

THE CHANGING ROLE OF THE EDUCATOR: A BEHAVIORAL LEARNING SYSTEMS APPROACH TO INSTRUCTION*

By Don Stewart
Director, SLATE Services

Introduction

It would seem that college teachers should be particularly concerned today about the changing role of the educator. In this modern world with all the advances in technology, all the problems concerned with social change and the tremendous increase in numbers of students – deans and faculty members are beginning to ask, "What are we going to do with all the students coming to us when we don't have the graduate assistants and faculty to work with them?" In fact, many chief educational administrators have already started restricting the number of freshmen allowed to start in their colleges and universities because of a lack of personnel and classroom space.

It would be a shame to have a young person's entry into productive life delayed just because we can't change some of our customs. It is time for us to consider new patterns that face up to the needs of people and cease trying to avoid them by saying essentially, "Tradition will not let me change in order to help the people who are coming to me."

Potential Teacher Roles In The Teaching-Learning Situation

There are four roles in the teaching-learning situation that the teacher could perform.

1. The first role is one that most teachers perform to varying degrees of effectiveness. That role is the presenting of course content to students.

2. A second role which is not practiced by many teachers in the classroom is that of solving learning problems. For example, if you have students whom you're giving "C's", "D's", and "F's", this represents the existence of learning problems. Many teachers typically say, "some students can make it and some students can't make it." This is the way educators look at it now because it is considered the norm of education. Most of these other students could also have made it if teachers were willing to solve their learning problems. As a more specific example of a learning problem, if any teacher has a given unit in his course in which even the "A" and "B" students are getting "C's" and "D's", this represents an easily identifiable learning problem. If your students make comments along the line of "I don't know what the author of this textbook is trying to say," "I don't understand your lecture," "What's the point of this whole course?", or something of that nature, these comments represent potential learning problems. If you yourself have made comments about your students along the line of, "The students are sure dumb this year," or "I don't know what's the matter with them; they just don't see the need for this subject," these are learning problems that can be solved if you want to tackle them.

3. Once you have solved enough learning problems, you can perform the third role of the teacher. This is essentially a diagnostic and prescriptive role, in which the prescription usually involves some form of technology. Typically, when the word technology is mentioned, most people only think of machines or hardware. You can also include books as a form of technology. It is not uncommon to hear administrators or audio-visual specialists remark that many of the faculty at their school resist the use of technology in their teaching. Well, there are tens of thousands of teachers who are resisting BOOKS. Let me describe the behavior of a teacher who is resisting the use of books so that you can identify whether or not you or one or more of your colleagues fit into this category. When you or any other teacher prepares a lecture that is essentially available in the textbook, or if you even go so far as almost reading to the students what is in the textbook, you are resisting the textbook. You are resisting the possibility that maybe the book could teach. Look back over your own life as a student. Did you ever have a teacher who lectured to you on what was available in the textbook? If yes, I'll bet that you either read the book

and didn't listen to the teacher, or you listened to the teacher and didn't read the book! The obvious reason for your behavior is that it seems wasteful of energy to go through the same thing twice. If the material is in the textbook, why not use the book? Why not let the students learn from it, and then after you give them a test, find out what they didn't learn from the book and you teach that. Why take time – your valuable time – to present what's already available in a textbook?

4. The fourth role of the teacher is to update and evaluate the curriculum, particularly during the past few years when students and faculty are becoming more and more aware of the "relevance" of required learning.

As long as you don't solve the learners' learning problems most curriculum changes are essentially wasted effort. After a faculty group has spent weeks and months developing a new curriculum, it is not unusual to go into a classroom and find that a teacher is doing the same thing that he was doing before the curriculum was ever changed. The changes were not based on the learners' needs and problems. The changes are typically based on a lot of subjective, semantic decisions that make an excellent volume which goes on the shelf some place, and that is where it stays. If curriculum changes are based on identified learning problems and needs of students, these changes are meaningful and can measurably increase student learning and the performance of your graduates out in the real world.

Teacher Problems In Teaching-Learning Situations

What are the teacher's greatest problems in trying to perform these roles in the teaching-learning situation? The most critical problem is that few teachers have ever really spelled out in detail exactly what students are supposed to be learning in their courses. Although many teachers have written out general course objectives, they have not made these objectives specific and measurable. A second problem is that most faculty don't recognize a learning problem when they see one. The "modus operandi" of education ignores individual differences among students and assumes differences in achievement to be normal. It is not normal! If a teacher is willing to solve learning problems and TEACH (defined as helping students learn), ninety percent or more of all students could be achieving at the A or B level. This ignoring of individual differences among students and their learning problems by faculty will begin to diminish as soon as students and their parents recognize that the practice constitutes various forms of educational malpractice.* Under this concept, educators and schools will be forced by law if not by their own conscience and/or regulations, to eliminate those traditional educational malpractices which are actually interfering with student learning.

A third problem for teachers is that there are not sufficient instructional modules that can be prescribed for various learning problems, nor are there diagnostic instruments which will identify a student's learning problems. Let me give you an example of what I am referring to when I talk about instructional modules. Would you object to the statement that entering college freshmen students represent reading levels all the way from about eighth grade up? You know it. I know it, and every other faculty member in colleges and universities knows it. Now, did you ever identify the reading level of the freshman textbooks that are used? There is hardly a freshman college textbook that is written at the learners' level. They are typically written at the professorial level: and if some professor happens to write at the tenth grade level, that's a

* This article is a brief summary of a book by the same title which will be published by SLATE Services during the summer of 1971. Readers who are interested in being notified when the book is published should write to SLATE Services, P. O. Box 456, Westminster, California 92683.

* This is in reference to another book by Don Stewart, Educational Malpractices: The Big Gamble In Our Schools which is available from SLATE Services, P. O. Box 456, Westminster, California 92683.

bonus for the learners, but he's not going to sell very many textbooks. College and university faculty write for their colleagues, not for their students. If in black and white on the learner's transcript it states that the student reads at the tenth grade level and yet the student is supposed to learn from some of the calculus and biology books that are being used in most schools in the freshman year, the faculty is giving him professorial level materials and ignoring individual student differences. In this type of situation, it shouldn't be surprising when it is discovered that the student can't comprehend the material in the book. Rather than fail him (now the traditional practice – which makes the teacher subject to a malpractice suit), the teacher should try to find a book that's written at a lower level. In this case, the alternate book would be used as an instructional module. Thereafter (assuming that the alternate book solved the problem and the student learned the desired concepts), whenever the teacher identifies other students who have a similar problem, the same alternate book could be prescribed.

The third problem for teachers in trying to perform the second and/or third roles is the common excuse, "I don't have enough time." One of the interesting things I have found is that if I am working with teachers only, the excuse for not doing something generally brings out comments such as, "If we could only get our administrators to let us make changes. They're the ones who should be here listening to this kind of thing; maybe then we could do something." If I am talking to department heads, deans, or presidents, they generally say, "If only we could get teachers who want to do something." And then if I get the two groups together, they either say, "I don't have enough time," or "If we only had some money." Let me give you two suggestions with reference to the excuse, "I don't have enough time." First of all, most (not all) of the time that is presently being spent by the teacher in front of the class presenting course content is wasted time. Let those students who can learn from the textbooks, learn it on their own, either in or out of class. Whatever is not available in textbook or printed form can be put on audio or video tape. Anything that is important enough for a teacher to take up class time to present should also be important enough to let students study. It is very difficult for every student in a class lecture situation to learn everything which is considered important by the teacher under the condition of a "one-shot" presentation. In order for learning to take place, many students need extra time to listen to a presentation several times or they need to be able to stop the presentation and ask questions, discuss concepts with other students, or to look up the definitions for some of the terms used by the teacher. Teachers do not have "rewind or pause buttons" and unlimited patience – recorders do!

A second suggestion concerns the time faculty spend "preparing to teach." At all levels of education, teachers claim they need more time for preparation. Yes, under the concept of the teacher's role as a presenter of course content, it is presumable that each teacher would want to make his or her presentations at least a little bit different from any other teacher's presentations (regardless of whether or not students are learning). If our major concern is "students learning" and not "teachers presenting," then for teachers all over the country to be reinventing the curriculum "wheel" for each course as if no other teacher had ever taught it before is not only asinine but wasteful of the teacher's time. Most of the courses taught at any one school of agriculture are also taught at almost every other school of agriculture. But instead of a spirit of cooperation in which a new teacher would get lists of course objectives, tapes, slides, etc. from his colleagues who are teaching the same course at the same school or other schools, the impression given to most new teachers is "invent your course yourself – each of us did!" Most of the time spent by teachers in preparing to teach is wasted time and gives evidence of the lack of cooperation among faculty. This time spent in preparation would reap much greater benefits for teachers and learners if it were spent in solving learning

problems and helping students learn more. It is obvious to anyone who cares to look, that when a teacher gives out "C's", "D's", and "F's," that there are students who aren't learning what the teacher thinks is important. These students can be helped.

Students' Problems In The Teaching-Learning Situation

What is the students' greatest problem in the teaching-learning situation? The students' biggest problem is to find out what they are supposed to learn. I would guess that each of us at some time, or probably many times in our student learning careers, have had the occasion to say to ourselves, "If that teacher would only tell me what I am supposed to learn, I would learn it." Or it might have taken the form of raising your hand and saying, "What are we supposed to study for the test next week?" The usual answer to this question should be very familiar to you because most of you now give this answer to your students. It is usually "Everything we have had so far," or "the book," or some other vague, ambiguous statement. After all, if teachers were honest and really told students what they were specifically supposed to study for a test, all the students might learn it; and then the teachers might have to give all of their students "A's" and "B's." Such success in higher education is considered a disaster; and every year, some teachers in higher education are fired because too many students in their classes were successful and learned "A" or "B" worth of their courses. Consider for a moment the hospital administrator who calls in all of the doctors and says, "Too many patients are getting well. You'll have to kill a few more and let more patients leave the hospital 65 percent well ("D" worth) or 75 percent well ("C" worth), instead of trying to get them 100 percent well!!!!" or how about the 4-H leader who says, "too many of the 4-H boys and girls are being successful in their projects. I'm going to stop giving them hints and guidelines for success so that more of them will be doing "C", "D", or "F" projects!!!!"

In most of our colleges and universities, if a student is caught with a copy of the examination about two weeks or so before it is given, even if it doesn't have the answers on it, what would happen to him? Obviously, he would be kicked out of school or punished in some way. We do this all around the country. All the student wanted was to know what he or she was supposed to study and learn. Why is it that educators get so upset when students find out what they are supposed to learn? Don't we want them to learn? If we are really concerned about learning and we want students to learn, why not tell them what they are supposed to learn? In fact, hundreds of teachers who have attended my seminars start out their courses with the final examination. They say to their students, "This is what you are supposed to know. If you can come in and answer this all correctly in a month or two months, great – the sooner you learn it, the sooner you are through with the course." Let your students know what they're supposed to learn, and guess what? They'll learn it. There is nothing wrong with successful learning and teaching. On the other hand, if you want to fail half of your class, you had better not be honest with your students, because they're liable to learn your course. In this business of teaching and learning, there is no reason to hide from the learners what they are supposed to know.

Problems With Technology In The Teaching-Learning Situation

What are the greatest problems with technology in the teaching-learning situation? To me, it is primarily that most educators believe that the technology exists all by itself. When educators say to me, "I have tried overhead projectors and they just don't work," "I have tried motion picture films and they are not successful," "I have tried programmed instruction and it's no good," or "I have tried slides and they're no good," what these educators are really saying to me is, "I've tried overhead projectors and the transparencies I used were lousy," "I tried motion picture films, but I made poor selections," or "I tried slides and the slides I used weren't very good."

The hardware is not the thing that's going to teach. The overhead projector could sit until it rusts of old age, and there will never be a potential for learning until somebody puts something on it that is called software (transparency) and this something takes on the presenting function of the teacher. If learning doesn't take place, it is not the fault of the overhead projector. It is the fault of the teacher who made and is using the software (transparencies) on the overhead projector.

If you say, "I used programmed instruction, and the programs I selected were no good," then you must solve some learning problems and make it good. If you say, "I used overhead projectors, and the transparencies I used were not very good," then you must find out why they weren't good, solve the learning problems and make them good. It's up to us as teachers to make this software effective. Of course, if you don't know specifically what you are trying to teach anyway, then you are going to have a lot of trouble making any software effective.

The second problem with technology is one which I refer to as the misuse of technology. It is not unusual at all to find courses in which many visuals and three dimensional objects are used in the teaching-learning situation, and yet the tests consist mainly of verbal items. If all a teacher wanted was verbal learning, the use of visuals, etc. may mislead the learner. If on the other hand, a teacher really wanted the student to learn some objectives involving visuals and three dimensional objects, then the students should be tested accordingly. If you want to teach with visuals, etc. then test with them also. For example, in a course in plant pathology, a teacher may do a great job in presenting the course content by use of a series of good slides; and then in the test, the student will be asked to define some word or respond to a verbal multiple-choice question. This isn't what the teacher really wants the students to learn. What most teachers really want is to show a slide or the real thing and ask the student, "What is the plant?, What is the condition of the plant?, How do you know?, Prove it."

This may sound quite obvious, but our schools are filled with lab courses in which at the end of the semester the students are given a paper and pencil test. As we all know, students who perform well on a paper and pencil test are not necessarily the students who can perform well on a laboratory test and vice-versa.

Potential Sources of Learning Problems

If you are going to use audio, visual, and verbal learning experiences in your courses, do not assume that your students are all professionals such as yourself. As naive learners, (particularly in basic courses), it is very possible that many of the learners will have to be taught how to "hear," "see," "read," and "speak" like the professional before they can learn many of your course objectives. For example, in every subject matter area, there is a unique terminology for that area. Hopefully, you have at least provided your students with a glossary of terms. But, remember a written glossary of terms only specifically helps learners to read and write; it does not necessarily help them to speak or listen to you. It is important for the students to hear how the teacher pronounces the words in the glossary. Therefore, a language laboratory type situation should be set up such that students can have an opportunity not only to learn the reading, writing, and meaning for a given glossary of terms, but they should also have an opportunity to learn how to "hear" the words and to practice "speaking" the words. This is particularly important, because many faculty subjectively evaluate a student on the basis of "Does the student use the terminology of the subject matter in his speaking?" If this is one of your measures of whether or not a student is learning the content of your course, then give them an opportunity to learn to speak the terminology. I don't know of a student who would willingly come up to a professor and talk to him using the terminology of the course unless the student was sure he knew how to pronounce the words correctly.

The Learning Systems Approach To The Instructional Process

There are two stages in the learning systems approach, the analysis stage and the synthesis stage. In this paper, I will only deal with a brief summary of the behavioral analysis stage.

There are seven steps in the behavioral analysis. To introduce the first step, I would like to refer to a story that many of you read as a young person, "Alice in Wonderland." Remember when Alice came to the crossroads, she asked the Cheshire cat, "Which road should I take?" and the Cheshire cat said, "Where are you going?" She said, "I don't know." He said, "Well, any road will get you there."

This situation is similar to a common one found in education. As long as teachers don't know where they are going in a course, whatever they are doing in the classroom is great. Once teachers start to specify exactly what it is that they want their students to learn, then there are certain pathways and experiences that may have to be achieved in order for the students to accomplish the goals (objectives) of the courses.

For each terminal behavior of a course that you decide to specify for the students to learn, there are three questions which you should ask yourself.

1. "Why do I want the learner to learn this?" If you catch yourself saying, "I don't know; I learned it," or "It's in the textbook," or "It's traditional," I would question the inclusion of that objective. Educators throughout our country are great at adding things to their courses, but are rather reluctant to ever drop anything.

2. "Once the student learns this objective, what's he supposed to do with it?" Here again, if you catch yourself saying, "I don't know; I never did anything with it," then I'd question whether you should include it. If, for example, we're going to teach the students in a course in horticulture about roses, the students who will use this information in landscape design may want to learn slightly different things about roses than the students who are planning to go into the nursery business. A student who is planning to work for some agri-chemical firm may need to learn some other things about roses. Of course all three of these students will need to know many things in common. This particular question is very important in the area of relevance. When students claim that certain parts of a course are irrelevant, too many faculty think they have to change their objectives. Generally this is not the case. From the point of view of the naive learner, something that appears irrelevant can be made relevant by just changing the wording of the objectives and test items to reflect "how the concept will be used once the student has learned it." So what you want the learner to do with a particular behavior once he has learned it must affect the way you teach it and the way you test for the achievement of it.

3. "Once the learners have this behavior, how long are they supposed to keep it?" There is a very important connection between the answer to the second question and the answer to this third question. It should almost be obvious that if a student isn't going to use a particular behavior very much if at all, the student will tend to forget it. If the student is going to use the behavior a lot, then the student will remember it. If in answer to this third question, you realize that although the behavior is very important, the student won't use it for several years, then it becomes much more important to teach the student how to identify the need for the behavior and how to relearn it or retrieve it than to teach the actual behavior.

Once you have specified the terminal objectives of your course, the second step is to make up a posttest to measure whether or not the students have achieved the terminal objectives. If the objectives are really specific, appropriate test items can be made by a slight change of the wording of the objective. If, for example, an objective is worded "The student will be able to do . . .," then the test item is simply "to do . . . (whatever it was the objective specified)." Have you ever tried to specify objectives? For most people, it is a difficult task, and very time consuming. As a hint on how to develop objectives much faster, just as you can go from the terminal objective to a test item by dropping the "be able to," you can go backwards. If you are giving any kind of tests at the present time, each test item can be made into a behavioral objective just by putting the "to be able to" in front of it.

The examples below demonstrate the slight change of wording that changes specific learning objectives into test items.

<p>Specific Learning Objectives To be able to list and discuss the sequence of events followed in the scientific methods for evaluating health concepts.</p> <p>To be able to identify the following statements as being statements of fact or hypotheses: etc.</p> <p>To be able to list the interrelationships among the ideas in each of the following passages: etc.</p>	<p>Test Items List and discuss the sequence of events followed in the scientific methods for evaluating health concepts.</p> <p>Identify the following statements as being statements of fact or hypotheses: etc.</p> <p>List the interrelationships among the ideas in each of the following passages: etc.</p>
---	---

The examples below demonstrate the slight change in wording that changes test items into specific learning objectives.

<p>Test Items (True-False) The server in volleyball may stand anyplace behind the back line while serving.</p> <p>(Multiple choice) A major uprising of slaves in 1831 was led by (1) Uncle Tom, (2) Abraham Lincoln, (3) Nat Turner, (4) Booker T. Washington.</p>	<p>Specific Learning Objectives The learner will be able to identify whether or not the following statement is true or false - "The server in volleyball may stand anyplace behind the back line while serving."</p> <p>Given the following stem of a statement, "A major uprising of slaves in 1831 was led by, "the learner will be able to identify the correct completion of that statement from among the following four choices: (1) Uncle Tom, (2) Abraham Lincoln, (3) Nat Turner, (4) Booker T. Washington.</p>
--	---

This doesn't mean you're going to like what you see, because too often teachers make up test items from the point of view of "I want to test the student," (for the sake of a test) not from the point of view of "I'm testing what I want the student to learn as a result of going through my course." If you don't like an objective which is made from a test item, it means that the test item isn't any good either. Remember, students learn what is on your tests. They do not learn your beautiful objectives unless the objectives are reflected in your test items. If a teacher has "lousy" test items, then students in that teacher's course are learning "lousy" things!

The third step concerns the identification of where the students are intellectually compared to the terminal behaviors of the course. How many of you, at the beginning of a semester start on page one of your textbook, regardless of where the learners are? How can you expect to take them any place intellectually unless you find out where they are? What if they're only halfway through the last course (a "D" grade)? You may have a brilliant course this semester, but if your students are not ready for it, it won't succeed. It is critical to find out what the various entry levels of your students are; and as you specify each of these entry behaviors, by a slight change of wording you can develop what is called a preentry test which can be used to measure whether or not students are really ready for your course. A practical example of a preentry test is a composite of the final examinations of prerequisite courses - leaving out all of the items which are not relevant to your course.

The difference between where the students are at the beginning of the course and where you want them to be at the end of your course is the change in behavior or content of your course. Here again, every learning objective that is necessary to take the student from the entry level to the terminal level can, by a slight change of wording, be developed into what I call a pretest item. A practical example of pretest items are the unit tests that are given during a course.

The most important step in a behavioral analysis is to try out the three tests (posttest, pretest, and preentry test) on

samples of students. The data resulting from this trying out of the tests is very useful in designing an effective and efficient course.*

Why Specify Objectives

Under the increasing emphasis of teacher and student "accountability," it is becoming more and more important that course objectives be made as specific as possible. There are eight reasons for specifying objectives. First of all, it is necessary to identify the nature of the behavior of an objective. The verb in the objective describes the nature of the behavior. The verb also describes how the objective should be taught and how it should be tested, i.e., if the objective states that a student should identify something, then in the teaching and testing situation the student should be involved in the behavior of identifying.

A second reason for specifying objectives is that behaviors to be modified are identified. Where this becomes important is that as a subject matter specialist in your field, you may be able to look at a certain category of shrubs, and you can identify 15 different species. The learner who comes to you is lucky if he can even recognize the category.

As learners come to you, they do not perceive things from the same point of view that the specialists do. Your job is to modify their behavior so that they can now start to perceive a wide number of species and they see them as separate and different. Another view of the modification of a learner's existing behavior concerns the identification of similarities between things the student sees as completely different.

Third, if you specify your objectives, you can measure student achievement. If you cannot specify what it is you are teaching, you cannot measure for the achievement of what you are teaching. Because most teachers at all levels of education have not specified what it is that students should be learning in their courses, it has become common to measure learning in terms of time. In education, we talk about semesters, quarters, two years of English, three years of mathematics, etc. Rarely will an educator be willing to specify exactly what it is all students will know who have completed a particular course. As long as teachers give letter grades which are sooner or later translated into numbers (grade points), then teachers had better be able to spell out what it is that students are or are not learning, or they will be subject to an educational malpractice suit. For faculty to continue to base letter grades on subjective opinions and evaluations while at the same time they know that this subjective data is going to be transformed into interval data (grade points), violates the most basic concept in research.

The fourth reason for specifying objectives concerns the concept of communication. The greater the degree of specificity of the objectives, the easier it is to communicate the objectives to the learner so that the learner knows what he is supposed to learn. If the teacher does not know specifically what he wants the learner to learn, it is difficult, if not impossible, to communicate to the learner what he is supposed to learn. The most common result of courses which are taught in the traditional manner and in which objectives have not been specified is that the learners only learn some kind of a "curve's worth" of what they are supposed to learn. This is because of the guessing game in which the teachers are guessing by their test items as to what it is they are teaching and want to test, and the students are trying to guess in their studying what it is the teachers are going to test. If the students' and teachers' guesses coincide, the students may answer everything correctly and get "A's. If they do not coincide, the student fails the course. The other grades ("B's," "C's," and "D's") achieved by the other students indicate the degree of overlapping of the

* The detail of the analysis and interpretation of the data is omitted here because of space. It is available in the book to be published this summer, *The Changing Role of the Educator: A Behavioral Learning Systems Approach to Instruction*.

student's guess and the teacher's guess, and does not necessarily indicate whether or not the students learned anything. The most common result of curriculum projects in which objectives are specified is that the learners learn what they are supposed to learn.

Actually, almost all learning problems can be traced to problems in communication. Sometimes, the teacher doesn't really know what he wants to communicate. Sometimes, the teachers know exactly what they want, but they don't or can't communicate to the students such that the students know what the teachers want. Sometimes, the teachers know what they want and are capable of communicating to the students, but the tests they use communicate different objectives than the teachers were teaching.

The fifth reason for specifying objectives is that the more specific and measurable the objectives, the easier it is to plan or design a learning situation that will be successful in taking the students from where they are intellectually through to the goals of the course. Knowing exactly what objectives the students should be learning, makes it relatively easy to identify a learning problem (the student or students are not learning one or more of the objectives). It also is much easier to develop alternate paths to learning when a student runs into trouble in learning a specific objective in a designed sequence.

The sixth reason for specifying objectives concerns the evaluation of the instructional process. As long as teachers (at all levels of education) can avoid specifying what it is that students should be learning, then no one (including the teacher) can really evaluate whether or not the students are learning and consequently, no one can evaluate whether or not the teachers can teach. Once objectives for courses are specified, then not only is it possible to evaluate whether or not students are learning, but it also becomes very easy to evaluate whether or not teachers can teach. Obviously, teachers who are not sure that they have the ability to help students learn are going to have a tendency to resist the whole concept of specifying objectives, teaching with objectives, and evaluating the achievement of objectives. In other words, teachers who are not sure whether or not they can teach (as measured by students learning) are not going to want to be held "accountable" for the learning that does or does not take place in their courses.

Note: Remember, very few teachers in higher education have been taught "how to teach by design," because all that is necessary to teach in higher education is to have advanced degrees (masters or a doctorate) in the general subject area the teacher is supposed to teach. It is not considered important in higher education that the teachers know anything about how to teach or about how to test for the achievement of what they are trying to teach.

The seventh reason for at least trying to specify objectives is that as teachers increase the specificity of their course objectives, they decrease the randomness of what is learned. Although many course objectives can be directly defined in such a way that the objective when stated in behavioral terms and the test item are almost identical, there are also many objectives at the present time which are not directly definable, and as such, usually remain undefined. These objectives are usually the ones that are stated in terms of appreciation, understanding, familiarity, value judgments, etc. These undefined objectives can be indirectly defined if the teacher is capable of identifying how the students behave that seem to have this "appreciation," "understanding," "familiarity," etc., and are also able to identify how students behave that do not have the "appreciation," "understanding," "familiarity," etc. Whenever the teacher is able to identify as observable and measurable the behavioral differences between the students who have this previously undefinable behavior and other students who do not have it, then it is possible that these behavioral differences constitute an indirect or even possibly a direct measurement of the undefined objective. In some cases, the specification of an objective is a matter of degree of specification. For example, if an instructional objective is as vague as the statement, "I'll meet you in New York," then the chances for the student learning the objectives are just about

as small as the chances of any two people to meet in New York City. But, by increasing the specificity, you start to increase the possibility of meeting someone, i.e., by naming a general location, then a street, then a building, then a room, and finally the time. Although a teacher may not be able, at the present moment, to define an objective so precisely that by a slight change of wording the objective can be made into a measurable test item, at least as the teacher increases the degree of specificity, the possibility of students learning whatever it is the teacher wants is also increased. It should be pointed out, however, that objectives in the teaching-learning situation which are not directly or indirectly definable and still depend on various degrees of chance for learning to take place, should not be included among the objectives for which the student is going to be evaluated on for achievement. I challenge any teacher's right to fail or downgrade a student for not learning "something" when the teacher does not know what that "something" is that the student did not learn (undefined objectives).

The eighth reason for specifying objectives is that the practice of specifying objectives develops common expectations. Not only is it important for the teacher who is developing the instructional materials to specify the instructional objectives, it is also important that the learner be made aware of these objectives, thus establishing common expectations of the learner's performance held by the instructor, the learner, or any other instructor or learner. Specification of objectives should also reduce the variability from classroom to classroom introduced by having different instructors who may interpret the general objectives differently. One of our biggest problems today in education is that when the same course is taught by two or more teachers, the content of the course varies almost as much as the teachers themselves vary. Yet, as the students go on to subsequent courses which depend on the learning which was supposed to have taken place in prerequisite courses, the students are ultimately punished because of the previous teachers' lack of common expectations with other teachers who are teaching this same prerequisite course with reference to the minimum content of the course which should have been learned by the students.

Learning Variables

In identifying learning problems and trying to maximize learning for every student, it is critical that teachers become aware of five major learning variables which contribute to individual student differences.

The fact that students **Learn at Different Rates** is probably accepted by most teachers because of the evidence resulting from programmed instruction research. The problem is that while most teachers agree that students learn at different rates, their teaching behaviors in the classrooms denies this fact and appears to be based on the guidelines that either all students should learn at the same rate or if the students do not learn at the same rate it is the students' fault and of no concern to the teacher.

The **Amount to be Learned** varies from student to student. The only way the amount to be learned can be identified is through the use of preentry tests and pretests (see the Figure below).

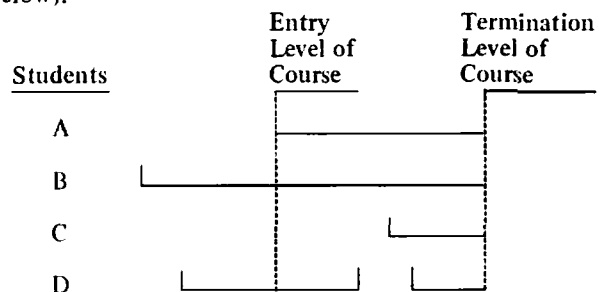


Figure – Amount to be Learned

For example, student "A" has the right entry behaviors for the course and doesn't know any part of the course. Student "B" needs some remedial work before he can start the course. Whether or not student "B" takes his remedial work prior to the course or concurrently with the course depends upon the subject matter, the student, and the dependency of the course on the student's knowledge of prerequisite material. Student "C" knows most of the course and in most instances would probably be wasting his time and the teacher's time if he were to go back through the material in the course he already knows. Student "D" is more likely to be typical of most of the students today. He needs a certain amount of remedial study and in addition, he already knows a considerable part of the course. Some kind of branching is indicated in dealing with students like "C" and "D."

The learning variable concerning the **Mode of Learning** is very important. As teachers, we make certain assumptions about how students learn which may in fact reflect more about how we teach than how students learn. We must remember that as individuals some of us may learn best by one mode and others by some other mode.

Throughout the research literature on instructional media, the reader is confronted with conflicting comments, i.e., students were bored — students were captivated; students learned faster through programmed instruction — students learned faster through television; students learned more — students learned less; students learned better by branching programmed instruction — students learned better by linear programmed instruction; etc. Because of their varied abilities, interests, and prior experiences, some students will learn better and faster in certain subject areas through one mode or combination of modes while other students will learn better and faster in the same subject areas through a different mode or combination modes.* Teachers should be willing to manipulate the learning environment for each student in order to facilitate learning rather than spend their time presenting the course content which obviously limits the students to one mode of learning. This method necessitates the efficient utilization of a variety of media and materials, films, slides, demonstrations, face-to-face lectures, etc. It is not an efficient use of learning time to have a student go through an hour of the stereotyped textbook form of programmed material when the same learning objectives could be accomplished by having him read a regular textbook for ten minutes or view a five minute demonstration. Conversely, it is not efficient use of learning time to have teachers and students in a lecture situation for an hour when the same learning objectives could be accomplished through independent study by the students of a programmed text for fifteen minutes.

A fourth learning variable, the **Interpersonal Relationships in Learning**, has just become evident in the past several years. Actually, many people have been aware of this variable for years, but little, if any, effort has been made to classify it as a learning variable and to take it into account in the learning situation. This particular variable became especially noticeable in a programmed instruction project in which it was noted that not all students liked a particular programmed text but if given a choice of three programmed texts covering approximately the same content, each student was able to choose a text that he liked and also could learn from. This result is not surprising, a lot of people may like western stories, but they do not all like the same author. We do not all like the same type of car, house, or marriage partner.

Why do we expect the learners to all like the same author of a programmed text or a regular textbook or even to like the same classroom teacher? Many parents have had the experience of having one of their children in the classroom of a

particular teacher, and the child loved the teacher and learning took place. Later on, when a younger brother or sister was assigned to the same teacher, this child did not like the teacher and learning did not take place. What is so important about making children use the same text or staying with teachers they do not like and can not learn from? If our ultimate goal is learning, then whatever will facilitate learning should be a part of the system. If a student is not learning and a change in the textbook or a change in the teacher does result in learning, then why not do it!

The last learning variable concerns the reason why students learn — Motivation. This variable has been the topic of many conferences in education during the past several decades. Although this is a learning variable that all teachers and most parents are familiar with, it is very common for parents and teachers to make comments about the slow or nonlearning student, such as, "What can you do if the student doesn't want to learn?" or "How can you teach the apathetic student?" Somehow, it is assumed that no matter what the instructional materials are that are developed and no matter in what way they are used in the teaching-learning situation that they will automatically have the proper motivation built into them, and when the student does not learn, then it must be the fault of the student. The only statement that can actually be made in a situation where the student is an apathetic learner, a slow learner or a nonlearner, is that the student is reacting this way to the kinds of instructional materials and learning experiences that he is being exposed to, which does not mean that if the student were exposed to something more interesting, that the student might not want to learn and will learn. The term "more interesting" does not mean the course objectives are changed. What it does mean is that the course objectives are presented to the student in such a manner or in such a situation that the student will want to learn them. The concept of motivation is like the concept of individual differences: almost all educators will agree that what will motivate one child will not necessarily motivate another, yet in the classroom, we continue to assume that all children are motivated in the same manner and that there are not any individual differences. Quite often, teachers and parents when faced with a nonlearning student will retreat to the old cliché about how "You can lead a horse to water, but you can't make the horse drink." My answer to this excuse for not recognizing the problem as a learning problem and trying to solve it is "but you can run the horse around the pasture until it gets thirsty!"

There are two types of motivation; the first type of motivation could be called "intrinsic" (internal) motivation. This is the type of motivation that is evidenced when the student says, "I want to learn this because I like it." For example, if students make the remark that a particular subject or textbook is dull and uninteresting, this does not mean that the subject or textbook is naturally dull and uninteresting or that the students are incapable of becoming interested in the subject; it means that using that particular textbook makes the subject dull and uninteresting to those students. By varying the point of view, textbook, meaningfulness, etc., (without changing the objectives), the teacher may be able to get the student to learn a behavior just for the sake of the learning experience itself.

A second type of motivation could be called "extrinsic" (external) motivation. This is the type of motivation that is evidenced by students saying, "I don't like this, but I'll learn it because of the reward I am going to get afterwards." If the teacher can't find any way of getting the student to learn for the sake of learning, the teacher may identify the kinds of activities which are considered rewarding from the point of view of the learner (getting out of class or school earlier, permission to work on special projects or activities, etc.) these activities can then be used as rewards for learning something which the student considers not rewarding by itself. Another version of "extrinsic" motivation is evidenced by students saying, "I don't like this but I'll learn it because I want to

* Relative to this concept, it is possible for any researcher to come up with almost any result he desires, if he can select the subject area, the students to experiment with, the mode of presentation, and particularly if he can design his own testing instruments.

avoid punishment I might get if I don't learn it." The punishment or negative form of extrinsic motivation should only be used as a last resort.

In conclusion, the fact that few institutions of higher education require their faculty to have formal training in teaching and testing does not mean that this knowledge is not important, it just means that in the opinion of most non-education faculty, the available courses in teaching and testing are of little, if any, value. This is primarily because few

professional education faculty "practice what they are preaching." If the future lives of our young people and the future of our country is dependent upon what happens in our schools and in particular in higher education, then teachers are going to have to become accountable and will consequently have to learn how to teach by design such that learning is maximized for each and every student in the most effective and efficient manner possible.

OUR CONFERENCE HOST – 1971

Northeastern Junior College is a comprehensive junior college located at the north edge of Sterling, Colorado, 125 miles northeast of Denver in the heart of the Colorado plains country.

Sterling is a city of 12,500 residents, characterized by strong business, cultural, and professional interests. It provides a trade, education, and health center for an area which is primarily agricultural. Major resources include extensive cattle and wheat operations and both dryland and irrigation farming.

The history of Northeastern Junior College cannot be separated from the rural economy, nor from attitudes which recognize the importance of both agriculture and education. The identifiable mark of Northeastern Junior College on the surrounding hinterland can hardly be distinguished from the citizens of the area who want the diversity and quality of educational opportunity which Northeastern offers.

The college was founded in the spring of 1941 as a result of joint planning and activity on the part of educational leaders and interested citizens. Formal history began when five members of District No. 12 Board of Education and the Logan County High School Committee filed articles of incorporation as private citizens. Sixty students from seventeen Northeastern Colorado communities enrolled September 8, 1941, when first classes opened as an extension of the public school system.

In October, 1944, citizens of Logan County voted tax support, and a junior college district was organized coextensive with Logan County. The Board of Regents became the Junior College Committee, and shortly thereafter the name of the school was changed to Sterling Junior College.

In 1945, the College Committee purchased a separate 15-acre campus centered by the building now known as Smith Hall. The surrounding acreage was used as an agriculture lab and farmed to provide additional income. Early students also received help from agriculture teachers on home projects. The immediate building commitment was for an agriculture facility. Vocational objectives have been included in all listings of purpose since the college was founded.

Early curriculum planning centered in the educational goals of students from the essentially rural area. Agriculture and business became strong subject matter areas for both transfer and terminal students.

Ervin S. French became chief administrator in 1948. When the administration separated from the public school system in 1953, Dean French was named president.

Agriculture faculty soon realized that the vocational agriculture format of the secondary school was impractical and inappropriate. Under the leadership of President French, they began to forge a post-secondary program to provide for the needs of both terminal and transfer students.

A close working association with Colorado State University, with area stockmen, and with farm youth has produced a strong program of agriculture activities at Northeastern. Confidence in the program is reflected in the number of stockmen in adjacent areas of Colorado, Wyoming, and Nebraska who make thoroughbred stock available for practice judging sessions by NJC students.

The strength of the agriculture program is further reflected in the number of students who have achieved in an outstanding manner in transfer, in the agriculture profession, and in the number – both transfer and terminal – who have returned to the home community to live – and to contribute to the improvement of agriculture.

The strengthening of the agriculture program has been part of the strengthening and expansion throughout the institution. A strong science offering made it possible to upgrade offerings in agriculture and also strengthened many other areas.

In 1961, the administration was organized to provide a framework for growth. Enrollment soared from 390 in 1960 to 1,791 in 1967.

Northeastern enjoys excellent relationships with high school counselors, transfer institutions, industry, and public agencies. Based in continuing close association with the home community and the larger area from which students flocked to the campus, the climate of communication produced new dimensions of service.

As the concept that the individual needed more than a high school education gained ground and the crush of the sixties developed, Northeastern Junior College was in a position to serve vast numbers who could not gain admission to the four-year colleges and to further implement its basic philosophy that recognizes the right of each individual to pursue his own educational goal in a campus atmosphere. Development of occupational programs received impetus.

Concern for the students with farm background was again at the forefront in the expansion of occupational programs. It was characteristic that they result from interaction between faculty and leaders in agriculture, education, and industry.

Again, confidence from a much larger community enabled Northeastern to make a significant contribution. In the early sixties, Northeastern was invited by the farm chemicals industry to develop the pilot two and one-half year program in Agri-Business which has been duplicated throughout the United States. The pilot Agri-Business, partially supported by W. K. Kellogg Foundation and offering options in animal science or agriculture chemicals, signalled the new direction. Developing from it have been Turf Management and Grain and Feed Technology. Also added, because of awareness of needs in agriculture and the interests of students, is a two-year occupational course in Farm Machinery Mechanics.

The Northeastern Junior College main campus now totals 25 acres, with seventeen buildings. A 34-acre campus addition acquired in December, 1961 is available for further development of the physical plant.

No other head of an institution of higher learning in Colorado approaches President French in length of service. In 1965, he was elected to the North Central Commission on Colleges and Secondary Schools and is now completing his seventh year as an examiner-consultant for the Commission. Many NJC staff members participate in professional activity at both the state and national level.

In 1967, the Colorado General Assembly created the State System of Community Colleges and Occupational Education.