being as precise and systematic as possible. However, the models which we use to develop a unit of instruction are often too theoretical to offer operational guidelines. Procedural models are needed to facilitate this process. The following model of instructional development suggests that there are critical points of examination during the development of a course: A preliminary evaluative examination to assess where you are and where you want to go, an examination of alternative design approaches, an examination of implementation strategies, and an evaluation/revision. The term "examination" is used because we constantly examine portions of our learning units as we develop them. Hopefully, this examination approach will call closer attention to the process and content of instructional development.

Richard L. Holloway is an assistant professor in the Curriculum Improvement Office, University of Minnesota.

The "examination" model starts with an evaluative examination — an assessment of what is presently going on in your course.

Evaluative Examination

All too often, instructional development has been conducted without any guiding information other than hunches. It is difficult to get information geared to instructional improvement unless the process starts with a systematic effort to get that information. Depending on the focus of your development effort, you may wish to examine the activities of a unit, a course, a program, or an entire curriculum. Obviously, the larger the focus, the more complex the process becomes. But whatever the focus, certain kinds of information can and should be collected. For convenience, the course will be used as the unit of analysis here, since most instructors will be operating at that level.

1. **Determine "what is."** Get as complete a description of the activities of the course as possible. What information is given to students about the conduct of the course (i.e., outlines, syllabus, objectives/goal statements, etc.)? What performance is expected of students daily, weekly, or by the end of the quarter? What kinds of formal assessments are required of students? Try to be as objective as possible in collecting information, and keep a record of any data that you have collected. The result should be some representation of the structure the course has. This representation could be in many forms — the style depends on what is most useful for you. However, any description should include the following:

- a. Content outline
- b. Complete list of books, readings, suggested readings
- c. Week-by-week activity log and student requirements
- d. Student product requirements (i.e., tests, papers, or other forms of assessment).

Collecting information for your description from students may involve using questionnaires, interview protocols, or perhaps be as simple as asking students questions. You will probably want to ask students about their preparation for the course: What has been helpful for them? What strategies have they used? What do they feel has been required of them in terms of studying and outside preparation?

2. **Determine "what should be."** This is a difficult portion of the process, because "what should be" is a highly subjective question. There is a lot of room for your judgment. Try to think about ways in which you've wanted to improve your course or ways in which an "ideal" course in your subject might be taught. Once again, record the data you collect from students. Here are some ways to gather data about your course to inform "what should be":

- a. Ask students for their views about their satisfaction with the course both in general and in specific parts of the course.

- b. Assess your own strengths and weaknesses as an instructor. Are you a good lecturer? Discussion leader? Or are you better at communicating in writing, preparing outlines, reviewing materials? Try to relate each of these assessments to the course you're teaching. For instance, some courses may not require certain kinds of teaching abilities.
- c. Assess the kinds of strategies useful in teaching certain portions of the course. Where are discussions appropriate? Are lectures necessary? Are there points at which alternative media might be used?

3. **Are students learning?** Perhaps the central question of instruction is whether students are learning the information that they are given. In this phase of the evaluative examination, be concerned with the achievement that students have demonstrated in the course. Also, beyond what you have required of them, ask if students have felt their knowledge has increased. Have they been challenged? Does the course cover new ground, or is it redundant with some other course(s)?

Try to get a description of both kinds of data suggested above. Go back in your records to find previous achievement patterns. If possible, contact students who have been through your course to determine what contribution it has made to students' overall programs. Try to access the ways in which students have been asked to demonstrate their learning. For instance, if they are required to write a paper, does a paper afford the student an opportunity to demonstrate a knowledge of the subject? Another question is the use of tests: Are you reasonably sure that your tests measure what you think they do? Do they measure those subjects with some degree of precision? You may want to consult with your colleagues about the areas covered and the means of assessment in your tests to determine the validity and reliability of them. If you can go further, you may wish to compute indices of reliability. If you are confident in your means of assessment you can be more certain in your determination of whether students are learning what you had hoped they would.

Have you had to lower your expectations for class performance on a test to accommodate a lower set of test scores? Are students prepared adequately for all areas the test covers? These, and many other considerations can indicate the degree to which students are learning the material you are presenting. Try to collect these data with the idea that certain teaching strengths and weaknesses may relate to the degree to which students learn some material better than other material. Here's a review of the considerations for this phase of the analysis:

- a. Quality of tests and other assessment means (are they reliable, valid, appropriate?)
- b. Are students prepared for all areas?
- c. Are a significant number of students not achieving your expectation for average performance on a test?

Once again, keep records as complete as possible. Where possible, plot your data on some kind of visual display to aid in comprehending its meaning. Sharing your data with colleagues and asking for their comments will also help you.

Examination of Alternative Design Approaches

Now that you have an idea of "what is," "what should be" and some student achievement indicators, you will want to think about areas in which you feel course improvement is needed. It is possible, of course, that your data will reveal that everything is just fine — but we will assume that is a rarity, and you will want to proceed with the design process to improve your course.

The examination of a design for instruction is an exciting process, and will use much of the data you have collected. However, it is also a creative process since it calls on your abilities to make inferences from your results, and suggest reasons for the occurrences of certain results. It is also the point at which you can begin to think about solutions to your instructional problems and be creative about those solutions.

The beginning of the design examination phase is the point at which you are ready to establish some goals for your course based on what you now know about it. That is where this discussion will begin. A separation will be made between content goals and teaching goals. It avoids confusion, and it seems to be helpful to keep them separate when constructing the design of the course. Content goals will differ from teaching goals, since content goals are "product" goals (for example, "what should students know?") and teaching goals are "process" goals (for example, "how should students be taught?").

1. **Content goals:** You now have an idea of what you have been doing and how your students have reacted to what you have done. Within the content area itself, consider the reactions from you, students, and colleagues. Try to establish first a general goal statement. What do you want your students to come away with at the end of the course? Try to be as broad as possible. At this point, incorporate your ideas about an "ideal" course. Are these "ideals" consistent with what your students and colleagues have told you? Next, divide the content into subunits. Are there areas where certain kinds of knowledge are dependent upon other previously learned material? The end result of your thinking should be some sort of content description — either an outline, flow-chart, graph — whatever you are most comfortable with. Some people have found it helpful to put content subunits on cards and spread them out on a table and try to visualize the ways in which these content areas interrelate to one another. Then ask, "what are the best ways to group the content?" Should students be given a broad overview and then have details emerge? Or should the content be grouped chronologically? Remember to make use of all the relevant data you collected earlier — content areas in tests, the descriptive information, opinions

of colleagues. It might be helpful at this point again to get colleagues' reactions to your content approach.

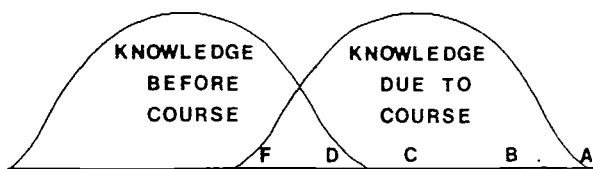
2. **Content Objectives:** Many books and papers have been written about instructional objectives. There is also much argument about how specific they should be. Some claim they should explicitly state the audience, behavior, conditions, and degree to which the behavior will be achieved. Others feel that this approach is unduly restrictive. It is probably wise to read at least one book on the topic — Robert F. Mager's **Preparing Instructional Objectives** (Fearon Publishers, 1962). The book will not take more than an evening to read, and after you have read it, you can determine whether you want to use behaviorally stated objectives, and for what areas. There may be some areas where they are quite appropriate, others where they are not.

3. **Teaching Goals:** Given that you now have a complete content outline arranged both by concepts and chronology, you will want to examine your goals for teaching. Implicit in this examination of goals is the adoption of some central approach toward your instruction. There are probably a multitude of approaches that can be described, and each approach revolves around some central set of principles. But for the purpose of simplicity, let us consider two major contrasting approaches, based on distinctions in the concept of student achievement. These two broad approaches are the "mastery" approach and the "normative" approach. The central differences in these approaches are in the concept of the learner and the role of the instruction:

a. **Normative Approach:** The normative approach is the broad class of teaching philosophies which have existed for many years. It is the approach with which you are probably most familiar. Some of the assumptions underlying the normative approach are that the learner must seek information in a given period of time. Therefore, the normative approach assesses achievement on the basis of a student's comparative performance with other students. Norms are established for the entire class, and those above average at the end of the course are given higher grades than those who are below average. In a normative system, there are always those who will pass and those who will fail no matter what the absolute level of performance is. Figure 1 depicts the process of "raising knowledge" in a normative system.

In effect, the normative system raises the average knowledge level without changing the distribution of knowledge. Since the average is dependent upon the particular class, what is a high performance student one year may be relatively lower when compared to the performance of a class for the following year.

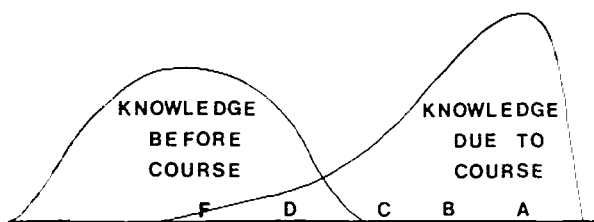
Figure 1. The Normative Approach



This system seems to be most appropriate in courses where an absolute standard of achievement is not necessary, and where competition among students is appropriate.

- b. **Mastery Approach:** The mastery approach differs greatly from the normative approach. In the mastery approach, it is assumed that most students, given enough time, can achieve performance levels of mastery — or the equivalent of an “A” grade. The main difference from the normative approach is that the mastery approach sets a level of content mastery, and gives students as much time as they need to achieve that mastery. It has been said that certain kinds of tasks — among them are brain surgery and parachute-packing — require complete mastery for adequate performance. Other kinds of content also lend themselves to the mastery approach. Figure 2 describes in graph form the effect of the approach. Notice the difference between Figure 2 and Figure 1.

Figure 2. The Mastery Approach



The main difference between Figure 1 and Figure 2 is that in Figure 1, achievement is increased, but the distribution remains the same. In Figure 2, achievement increases and the distribution is “squeezed” toward the mastery level. In other words, more students achieve “mastery” than in the normative approach.

Both approaches outlined above have their limitations and strengths. There are no strict guidelines where to use each approach, and neither is necessarily exclusive of the other. Courses can be designed to incorporate some mastery strategies and some normative strategies. A wide variety of strategies can be used in either normative or

mastery concepts. This cursory explanation is intended as a basic introduction to the two concepts. Examine **Mastery Learning: Theory and Practice** edited by J.H. Block (Holt, Rinehart, and Winston, 1971) before attempting to implement a mastery strategy.

Examination of Implementation Strategies

Many strategies have been tried by many practitioners, and each seems to have its own success story associated with it. Your use of one of the existing strategies, or the design of your own may depend on your preference for one strategy over another. To give you an idea of the variety of strategies available, here are some which have been tried, and some sources you may want to consult.

1. **Personalized System of Instruction.** This system uses the psychological principles of reinforcement and personal contact to manage the instructional environment. There are numerous examples of the system, but the premier work is by Fred S. Keller, “Goodbye, teacher. . .” *Journal of Applied Behavior Analysis*, 1968, 1, 79-89. This system is also known as the “Keller Plan.” Dr. Keller summarized a large number of applications of his system and offers definitional guidelines in “Ten years of personalized instruction,” *Teaching of Psychology*, 1974, 1, 4-9.

The Keller Plan usually involves dividing a course into small units of instruction, testing students at the end of each unit, and permitting students to advance only when a unit has been mastered. Keller used student proctors for the tests, which can be taken until mastery is achieved. However, other applications of the Keller Plan have been successful without the use of proctors. Keller used his lectures as a reinforcer. Students were not allowed to attend these lecture/demonstration sessions until they had passed a prerequisite number of tests.

Get help if you plan to try a Personalized System of Instruction. Setting one up is a fairly complex procedure and having help would make it easier. The main “selling feature of this course design is its record of high student achievement and high degrees of satisfaction in courses where a lot of factual knowledge is required.

2. **Contingency Contracting.** Remember when Grandma used to say, “If you do not finish your dinner, there will be no dessert!”? This is the basic principle of Contingency Contracting. The system, in its most elemental form, is a process of identifying and using classroom behaviors which students find reinforcing. For instance, some instructors will use a demonstration, film, or other “fun” event as a reward for students who have completed a given amount of work. A detailed examination of the concept and its use is in **How to Use Contingency Contracting in the Classroom** by Lloyd Homme (Research Press Company, 1970).

3. **Audio-Tutorial Instruction.** Samuel N. Postlewaite, Professor of Biology, devised an instructional

method which allows students to learn whenever they wish using mediated instruction such as audio tapes and slides. This approach has been used in biology instruction primarily, and is discussed in S.N. Postlewaite, J.D. Novak, and H. Murray, *An Integrated Experience Approach to Learning with Emphasis on Independent Study* (Minneapolis: Burgess Publishing Company, 1964). Many of the principles suggested in the above approaches can be modified to fit your particular situation.

Evaluation/Revision

We have ended where we started. The next step is to evaluate the impact of the new strategy in terms of stu-

dent learning, student attitude, demands on your time, costs, and a range of variables which may reflect the degree to which your development effort has succeeded. These are the variables discussed in the first section. The aim of this activity is to suggest further ways in which instruction can be improved. In fact, this process should continue indefinitely! As evaluation points up new areas of revision, make those revisions and assess their effectiveness. As you assess the effectiveness of the revisions, more areas of improvement will be suggested. This process reflects the fact that teaching and instructional development are systematic processes which can be examined at critical points.

Issues in Formulating Course Grading Policies

David A. Frisbie

Abstract

Assigning course grades to students is a component of the instructional process which must be defensible to both students and colleagues. This paper identifies issues significant in grading and explores the rationale for accepting or rejecting each.

Evaluating student performance is a necessary component of the instructional process, and grading student performance is one widely-used method of providing students with feedback about their progress. If this feedback system is to operate successfully, students must know which aspects of their performance will be evaluated and what standards will be used to make the judgments. This important information must be communicated to students at the outset of the course. With these basic premises in mind, what should a faculty member consider in building a personal philosophical basis for grading and arriving at a sound methodological framework for translating that philosophy into action?

The issues which contribute to making the grading of student achievement a controversial topic are primarily philosophical in nature. There are no empirical studies that can answer questions like: What should an "A" grade mean? What percent of the students in my class should receive a "C"? Should spelling and grammar be judged in assigning a grade to a paper? What should a course grade represent? These "should" questions require value judgments rather than an interpretation of empirical data; the answer to each will vary from instructor to instructor. But each instructor must ask these questions and find acceptable answers to them in establishing his/her own grading philosophy. It is not sufficient to have a method of assigning grades; the method used must be defensible to the user in terms of her/his philosophical foundations.

Dr. Frisbie is supervisor of Placement and Proficiency Testing, Measurement and Research Division, Office of Instructional Resources, University of Illinois at Urbana-Champaign.

This paper identifies many of the significant issues in grading and explores the rationale for accepting or rejecting the pros and cons of each. Through this process an instructor might arrive at a systematic and cohesive set of values which could provide the foundation for using particular procedures in assigning course grades to students.

An instructor's philosophy is influenced by many factors; as these factors change there may be a corresponding change in philosophy. The type of instructional strategy used in teaching dictates, to some extent, the type of grading procedures to use. For example, a mastery learning approach to teaching is incongruent with a grading approach which is based on competition for an arbitrarily set number of "A" or "B" grades. Grading policies of the department, college, or campus may limit the procedures which can be used and force a basic grading philosophy on each instructor in that administrative unit. The recent response to grade inflation has caused some faculty, individually and collectively, to alter their philosophies and procedures. Pressure from colleagues to give lower or higher grades often causes some faculty members to operate in conflict with their own philosophies. Student grade expectations and the need for positive student evaluations of instruction probably both contribute to the shaping or altering of the grading philosophies of some faculty. The dissonance created by institutional restraints probably contributes to the wide-spread feeling that end-of-course grading is one of the most dreaded tasks facing a college instructor.

What Meaning Should a Course Grade Carry?

The meaning that a given grade represents seems to vary substantially between instructors within the same department, college, or institution. This variability tends to deflate the value of course grades as an index of quality of performance; the interpretation of a course grade or comparisons between grades is ambiguous. What does it