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IDENTIFIERS Hunter (Madeline)

ABSTRACT

This document contains materials from a workshop on Elements of Instruction Vocational, Technical, and Adult Education (VTAE). The model used in the workshop was based on the teaching model resulting from the work of Madeline Hunter. The workshop consisted of formal presentations, opportunity for participants to put the content into their own words, and practice. Participants completed an evaluation form and rated each area above 4.5 on a 5-point scale. A four-page report is followed by these attachments: correspondence, a participant list, sample certificate, and participant comments. The largest attachment consists of the handout materials from the workshop. These are divided into nine sections: introduction; decision in teaching and introduction to elements; selecting objectives at the correct level; teach to an objective; monitor and adjust; principles of learning; lesson design; reference; and glossary. The section on principles of learning is further divided into motivation; rate and degree (active participation, reinforcement, anticipatory set, and closure); retention; and transfer. Each section begins with a list of learner objectives. Information sheets, excerpts from Hunter's work, and pencil and paper activities follow. (41 references) (YLB)

Final Report

Workshop Conducted for

Wisconsin State Board of Vocational, Technical and Adult Education

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Project Director

Center for Vocational, Technical and Adult Education
University of Wisconsin-Stout
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ELEMENTS OF INSTRUCTION
VTAE WORKSHOP 90
June 1990

Project #30-107-150-230

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ELEMENTS OF INSTRUCTION-VTAE WORKSHOP 90
FINAL REPORT

Background

The Elements of Instruction VTAE workshop was conducted February 5-7, 1990, in Wisconsin Rapids. A similar workshop was conducted March 7-9, 1989, and requested again by the VTAE Instructional Service Administrators.

The workshop was based on the notion that effective instruction is directly related to recruitment, retention, placement and overall program effectiveness and thus vital to any school. The model used in this workshop is based on the UCLA Teaching Model, Essential Elements of Instruction, resulting from the work of Dr. Madeline Hunter. Dr. Hunter has translated psychology research along with hundreds of hours of observation and analysis into meaningful content easily understood by those in the teaching field. When coupled with an ongoing program of instructional supervision and live instructional conferences, this two-part process has been judged to be one of the most effective ways to heighten, maintain and refine instructional skills.

The process assumes that there is a body of knowledge which forms the underpinning of teaching. This body of knowledge is not limited to any one content area or learning situation, but rather, "It applies to every human interaction that is conducted for the purpose of learning." In contrast to many other models of teaching, the UCLA teaching model negates the need for a particular style of teaching . . . eliminating a "recipe" to follow for success. Instead, the model recognizes teaching as a process of decision-making, utilizing proven research to delineate what a teacher needs to consider before deciding what to do. Districts have seen that the UCLA model undergirds many other models of teaching (direct, indirect, discovery approach, cooperative learning, individualized instruction, etc.) because it identifies the decisions that all teachers make regardless of the chosen method of instruction. As such, it provides the base for other programs to build upon. The process acknowledges the fact that the most important educational element in our schools is the instructional skill of the teacher.

Many new and experienced instructors need help concentrating on improving instruction - studying research, integrating effective

instructional techniques into new curriculum programs, and highlighting instructional behaviors in teaching. The "Elements of Instruction," forms the theoretical base of knowledge describing how students learn and form this knowledge, how instructors can then make instructional decisions to increase the probability that students will learn.

Workshop Objectives

The objectives of the workshop were:

Develop an awareness of the Elements of Instruction as it applies to vocational, technical, and adult education by:

1. Defining criteria and critical questions relating to a profession and teacher responsibilities.

2. Identifying characteristics of teaching to an objective.

3. Selecting an objective at the correct level of difficulty.

4. Recalling the steps to monitor and adjust the teaching.

5. Identifying and demonstrating use of the principles and characteristics of learning.

6. Keeping a log of teaching actions for two weeks.

7. Analyzing and evaluating the teacher action with respect to the Elements of Instruction.

Workshop

The content of the workshop consisted of techniques in researched topics of Elements of Instruction as applied to vocational, technical, and adult education. Topics included: teach to an objective; selecting objectives at the correct level of difficulty; monitor and adjust, and principles of learning; including motivation, retention, transfer, set, active participation, reinforcement and closure.

Letters were sent to each district announcing the workshop in December 1989. At that time, background information, objectives, teams, registration and credit information were also included in the letter (see Attachment A).

Each VTAE District was invited to send three participants. It was suggested that a team be made up of two instructors and one first-line supervisor. This team would also participate in a three day follow-up Instructional Supervision workshop to be offered a few weeks after the Elements of Instruction workshop.

The workshop was conducted with formal presentations, opportunity for participants to put the content in their own words, and practice. Practicing was accomplished through sharing, worksheets and group activities. Each participant had an opportunity to practice what they learned by presenting a lesson and to observe other instructors as they presented instruction. Feedback from participants was gathered at the end of the first two days and adjustments made to accommodate participant's concerns.

Initially thirty-six signed up for the workshop from thirteen VTAE Districts. Thirty-two showed and participated in the three day workshop. Of the participants, eight were supervisors, two were curriculum specialists two were general education instructors, and twenty were occupational instructors (see Attachment B).

Participants were each provided with a three ring notebook (see Attachment C) with labeled dividers. Also provided were numerous articles, information sheets, worksheets and notebook paper. Many transparencies were developed and also mailed to each district for use. Each participant also received a Certificate of Completion (see Attachment D). All thirty-two participants signed up for a one credit course, 190-570 Elements of Instruction, through the University of Wisconsin-Stout. Based on the University of Wisconsin System Policy #22, the tuition fee was waived except for the segregated fee which participants paid.

Each participant completed an evaluation form. Questions and mean scores based on a 5.0 scale are indicated below:

1. Clarity and Appropriateness Of Workshop Objectives.	4.65
2. Applicability of Workshop Content.	4.71
3. Delivery of Information/Modeling.	4.58
4. Relevance of Activities.	4.77

5. Attention to Your Efforts. 4.50

6. Use of Principles of Learning. 4.58

The tabulated average rating was 4.6 (see Attachment E). Participant comments are attached and indicate excellent results (see Attachment F). Many expressed the lack of some district support by not sending anyone, or only sending one person to the workshop. Many asked if the workshop would be offered again.

ATTACHMENT A

Letters

November 9, 1989

(See attached list)

Dear (name):

The Wisconsin State Board of Vocational, Technical and Adult Education and the Center for Vocational, Technical and Adult Education, University of Wisconsin-Stout are conducting two staff development workshops:

- **ELEMENTS OF INSTRUCTION**
  February 5-7, 1990
  Mead Inn
  Wisconsin Rapids, WI
- **INSTRUCTIONAL SUPERVISION**
  March 5-7, 1990
  Mead Inn
  Wisconsin Rapids, WI

The purpose of the first workshop, ELEMENTS OF INSTRUCTION, is to heighten the skills of the instructor by providing knowledge and skills in the essential elements of instruction. Each district should consider sending a team of three people: two teachers (ACE - or part-time instructor may also be sent) and one first line supervisor, or department head. It is important that the first line supervisor be someone who has responsibility to evaluate/supervise instructors.

The second workshop, INSTRUCTIONAL SUPERVISION, will apply skills learned in the first workshop by providing a focus on improvement of instruction by the development of observation, analysis and conference skills. Participants will be able to reinforce the effective instruction of skills observed, and refine or add new skills.

Districts should plan to send the same first line supervisor to each workshop. One or both of the teaching staff who attended the first workshop should also plan to attend the second with the supervisor. A team will facilitate the comprehension, application and implementation of the new concepts and strategies learned.

The presenters for the workshop will be Howard Lee, Co-Director, Center for Vocational, Technical and Adult Education, University of Wisconsin-Stout and Bill Mamel, Consultant, Instructional Troubleshooters, Minneapolis, MN.

Credit Offered: One credit (either graduate or undergraduate) will be offered with tuition waived. A small UW-System institutional fee (graduate $10.40, undergraduate $13.28) will be the only charge. Registration for credit will occur at the workshop.

A confirmation letter will be sent to registered participants prior to the workshop.

The workshop grant will cover lunches and breaks. Other meals, travel and lodging expenses are the responsibility of each VTAE district. There will be no general registration charge for this workshop.

Please complete the enclosed registration form and return it in the envelope provided by **Wednesday, January 10, 1990.** Call the Mead Inn (715) 423-1500 directly for lodging arrangements, noting you are attending this workshop. A block of rooms have been reserved. We look forward to your involvement in this staff development activity. If you have any questions, please contact Steve Schlough at (715) 232-3793.

Sincerely,

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CVTAE, UW-Stout
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Steve Schlough, Workshop Coordinator
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dmd

Enclosures: Registration Form
Agenda

cc: Bob Johnson
James Urness

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Participant List

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ATTACHMENT C

Handout Materials

ELEMENTS OF INSTRUCTION

TABLE of CONTENTS

Agenda

ELEMENTS OF INSTRUCTION VTAE WORKSHOP

Monday, February 5, 1990 Mead Inn-Wisconsin Rapids

WORKSHOP INSTRUCTORS:

- Howard Lee, Co-Director, Center for Vocational, Technical & Adult Education, University of Wisconsin-Stout
- Bill Mamel, Manager Operations Training, LORAM, Hamel, MN

7:30 - 8:00	**Registration**
8:00 - 9:00	Introduction, Objectives & Expectations - Howard/Bill
9:00 - 9:45	Decisions in Teaching and Overview of the Elements - Howard
9:45 - 10:00	**Break**
10:00 - 12:00	Selecting Objectives at the Correct Level - Howard
12:00 - 12:45	**Lunch with discussion**
12:45 - 2:45	Motivation - Bill
2:45 - 3:00	**Break**
3:00 - 3:15	Assignment - Howard
3:15 - 3:30	Closure - Bill

EVENING

6:30 - 8:00	**Consultation - Informal Discussion**

Agenda

ELEMENTS OF INSTRUCTION VTAE WORKSHOP

Tuesday, February 6, 1990 Mead Inn-Wisconsin Rapids

8:00 - 8:20	Review/Objectives - Howard
8:20 - 9:45	Teach to an Objective - Howard
9:45 - 10:00	**Break**
10:00 - 12:00	Rate and Degree - Bill • Active Participation • Reinforcement • Anticipatory Set • Closure
12:00 - 12:45	**Lunch with discussion**
12:45 - 1:15	Monitor & Adjust - Howard
1:15 - 2:15	Introduction to Lesson Design and Micro-teaching Demonstration - Bill
2:15 - 2:30	**Break**
2:30 - 3:15	Continue
3:15 - 3:30	Closure/Assignment/Review/Evaluation - Howard

EVENING

6:30 - 8:00	**Consultation - Informal Discussion**

Agenda

ELEMENTS OF INSTRUCTION VTAE WORKSHOP

Wednesday, February 7, 1990 Mead Inn-Wisconsin Rapids

8:00 - 8:30	Review/Objective - Howard
8:30 - 9:30	Retention- Howard
9:30 - 9:45	**Break**
9:45 - 10:45	Transfer - Bill
10:45 - 12:00	Micro-Teaching
12:00 - 12:45	**Lunch with discussion**
12:45 - 2:00	Continue Micro-Teaching
2:00 - 2:15	**Break**
2:15 - 3:00	Putting It All Together - Bill/Howard
3:00 - 3:30	Assignment/Feedback/Evaluation - Howard

ELEMENTS OF INSTRUCTION

Assumption of the Model

1.

2.

3.

4.

5.

DECISIONS IN TEACHING

The learner will:

1. Recall and explain the three decisions in teaching.
2. Identify the category of decision statements.
3. Write one decision statement for each category.

Hunter defines teaching as:

> **"a constant stream of professional decisions made before, during and after interaction with the student; decisions which, when implemented, increase the probability of learning."**

DECISION MAKING MODEL

1. Content Decision:

A.

B.

-
-

2. Learner Behavior Decision:

A. Input

B) Output:

1)
2)

3. Teacher Behavior Decision:

Teacher actions fall into four basic types:

1)

2)

3)

4)

Knowing the principles of learning and and using them appropriately is essential.

Principles of Motivation - Learning more if student is focused.
Rate and Degree - The speed and amount of learning.
Reinforcement and Practice - Teach more faster.
Level of aspiration - affects the rate and degree of learning
Retention and Transfer - How you get students to use the learning.

"Many people are seeking an instrument that will diagnosis, then will "tell us what to do." it is important that we remember this has not been accomplished in any profession that deals with the intricacies of a human being. The thermometer registers with considerable accuracy the temperature of the patient, but a doctor must decide which medication to use.

M. Hunter

DECISIONS IN TEACHING

Content Decision	Learner Decision	Teacher Decision

CRITICAL BEHAVIORS OF A TEACHER

Select Objectives at the Correct Level

Teach to an Objective

Monitor & Adjust

Use Principles of Learning
- Motivation
- Rate & Degree
- Retention
- Transfer

Avoid Abuse of Principles of Learning

DECISIONS IN TEACHING

Educators have finally arrived at the point that professionals in medicine achieved when the latter discovered that germs and not evil spirits were causing much of the problem. We now know many cause-effect relationships in teaching and learning. As a result, we can use those causal relationships to promote student learning in the same way the doctor uses his medical knowledge to promote health. In both education and medicine we are learning more each day even though there still remains much we don't know.

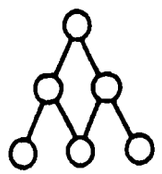
Whenever humans are involved, we are dealing with probability, not certainty. When the doctor prescribes, it is to increase the probability of the patient's recovery, not to guarantee it. In the same way, if teaching decisions and actions are based on the principles presented in this book and in the Mastery Teaching series of videotapes, the probability of students' learning will be increased but it will not be guaranteed.

There is no question but that genetic endowment and past experience influence students' learning but your own teaching decisions also have a powerful impact. Consequently, teaching is now defined as a *constant stream of professional decisions made before, during and after interaction with the student; decisions which, when implemented, increase the probability of learning.* Students learn more when they are taught effectively than they can learn on their own. *Even champions have coaches.*

For the last two decades, educators at the University of California, Los Angeles, have been studying teaching decisions and their implementation: the essence of the process of teaching. It was found that, regardless of who or what is being taught, all teaching decisions fall into three categories: (1) what content to teach next, (2) what the student will do to learn and to demonstrate learning has occurred, and (3) what the teacher will do to facilitate the acquisition of that learning. When those professional decisions are made on the basis of sound psychological theory and *if* those decisions also reflect the teacher's sensitivity to the student and to the situation, *learning will be increased.* Should errors be made in any of those three decisions, student learning can be impeded. Consequently, it is important for teachers to consciously and deliberately identify the decisions needing to be made in each category and base their decisions on research validated knowledge. Equally important is teachers' ability to "read" signals from students and to assess the learning situation so necessary adjustments will be made.

I The Content Decision

The first professional decision to be made is the answer to the question, "What will be taught." You may be thinking that decision has already been made. You're to teach English I, History of the United States, French II, Computer Science. Those subjects merely label the content area in which you, the teacher, need to make the critical decision about the particular part of that content you will teach *today.* To increase the probability of students' learning, that decision must reflect your knowledge of what that particular group of students already knows and what is next to be learned. The psychological generalization which guides your content decision is that basic concepts, simple generalizations and processes must be acquired before more complex learnings are achieved. Advanced processes and understandings are built on a pyramid of simpler ones.



complex understandings and processes

simpler generalizations and skills

simple concepts and behaviors

Therefore, to make the decision about the content you are going to teach successfully tomorrow, you need to determine which prior learnings are prerequisite to more complex ones and make sure those essential learnings have been *acquired* by your students (not "have been presented to") before advanced material is introduced.

Once the decision has been made about the "what" of teaching, the content decision, teacher and student effort should be directed to the acquisition of that new level of learning, not be dissipated on nonessential or tangential matters. It is tempting to spend class time on vivid or interesting "bird walks" that may distract attention from, rather than enhance understanding of more important issues. A typical example is, "By the way, that reminds me of something that happened _____." If "what happened" will help students understand what is being presented, by all means use the example. If what "happened" is tangential or only loosely related, don't waste time by introducing it. If you have lords of extra time or comedy relief needs to be introduced to brighten up the lesson, a "bird walk" might be forgivable, but most of us find that time and energy are in too short supply to be expanded on loosely associated material or random exchange between students and teachers. This does not mean you ignore students' nonrelevant

commer a sign of skill in teaching to dignify a student's extraneous contribution without letting it dilute the lesson. "That's an interesting point that will come a little later," usually will handle a tangential contribution.

Then by all means *do* come to it later, either with that student after class or with the group at a time when it is relevant. "You remember Harry cited an example of_____."

Lest you think disciplining yourself in terms of your content decision imposes rigidity to your teaching, it doesn't. It adds the professional rigor that leads to successful learning. Remember, *you're the decision maker* and if, during class, a *better* idea emerges, by all means pursue it.

You may wish to delegate the content decision to your students and let them decide when they have achieved sufficient mastery to move on but, as their teacher, you can't delegate your responsibility for the results of that decision and for its potential to increase or interfere with the probability of their learning.

II The Decision Regarding Learning Behavior of the Student

While the first decision of teaching is based on content, the *what* of teaching, the second decision is directed to the *student behavior* that makes learning possible, the student's *how* of learning. There are two aspects of a student's learning behavior. One aspect is focused on the input modalities the student will use to acquire knowledge or skill. Will (s)he read, discuss, listen, observe, do? *There is no one best way to learn*, and use of a combination of these input behaviors usually is more effective then relying on only one.

Another aspect of the teacher's decision about learning behavior is focused on students' output which validates acquisition of the knowledge or skill. That output must be *perceivable* so you know (not hope) that students have achieved and are ready to move on to the next learning or whether you must reteach or extend practice of the current learning. Also, that student output behavior must *validate* that learning has been accomplished. Output can't be such that students can bluff, guess or be lucky in their demonstration of accomplishment. As with the content decision, the input and output student behavior decision also can be delegated to students but *not* your responsibility for the results of their decision.

Your *instructional objective* specifies the first two teaching decisions of 1) content and 2) behavior of the learner and brings both of them to the level of conscious professional decision making rather than leaving them as vague intentions or wishful thinking.

To make those two decisions more identifiable, in the .les below, the specific content is capitalized and the validating student behavior is written in italics. All instructional objectives begin with, "The Learner will...(T.L.w.)

T.L.w. *state* the SIX CATEGORIES OF PLANTS and *describe* the CHARACTERISTICS OF EACH.

T.L.w. *write* his/her INTERPRETATION OF ARNOLD's POEM.

T.L.w. *respond in German* to the QUESTIONS ON PAGE 37.

T.L.w. *diagram* the ASSERTIONS AND CONCLUSION.

T.L.w. *discuss* the CHANGES WHICH RESULTED FROM THE TREATY.

T.L.w. *solve* the QUADRATIC EQUATIONS ON PAGE 97.

Having an articulated instructional objective, rather than intuitive or subliminal intent, accomplishes two things. First, it helps you focus your teaching on the learning behavior which you will use to validate whether students have achieved the intended learning. Second, it encourages you to identify the prerequisite learnings which must be taught (and learned!) in order for students to achieve the intended results.

III The Decision Regarding Teacher Behavior

The third decision in teaching (note that this is the *third* decision not the first) is directed to your own teaching behavior; what *you* will do to increase learning. If you deliberately use principles of learning which research indicates are accelerants to student achievement, you will have power to increase your students' motivation to learn, the speed and the amount (rate and degree) of their learning, and their retention and appropriate transfer of that learning to new situations requiring creativity, problem solving and decision making. Principles of learning constitute a powerful pharmacy of alternatives from which you can create an effective learning prescription. Knowing principles of learning and deliberately and artistically using them is the hallmark of the master teacher. This book and the accompanying series of Mastery Teaching videotapes were developed to present some of these principles to you and thereby to help you consciously achieve master teaching.

The responsibility for making these three decisions of, (1) content (what to teach today and tomorrow), (2) behavior of the learners (which input modalities students are going to utilize and the student output that will validate successful accomplishment) and (3) your teaching behavior (utilization of principles of learning to accelerate achievement) sounds like a lot of professional decision making. It is! These decisions, however, are already being made by you either purposefully, intuitively,

or by default every day you teach. As you read, you will find that you already are using much of what is described in this book or shown in the Mastery Teaching Videotapes, but now you will have categories and labels for the decisions you are making and you will know the research that supports them. You may also learn some new techniques which will make your teaching not only easier but more predictably successful.

Each chapter in this book and each module in the videotape series will focus on some aspect of professional decision making to help you become more conscious of why you do what you are doing and, as a result, you will become increasingly effective as a teacher.

After you study this book and view the videotapes, you should have deliberately constructed a professional launching pad from which your own particular style and artistry in teaching can soar.

Bon voyage!

I. Content
II. Behavior of the Learner
III. Behavior of the Teacher

Write the number that describes the teacher decision (the three teaching decisions are noted above) by each statement.

The teacher is deciding whether:

___ A. The content should be Chaucer or Shakespeare.

___ B. To stand by a student to increase that student's concern or move to the other side of the room to lower concern.

___ C. To tell students that they need not worry if at first things are not clear, that everyone has trouble at first.

___ D. To have students write a paper or take a test to demonstrate their understanding.

___ E. To have students validate their comprehension by making a diorama or a time line.

___ F. To start with the ideas of Socrates or those of Plato.

___ G. To have students read the chapter or view a film.

___ H. To teach photosynthesis or respiration.

___ I. To praise a student for what he has accomplished or chide him for what he has not.

___ J. To teach by using examples in the book or to create original examples.

___ L. To indicate the number correct on a student's paper or the number incorrect.

___ M. To teach the critical attribute of assumptions and conclusions.

What's Wrong with Madeline Hunter?

by Madeline Hunter

"Never worry about your enemies, it's your friends who will sink you" was advice given me years ago. How true! As I look at the implementation of some so called "Hunter Models" I cringe. Our clinical theory of instruction was developed on the premise that the teacher is the decision maker. Some zealots have turned the model into a rigid, non creative misinterpretation which "lays on" teachers a way of teaching rather than identifying research based, cause-effect relationships which help teachers make educational decisions. Knowing cause and most probable effect frees teachers for artistic and successful teaching.

Briefly summarized, ours is a model which a) identifies professional decisions teachers must make, b) supplies research based cause-effect relationships to support these decisions and c) encourages the teacher to use data emerging from student and situation to augment or correct decisions in order to increase the probability of learning.

No one can tell a teacher what to do. Ours is an effort to tell the teacher what to consider before deciding what to do. Teacher decisions in this model emerge from propositional knowledge: knowing what has an effect on student learning. Propositions are those generalizations, validated by psychological research, which identify behaviors that affect learning such as: "Massing practice increases speed of learning. Distributing practice increases retention of what has been learned." These generalizations guide teaching decisions. From these propositions, educators who use the model must develop procedural knowledge: knowing how to translate propositions into effective teaching practice. This

implies that a teacher will be able to design "massed practice" so it remains meaningful and interesting. Decisions also must be made about the length of time between "distributed practice" so it maintains maximum efficiency. Propositions are easy to learn, performance procedures are much more difficult. Unless propositions are translated into procedures, however, the "never use a preposition to end a sentence with" syndrome occurs.

Finally, this model demands conditional knowledge: knowing when to use each proposition and why existing conditions in content, student, teacher and situation would indicate its use with whatever modifications are necessary. This is the essence of translating science into artistry in teaching.

Known by several names (A Clinical Theory of Instruction, ITIP, Mastery Teaching, PET, Clinical Teaching, Target Teaching, UCLA model, Hunter model), this model identifies the decisions all teachers must make regardless of content, age or ethnicity of the learner, style of teacher or mode of teaching (direct, indirect, discovery, lecture, cooperative learning--you name it!). Our model is analogous to nutrition theory. Regardless of the menu, age of the eaters, type of meal, service or preference of the cook, food to be nutritious must incorporate those nutrients which promote health. Using nutrition theory, a skilled cook can produce a variety of meals, served in a variety of ways to accommodate the taste of the eaters. In the same way a teacher can accommodate preferences of learners and his/her own style as long as those elements that promote learning are incorporated in planning, teaching, and evaluating. These elements have been described in detail elsewhere.(1)

Lets examine some criticisms which are based on misunderstandings, and some problems arising from mutations which are no part of the basic model.

1) Hunter's is a rigid model which stifles creativity.

On the contrary, this model provides the launching pad from which creativity can soar. All creativity is based on structure from which artistry and freedom emerge. The propositions of this model are exquisitly used by the gifted teacher, never abused. The Taj Mahal is not a violation of the propositions of physics, engineering and design, but a beautiful manifestation of an architect's inspired use of those propositions.

2) The model was created to evaluate teachers.

Not at all! This model was created to increase teaching excellence. Learning to use this model has changed many marginal teachers into effective ones and effective teachers into masters. With the orientation of this model, an observer can pinpoint inappropriate teaching decisions and behaviors then offer productive alternatives. Rather than general admonishments, "You need to tighten up your discipline--make your lessons more interesting--create more motivation in your students--develop better class routines," this model equips observer and teacher with knowledge, skills and the practical assistance that makes excellence attainable.

We can't save them all, but when we accept defeat we know it is not for want of help that is research based and so practical that the teacher must have been unwilling to or incapbable of using the help offered.

3) The Hunter model is great for direct teaching but does not apply to discovery learning or cooperative learning.

Not so! This model undergirds the decisions made in every method of teaching. Teaching decisions may be delegated to the learner. Any style of teaching or learning may be used, but the teacher remains responsible for learning outcomes. The more skilled the teacher in using this model, the more independent and successful the learners can become and the greater is the variety of teaching and learning styles being used.

4) The Hunter model applies only to elementary teaching.

This model is equally effective in secondary and university teaching.(2) It applies to every human interaction which is conducted for the purpose of learning. A faculty meeting can be a classic example of violation of what is known about human learning. Faculty meetings, PTA meetings, School Board meetings, Rotary Club meetings, Scout meetings and grade level meetings are improved by conscious application of the principles of human learning. Parent conferences, assemblies, working with a disturbed or unhappy student, discipline of a group or of an individual student, all involve those same principles which affect human learning. An educator who can artistically implement principles of learning will be more successful with any of the above situations.

5) The Hunter model helps teachers who are having difficulty but is not needed by successful teachers.

A great many of the basic propositions in this model were identified by observing successful teachers. Psychological research enabled us to label these generalizations and explain why they worked. Teachers

moved from intuitive to purposeful behavior. They knew what they were doing, why they were doing it and did it on purpose. As a result, students' learning became more predictable and more successful. Teachers consistently express their gratitude for bringing this predictability to their planning and teaching. All professionals continue to grow as their knowledge, skills and artistry increase. Teachers are no exception. In the same way that use of this model speeds up learning for both slow and fast learners but does not make them equal, use of this model enables less expert teachers to become more effective and expert teachers to become proficient educational artists.

6) This model expects the impossible of the typical teacher.

Not at all! Student teachers learn to use theory to make productive teaching decisons with results that are gratifying to them, to their students and to their supervising teachers. Using this model results in more inspiration and less perspiration for all teachers. Knowledge and skill make all work easier to accomplish successfully and artistically. This model is not based on working harder but on working smarter.

7) "Elements of Effective Instruction" must be in every lesson.

Horrors no! That "white sauce receipe" for teaching was designed to help teachers plan. In no way can a teacher be judged by the inclusion of all those elements. In fact, many lessons will incorporate only a few elements as, over a period of time, students progress toward achievement of complex learnings. Any observer who uses a check list to make sure a teacher is using all seven elements does not understand the model.

8) If a little is good, more is better.

Probably not! Teachers can over reinforce, or "motivate" when that is not needed. Students can practice beyond productivity. Students can make decisions that are not facilitating to their growth. Educators must develop conditional knowledge to determine "under what conditions," procedural skills should be used. For example, if students are fatigued or bored by practice, that practice should be changed or discontinued even though students have not mastered the skill. It's "common sense", something which can be uncommon in education. Frequency counts are no more useful to teachers than to doctors. How many times pills or surgery are prescribed does not tell you if a doctor is making valid medical decisions.

9) Observers make judgments about a teacher's decisions without checking with the teacher as to the reasons for those decisions.

Checking the reasons for the teacher's decisions will often reveal excellent professional thought processes. One the other hand, an observer can frequently "see" what was not visable to the teacher who is busy teaching. (The general with binoculars in the lookout can see more of what's going on than can the soldier who is making it happen in the trenches.) Communication between teacher and observer as to the basis for each one's thinking results in learning for both.

10) Too much is expected too soon.

This model is deceptively simple in conception, incredibly complex in application. It is a quantum leap from "knowing" to artistic practice. Frequently, a teacher is "exposed" in a workshop to sequence theory, practice theory or whatever and then it is naively assumed that theory will appear magically and correctly in the teacher's subsequent practice.

Artistic performance, whether in music, writing, physical skills or teaching results from countless hours of practice with coaching to increase productive responses and remediate or elminate unproductive ones. Frequently after inservice, observation and coaching within the teacher's classroom are not available. Consequently, new learning may never get translated into subsequent teaching, or it appears in a form which is not as productive as would be desired. Artistic and effective teaching results from a well-planned staff development program. The stages necessary to translate knowledge into artistic practice have been described elsewhere.(3)

11) Promoters of the model want to begin with teachers.

Knowledge of effective teaching should first be learned by central administrators and principals, because the district's local leaders will make the greatest impact on teaching excellence. Administrators are not engaged in daily teaching so many have become "rusty" and have lost the skills they once possessed. Also, most of those former teaching skills were intutitive rather than articulate and theory-based so they cannot be transmitted. As a result, many administrators and supervisors attempt to clone themselves and get teachers to imitate the way they "used to do it." Instead, they need to use theory to help each teacher use his/her own style to achieve excellence.

In addition, administrators need to internalize skills so the administrator becomes a model of what is expected of teachers. Otherwise a "do as I say not what I do" situation exists.

12) Districts provide a "one shot" or one year exposure then move on to a new focus.

A major problem of inservice is the patch work effect of a little of this and a little of that so the the teacher sees no relationship between the patches. Our model provides the scaffolding on which each additional inservice focus can be added. These additions become an extension or refinement of the undergirding propositons of effective teaching. Seeing the relationship between the three categories of decisions which all teachers must make enables a teacher to assimilate, accommodate and use new professional information, techniques, organizational schemes, methods and discoveries. We can't just hope that professional integration will occur, we must provide for it.

13) Once teachers or administrators have had the training, they are "finished."

A professional is never finished learning that which increases professional effectiveness. Consequently, systematic and periodic renewal is essential for both teachers and administrators. In addition, even with coaching, undesirable mutations of practice emerge, spontaneous recovery of old habits occurs, and forgetting of some new learning is inevitable. For these reasons, all educators need scheduled renewal and revitalization.

14) Leaders are not adequately trained.

"Trainers" take a quick "crash course" to acquire the propositional knowledge of this model, then are expected to teach it to others. The trainers have not had time to internalize procedural knowledge so they can't translate propositions into their own teaching behaviors. In addition, they lack the conditional knowledge of knowing when and under

what conditions to use the generalizations. Frequently, trainers make the error of teaching "rules" to govern teachers rather than generalizations on which to base teaching decisions.

From original "exposure," usually a two year period is required to translate knowlege into valid and artistic practice. Short circuiting that time can result in the "never use a proposition to end a sentence with" syndrome where trainers are violating the very principles they are teaching.

15) <u>There has been no research to support this model</u>.

Every proposition of this model was derived from research in human learning. Any beginning psychology text identifies the research basis for the propositions. The model was originally validated in Project Linkage: a project funded by the California State Department of Education in a difficult Los Angeles innercity school. Outside evaluation demonstrated increase in student learning and teacher satisfaction, decrease in discipline problems and vandalism. Since then, major research studies (such as BTES and Effective Schools) have corroborated the propositions of this model. Many projects, however, have attempted to evaluate results from one short training or exposure without checking whether the propositions were translated into procedural and conditional teacher behavior in the classroom.

Models are judged on their ability to guide behaivor, predict outcomes and stimulate research, not on their being the final answer. This model was developed to accomplish all three purposes. If it has contributed to educators' use of research based knowledge to make and implement more successful professional decisions, and to the constant addition of new research based propositions which guide future actions

to increase teacher and student success and satisfaction in schooling, then the Hunter model will have served its purpose.

Footnotes

[1]Hunter, M. "Teaching is Decision Making." Educational Leadership, October 1979.

[2]Hunter, M. Mastery Teaching. Tip Publications, P.O. Box 514, El Segundo, California.

[3]Hunter, M. & Russell, D. "Critical Attributes of a Staff Development Program to Increase Instructional Effectiveness." In Press.

ELEMENTS OF INSTRUCTION

Critical Behavior of the Teacher

1.

2

3.

4.

5.

DEFINITION OF TEACHING

WHAT DOES IT MEAN TO YOU?

PLANNING A TEACHING EPISODE

Objective: Participants will apply their knowledge and understanding of Teaching to the Objective, Correct Level of Difficulty, Moniter and Adjust, Motivation and Active Participation by completing this worksheet.

1. If I want my students to proofread their work before turning it in, I _____

2. After I give directions to the class on work they are to do, I _____

3. While I am presenting information to the entire class, two students are talking to each other in the back of the room, I will _____

4. To increase participation of all students in a class activity, I _____

5. To increase the probability that the students will listen while I'm giving directions, I _____

SELECTING OBJECTIVES AT THE CORRECT LEVEL

The learner will:

1. Formulate a 2-3 part objective
2. Perform a content task analysis
3. Recall the 6 levels of Bloom's Taxonomy
4. Identify the three kinds of diagnosis activities

1. Formulate an objective: What are the two basic parts of an objective?

A.

B.

Write an objective with the two parts.

2. Identify the three complexity levels of behavior:

A.

B.

C.

3. List the six levels of the cognitive domain:

1)
2)
3)
4)
5)
6)

4. **Identify the five steps to do a task analysis:**

1)

2)

3)

4)

5)

5. **What three kinds of diagnosis are available that help determine what to teach?**

1)

2)

3)

COMPLEXITY LEVELS OF BEHAVIORS

PSYCHOMOTOR	COGNITIVE	AFFECTIVE
PERCEPTION	KNOWLEDGE	RECEIVING
SET	COMPREHENSION	RESPONDING
GUIDED RESPONSE	APPLICATION	VALUING
MECHANISM	ANALYSIS	ORGANIZATION
COMPLEX RESPONSE	SYNTHESIS	CHARACTERIZATION
ADAPTION	EVALUATION	
ORGANIZATION		

SELECTING ACTION VERBS FOR BEHAVIORAL STATEMENTS

WORDS OPEN TO INTERPRETATION

To Know
To Understand
To Appreciate
To Believe
To Have Faith
To Enjoy
To Communicate
To Empathize

WORDS OPEN TO FEWER INTERPRETATIONS

COGNITIVE

To Identify
To Recognize
To Recall
To List
To Match
To Discriminate (Between)
To Discriminate (Among)
To Calculate
To Solve
To Compare
To Differentiate
To Name
To Describe
To Write
To Evaluate
To Diagnose

PSYCHOMOTOR

To Remove & Replace
To Construct
To Select
To Measure
To Read
To Assemble
To Inspect
To Complete
To Diagnose & Prescribe
To Lift
To Carry
To Mend
To Disect
To Administer

AFFECTIVE

To Express Satisfaction
To Express Likes
To Express Preferences
To Be Cooperative
To Be Well Groomer
To Be Neat
To Be Prompt
To Follow Rules
To Care for Equipment
To Be Poised
To Be Pleasant
To Be Friendly
To Be Affirmative
To Respond Positively
To Be Attentive

EI-AV

BLOOM'S TAXONOMY OF COGNITIVE THINKING

LEVEL	THOUGHT PROCESS	BEHAVIORAL INDICATORS (OVERT)
Knowledge	Ability to recall and recognize facts, concepts or principles.	List, label, read, define, repeat, record, name, match
Comprehension	Ability to interpret, understand and grasp the meaning of information, to summarize in own words; to translate into a different form of communication.	Explain, show, identify, describe, tell, discover, infer, report, discuss, express, give examples.
Application	Ability to apply previously acquired knowledge and information to a new or concrete situation; to an unfamiliar situation; to a situation which has a new "slant".	Dramatize, operate, model, construct, relate, generalize, code, draw, calculate, reconstruct, illustrate, demonstrate. solve.
Analysis	Ability to "break down" material into its component parts so that organizational structure may be understood; perceive relationships and patterns; see cause and effect.	Deduce, compare, contrast, combine, discriminate, experiment, question, diagram, examine, distinguish, classify, outline.
Synthesis	Ability to analyze the parts and put them together to form a whole; to develop original ideas; propose options.	Create, imagine, plan, organize, predict, assume, translate, collect, hypothesize, design, derive, arrange, assemble, invent. compose.
Evaluation	Ability to make judgments based on evidence and determine the value of material based on definite criteria.	Appraise, judge, evaluate, validate, justify, criticize, select, assess, defend, rate, determine, decide and support decision, "yes or no".

Write in the correct level of Bloom's Taxonomy on the line provided.

Knowledge
Comprehension
Application
Analysis
Synthesis
Evaluation

_____ 1. Name seven states.

_____ 2. Design a house.

_____ 3. Classify flowers.

_____ 4. Drive a vehicle.

_____ 5. Summarize the discussion.

_____ 6. Judge a beauty contest.

_____ 7. Plan a family reunion.

_____ 8. Predict the outcome.

_____ 9. Define in your own words.

_____10. List all the presidents.

_____11. Choose the best option.

_____12. Organize your files.

_____13. Defend nuclear power.

_____14. Arbitrate a conflict.

_____15. Sketch a map of your community.

_____16. Distinguish between education and training.

_____17. Compare 1985 with 1885.

_____18. Diagnose a malfunction.

_____19. Program a computer.

_____20. Compare salt and sugar.

SELECTING OBJECTIVES AT THE CORRECT LEVEL OF DIFFICULTY **WORKSHEET**

Select one of the following objectives and do a task analysis:

1. **Know the meaning of the Pledge of Allegiance**

2. **Recognize the steps for lighting a welding torch**

3. **List the steps for making cooking pasta**

4. **Tear a sheet of folded paper**

TOPIC: SELECTING OBJECTIVES AT THE CORRECT LEVEL OF DIFFICULTY

DEFINITION: The part of the teaching - learning

FACTOR: Formulate an objective

-Content

-Behavior

FACTOR: Complexity of Behavior

-Cognition Taxonomy

-Psychomotor Taxonomy

-Objective Taxonomy

FACTOR: Task Analysis

-Start with an objective

-State qualifiers

-State baseline

-List essential components

-Consider independent and dependent sequence

FACTOR: Diagnosis

-Formal

-Informal

-Inferential

STEPS IN TASK ANALYSIS

1. **Start with an objective.** Make sure it has the two parts. You have to begin somewhere and the objective is where you begin. After you formulate the objective, you should be able to describe the successful learner at the end of the lesson.

2. **State qualifiers.** Clarify the objective so a fellow professional looking at the student response would know what constitutes evidence of successful achievement of that objective. We're talking about reasonable precision, not nit picking. Again, if you are writing a paragraph, will it contain a topic sentence, 5 or more related sentences, incorporate conventional spelling, punctuation, capitalization, indentation and correct grammar? You need to think about the content, the process the students will be going through, words they don't understand, and basically think about what is critical.

3. **State the bottom level or <u>baseline</u> of the task analysis.** This is the entry level behavior you infer is already possessed by the student. What does he/she know already before you even begin the instruction. If your inferences proves to be incorrect, you can always task analyze below this level. In the case of writing a paragraph, the base line might be that the student can write a sentence.

4. **List essential components.** What the student must be able to do to move from baseline to successful achievement. This process can be accomplished in several ways.

   A. **Do the task yourself.** Describe what you are doing or thinking. It often helps if you think in slow motion as you perform the task.

   B. **Observe or "image".** Let someone else perform the task and record what they are doing.

   C. **Examine or "image" the final product.** Infer what the student must have done to accomplish it.

   D. **Factor out essential components.** Subject each component you have identified to impeachment by, "could you do the final task without having achieved this component?" Pull only the essential components out from those that are related.

Example might be:

A. select topic
B. generate and write five sentences related to topic
C. sequence sentences with some order plus necessary transitions
D. generate a topic sentence
E. proofread

5. **Consider independent and dependent sequence.** Think about whether the learning is independent or dependent. Some things require a certain sequence because learning must be acquired in a certain order. Sequence dependent learning by determining which must be taught first, next, etc. At this time don't even consider how you would teach the learning, that will come later.

   Example: of dependent sequence
   First- decide on topic
   Second - write sentences in some sequence and then generate topic sentence or generate topic sentence and then write supporting sentences

   Example of independent sequence
   Edit transitions and conventions to form, spelling and language These skills may be incorporated into the initial writing or attended to at the proofreading stage.

No one task analysis is absolutely correct. It will vary with the setting and the students. If you were doing a task analysis on brushing your teeth, you might have only 12 steps for a kindergarten student and 50 steps for a special needs student.

TEACH TO AN OBJECTIVE

The learner will:

1. Identify the four actions of a teacher
2. Given an objective, identify congruent examples under each

List between 5-10 things that you do during a teaching episode which help students learn.

"Teaching to an objective focuses the teacher on the behaviors that are congruent with the lesson."

Remember, "congruent with" implies leading directly toward, not just "related to" or "associated with."

The four types of teachers actions are:

1.

2.

3.

4.

You can increase your effectiveness of teaching to an objective by using a balance of the four teacher actions.

TEACHING TO THE OBJECTIVE WORKSHEET

1. KNOW THE MEANING OF THE PLEDGE OF ALLEGIANCE

2. UNDERSTAND THE STEPS FOR LIGHTING A WELDING TORCH

3. TEAR A SHEET OF FOLDED PAPER.

4. UNDERSTAND THE STEPS FOR MAKING COOKING PASTA.

5. PLAY A BOARD GAME.

DIRECTIONS:

1. REWRITE THE OBJECTIVE IF YOU WISH TO MAKE IT MORE SPECIFIC (A TIGHTER VERB; LEVEL OF PERFORMANCE).
2. WRITE A ROUGH OUTLINE OF INFORMATION YOU WOULD PRESENT TO TEACH THE CONTENT.
3. WRITE 2 QUESTIONS YOU WOULD ASK STUDENTS ABOUT THE OBJECTIVE.
4. IDENTIFY ONE ACTIVITY YOU WOULD USE WHICH IS CONGRUENT TO THE OBJECTIVE.

DESIGNING ACTIVITIES/ACQUIRING INFO

LEARNING MAY OCCUR WHEN:

Observing the behavior of others

Observing the performance of others

Observing "things"

Fantasizing

Contemplating, reflecting, or mediating

Brainstorming

Role playing

"Acting"

Involved in sensual pleasures

Questioning others

Questioning one's self

Planning

Involved in intuitive thought

Experimenting

Interacting with a computer

"Using tools, materials, and equipment

Teaching others

Acting as a mentor

Sleeping

Analyzing dreams

Solving problems

In a hypnotic state

Involved in a "first-time activity"

Conducting research

Analyzing feedback

Imitating others

Playing games

Interacting with others

Debating

Practicing

Designing one's own experiences

Responding to feedback

Reading printed material

Listening to others

Sharing experience

By Accident

_____

_____

_____

_____

_____

_____

AND ON, AND ON, AND ON.....

ASKING QUESTIONS

TO AROUSE INTEREST AND CURIOSITY

At the beginning of an instructional episode, questions can be used as part of the set to focus the attention of the learner on the new learning

TO STIMULATE DISCUSSION

Questions at the Application level and above (Bloom) that are thought-provoking facilitate stating of reactions by the learner

TO CHANNEL THINKING

Questions can be used to direct thinking, keep the learner "on track", and focus on the objective.

TO OBTAIN THE ATTENTION OF AN INDIVIDUAL LEARNER

In this case, the question should be asked with the same feeling tone as others, and the response to the effort of the learner should be to dignify the answer.

TO HELP A TIMID PERSON TO EXPRESS THOUGHTS

It is important in this particular instance to allow sufficient time for the learner to respond

TO CHECK FOR UNDERSTANDING

Questions relevant to the material being covered will provide you with information as to whether you have accomplished what you intended to when providing information. Checking for understanding is the key factor in the Monitoring and Adjusting process

CHARACTERISTICS OF EFFECTIVE QUESTIONS

Questions which may be answered by a YES or NO should not be asked

Questions should have a specific purpose and be relevant to the subject

Questions should be stated as briefly as possible, and in the language of the learner

Questions should be restricted to one main thought, and not linked to other questions

Questions should be addressed to the entire group in order to obtain the maximum amount of active participation. If it is desired that a specific person answer, name the person after the question has been stated

Questions should be directed at the group randomly with an even distribution, and no particular order

Questions should not be used to antagonize the learner(s)

Questions should always be "answerable"

ASK QUESTIONS USING PLEASANT FEELING TONE

ALLOW THE LEARNER TO RESPOND WITHOUT INTERUPTION

ALLOW PROCESSING TIME FOR THE LEARNER BEFORE REQUESTING AN ANSWER

HANDLING QUESTIONS

* Some you will answer immediately.

* Some you won't answer at all.

* In answering questions you should be certain that you reply the question that was stated.

* Don't evade the question.

* If the question is not clear to you, ask to have it repeated or ask for some additional information.

* In a small group, everyone will probably hear the question. If the question is not heard by everyone, repeat it.

* The reverse question technique can be used if you want to get the individual or group to do some thinking.

* You may be asked a question you can't answer. Simply state that you don't know. You can offer to find out and let the person know. There's nothing wrong with admitting that you don't know or calling on someone else.

* If it is a question that will be answered later in the session, tell the group this.

* If it is an irrelevant question or one you shouldn't answer, simply state that it is something which does not pertain to the current subject.

DEFINITIONS OF FACTORS

TOPIC: TEACH TO AN OBJECTIVE

DEFINITION: The part of teaching - learning proves in which the teacher selects behaviors that are congruent to the intended goal.

FACTOR: Congruent Teacher Actions

-Actions selected by the teacher which are congruent to the learning objective and assist the learner in acquiring the new learning

-Teacher behaviors that promote the accomplishment of the intended goal

-Teacher actions that promote student behavior to reach a goal

MONITOR AND ADJUST

The learner will:

1. Explain the definition of monitor and adjust in their own words.
2. Identify the four steps in monitoring student progress.
3. Recall the difference between overt and covert behavior.

Teaching becomes more predictable when the teacher takes time to **MONITOR AND ADJUST.**

Monitor and adjust is . . .

The process for monitoring is . . .

1.

Overt monitoring can take the form of:

-
-
-
-

2.

3.

As you interpret the behavior, the decision may be:

A.

B.

C.

4.

The process for adjusting is . . .

A.

B.

C.

D.

Who do Teachers monitor?

TOPIC: MONITOR AND ADJUST

DEFINITION: The decision and action of the teacher to ascertain if learning is occurring as a result of appropriate teacher and learner behavior.

FACTOR: Monitor (Elicit and Check)

-Ongoing observation of student understanding of the lesson

-Process of eliciting feedback during instruction which enables the teacher to check student understanding

-Process where the teacher elicits and observable student response and checks for understanding to ensure incremental learning

-Teacher observations of student performance which indicate progress toward the objective

FACTOR: Adjust (Interpret and Act)

-Teacher ability to alter instruction based on student response

-A process of interpreting student response and acting on that interpretation

PRINCIPLES OF LEARNING

(from Madeline Hunter's Three Categories of Teaching Decision Making)

Factors which affect **MOTIVATION (INTENT)** to learn:

- Attribution Theory
- Intrinsic - Extrinsic
- Success
- Knowledge of Results
- Interest
- Level of Concern
- Feeling Tone

Factors which affect **RATE & DEGREE** of learning:

- Meaning
- Student Participation
- Degree of Original Guidance
- Hemisphericity
- Knowledge of Results
- Level of Aspiration
- Modeling
- Motivation (Intent)
- Observational Learning
- Practice Schedule (massed)
- Reinforcement
- Sequence / Length / Relationship / Position
- Set to Perform
- Transfer
- Vividness

Factors which affect **RETENTION** of learning:

- Meaning
- Degree of Original Learning
- Feeling Tone
- Practice Schedule (distributed)
- Transfer

Factors which affect **TRANSFER** of learning:

- Similarity

MOTIVATION (FOCUS)

DEFINITION: A classification of a group of variables (principles) of learning. These variables when utilized will activate a learner to do something to satisfy a perceived need or desire

PURPOSE: Gain or maintain the focus of the learner on the learning task with an intent to learn

VARIABLES:

Feeling tone
- Pleasant
- Unpleasant
- Neutral

Success
- Clarity of direction
- Difficulty of task
- Learner perception
- Interest
- Vivid
- Novel
- Unanticipated
- Meaningful

Interest
- Vivid
- Novel
- Unanticipated

Knowledge of Results
- Immediate
- Specific

Attribution
- Ability
- Luck
- Difficulty of task
- Effort

Intrinsic - Extrinsic (Relationship of activity to goal)

Level of Concern
- Proximity
- Visibility
- Time
- Material

MOTIVATION

Jot down specific examples for each of the variables of motivation

1. FEELING TONE

2. SUCCESS

3. INTEREST

4. KNOWLEDGE OF RESULTS

5. ATTRIBUTION

6. INTRINSIC - EXTRINSIC

7. LEVEL OF CONCERN

MOTIVATION

Write a statement or describe and action which will:

Indicate successful accomplishment of a task

Provide knowledge of results

Make the learner feel "comfortable"

Lower the level of concern

Improve a sagging level of interest

Increase internal satisfaction

Gain a great effort by the learner

INDICATORS OF ENTHUSIASM

PERSONAL QUALITIES	PERFORMANCE DEGREES		
DELIVERY	Poor variation in speech,monitone	Variation of tone, volume & speed, good articulation	Variations of tone & volume from whispers to excite, projections
EYES	Lack of eye contact, no contact with individuals or audience	Appeared interested, occasionally lighting up, shining, opening wide	Eye contact & facial expression synchronized to show numerous feelings
GESTURES	Never or seldom uses body, head & arms; often in a stationary position	Occasionally use of body, head & arms	Emphatic movement of body, head and arms to illustrate an idea
BODY MESSAGES	Never or seldom moves from one spot. Positively on one location	Moves freely in a variety of different directions	Designed and energetic body movements, change of pace frequently
FACIAL EXPRESSION	Expressionless, few smile lines, reserved	Expression fits situation; agreeable, sad, happy, etc.	Vibrant, broad smiles show many expressions
WORD SELECTION	Trite expressions, mostly nouns	Some adjectives used	Creatively descriptive, numerous adjectives, great variety
IDEAS AND FEELINGS OR IDEAS	Ignore feelings or ideas	Accepted ideas & feelings, some variation in response.	Vigorous acceptance of feelings, great variation in response
ENERGY LEVEL	Lethargic, dull, tired	Maintained even level, occasionally shows energetic spirit	Exuberant, gets energy from involvement and ideas, vitality plus

6.2 • Rate and Degree

6.2.1 • Active Participation	**Blue**
6.2.2 • Reinforcement	**Buff**
6.3.3 • Anticipatory Set	**Green**
6.4.4 • Closure	**Pink**

RATE AND DEGREE

DEFINITION: A classification of a group of variables (principles) of learning. These variables when utilized, affect the amount of learning and the rate at which it occurs

PURPOSE: Accelerate Learning

VARIABLES:

Anticipatory set
Reinforcement
Active participation
Closure
Motivation
Vividness
Meaning
Modeling
Practice schedule
Observation
Level of aspiration
Hemisphericity
Degree of original guidance
Transfer

EXAMPLES - COVERT

1. Visualize how the pistons in your car engine work.
2. Compute in your head the answer to 5 x 50.
3. Pretend you're a character in a book. How would you feel and what would you do?
4. Remember a holiday that stands out in your mind.
5. Picture yourself using the proper technique for a correct golf swing.
6. Think about all the things you have that are assets; that are liabilities.
7. Look for errors in capitalization in the sentences that are on the board.
8. Think about all the ways you could use burlap to decorate.
9. Follow along while the teacher reads the instructions.
10. Watch the technique I use in executing this dance step.
11. Say to yourself the 5 levels of the deciduous forest.
12. Suppose you're in a boat out on the lake and the only pair of oars you have falls overboard.
13. Create mental pictures of the donkeys walking along the Grand Canyon in the Grand Canyon Suite.
14. Close your eyes and smell a freshly-mowed lawn.
15. Guess what I have in this paper bag.

EXAMPLES - OVERT

1. Watch what I do and repeat it back to me.
2. Use role playing to simulate an event either individually or in small groups.
3. Thumbs up, thumbs down, or out to side to indicate yes, no, and I don't know.
4. Discuss with your neighbor before I call on someone to answer.
5. Point to the half notes in this piece of music.
6. Complete a worksheet.
7. Teach or help someone else with a particular classroom assignment.
8. Have students respond either as a group or individually (chosen randomly).
9. "Take the following dictation."
10. Compute the answer and check it on the calculator.
11. Demonstrate performance ...

ACTIVE PARTICIPATION

DEFINITION:	The action(s) of the teacher which cause the mind of the learner(s) to be consistently engaged on the learning task
PURPOSE:	Promote structuring/reorganizing new material with previously learned material which in turn accelerates learning
FACTORS:	Covert participation (not observable)
	Overt Participation (observable)

ACTIVE PARTICIPATION

Select a learning task which you might teach in your area of expertise:

Write two teacher statements that would generate covert behavior:

1.

2.

Write two teacher statements that would generate overt behavior:

1.

2.

Write a teacher statement that will generate overt behavior from one student and covert behavior from the rest of the group:

Write a teacher statement that will generate covert behavior from all students and then overt behavior from all students:

REINFORCEMENT

DEFINITION: Responses by the teacher to the behavior of the learner which strengthen that behavior

PURPOSE: Change behavior by strengthening desired responses and/or suppressing undesired responses

FACTORS:

Positive reinforcement

Negative reinforcement

Extinction

Schedule of reinforcement

ADAPTED FROM MADELINE HUNTER

NEGATIVE REINFORCEMENT OR PUNISHMENT?

There are a few generalizations which are central to the understanding of reinforcement theory:

(1) REINFORCE means "to strengthen." We reinforce a behavior to make it stronger, which means to increase the probability or the frequency of that behavior. "Stronger" in the behavioral sense means that the reinforced behavior is more apt to occur than some other behavior or that the reinforced behavior occurs more frequently than it did in the past.

"For him, intelligent decision making is stronger than is tossing a coin," means that intelligent decision making is a more likely or a more frequent behavior than is coin tossing. It does not mean that intelligent decision making always occurs or that coin tossing never occurs. Another analogy might be, "Bill is the stronger player." This does not mean that Bill always wins over another player, but if you're betting money, your best bet is Bill.

(2) POSITIVE REINFORCEMENT means that something has been added (+) immediately after a behavior occurs. If that "something" is needed, pleasant or desired by the person, it is highly probable the behavior will be strengthened. Johnny says, "Please, may I?" Mother says "of course you may, you ask so politely." Johnny's polite asking will become more probable or more frequent. If Johnny whines and fusses to get his way and mother says, "yes," whining and fussing will become a more probable or frequent response. Whichever behavior (asking politely or fussing) is followed by getting what he wants will be the behavior that is strengthened.

We could diagram reinforcement as follows:

Behavior _____ + reinforcement _____
(becomes stronger)

When we say a behavior is "weakened," we mean that behavior has become less probable or less frequent. When a teacher says, "You get the next turn because you raised your hand." she is attempting to increase the probability or frequency of hand raising and decrease the probability or frequency of calling out answers or sitting without participating. Notice reinforcement merely changed the order of probability of the three responses:

Raising hand _____ + Reinforcer _____

Calling out _____

Sitting without participating _____

All three behaviors start out at the same strength. When hand raising was reinforced, it became stronger (more probable). Although the other two behaviors may remain at the same strength, in comparison, they now are weaker in probability (strength) of behaviors.

Let's look at another example. Bert usually whines to get what he wants, whining is more probable than asking "please, may I?" Mother has decided she wants to strengthen the more desirable asking. So, whenever he says "please, may I?" she gives him (adds) what he wants. As a result asking becomes more probable than whining. Asking has been positively reinforced (strengthened). Knowing how to use a schedule of reinforcement will enable mother to keep his asking behavior stronger without giving him whatever he wants for the rest of his life.

(3) NEGATIVE REINFORCEMENT means that something has been subtracted or taken away. The removal (subtraction rather than addition) has reinforced (strengthened) the behavior which the removal (of something undesired) immediately followed. Example: you get in your car and start the motor with an unfastened seat belt. An unpleasant buzzing occurs. You fasten the belt. The buzzing stops. Fastening the belt has been negatively reinforced (strengthened) because it removed (subtracted) an unpleasant noise. Note that the buzzing and behavior (not fastening the seat belt) were occurring simultaneously. A change of behavior (fastening the seat belt) cut off (subtracted) the buzzing and the new behavior was strengthened (negatively reinforced). The negative reinforcer was the removal of the buzzing sound.

All reinforcers are defined by their consequences. POSITIVE REINFORCEMENT means strengthening of the behavior that brought on the positive reinforcer. Asking "please" brought on (added) the desired permission and the response became more probable. NEGATIVE REINFORCEMENT means strengthening of the behavior that removed (subtracted) the negative stimulus. Fastening the seat belt removed the buzzing and fastening became more probable. Note that car manufacturers, not understanding reinforcement theory, have made the noise pleasant (chimes) and have turned off the noise automatically after a short period, thereby reinforcing ignoring the noise or "waiting it out" which removes the noise. As a result, for many people, both of those behaviors have become more probable than fastening the belt.

Negative reinforcement could be diagrammed as follows:

Not fastening seat belt _____ behavior changed

Buzzing _____ Buzzing stopped

Fastening seat belt

Not fastening the seat belt and the buzzing occurred simultaneously. Because fastening the seat belt removed (cut off) the buzzing, that behavior became stronger (was negatively reinforced).

Not fastening seat belt and waiting _____

Buzzing _____ (Automatic stop).

Because the buzzer stopped while the driver was doing nothing but waiting, "waiting it out" was strengthened,: because it got rid of (removed) the noise.

Let's look at a classroom example. Two girls are giggling and whispering. The teacher stops teaching and glares at the girls. The behaviors of girls giggling and teacher glaring are occurring simultaneously The girls stop giggling and start listening (new behavior) which removes the teacher's glare so listening is strengthen. Remember that reinforcers are defined by their results. If the listening behavior does not become more probable, negative reinforcement has not occurred regardless of how much glaring the teacher does.

Negative reinforcement is important because when the student changes behavior (fastening seat belts, stopping giggling, (s)he can remove the negative reinforcers. Negative reinforcement is dangerous because any behavior which removes the undesired stimulus (disconnecting buzzer, pretending to pay attention, lying, cheating, blaming others) will be strengthened.

(4) PUNISHMENT is the addition of undesirable consequences in an attempt to suppress a behavior. In Canada, you get a ticket (punishment) if you drive without a seat belt. The teacher may say to the giggly girls, "You will stay after school." In the case of punishment, the person is not able to remove this unpleasant stimulus by

changing behavior at this point. Only the police officer or the teacher can remove the consequences.

But, and here is where negative reinforcement and punishment become fuzzy, in the future, the memory trace of the threat of the punishment can become a negative reinforcer. To remove the chance of getting a ticket, the motorist may fasten the belt and experience the negative reinforcement of relief from worry about a ticket. The girls may want to giggle and talk, but they can remove the unpleasant possibility of staying after school by listening to the teacher, so listening has been negatively reinforced. Now, if the teacher understands reinforcement theory, (s)he will add a positive reinforcer to the listening behavior: "You girls are listening so carefully, you will know this so well you won't have to study for the test," thereby increasing through positive reinforcement the probability of listening behavior in the future.

KEY POINTS:

REINFORCEMENT means to strengthen a behavior; make it more probable or more frequent.

POSITIVE REINFORCEMENT means to strengthen a behavior by addition of something needed or desired immediately after the behavior occurs. The presence of something desirable acts as a reinforcer.

PUNISHMENT means the addition of an undesirable consequence in order to suppress a behavior. The memory or threat of a punishment can subsequently become a negative reinforcer.

NEGATIVE REINFORCEMENT means to strengthen a behavior by subtraction of something undesirable immediately after that behavior has occurred. The absence of something undesirable acts as a reinforcer.

HINTS ON MANAGING A SCHEDULE OF REINFORCEMENT

Start with behaviors that are easy to change.

Focus on only one behavior at a time in order to maintain a regular schedule of reinforcement.

When a new behavior is being learned, be consistent with reinforcers.

A regular schedule of reinforcement, where the desirable behavior is reinforced every time it appears, results in rapid learning.

An intermittent schedule of reinforcement, (where behavior is reinforced one tine and then not reinforced the next time and the intervals between reinforcers become longer and longer), develops a very durable behavior that is long remembered.

STEP 1: Identify (first for yourself and then with the student) the behavior to be changed and the new behavior that is to replace the old.

STEP 2: Decide what constitutes positive and negative reinforcement. Devise a strategy to get the new behavior and determine the way you will positively reinforce it.

STEP 3: Decide whether the old behavior is so strong you need to suppress with negative reinforcement or whether lack of any kind of reinforcement will extinguish it. If you decide to use negative reinforcement, determine what it will be. Remember, the student's behavior that removes your negative reinforcer, is being strengthened so be careful!

STEP 4: Develop a strategy to get the student to practice the new behavior and positively reinforce it on a regular schedule (Every Time).

STEP 5: As soon as the student has practiced the new behavior enough so it is more likely than the old behavior, remove any negative reinforcement so the old behavior can occur with no reinforcement and be extinguished.

STEP 6: Change to an intermittent schedule of reinforcing the new behavior (make the intervals between reinforcement increasingly long) so the new behavior will be resistant to forgetting.

STEP 7: Know that occasionally the student will slip back into his old behavior (spontaneous recovery) but now you know how to achieve the new behavior. How?

REINFORCEMENT

Write three statements which you could make to a learner who has demonstrated adherence to a policy regulation or practice.

1. _____

_____

2. _____

_____

3. _____

_____

Jot down a policy, regulation, rule, procedure, or practice which has been breached or violated on occasion in your area of responsibility.

_____

_____

_____

Write a statement(s), or describe the activity you would use to suppress the undesired behavior and strengthen the desired behavior.

_____

_____

_____

ANTICIPATORY SET

Please fill in the blanks:

Anyone interested in TE_____ is concerned about C_____. It's hard to imagine TE_____ SCH_____ without them. Although they can sometimes be bothersome, we T_____ them. When things go wrong, we sometimes blame the P_____, instead of accepting responsibility for the consequences ourselves.

Please complete the following series:

2 4 6 8 ___

ANTICIPATORY SET

DEFINITION: The action(s) of the teacher which stimulates the learner(s) to retrieve from memory prior skills, knowledge, and/or experience which is related to the new learning

PURPOSE: Focus the attention of the learner on the new learning which in turn increases the rate and quantity of new learning

FACTORS:

Congruent to objective

Connection to past learning and experience

Learner participation (covert/overt)

ANTICIPATORY SET

Select a learning task which you plan to teach in your area of expertise:

_____

_____

_____

Identify previous learning(s) to which you might "connect" the new learning:

_____

_____

_____

Briefly describe how you will involve the student in the "set":

_____

_____

_____

Check yourself: Was the activity relevant to the new learning? yes ___ no ___

In your own words, tell yourself why set is important:

_____

_____

_____

CLOSURE

DEFINITION:	An activity conducted by the teacher which is designed to assist the learner to consolidate and organize what has been learned.
PURPOSE:	To accelerate learning by fostering clarification and insight
FACTORS:	Active participation Congruence

Adapted from Madeline Hunter, 1987

CLOSURE ON "CLOSURE"

Madeline Hunter

There is no question that the end of a lesson is important. It occupies the "end position" which is a prime time for learning. Nothing similar occurs immediately afterward that would erase that learning or interfere with its being remembered.

There is no doubt that ways of ending the lesson with artistry rather than, "Oh, we've run out of time," should be planned. Although some educators term the lesson ending as closure, psychologically speaking, closure refers to the "Aha" phenomenon where the student sees "how the whole think fits together" and closes down his/her thinking about it. We achieve closure when we seal the letter and mail it, when we finish the job, when we really understand how to do something.

Frequently, however, we do not want closure at the end of a lesson. "Tomorrow we will learn what happened" invites speculation. "We got a good start; tomorrow you'll clarify your understanding" stimulates further consideration. "You now know how to start; tomorrow we'll look at possible solutions" prepares for the next lesson. "Tonight, examine the headlines in the paper and see if there are examples of what we learned today," carries the student into a homework assignment. Any of these examples can be an effective ending to a successful lesson but no closure (or closing down of thinking) has been intended.

Let's look at some examples of effective endings of lessons and give them their correct psychological label:

> "You have made an excellent start on _____" gives knowledge of results and reinforcement.

"Let's summarize what we have done" supplies distributed practice and synthesis.

"Let's look at how taking notes, organizing our notes and creating an outline helps us in writing a report" relates part to the whole and gives a purpose to the lesson. This "pulling together" can occur anytime during a lesson as well as at the end.

"We have finished _____. Tomorrow we'll begin _____" builds an anticipatory set for the subsequent lesson.

"Do one more and hand it to me as you leave" is checking for understanding and, possibly, overlearning. It also serves purposes of raising level of concern, visibility of accomplishment, accountability, and places an important learning at last position.

"You now know how to use every kind of _____" gives knowledge of results.

If asked, "What did you learn today?" The students response could be distributed practice, possibly synthesis, knowledge of results for the teacher and preparation for questions from parents (public relations)

"Let's go over the steps one last time" is checking for understanding and/or guided practice.

"What have we accomplished in this lesson?" could be recall, synthesis or evaluation

Because the last position in a lesson is prime time (as there will be no retroactive inference), that time should be used wisely to accomplish a particular goal and not become a formula for closure. Beware of lesson endings, which can be "parroting" or untrue statements. "What did you learn today?" can elicit a response which is simply saying what the teacher wants to hear. If students don't know what they were working on, there was a problem earlier in the lesson. When the question is asked of several students, it becomes parroting.

"Be ready to tell what you have learned" introduces a new objective: "putting the learning in words." If you are not sure the learners know, it is better to ask several times throughout the lesson: "Tell me what you are working on now."

"We learned how to do two place multiplication" may or may not be true.

"Most of you learned how to _____" can elicit guilt or shame by those who have not.

In closing this brief discussion on closure we need to remember that the end of any sequence is an important time for learning and remembering as it has no retroactive interference. That end position may be devoted to summary, reemphasizing more important aspects, practicing again a part that needs it, or building a bridge into application or future learning. Like all other aspects of teaching decisions, the end position should not be a slot in which to place the mechanical behavior of "the teacher or learner restates the objective."

CLOSURE

Select a learning task which you might teach in your area of expertise:

_____

_____

_____

Describe two activities which you might conduct in order to achieve closure:

1. _____

_____

_____

2. _____

_____

_____

RETENTION TEST

A. List the three decisions in teaching:

1.

2.

3.

B. Identify the critical behaviors of a teacher:

4.

5.

6.

7.

8.

C. Recall the seven factors of motivation:

9.

10.

11.

12.

13.

14.

15.

D. What are the levels of Bloom's Taxonomy

16.

17.

18.

19.

20.

21.

E List four variables of rate degree

22.

23.

24.

25.

F. Total possible points = 25

_____ x 4 = _____
Number Correct (your total score)

Amount Retained = _____
% of Correct Answers

RETENTION

The learner will:

1. Recall the six factors of retention. (Meaning, Degree of Original Learning, Feeling Tone, Practice, and Transfer)
2. Recognize an example from each factor.
3. Give an example of each factor in their own teaching.

Retention deals with the factors related to memory. Retention helps students recall or remember relevant information.

ORIGINAL LEARNING + PRACTICE = RETENTION

Identify the six factors of retention.

1.

1) Relate to students past knowledge:

2) Structure and Organization:

A. Preview

B. Outline

C. Summarize

D. Grouping or categorizing

3) Similarities/differences:

4) Purpose:

5) Meaningful Processing:

2.

3.

1) Meaning:

2) Modeling:

3) Monitoring:

Four Factors of Practice

1) How Much?

2) How Long?

3) How Often?

4) How Well?

Does practice make perfect?
Practice per say does not make perfect.
It's perfect practice.

4.

5.

1) Teachers must highlight the critical feature of the performance to make sure students perceive them.

2) The modeling process must be accurate and unambiguous.

To overcome and stretch the right hemisphere, some generalizations are offered:

1. Provide many modalities or input in the classroom to match the number of differences in learning style that may exist.

2. Try to match new learning to the child's style of learning.

3. Try to strengthen the weaker hemisphere in students by providing activities simulating that side.

6.

Educational Theory			Into	Educational Practice	
Topic	Definition	Factor	•	Technique	Example
Retention	The ability of the learner to remember or recall events relevant to the objective	Meaning	•	Relevant to the Learners	
			•	Structure the Task	
			•	Use Mnemonic Devices	
		Degree of Original Learning	•	Teach it well the first time	
		Practice	•	Amount (how much)	
			•	Time (how long)	
			•	Frequency (how often)	
			•	Monitoring (how well)	
		Transfer	•	Teach for transfer	
		Modeling	•	Product	
			•	Performance	
		Feeling Tone	•	Pleasant	
			•	Unpleasant	
			•	Neutral	

Mnemonic Devices

1. Great Lakes
   - H uron
   - O ntario
   - M ichigan
   - E rie
   - S uperior

2. Planets

M y	Mercury
V ery	Venus
E lderly	Earth
M other	Mars
J ust	Jupiter
S ent	Saturn
U s	Uranus
N inety	Neptune
P izzas	Pluto

3. Arithmetic
   - A
   - R at
   - I n
   - T he
   - H ouse
   - M ay
   - E at
   - T he
   - I ce
   - C ream

4. Rhythm
   - R un
   - H ome
   - Y ou
   - T ired
   - H ouse
   - M ates

5.

Kingdom	K ings	K ind
Phylum	P lace	P eople
Class	C ats	C ome
Order	O ver	O ver
Family	F ire	F rom
Genus	G oing	G ermany
Species	S outh	S ometimes

6. Division of Fractions

   "Ours is not to question why, just invert and multiply."

7. Spelling of *their, there, they're:*

   a. All have the in them.
   b. *Here* and *there* are both places.
      There has *here* in it.
   c. *I* and *their* both refer to people. *I* is in *their*.

8. Colors of the Spectrum
   - R ed
   - O range
   - Y ellow
   - G reen
   - B lue
   - I ndigo
   - V iolet

9. Stationary - *a* as in stay
   Stationery - *e* as in letter

TOPIC: RETENTION

FACTOR: Meaning

-Student ability to integrate the learning into a base of knowledge

-Relationship of the learning to the student's own knowledge and past experience

-Relevancy of the learning as viewed by the learner

-Learning is important to the learner at a personal level

FACTOR: Degree of Original Learning

-Mastery of the initial learning

-How well the student learned the first time

FACTOR: Modeling

-Learner receives concrete representation of the learning

-Sensory representations of the critical attributes of the learning as perceived by the learner

FACTOR: Practice

-Opportunity for the learner to have repeated experiences with the new learning

-Repeated experiences of the learning over time

-Scheduled repetitions of the learning

FACTOR: Transfer

FACTOR: Feeling Tone (see motivation)

RETENTION SELF-TEST

1. IF YOU WISH LEARNERS TO REMEMBER THAT A MAP IS A SCHEMATIC REPRESENTATION OF THE WORLD, YOU PROBABLY WOULD HAVE HIM/HER BEGIN BY WORKING ON A MAP OF ... .

   A. HIS/HER TOWN.
   B. THE UNITED STATES.
   C. HIS/HER SCHOOL.
   D. A FOREIGN COUNTRY.

2. WHICH STATEMENT SHOULD YOU MOST EASILY REMEMBER?

   A. B + D = M
   B. A TEACHER CAN DELIBERATELY PLAN LESSONS SO THEY ARE BETTER REMEMBERED.
   C. THE LATEST RESEARCH INDICATES THAT FORGETTING IS INVERSELY CORRELATED WITH MEANING.
   D. EBBINGHAUS EXPERIMENTED WITH MEMORY IN THE LAST CENTURY.

3. SO CHILDREN REMEMBER WHAT THE PLEDGE OF ALLEGIANCE MEANS, YOU WOULD HAVE THEM ...

   A. SAY IT EVERY MORNING.
   B. USE A DICTIONARY TO LOOK UP DEFINITION OF KEY WORDS IN THE PLEDGE.
   C. MEMORIZE THE DEFINITION OF KEY WORDS IN THE PLEDGE.
   D. REWRITE THE PLEDGE USING THEIR OWN WORDS TO MAINTAIN ITS GENERAL MEANING.
   E. STUDY THE LIVES OF AMERICAN HEROES.

4. IF YOU WERE PLANNING THE MOST EFFICIENT WAY FOR YOUR STUDENTS TO REMEMBER THAT 8 x 7 = 56, YOU WOULD:

   A. PRACTICE IT ONCE EVERY DAY
   B. PRACTICE ON ONE DAY FOR A HALF HOUR
   C. PRACTICE IT WHENEVER IT WAS NEEDED IN A PROBLEM
   D. CONCENTRATE ON IT UNTIL EVERYONE KNEW IT AND THEN SPEND NO MORE TIME ON IT
   E. PRACTICE IT AT CLOSELY SPACED INTERVALS, AND AFTER IT WAS LEARNED, GRADUALLY INCREASE THE INTERVALS BETWEEN PRACTICE PERIODS ON SUBSEQUENT DAYS

5. STUDENTS DILIGENTLY WORKED ON THE MULTIPLICATION FACTS UNTIL BY CHRISTMAS EVERYONE KNEW THEM PERFECTLY. THEY THEN USED THE TIME TO WORK ON OTHER THINGS. JUST BEFORE EASTER VACATION A REVIEW TEST REVEALED STUDENTS HAD FORGOTTEN MANY FACTS. THIS WAS PROBABLY BECAUSE:

   A. LACK OF ADEQUATE DEGREE OF LEARNING
   B. LACK OF FEELING TONE
   C. LACK OF MEANING
   D. LACK OF POSITIVE TRANSFER
   E. LACK OF DISTRIBUTED PRACTICE

6. TO INCREASE RETENTION A TEACHER SHOULD BE SURE TO:

   A. COVER THE MATERIAL INCLUDED IN A COURSE
   B. SPEND EXTRA TIME ON THE IMPORTANT PARTS
   C. MAKE SURE THAT WHAT IS TAUGHT IS THOROUGHLY LEARNED BEFORE MOVING ON
   D. GIVE PLENTY OF DRILL
   E. GIVE MANY TESTS

7. IF ALL OF THE FOLLOWING WERE EQUALLY WELL LEARNED WHICH WOULD PROBABLY BE BEST REMEMBERED?

A. ALL REPTILES ARE COLD BLOODED
B. SOME SNAKES ARE TEN FEET LONG
C. A RATTLESNAKE HAS A DIAMOND PATTERN
D. RATTLESNAKES ARE FOUND IN CERTAIN STATES
E. SOME SNAKES LIKE MILK

8. ADULTS KNOW LITTLE ABOUT THE PARTS OF SPEECH ALTHOUGH MOST STUDIED THEM IN SCHOOL. THIS IS PROBABLY BECAUSE:

A. THEY DIDN'T HAVE ENOUGH PRACTICE
B. THEIR LEARNING WAS CONNECTED WITH UNPLEASANT FEELING TONES.
C. THE PARTS OF SPEECH HAD LITTLE REAL MEANING
D. SUBSEQUENT LEARNING HAS INTERFERED WITH THE MEMORY
E. THEIR ORIGINAL LEARNING WAS INADEQUATE

9. IF YOU CANNOT REMEMBER WHAT YOU HAD FOR DINNER A WEEK AGO LAST THURSDAY, IT IS PROBABLY DUE TO:

A. NEGATIVE TRANSFER
B. NEGATIVE FEELING TONES
C. POSITIVE TRANSFER
D. POSITIVE FEELING TONES
E. NEUTRAL FEELING TONES

10. WELL DESIGNED TESTS ARE VALUABLE IN PROMOTING RETENTION BECAUSE THEY:

A. IDENTIFY WHAT HAS BEEN WELL LEARNED
B. IDENTIFY WHAT HAS NOT BEEN LEARNED
C. ALERT THE TEACHER TO HOW STUDENTS' LEARNING IS PROGRESSING
D. CAUSE THE STUDENTS TO PRACTICE REMEMBERING
E. ARE BASED ON IMPORTANT GENERALIZATIONS

11. WHEN NEW TEACHERS DO NOT KNOW WHAT TO DO IN A LEARNING SITUATION, THEY USUALLY REVERT BACK TO WHAT THEIR TEACHER DID WHEN THEY WERE STUDENTS, RATHER THAN REMEMBERING AND USING THE THEORY THEY LEARNED IN COLLEGE OR IN-SERVICE COURSES. THIS IS PROBABLY DUE TO:

A. LACK OF MEANING IN THOSE COURSES
B. LACK OF APPROPRIATE PRACTICE WITH THE THEORY
C. NEGATIVE TRANSFER FROM THEIR PAST SCHOOLING
D. INADEQUATE LEARNING FROM THE COURSES
E. BOREDOM OR NEUTRAL FEELING TONES

Right-Brained Kids in Left-Brained Schools

Madeline Hunter

"Why should I read the directions? I can see how it goes together!" This obviously correct statement has baffled many a teacher as a student confidently confronted a bewildering array of pieces. And (s)he could "see" how it went together while his/her seemingly more able classmates struggled through decoding "attach narrow end of part A to rounded side of part B," in order to ferret out the knowledge that would guide their actions.

That same puzzling student would protest, "Don't tell me how to get there, draw me a map," while his/her bewildered teacher plead, "Don't show me a map, just tell me how to get there."

Teacher and student scratched their heads as each wondered how the other ever survived in this complex world. Each acknowledged the other seemed to have good sense, but "it's beyond me how (s)he thinks."

Such "differentness" in thinking, ways of remembering ("I don't remember what (s)he said but I can describe the room we were in." vs. "I don't remember where it was but I can tell you what (s)he said."), ways of attacking problems ("Let's lay it out on paper." vs. "Let's talk about it."), and styles of learning have been dealt with in the past by dumping those variations in the "people-are-different" basket. Now research in hemisphericity has begun to sort that basket into the categories of left- and right-brained thinking with promising and productive suggestions for teachers that could accelerate the learning outcomes of students.

Research in hemisphericity indicates that humans have two brains (hemispheres), each complete in itself. Unlike animals, man, at an early age, begins to differentiate the data processed by each of his brains. His left hemisphere "specializes" in data where significance is based in relationships that are built across time. You are using your left hemisphere as you relate what you are now reading to what you read in the previous paragraph and what you will read in the next paragraph. The left hemisphere has been called the temporal or propositional "if-then" brain because significance or relationships are perceived across time.

The right hemisphere in most humans "specializes" in data where significance emerges from relationships that must be perceived across space. You are using your right hemisphere when, from the surrounding visual environment, you are aware of where you are in the building, recognize a face, or understand diagrams or data displayed on a chart or graph. The right hemisphere has been called the visual-spacial or appositional brain.

The right and left hemispheres are connected by an impressive bundle of nerve fibers, the corpus callosum which transmits "messages" from one brain to the other to produce "integrated brain thinking." A somewhat similar analogy is that we have "assigned" certain responsibilities to our hands (holding the book with our left-hand while we point to the word or turn the page with our right-hand, cutting with our right-hand while we manipulate the material with the left). No matter how able we are with our right-hand, we do most things more efficiently and effectively if we also use our left-hand. In like manner, integrated brained thinking is the result of each hemisphere augmenting the information processed by the other.

Researchers suspect that individuals are born with a predisposition to prefer, or find it easier to use their right- or left-brain, however, as with handedness, practice has a great deal to do with skill. (Witness the right-handed pianist who plays beautifully with his/her left-hand, the typist who makes no more errors with his/her left than (s)he does with his/her right-hand, or the craftsman who needs both hands so uses them with almost equal dexterity.) Without practice, skills and processes can become stagnant so the comfort of using the dominant hand (or brain) often results in the subordinate hand (or brain) getting minimal use. As a result, the ineptitude which results from lack of practice is often incorrectly interpreted as lack of inherent ability.

This seems to be true of "brainedness." Because a student can "see" how it goes together, (s)he uses his/her more facile right-brain and may not give his/her left-brain the practice of reading and following directions. Because other students can get their instructions more easily from reading, they don't practice "seeing" if they can figure it out. The assumption that native ability is extended or diminished by practice is supported by current research which indicates that measured I.Q. can change with prescribed changes in experience. In no way, however, should these statements be construed as indicating that all difference in human performance is the result of experience. We still can't make every learner equal.

Hemisphericity plays an important role in the selection of occupations and hobbies. The architect, design engineer, accountant, farmer, artist, musician, etc., must deal comfortably with visual-spacial data. The philosopher, theoretician, salesman ("If I do this, then (s)he'll buy that") must handle temporal data and

synthesize those data across time into an idea or understanding. Many people are facile with both hemispheres (the Leonardo da Vincis of the world), and everyone uses both brains to varying degrees unless, as the result of an accident or surgery, they have only one.

For years, the relationship of the left- and right-brain to learning was considered relevant only to the remedial education of medical cases. It was from study of the pathology related to damage to one brain, or the severing of the corpus callosum (commissurotomy), that much of what we now know of hemisphericity has emerged. (Should the reader be interested in the medical and neurological aspects of hemisphericity, references are listed at the end of this article.)

Recently, hemispheric implications have been the subject of scrutiny by educators who were looking for more efficient and effective ways of promoting learning and for ways of remediating the learning of those obviously able youngsters who were not "getting it." The results of that scrutiny are powerfully suggestive of the conclusion that schools have been beaming most of their instruction through a left-brained, temporal input (reading and listening) and output (talking and writing) system, thereby handicapping all learners. Those who learned well through left-brained input had minimal or haphazard practice in using their right-brain. Those students who learned easier with right-brained input have been handicapped by having to use primarily their left-brain without the "backup" of the same information processed by the more proficient right hemisphere, "backup" that could be transmitted across the corpus callosum to augment and assign additional significance to the right-brained input message, thereby integrating the power of the two hemispheres.

Educators and brain researchers are becoming suspicious that the boy who knew everything about a carburetor, but couldn't read the test on carburetion systems or write the answers that he had already demonstrated in action that he knew, or the girl who did well in algebra, but almost flunked geometry, were both victims of our lack of understanding of hemisphericity. We are beginning to suspect that the student who can't remember what (s)he heard in the story, but can describe in detail a television program, and the one who is confused by the diagram, but can sequence perfectly the story (s)he read, are mirror images of the same phenomenon. In like manner, the student who can say the words in the book, but doesn't "comprehend" what has been read, or the student to whom the graph is a mystery, may represent our default in understanding rather than theirs.

Now what do all of these interesting findings mean to educators in the conduct of day to day schooling? First, they clearly mandate the responsibility for beaming instruction so that, whenever possible, information that is presented in a linear fashion across time (reading it or hearing it), is also presented in visual space (seeing or imaging it) so students have practice in integrating the information from their two hemispheres. Second, these findings suggest that whenever a student is not "getting it," the stimulus should be augmented or replaced with one that is beamed to the other hemisphere. Third, deliberate incorporation of practice that could increase facility in the use of each hemisphere singly and in concert should become an important educational objective.

Rather than elaborate diagnostic schemes to determine which brain a learner prefers, instruction to achieve these objectives includes:

1. Presenting stimuli simultaneously to both hemispheres.

2. Augmenting a stimulus by following it with information beamed to the opposite hemisphere.

3. Deliberate beaming to only one hemisphere for practice to increase fluency in processing one type of information.

Let's look at examples of each of these professional strategies:

1. Presenting stimuli to both hemispheres

Modeling often is an effective way to simultaneously augment the more typical verbal or written instructions by pairing the words with the visual input. Doing an example on the chalkboard while giving a verbal explanantion or having someone perform the act while hearing the directions, are possiblities for this pairing.

Examples:

"Now listen to what I'm thinking while I'm doing this problem. I can't subtract 7 from 3 so I need to regroup from the tens to the ones. I'll take a ten from _____" (while the work is being demonstrated on the chalkboard).

"Listen carefully while I give directions and watch what I am doing."

"Tell us what this graph is displaying."

"Watch me and listen to what I am thinking as I make a 'k.' I start at the top and make a straight line...."

"Say to yourself what you're doing while you're doing it."

The importance of modeling cannot be overemphasized. "Observational learning" can result from "seeing someone else do it." Successful teachers have been using this technique for years, but only recently have we known why the dual input of "seeing it" and "reading or hearing about it" was such an effective educational strategy.

2. Augmenting the stimulus by following it with information beamed to the other hemisphere when the student is not "getting it."

Obviously, hemisphericity is only one of the many reasons for learning difficulty. For the learner to be successful, the learning task must be at the right level of difficulty with all necessary subordinate learnings having already been achieved. The student must be motivated to exert learning effort. The learning should have been made meaningful and relevant to the learner. Practice should be appropriate to the task and to the learner. Changing hemispheric input systems, however, can aid and often remediate a learning problem.

Examples: Alternate

"Watch while I do one," and "You tell me what to do."

"Look at this, now find another one like it," and "I'll describe one, you describe another one like it."

"Look carefully so you match yours to mine," and "You say one like the one I say."

"Let's talk this one through," and "Let's act one out - do one without talking."

"Make a picture of 6 x 7," and "Describe this multiplication picture."

"How would you show that with dots?" and 'What do these dots show?"

"Find it on the map," and "Say what the map shows."

"We would graph it like this," and "How would you interpret this graph?"

"If we put it on a time line, where would it be?" and "If we translated the time line into words, we would say...."

"Do what I say," and 'Show me what I should do."

Of great importance in giving learners the "assist" of using both hemispheres, is asking the student to generate examples from his own experience. Not only does this add imaging which transfers learning from the past to give added meaning to the present experience, but it enables the teacher to check the accuracy and validity of the student's perception and understanding of the present learning.

Examples:

"Make up a word problem that will go with 250 $\div$ 25 = (or 4 + 8 =)."

"What things would Goldilocks try out in your house?"

"What traits do you have that make you like Columbus?"

"What have you done that is the same as _____?"

3. Deliberate beaming of instruction to only one hemisphere to enable students to practice handling unaugmented, nonintegrated input.

Examples:

"Read the directions and see if you can do it."

"Look at the diagram and see if you can figure it out."

"Look at this design and see if you can make one just like it."

"Listen to my directions and see if you can make the figure I am describing."

"Read the chapter and answer the questions."

"Look at this sequence of 3 pictures and draw what the 4th might be."

Schools long have realized the importance of augmenting the written or spoken word with chalkboard, pictures, diagrams, graphs, etc. As technology advanced, more sophisticated audio (left-brained)-visual (right-brained) materials became available to teachers.

The audio of spoken words (not music), while using the same language (left-brained) input system as reading, eliminated the barrier created by the necessity for possession of the skill of reading to decode letter symbols into sound - into speech - into meaning. Not knowing the neurological reason, those visuals were important. Unfortunately, however, "audio-visual" became an end in itself with millions of dollars being spent on materials that in some cases were poorly designed, ineffectively executed, and unintelligently used.

With the advent of television, which is primarily a right-brained input system (configurations of dots in space to which significance is assigned) and which is augmented by the temporal input of speech (often the same few words repeated over and over as in T. V. commercials), the whole world, literate and illiterate, is able to receive information without so much left-brained processing, and in spite of inability to surmount the hurdle of decoding written speech into meaning. With television, the right-brained individual can take his/her proper "place in the sun" with his/her left-brained, formerly advantaged, friends, in terms of "knowing about" and "understanding" both current issues and mankind's past. The "Ascent of Man" and the horrors of Vietnam are no longer privileged communications to the "ones who were there" or the left-brained scholars.

While language and linguistic markers are processed in the left hemisphere, it is interesting to note that the sonorous clues of timbre, intonation, pitch, etc., of the spoken words are processed in the right hemisphere (as is music). "Hearing what (s)he says" and "hearing what (s)he means" can be different messages, each processed in a different hemisphere and posing the problem as to which message

the receiver accepts as the valid one. Recently, nonverbal communication, the interpretation of kinetic (movement), iconic (images), and sonorous (sound) clues, has come into high visibility as a right hemispheric function. "Intuition" could be a manifestation of this kind of "knowing" without being told by words.

It is important for the teacher to note that his/her own verbal and nonverbal communication must deliver the same message or "what you do speaks so loudly I can't hear what you say" may result. The younger child is particularly responsive to nonverbal cues. For integrated perception and development of facility with both hemispheres, language, plus visual, and kinetic, plus sonorous clues constitute the most effective communicative process.

What is our final educational responsibility, we who are not neurologists, we who are not responsible for the re-education of victims of accident or those who evidence brain pathology, we who have the important responsibility for making learning more probable, more predictably successful, more efficient and more effective for those millions of students, from preschool through post secondary education, that are entrusted to our classroom guidance?

We must, of course, follow the paths of the researchers, translating, as soon as we are able, their findings into classroom practice. We must, with that translation, make available to every teacher, in language (s)he can understand, strategies that effectively and comfortably can be used in his/her classroom regardless of budget, organizational scheme, materials available, pupil-teacher ratio (granted all of those are important, but not determining variables). We must, in turn, present questions and concerns that will focus researchers on areas most productive in terms of learning

gain for students. And finally, we must incorporate in our dissemination of important information, our acknowledgment that "we must practice what we preach" and develop left-brained and right-brained input of the information, modeling by our own behavior the fact that neither brain is superior to the other, neither is the chosen one, both are essential to integrated thinking and this world would be a better, more accepting, more stimulating, and more fulfilling place for all of us if we accepted the difference, recognized the similarity, and acknowledged the right to learn of all students: Therefore, as a beginning step, we must deliberately incorporate those strategies which reflect research in hemisphericity into our daily teaching and augment (not replace!) with right-brained input, the predominately left-brained educational programs currently in our schools.

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WHOLE-BRAIN LEARNING

ALBERT PAUL MALVINO

WHOLE-BRAIN LEARNING is based on the idea that visual images are just as important as words when you are trying to learn something new. The reason is that the human brain is organized like a pair of computers. The left half of the brain is a symbol processor; the right half of the brain is an image processor. The data in these two brain halves must combine into a unified whole for deep understanding to take place.

THE TWO HEMISPHERES

When we look at the brain, it appears to be a single organ. But a closer examination reveals that it is two separate hemispheres joined by a bundle of nerve fibers called the *corpus callosum* (Fig. 1). The corpus callosum allows the two hemispheres to exchange information. Looking at the two brain halves, a philosopher might ask "Is there one mind here or two?" The traditional answer is one mind. But the one-mind model turns out to be as short-sighted as the idea that the world is flat. As you will see, a new Christopher Columbus claims that we have two minds, not one.

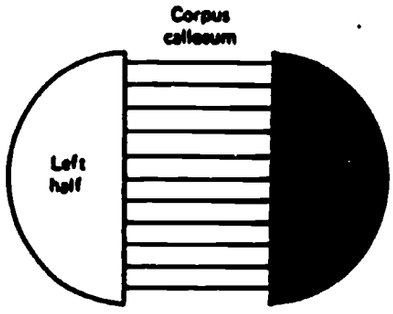

Figure 1. Structure of human brain.

THE DOMINANT LEFT HEMISPHERE

Before the 1960s, anatomists had already examined the brain and could see two distinct halves connected by the corpus callosum. Furthermore, it was already known that a crossover wiring existed between the brain and body.

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For example, a serious injury to the right side of the head paralyzed the left side of the body, and an injury to the left side of the head paralyzed the right side of the body. Another curious phenomenon was that injuries to the left half of the brain rendered people speechless, but injuries to the right half of the brain did not impair speech. Because of this, people used to believe that the left half of the brain was the center of the intelligence, while the right half was a silent partner that did nothing but control the left half of the body.

DUALITY OF THE HUMAN MIND

Radical changes in brain theory began in the early 1960s. Dr. Roger Sperry (California Institute of Technology) had been experimenting with cats and monkeys trying to find out what the corpus callosum did. In his experiments, he cut the corpus callosum to isolate the two brain halves. To his astonishment, the cats and monkeys remained normal in every way.

These results prompted Drs. Bogen and Vogel to perform a similar operation on an epileptic patient. The patient's seizures had become so violent that death was near. Bogen and Vogel assumed that cutting the corpus callosum would reduce the severity of the seizures because the brain half originating the seizure would be isolated from the normal brain half.

The operation was more than a success. The epileptic seizures disappeared completely. Furthermore, the patient appeared normal in every way. Because of this historic operation, split-brain surgery became the method of choice for treating severe epilepsy. As a result, many epileptics had this kind of brain surgery. This allowed Dr. Sperry to extend his brain research to human beings.

What followed won a Nobel prize for Sperry. Although the split-brain patients seemed normal, they were not. Something was different, but it required special apparatus to discover. With the help of Dr. Michael Gazzaniga, Sperry examined dozens of split-brain people and came to the following conclusions:

1. The left half of the brain thinks in words and numbers.
2. The right half of the brain thinks in pictures and other nonverbal images.
3. The two brain halves are so different that it is more accurate to speak of a left brain and a right brain than of a single brain.
4. It is impossible to describe in words how the right brain works.

Drs. Galen and Ornstein (University of California Medical Center) confirmed the Sperry conclusions using a different experimental approach. Alpha waves occur in the brain when it is resting and beta waves appear when it is active. Galen and Ornstein discovered that someone reading a book had beta waves in the left brain and alpha waves in the right brain. Conversely, someone drawing a picture had beta waves in the right brain and alpha waves in the left brain. The conclusion: the left brain processes words and the right brain processes visual images.

IDEAL LATERALIZATION

Ideally, the left brain is the source of language, number, sequential thinking, logic, verbal memories, and verbal consciousness. The right brain is the source of visual images, music, spatial relations, intuition, visual memories, and nonverbal consciousness (Fig. 2). In the west we tend to think the self-talk inside our heads is our total consciousness. But people in eastern countries have long known that there is more to human consciousness than the self-talk of the left brain. In fact, many eastern philosophies distrust language because they claim it creates illusions and limits our perception of reality.

The east may be right. Apparently, vision has the power to create. The great achievers always visualized the results they were aiming at. The methods for getting there would then appear in the form of hunches, dreams, and intuitions. In short, the breakthroughs in science and other fields usually originate in the right brain. This is the same brain that before the 1960s was thought to be useless except for moving the left half of the body.

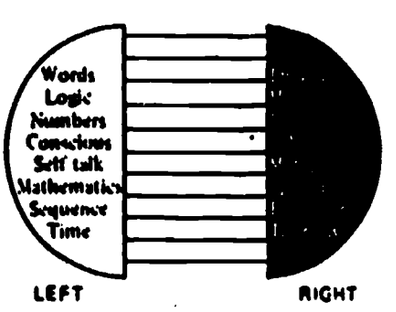

Figure 2. Ideal lateralization of human brain.

The left-brain/right-brain model applies to 95 percent of the U. S. population. You may be wondering why the left brain has emerged as the word processor and the right brain as the image processor. One explanation is this: For evolutionary reasons, infants tend to hear slightly better through the right ear. Because of the crossover in brain-body wiring, sounds enter the left brain more efficiently. This slight edge leads to the left brain specializing in word and other symbol processing, while the right brain handles image and other nonverbal processing.

THE PROBLEM WITH EDUCATION

Everyone knows something is wrong with traditional education. It's too narrow, too pat for the real world. It fails to train the subtle parts of the mind. It ignores wholistic and intuitive learning. Why is this? Because traditional education is still based on the pre-1960s model of the human brain. Too many educators still believe there is only one right answer to a problem, and even worse, that there is only one right way to solve a problem. In other words, most schools in the United States continue to educate a student as though he or she has only one brain. They do this by stressing calculations, formulas, logical analysis, sequential thinking, and all those functions associated with the left brain. This is unfortunate because human understanding seems to be based on vision.

The bulk of consciousness is centered in the right brain during the early years of life. After the left brain becomes proficient in language, a shift starts to take place in consciousness. The child begins to use the left brain more and more. At some point beyond the fifth grade, the educational system comes to emphasize left-brain learning almost totally, partly because words and numbers have been mistakenly identified with total human intelligence.

The higher one moves through

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the educational system, the greater the emphasis becomes on left-brain learning. If the right brain does get any stimulation in science classes, it is usually an accident, unless an outstanding teacher is involved. By the time someone graduates from college, he or she typically has a well-developed left brain and a withered right brain.

TOWARD THE WHOLE BRAIN

Based on my research, I have arrived at a hypothesis for how we understand things. I believe the following three steps are necessary to understand almost any concept:

1. A visual image of the concept must be stored in the right brain.
2. A verbal description of the concept must be stored in the left brain.
3. The visual and verbal memories have to be connected.

There may be exceptions, but as a guideline, I have found these three steps are necessary for understanding the concepts of science and technology.

These three steps are my definition of whole-brain learning, the type where something new is created in the brain. In other words, I believe the correlation of visual images and verbal descriptions produces a synergistic effect whereby the whole becomes greater than the sum of the parts. The idea is similar to a chemical reaction. When you combine hydrogen and oxygen, you get water. The water has new properties, quite different from either hydrogen or oxygen. Similarly, whole-brain learning means the visual and verbal data in the two brains combine to create a Eureka effect, a discovery of the full meaning of a concept.

APPLYING WHOLE-BRAIN LEARNING TO TECHNICAL EDUCATION

As a teacher and a writer for the past 20 years, I've been trying to discover what happens when real understanding takes place. I think my three-step hypothesis goes a long way toward answering the question. What follows are some suggestions for whole-brain teaching of technical subjects. These are guidelines to help you think

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about how you might adapt these ideas to your teaching style.

1. Start by accepting the *duality of human mind*, the notion that a human being has two minds or modes of thinking. To reach one of these minds you have to use words, numbers, logic, and formulas. To reach the other mind, you have to use pictures, diagrams, visual aids, and metaphors.

2. In the typical educational setting, the left brain is feasting, while the right brain is starving. Because of this, the simplest way to implement whole-brain learning is to use *more visual aids*. The old saying that a picture is worth a thousand words falls short of the mark. Some pictures defy verbal description. They contain information that only right brain can absorb. Because of this, a student can develop an intuitive understanding from visual images. Once the student has this intuitive grasp of the concept, you can add the technical terminology and mathematics that produce whole-brain understanding.

3. Time and time again I have asked students with difficulties to describe their problem. In almost every case, there was no visual image of the concept they were struggling with. Therefore, I've come to the conclusion that human understanding seems to be based on vision. Even the words we use confirm the idea of vision-based understanding. We have expressions like "Now I see" or "Do you see what I mean?" I think this is more than a coincidence. I think it is virtually impossible to understand anything without some kind of visual model. Geniuses like Newton and Einstein relied heavily on visual models for their mathematical derivations.

So another suggestion I have is this. When you are troubleshooting a student's difficulty, work on the *visual image* of the concept first. Make sure the student has some of kind of picture of what he or she is trying to understand.

4. One of the left-brain traps of technical education is the idea that every problem has only one right answer. Sometimes this is true and sometimes it is not. Based on my experience through graduate school, I think one-answer solutions are emphasized to the point that students stop looking for more than one right answer. This is unfortunate because most of the problems encountered in industry have *many right answers*. Often, the best solution to a real-life problem is the second or third right answer that you can find.

Being aware of the one-right-answer trap is a beginning. I would also ask open-ended questions that encourage more than one right answer. And I would also make up some homework problems that had several right answers.

5. Some people scoff at the idea of intuition, claiming it doesn't exist, or that it is logical thinking taking place at high speed. Such people don't know their left brain from their right. *Intuition* can be defined as those thinking processes that we cannot explain verbally because they take place in the right brain. Recall that Sperry's fourth conclusion was that we cannot explain in words how the right brain works. This means the right brain can process data without our being verbally aware of it. Since the right brain is nonverbal, it processes data on a different level of consciousness.

So, I would accept the existence of intuition and would try to develop it in my students. If you have any reservations about intuition, consider that even Einstein said "The really valuable thing is intuition."

6. Finally, I would try to develop *what-if thinking* (right brain) as well as sequential thinking (left brain) in my students. Sequential thinking is what we usually do. It is the kind of thinking where the result of each step is used in the next step. It is logical and mathematical. It is neat and clean and unforgiving. It is what a computer does. What-if thinking is different. This is the kind of thinking where anything goes and all things are possible. What-if thinking searches for more than one right answer. It is sometimes illogical, it breaks the rules, it makes mistakes, it is playful, it is sometimes foolish, and it is creative. □

LEARNING AND REMEMBERING

How People Learn

1% through taste

1-1/2% through touch

3-1/2% through smell

11% through hearing

83% through sight

How Much People Remember

10% of what they read

20% of what they hear

30% of what they see

50% of what they see and hear

50% of what they say as they talk

90% of what they say as they do a thing

How Long People Remember

Method of Instruction	Recall 3 hr. later	Recall 3 days later
A. Lecture Method only	70%	10%
B. Demonstration Method Only	72%	20%
C. Both Lecture and Demo	85%	65%

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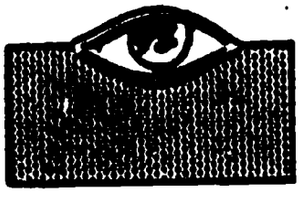
ALL THINGS BEING EQUAL YOU'LL REMEMBER --

THIS MUCH OF WHAT YOU HEAR

10%

THIS MUCH OF WHAT YOU SEE



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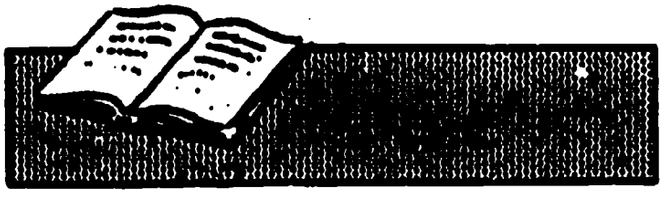
THIS MUCH OF WHAT YOU READ



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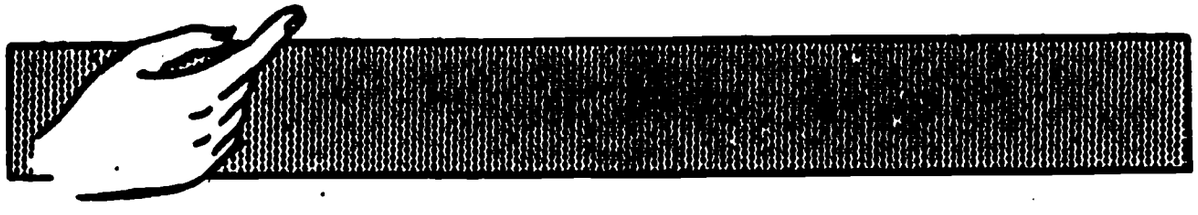
AND THIS MUCH OF WHAT YOU DO



90%

SO DO ALL YOU CAN!

BASIC TEACHING TECHNIQUES THAT WORK

GROUP DISCUSSION

When you want to involve all your students in exploring an idea, in organizing and articulating their thoughts, in developing critical thinking--try the technique of group discussion. This method can also be used to advantage after a lecture, a film showing or a symposium or panel discussion.

Some Discussion Do's and Don'ts

1. Prepare in advance a few questions students may want to ask about the topic. This will prime the pump...will help students think of questions of their own. Tell them you have anticipated a few questions, and either pass them out, write them on the board, or read them aloud.

2. Don't answer student questions yourself, if possible. Ask the class if anyone can come up with an answer. Ask for additional suggestions on handling the problem.

3. If students have questions or topics different from the ones you prepared, use theirs. Yours are just a kick-off point to get them going.

4. Don't let any one person talk too often or too long. Simply say, "Let's hear from someone else now," or "I'm sorry to interrupt but we must let others in on the discussion."

5. If some people do not talk (there are silent or shy ones in every group), throw them a question--"How would you handle a problem like this?"

6. When one topic seems exhausted or the time is about up, summarize what has been said and add you own thoughts or ideas--then go on to another topic. Don't devote more than five to eight minutes on any one problem.

7. Involve the students in your summary, by asking "What is one important thing you have picked up from this discussion?" If no one responds, you can say, "Well, I've learned...Who else has something he or she will remember from our discussion?"

DEMONSTRATION AND PRACTICE

There are times in most skill classes when talk and textbooks are not enough: the participants need to be shown how a thing is done, and need opportunities to practice the skill themselves.

Demonstration Do's and Don'ts

1. Explain the purpose of the demonstration. Make your explanation clear and simple. Make sure all students understand.

2. Make sure every member of the group can see what is going on.

3. Do not demonstrate too many steps at once. If it is a complicated procedure, demonstrate one segment at a time, and allow time for questions about that segment.

4. Repeat the procedure slowly, emphasizing key points, and again encouraging questions.

5. Allow time for every member of the group to practice the operation. While you move about the room, observing, assisting, and correcting individuals as they practice.

6. Limit comments and questions during the demonstration to what is actually being demonstrated. Tell students there will be time for questions on broader aspects of the subject later.

7. If appropriate, have a general class discussion of difficulties, variations, applications, after the demonstration and practice period. This will cue you to specific learning difficulties--which students need special help, and of what kind.

ROLE PLAYING

This technique helps students to actually experience a human relations situation, rather than simply read or hear about it. It is particularly useful in business education, in adult basic education, in family life education. By acting out a situation, people gain insight into their own feelings and those of others.

Some Role Playing Do's and Don'ts

1. Select the role-playing situation from a discussion topic, or from a problem a particular student has brought to the classroom. For example, John reported that he applied for a job, had a job-interview, but didn't get the job. He tells what happened during the interview. You can then ask "How could that interview have been handled differently? Would anyone like to play John's role and another the interviewer's role?"

2. As players act out the situation, ask them to comment on "How do you feel now as John, being interviewed?" and "How do you feel about John as the prospective employer? Would you hire him? What should he have done differently?"

3. Avoid rehearsing, but do set the stage for the players by describing the scene and answering any questions they might have--asking John exactly what he said and did, what he wore, etc.

4. Follow up by having the two players switch roles, one now playing the interviewer, the other the interviewee.

5. If someone does not want to be a role player, encourage him/her but don't push. But if this method is introduced in the right spirit, it usually rouses people's interest and they rarely refuse to cooperate.

6. Do not assign a role too close to a person's character, which could be

embarrassing. He/she will probably learn more by playing a completely different kind of person. A very assertive person, after taking the part of a very shy person, said it had been a useful experience.

7. Some amount of clowning or initial awkwardness is to be expected. But if horseplay gets out of hand, or shyness and silence take over, gently remind them of the time remaining, and ask them to get on with the problem situation.

8. Invite the rest of the group, who have observed the role playing, to give their opinions about what went on. Discussion should relate to how it feels to apply for a job, to be questioned, corrected, advised flattered, or whatever the role-playing sequence tried to portray.

9. If possible, give every member of the group an opportunity to be part of a role-playing sequence, rather than a mere observer.

10. Explain to participants that role-players should not "ham up" or overplay their roles. Every part should be undertaken as if it were real.

11. One way to involve more people: divide the class into small groups so that the number of people in each group equals the number of roles to be assigned, then appoint several as observers.

ASKING QUESTIONS

All students are familiar with teachers who feed them information and then ask questions about it. This is often merely the time-worn game of "Let's guess what the teacher wants us to say." However, skillful question-asking plays a vital part in teaching adults.

Asking Questions: Some Do's and Don'ts

1. Ask for more information. By asking the responder to be more explicit and perhaps more sure of his/her answer, "Can you give me an example?" or "When you say xyz, what do you mean?"

2. Make critical observations, to make the learner look at his/her answer in a more probing way. "Why do you think that is so?" or "How would you explain your answer to someone who feels just the opposite?"

3. Encourage silent members to comment if you think they might have the answer but are reluctant to speak up. "This is probably something you know quite a bit about, David."

4. Piggy-back new questions on top of the responses you get for your previous question. "OK, let's take that approach and take it one step further."

5. Try not to answer your own questions too often. After a while you will be performing a one-person show...with little learning produced.

6. Don't ask "Are there any questions?" We all know the silence that

typically follows this question. Here are some questions that are more likely to bring responses as you proceed through a talk or demonstration:

1. "Before I go on, does this make sense to you?"
2. "Am I going too fast?"
3. "I am not sure I am doing this right. Do my examples make sense to you? Do you need additional information from me?"
4. Ask "Are there any questions you want me to answer?" Wait for five seconds, then address a person who you feel has, or ought to have, a question: "Perhaps you could start, Henry?"

TRANSFER

DEFINITION: A classification of a group of variables (principles) of learning. These variables when utilized will assist the learner to use what has been learned in one situation in a different situation (possibly in a modified or generalized form)

PURPOSE: To shorten learning time and form the basis for creative thinking, problem solving, and higher mental processes

FACTORS: Similarity (Past to Present)
Simulation (Present to Future)

Higher order thinking requires the application of concepts, generalizations and discriminations to a new situation: a situation to which the person does not have a ready or automatic response. If we wish higher thinking to occur in students, we need to learn how to teach concepts, generalizations and discriminations so they contribute to the thinking required for creativity, problem solving and the making of responsible and satisfying decisions.

It is important to stress that "teaching" includes all modes of learning for which the teacher is responsible: direct instruction, deductive, inductive, discovery learning, cooperative learning, or individual learning, plus use of prepared, written or AV materials. A teacher plans, prepares for and programs students' utilization of these modes of learning. The concept of teaching certainly includes more than direct instruction. (Incidentally, this is a concept many people still have not acquired.)

At times we may wish students to discover concepts, generalizations and discriminations by themselves. At other times we will teach them to students. The important issue is not how concepts, generalizations and discriminations are acquired but that they are acquired. That achievement is primarily the result of the professional skill with which the teacher works regardless of the mode of acquisition.

TEACHING CONCEPTS

A concept is the name of a category rather than a specific instance. To develop a concept, regardless of whether we teach it or students discover it, we first must identify for ourselves the critical attribute(s), or properties, or functions of the concept that make that concept what it is: that determine which members are included in or excluded from that concept or category. "A square is a closed figure with four equal sides and four right angles." Note the critical attributes of a square are themselves

Knowledge of the concepts which are related in a generalization is an essential first step before the generalization can be understood and subsequently applied to a new situation.

To certify possession of a concept requires the learner discriminate, generate or select new instance of that concept. This extension of understanding is called "elaboration" and creates a network of relationships in the learner's long term memory. A network is more easily stored and retrieved from memory than are single instances.

TEACHING GENERALIZATIONS

Generalizations include rules, statements of critical attributes and probability statements. A generalization expresses the relationship between two or more concepts. ("Dogs can be friendly." "People live in houses." "Periods go at the end of declarative sentences." "A response which is reinforced increases in probability or frequency.")

To teach or to acquire a generalization, the initial examples or instances of that generalization must be clear and consistent. Then the student should be presented with a wide variety of circumstances in which the generalization is held constant. Only after the generalization is well learned are exceptions presented.

Let's look at a simple example: the generalization that "two of anything plus two more of the same thing equals four of that thing." We represent this generalization by 2 + 2 = 4. To teach that generalization, our examples should hold the generalization constant but present it in the widest possible variety of circumstances. "Two candy bars plus two candy bars equals four candy bars." "2 days + 2 days = 4 days." 2

concepts: closed, figure, four, equal, sides, right angles. Each of these concepts must be discriminated from other angles, equal from unequal. Then the square must be discriminated from a trapezoid, rectangle or other parallelogram regardless of size, color, position, thickness of lines etc.

The critical attribute of the concept "compromise" is that each party gets some of what s/he wants but not all of what s/he wants. If a boy wants to use the car every Saturday and his father wants him to work in the yard, it is a compromise if some Saturdays he gets the car and some Saturdays he works in the yard. The number of yard and car Saturdays is not the critical attribute. There could be 1 and 3 in a month or there could be 2 and 2. The latter ratio would be the critical attribute of father and son having equal rights to determine what occurs on Saturdays.

Sometimes it is not possible to articulate the critical attribute. Even linguists have not specified the critical attribute of a sentence in a way we can transmit it to a student. In such cases, through the use of examples, we have to develop an intuitive (non articulated) knowledge of the concept. "The ball is in the tree," is a sentence. "The ball," or "The ball is," (subject and verb) or "in the tree are not sentences.

Nevertheless the articulated or non-articulated (intuitive) critical attribute(s) of a concept must be understood by the student before valid discriminations can occur. Discriminations are made on the basis of presence or absence of critical attributes. "A circle is a continuous line with all points equidistant from the center." "A square is a four, equal sides, closed figure with four right angles." These critical attributes must be perceived either intuitively or consciously by the learner if s/he is to discriminate a square and a circle from other forms.

blocks + 2 blocks = 4 blocks. "2 minutes + 2 minutes = 4 minutes." "2 ideas + 2 ideas = 4 ideas."

When we are teaching the generalization that the letters c-a-t in that order spell "cat" we introduce "cat" on the bottom of the page, on the top and in the middle, in capital letters, in manuscript, in cursive, written on book jackets, on billboards, and on pictures.

When we wish the subject to discover the generalization. "When two or more subjects are joined by "or", the subject closest to the verb determines the verb form," we introduce examples such as: "Dogs or a cat is in the house." "A cat or dogs are in the house." "He or they or I am going." "I or they or he is going." "He or I or they are going." We will use the same subjects but vary the order, so we focus the student on the relationship between the verb and subject closest to it.

If we plan to teach this same generalization by direct teaching rather than by discovery, we may use the same examples but we will teach the rule rather than have students discover it. Practice will continue with, Harry or I am responsible." "Carrots or celery has fiber." "Either you or he goes with me." to make obvious the relationship of the verb form to the closer subject.

TEACHING DISCRIMINATIONS

Making a discrimination is a process which requires the opposite kind of thinking from generalizing. Discrimination requires that of treating perceivably similar things as if they are different.

To teach students to discriminate between concepts or to discriminate between generalizations, we hold surrounding conditions constant and vary the presence or absence of the critical attribute(s) which indicate it is or is not an instance of that concept or generalization. Then the student needs to support or impeach the correctness of the discriminative judgment by identifying the discriminator being used. This will be clarified by the following examples.

To discriminate between the concepts of "addition" and "subtraction," we would hold everything constant except the critical attribute which indicates which operation is appropriate (combining quantities is the critical attribute of the concept of addition, separating parts from a whole is the critical attribute of the concept of subtraction.) "How many pennies would you have if you had three pennies and found two?" vs. "How many pennies would you have if you had three pennies and lost two? "How many problems would you have done if finished 15 and then did 10 more?" vs. "How many problems would you still have to do if you had to do 15 problems and had already finished 10?"

To develop the discrimination between the generalization that "c-a-t spells cat" and other similar letter configurations we might ask the student to find the name of the animal that says "meow" in the following: can, cap, car, cat, cab, cad.

To test the students ability to discriminate between the concept of "cat" and "skunk" we would need to use pictures of a black and white cat and a skunk.

To develop the discrimination of which subject is closest to the verb, we would ask the students to circle the word that determines the verb form and underline other subjects that had no effect. To develop the discrimination of that rule from the rule, "Whenever

two or more subjects are joined by "and" the verb is always plural" we would use sentences such as: "He or I ___ going" and "He and I ___ going", then have the student select the correct verb form.

Problems exist in teachers' use of psychological generalizations because discriminators are not taught so teachers can differentiate times when a generalization should be used by the teacher and when it should not because the situation is different. As a result, generalizations in teaching can become false absolutes.

Let's look at a way we might apply the psychological generalization, "Mass practice for fast learning, distribute practice for long retention (remembering)." The concepts of "fast learning" and "long retention" are familiar to teachers. The critical attribute of the concept of "practice" is doing something again to increase accuracy or fluency. The critical attribute of the concept of "massed" is practicing several times without intervening activities. The critical attribute of the concept "distributed" is that other activities occur between practice periods.

Using this generalization as one thinks about teaching requires discrimination whether, at this point, learning is necessary and needs to become more accurate, or whether that learning has been reasonably achieved and the objective is students' automating and/or remembering that learning. As an example, when the concept of "square" is being learned, students will mass practice, identifying squares of various sizes, shapes, colors. Once students have learned the concept "square", distributed practice will be utilized as to identify squares with longer and longer time intervals between identifications so permanence of learning is achieved.

To teach the rule about "subjects joined by "or", we would give students many sentences with different subjects and varying numbers of subjects, holding the "or" which joins those subject constant (massed practice). Then we might review the learning the next day, skip a day, review, skip several days, review occasionally for long remembering (distributed practice). Eventually we would have students discriminate between sentences where subjects were joined by "or", and sentences when subjects were joined by "and".

SUMMARY:

To teach a concept, we identify (if possible) the critical attribute(s) of that concept and present that attribute in a wide variety of circumstances. The greater the variety of circumstances the more effective is the learning of that concept and the most accurately that learning will transfer to new situations.

To teach a generalization, we make sure students understand the concepts and the relationship among them. Then we hold the generalization constant in the widest possible variety of circumstances, the greater the variety of circumstances, the more mental operations on the part of the student and the more memorable and transferable that generalization will become.

To teach a discrimination, we hold the circumstance constant and vary only the presence or absence of the critical attribute(s) of that concept or generalization which the student must use to make the discrimination. The more discriminations a student makes when surrounding circumstances are similar, the more quickly the discrimination will be learned and the longer it will be remembered.

Teaching concepts, generalizations and discriminations effectively is a major contribution to students' ability to think creatively, to solve problems and to make responsible, satisfying decisions.

TRANSFER

Select a learning task from your area of expertise which has not been previously taught:

Write a statement or describe an activity which will make the "connection" from past learning on experience to the new learning (task listed above):

Write a statement or describe an activity which will assist in making the "connection" to future use of the new learning (task listed above)

HINTS ON PROMOTING TRANSFER

1. Look for knowledge in past experiences that will propel present learning.
2. Identify and label the similarities of the two learnings which make transfer from one appropriate to the other.
3. Use appropriate associations from the past and develop productive present associations.
4. Elicit the appropriate set to perform.
5. Make sure learning is achieved to an appropriate degree.
6. Identify and label key discriminators that make a situation what it is.
7. Practice transfer ... It is a critical attribute of "learning how to learn".

TEACHING CONCEPTS, GENERALIZATIONS, AND DISCRIMINATIONS

Madeline Hunter

All higher order thinking is based on the thinker's possession and use of concepts, generalizations and discriminations. Thinking is a performance behavior which results from having learned both the necessary content and the thinking process involved. The ability to generalize (perform by thinking) entails the use of concepts rather than specific items of information. To generalize correctly requires the ability to discriminate when a generalization is applicable and when it is not.

CONCEPTS GENERALIZATIONS AND DISCRIMINATIONS DEFINED

A concept is the name of a category (chair, red, mammals, courage) which includes many members. For example, a chair is a piece of furniture with a back, on which only one person typically sits.

A generalization is a statement of relationships between or among concepts. To generalize is to treat perceivably different things as if they were the same. (Elephants, whales and mice are all mammals.)

To discriminate is to treat perceivably similar things as if they were different. (A chair is not the same as a stool. A porpoise and a fish are not the same. A "b" is not the same as a "d".)

To generalize and to discriminate are mirror images of each other. Both are based on accurate concept formation.

Adapted from Doug Russell and Madeline Hunter - 1976

Planning for Effective Instruction
(Lesson Design)

Planning is acknowledged to be one of the most influential factors in successful teaching. Should there be a system to this planning or does one hope for a burst of inspiration from which effective instruction will automatically flow? While the writers are all for inspiration, we agree with Edison, that a certain amount of well-directed "planning perspiration" will work wonders in increasing learners' successful achievement. We believe that a systematic consideration of seven elements, which research has shown to be influential in learning and which therefore should be deliberately included or excluded in planning for instruction, will make a great deal of difference in learners' success or lack of it.

It is assumed that:

1. Content has been identified
2. The degree of competence has been chosen
3. A specific objective based on the student's previous learning has been selected.

Now the teacher is ready to plan for that instruction regardless of whether the plan is implemented by input from the teacher, by materials or by the student him/herself.

For each instructional session, the teacher must consider the following seven steps separately to determine whether or not it is appropriate for the particular objective, for the particular student, and whether it should be included, or combined with subsequent steps.

Components of Lesson Design

1. Anticipatory Set

   Anticipatory set is the result of an activity which occurs during the time that a student is physically arriving or mentally "shifting" gears from the activity just finished. Anticipatory set elicits attending behavior (deliberate focus) and a mental readiness or "set" for the content of the ensuing instruction. Planning an effective activity to develop anticipatory set will

   a) focus the students' attention,

   b) provide a very brief practice on previously achieved and (if possible) related learnings and/or

   c) develop a readiness for the instruction that will follow.

   This anticipatory activity should continue only long enough to get the student ready so that the major portion of instructional time is available for the accomplishment of the current objective.

2. The Objective and Its Purpose

This step involves communication which informs the student what he/she will be able to do by the end of instruction and why that accomplishment is important, useful and relevant to present and future life situations.

3. Instructional Input

To plan this step, the teacher must determine what information (new or already processed) is needed by the student in order to accomplish the present objective. Often students' are expected to achieve an objective without having been taught that which is necessary in order to do so.

Once the necessary information has been identified, the teacher must select the means for "getting it into the student's head." Will it be by the teacher, a book, film, diagram, picture, real object, demonstration? The possibilities are endless.

4. Modeling

It is facilitating for the student to not only know about, but to see examples of an acceptable finished product (model, diagram, graph) or a process (how to perform a particular procedure).

It is important that the visual input of modeling be accompanied by the verbal input so the student is focused on the essentials rather than being distracted by transitory or irrelevant factors in the process or product.

5. Checking for Understanding

The teacher needs to check for the student's possession of essential information and also needs to observe students' performance to make sure they exhibit the skills necessary to achieve the instructional objective. This can be done by:

1. Asking questions involving knowledge
2. Requesting a demonstration of the desired skill/task
3. Observing the desired behavior

6. Guided Practice

The beginning stages of learning are critical in the determination of future successful performance. Consequently, the students' initial attempts in new learning should be carefully guided so they are accurate and successful. Having instructed, teachers need to circulate among students to make sure the instruction has "taken" before "turning students' loose" to practice independently. The student needs to perform all (or enough) of the task so clarification or remediation can occur immediately as it is needed. In that way, the teacher is assured that students will be able to perform the task satisfactorily without assistance rather than practicing mistakes when working by themselves.

7. Independent Practice

Once the student can perform without major errors, discomfort or confusion, she/he is ready to develop skill by practicing without the availability of the teacher. Only then students' can be given an assignment to practice the new skill or process with little or no teacher direction.

Simply "knowing" the seven steps in planning for effective instruction will not ensure that hose steps are implemented with artistry. Simply having an "artistic knack" will also not ensure the elements that promote successful learning are included in instructional planning. Both the science and the art of teaching are essential

LESSON DESIGN

SET

OBJECTIVE

PURPOSE

INPUT

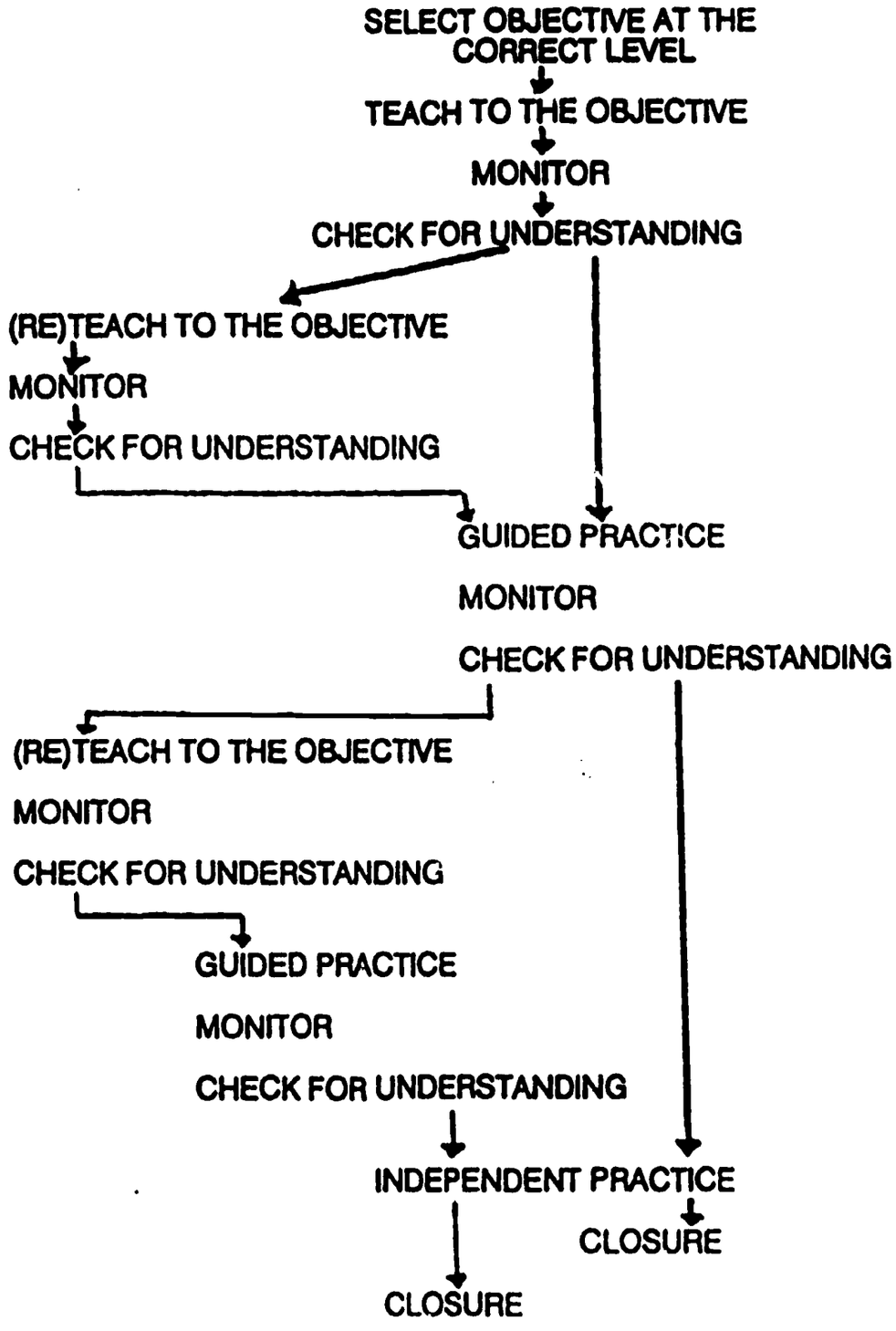
MODELING

CHECK FOR UNDERSTANDING

GUIDED PRACTICE

INDEPENDENT PRACTICE

[CLOSURE]


SELECT OBJECTIVE AT THE CORRECT LEVEL
TEACH TO THE OBJECTIVE
MONITOR
CHECK FOR UNDERSTANDING
(RE)TEACH TO THE OBJECTIVE
MONITOR
CHECK FOR UNDERSTANDING
GUIDED PRACTICE
MONITOR
CHECK FOR UNDERSTANDING
(RE)TEACH TO THE OBJECTIVE
MONITOR
CHECK FOR UNDERSTANDING
GUIDED PRACTICE
MONITOR
CHECK FOR UNDERSTANDING
INDEPENDENT PRACTICE
CLOSURE
CLOSURE

LESSON DESIGN

The components of LESSON DESIGN are . . .

1. _____

2. _____

3. _____

4. _____

5. _____

6 _____

7. _____

8. _____

TELL ME AND I WILL FORGET

SHOW ME AND I MIGHT REMEMBER

INVOLVE ME AND I WILL UNDERSTAND

LEARNING AND REMEMBERING

How People Learn

1% through taste

1 1/2% through touch

3 1/2% through smell

11% through hearing

83% through sight

How Much People Remember

10% of what they read

20% of what they hear

30% of what they see

50% of what they see and hear

50% of what whey say as they talk

90% of what they say as they do a thing

How Long People Remember

Method of Instruction	Recall 3 hr. later	Recall 3 days later
A. Lecture Method only	70%	10%
B. Demonstration Method Only	72%	20%
C. Both Lecture and Demo	85%	65%

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OBSERVATION PRACTICE SHEET

A set was utilized to focus student(s) on the new learning
Evidence: _____

_____

The objective for the lesson was communicated to the student(s)
Evidence: _____

_____

The purpose for learning the new material was communicated to the student(s)
Evidence: _____

_____

Information was provided which was relevant to the new learning
Evidence: _____

_____

Modeling was used when/if appropriate
Evidence: _____

_____

A check for understanding was used to determine if students understood the information/modeling
Evidence: _____
_____

Guided practice was provided when/if appropriate
Evidence: _____

_____

Independent practice was provided when/if appropriate
Evidence: _____

_____

Closure activities were used to determine if learning took place
Evidence: _____

_____

LESSON DESIGN PLANNING SHEET

How will I focus the student on the "new" learning:

How will I let the student know what is to be learning and why?

What information will be presented? How will it be presented?

Will modeling, demonstrating or giving an example be necessary? How will it be done?

How will comprehension of the information and/or demonstration be checked?

How will guided practice be provided?

How will independent practice be monitored?

How will mastery of the task be determined?

ELEMENTS OF INSTRUCTION
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What Teachers Should Know And Be Able To Do

Following are excerpts from Toward High and Rigorous Standards for the Teaching Profession, *a report issued by the National Board for Professional Teaching Standards:*

The National Board for Professional Teaching Standards seeks to identify and recognize teachers who effectively enhance student learning and demonstrate the high level of knowledge, skills, dispositions, and commitments reflected in the five following core propositions.

1. Teachers are committed to students and their learning.

Board-certified teachers are dedicated to making knowledge accessible to all students. They act on the belief that all students can learn. They treat students equitably, recognizing the individual differences that distinguish their students one from the other and taking account of these differences in their practice. They adjust their practice, as appropriate, based on observation and knowledge of their students' interests, abilities, skills, knowledge, family circumstances, and peer relationships.

Accomplished teachers understand how students develop and learn. They incorporate the prevailing theories of cognition and intelligence in their practice. They are aware of the influence of context and culture on behavior. They develop students' cognitive capacity and their respect for learning. Equally important, they foster students' self-esteem, motivation, character, civic responsibility, and their respect for individual, cultural, religious, and racial differences.

2. Teachers know the subjects they teach and how to teach those subjects to students.

Board-certified teachers have a rich understanding of the subject(s) they teach and appreciate how knowledge in their subject is created, organized, linked to other disciplines, and applied to real world settings. While faithfully representing the collective wisdom of our culture and upholding the value of disciplinary knowledge, they also develop the critical and analytical capacities of their students. Accomplished teachers command specialized knowledge of how to convey and reveal subject matter to students. They are aware of the preconceptions and background knowledge that students typically bring to each subject and of strategies and instructional materials that can be of assistance. They understand where difficulties are likely to arise and modify their practice accordingly. Their instructional repertoire allows them to create multiple paths to the subjects they teach, and they are adept at teaching students how to pose and solve their own problems.

3. Teachers are responsible for managing and monitoring student learning.

Board-certified teachers create, enrich, maintain, and alter instructional settings to capture and sustain the interest of their students and to make the most effective use of time. They are also adept at engaging students and adults to assist their teaching and at enlisting their colleagues' knowledge and expertise to complement their own.

Accomplished teachers command a range of generic instructional techniques, know when each is appropriate, and can implement them as needed. They are as aware of ineffectual or damaging practice as they are devoted to elegant practice.

They know how to engage groups of students to ensure a disciplined learning environment, and how to organize instruction to allow the school's goals for students to be met. They are adept at setting norms for social interaction among students and between students and teachers. They understand how to motivate students to learn and how to maintain their interest even in the face of temporary failure.

Board-certified teachers can assess the progress of individual students as well as that of the class as a whole. They employ multiple methods for measuring student growth and understanding and can clearly explain student performance to parents.

4. Teachers think systematically about their practice and learn from experience.

Board-certified teachers are models of educated persons, exemplifying the virtues they seek to inspire in students—curiosity, tolerance, honesty, fairness, respect for diversity, and appreciation of cultural differences—and the capacities that are prerequisites for intellectual growth: the ability to reason and take multiple perspectives, to be creative and take risks, and to adopt an experimental and problem solving orientation.

Accomplished teachers draw on their knowledge of human development, subject matter, and instruction, and their understanding of their students to make principled judgments about sound practice. Their decisions are not only grounded in the literature, but also in their experience. They engage in lifelong learning which they seek to encourage in their students. Striving to strengthen their teaching, board-certified teachers critically examine their practice, seek to expand their repertoire, deepen their knowledge, sharpen their judgment, and adapt their teaching to new findings, ideas, and theories.

5. Teachers are members of learning communities.

Board-certified teachers contribute to the effectiveness of the school by working collaboratively with other professionals on instructional policy, curriculum development, and staff development. They can evaluate school progress and the allocation of school resources in light of their understanding of state and local educational objectives. They are knowledgeable about specialized school and community resources that can be engaged for their students' benefit, and are skilled at employing such resources as needed.

Accomplished teachers find ways to work collaboratively and creatively with parents, engaging them productively in the work of the school.

LEARNER ASSESSMENT

According to the UCLA Model (Hunter), there are four Essential Elements of Effective Instruction. Name the four:

1. _____
2. _____
3. _____
4. _____

Anticipatory set is a "focusing" principle of learning. What are the critical attributes of anticipatory set?

1. _____
2. _____
3. _____

Teachers make many decisions as they plan their actions to conduct an instructional episode. In your own words, name the factors to be considered in designing a lesson:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

There are four major classifications for the principles of learning. Name them:

1. _____
2. _____
3. _____
4. _____

Thinking it over ...

I liked...

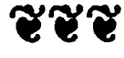
and I ...

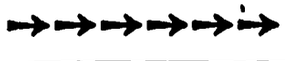
I would have liked:

I learned:

today was:

A problem I solved





more about:

I would like to know

I am: *optional*

Name _____

School _____

I plan to:

Use reverse side for additional comments and suggestions. Thank you!

Adapted from a form developed by Sidney L. Hahn, University of Nebraska at Lincoln 1985

G L O S S A R Y

Active Participation: Active responding by a student. It may be thinking (covert) behavior or observable (overt) behavior. Active participation increases the rate and degree of learning. However, just any activity will not do. Only relevant student responding increases learning.

Affective Domain: Referring to learning involving interest, attitudes and values and the development of appreciation. Krathwohl has categorized objectives in this domain into: receiving, responding, valuing, organization, and characterization.

Analysis: Breaking material into parts and comparing or contrasting those parts. Analysis is the fourth level of Bloom's taxonomy, (knowledge, understanding, application, analysis, synthesis, evaluation). It enables a student to detect relationships among parts and the way they are organized.

Anticipatory Set: An activity designed to prepare the student for upcoming learning. Focus is provided on what is to be learned and previous learning/experience is tied to what is to be learned.

Application: Using appropriate generalizations and skills to solve a problem encountered in a new situation. The third level of cognition in Bloom's taxonomy (knowledge, understanding, application, analysis, synthesis, evaluation). Activities designed at the application level provide practice in the transfer of learnings.

"Birdwalking": To wander off the objective during teaching so that time is wasted and learners lose focus of the learning.

Bloom's Taxonomy: A classification of cognitive objectives into 6 levels: knowledge, understanding, application, analysis, synthesis, evaluation. Serves as a guide in writing objectives, diagnosing student behaviors, and planning activities to extend student thinking.

Check for Understanding: An overt activity in which the instructor ascertains to what degree the student comprehends the new instructional input/information.

Closure: Actively eliciting feedback from learners during appropriate intervals within the lesson in order to determine if learners grasped critical atributes of the learning. Closure is most appropriately used at the conclusion of an instructional objective. Closure can be achieved through Checking for Understanding.

Cognitive Domain: Refers to that area of student learning related to knowledge (knowledge of content, knowledge of concepts, knowledge of generalizations, and knowledge of processes).

Concept: A name for a class of objects or events Example: square is the concept name for any object having 4 equal sides and 4 right angles. A student understands a concept when she/he can discriminate between examples and nonexamples of the concept.

Condition: One component of a behavioral objective that defines that defines limitations, materials, or equipment utilized for instruction and practice during a lesson.

Congruent: Used to describe teacher action and decision when in agreement, harmony or correspondence to a selected objective.

Consequence: Anything not needed or desired by the learner. A consequence following an undesirable behavior may suppress that behavior.

Contaminator: Something that interferes or distracts from the learning; sometimes intentionally done to determine if learners can discriminate correct from incorrect information.

Covert Behavior: Student responses that are not observable. Thinking about the desired learning. This level of active participation takes less time than an overt response but it cannot be monitored by the teacher. Allowing time for covert behavior (thinking) can increase the quality of the overt response.

Critical Attribute: The unique characteristics or elements of a specific learning which make that learning separate and distinct from any other learning.

Diagnostic Survey: A method(s) of determining where a student's learning left off and new learning begins. May be informal (asking oral questions) or formal (written pretest). Usually designed from the task analysis (the sequential learnings leading to the final objective) using questions from easy to more difficult. Used to determine "correct level of difficulty".

Elements of Effective Instruction: A classification system of teacher decision making developed by Madeline Hunter. When teachers make consistent and conscious decisions during instruction, they increase the probability of student learning. The following are the four categories:

1. Select objectives near the correct level of difficulty
2. Teach to objectives
3. Monitor and make adjustments
4. Use principles of learning

Evaluation: The level of thinking at which a person makes a judgment based on sound criteria. There is no right or wrong answer. Evaluation is the sixth level of Bloom's taxonomy (knowledge, understanding, application, analysis, synthesis, evaluation). It involves a combination of all the other levels of the taxonomy.

Extinction: The absence of any reinforcers. To ignore behavior that has occurred results in reduction in the frequency of that behavior. A variable of reinforcement.

Extrinsic Motivation: A variable of motivation. Increases focus by using reinforcers (rewards) not related to the learning itself. Incentives for learning tasks are established by someone other than the learner. The child focuses on a task in order to receive a payoff. Examples: doing task to earn a grade, points, star, etc.

Feeling Tone: The atmosphere or climate created by the teacher in the learning environment. Students interact in this environment according to their perceptions of the tone.

Goal: A subjective statement of what is desired (usually long range).

Guided Practice: During the lesson the student practices what has been taught with close teacher monitoring to catch any mistakes before students practice independently. It gives the students successful original learning, promotes retention, and allows the teacher to monitor.

Hemisphericity: Refers to the specialization of the right and left hemisphere of the brain. The left side processes information that is sequential or verbal. The right side processes spatial or visual information.

Individualized Instruction (personalized): Meeting the needs, interests, and abilities of learner.

Interest: Something vivid, different, or meaningful to the learner. One of the variables of motivation. When elements of a lesson are interesting it focuses the learner on the task.

Intrinsic Motivation: When the task is the reward itself for a learner, the learner is motivated to stay on task, i.e., a student reads a book because she/he loves to read. A variable of motivation.

Knowledge: The student recalls or recognizes information. The lowest or first level of cognition in Bloom's taxonomy (knowledge, understanding, application, analysis, synthesis, evaluation). The student needs information that she/he can recall before using that information at higher levels of cognitive complexity.

Knowledge of Results: Providing the student with feedback about the adequacy of his/her response. This feedback should come immediately after student responses and it should be specific in terms of what the student has done well and what she/he might do to change. A variable of motivation. It helps students focus on the task when they know how well they are doing.

Learning: One component of a behavioral objective that defines the specific content component (information, skill, or process) taught in a lesson.

Learning Styles: An individual's way of acquiring and processing information and experience.

Lesson Plan Format: Step by step process for instruction, review, or diagnosis of a specific learning.

Level of Concern: The degree to which expectations are perceived by the learner. The level may be raised or lowered depending on the desired effect by the teachers.

Level of Difficulty: That the particular learning step being taken toward the objective is an achievable one by the learners--not an objective that is so difficult its achievement is impossible or one so easy it requires no learning effort or it has already been achieved.

Massed Practice: Short, intense practice periods which occur very often after new learning has been taught. Scheduling practice periods aids retention. Promotes fast learning during initial stages of learning.

Meaning: When new learning relates personally to the student in a language which is understood and is perceived as being of value to the student.

Meaningful Processing: Causing students to do more that just read or hear the material one more time. Having students actually demonstrate understanding or ability to apply information will promote retention.

Modeling: Teaching using visual-spatial activities. Will increase rate and degree of learning as well as retention. Learning acquired by modeling activities is processed in the right hemisphere of the brain.

Monitor and Adjust: A process whereby the teacher elicits overt behavior from the students, checks that behavior, interprets it, and decides on appropriate adjustments. Adjustments may be in terms of content, teacher presentation, or principles of learning. It is the third category of teacher decision making in the Effective Elements of Instruction. Allows the teacher to check on the learning of students and to change instruction appropriately (teaching diagnostically).

Motivation: Refers to the focus, attention, or persistence of student behavior. One of the principles of learning. Elements of motivation that can be used to increase focus are: success, knowledge of results, interest, level of concern, and intrinsic/extrinsic motivators.

Objective: The goal toward which teaching is directed. A clear statement the content, thought process, and behavior of the learner. It may also contain the conditions for testing and the performance level required.

Overt Behavior: An observable form of student involvement. One level of active participation. Overt behavior is elicited from students so the teacher can check for understanding, establish closure and provide knowledge of results (monitor student progress). It increases the learning by keeping students actively involved.

Performance Level: Minimum competency expectation to measure achievement of a given learning.

Positive Reinforcement: A strategy used to strengthen productive behavior or change non-productive behavior into productive behavior.

Post Test: Assessment of achievement at the end of a lesson.

Practice: An activity in which the learner develops proficiency by repeating an action. Practice may occur under the close supervision of the teacher (guided) or without supervision (independent).

Pre Test: A brief diagnosis before a lesson to determine if the learning is appropriate for the learners in the group.

Principles of Learning: Fundamental processes identified by psychologists that improve the efficiency of learning; e.g. motivation, retention, active participation, and reinforcement.

Proactive: A Brophy Characteristic factored out of the research to describe effective teachers. Refers to behavior initiated by the teachers themselves--in contrast to reactive behavior that less effective teachers exhibit in situations when students do something that forces them to make some sort of immediate reactive response. Proactive teachers predict possible undesirable situations or behaviors before they occur and attempt to solve or prevent them from occurring.

Psychomotor Domain: Refers to the area of student learning associated with the combined function of body and mind.

Retention: The act of remembering or retaining learning. One of the principles of learning. Variables affecting retention (discussed in this book) are: meaning, modeling, meaningful processing, and practice.

Schedule of Reinforcement: Refers to the relationship between the number of times a behavior occurs and the number of times it is reinforced. A regular schedule (reinforcement after every occurrence of the behavior) makes for fast learning. An intermittent schedule (reinforcing behavior periodically) makes the behavior more persistent and more resistant to forgetting.

Script Taping: A handwritten descriptive narrative of the lesson. It is an objective and non-evaluative technique for collecting observable descriptive data about teacher and student behavior.

Sponge Activities: Activities relevant to the objectives designed to enhance learning during slow or "wait" times.

Success: Refers to the feeling of achievement when one accomplishes a task. A variable of motivation. Success is more probable if tasks are set at the appropriate level of difficulty.

Synthesis: Refers to the putting together of parts into a whole using creative and original thinking. The fifth level of Bloom's taxonomy (knowledge, understanding, application, analysis, synthesis, evaluation). The student must draw upon elements from many sources and put them together into a pattern new to the learner.

Task Analysis: An identification of the sublearning necessary to accomplish a given objective. The process of task analysis involves breaking a learning down into enabling skills and knowledge, and sequencing the list. Can be used to diagnose for correct level of difficulty, as a guide in teaching to an objective, and for monitoring and adjusting.

Teach to an Objective: The part of the teaching-learning process in which the teacher chooses behaviors that are relevant to the intended objective. These behaviors (questions, directions, activities, explanations, responses to learner efforts) lead to the accomplishment of the objective and increase a student's time on task.

Transfer: Using previous or "old" learning in a new situation. Allows learners to build on and expand previous learning.

Understanding: Refers to the student grasping the meaning of the intended learning. This is the second level of Bloom's taxonomy (knowledge, understanding, application, analysis, synthesis, evaluation). Evidence of comprehension or understanding includes being able to translate the information into another form of communication, interpreting by summarizing, and extrapolating or predicting based on trends indentified.

ATTACHMENT D

Certificate of Completion

Elements of Instruction VTAE Workshop

Certificate of Completion

This is to certify that

Participated in an 18 hour workshop February 5-7, 1990, Wisconsin Rapids, Wisconsin

Howard Lee, Project Director/Instructor

William Mamel, Instructor

A project sponsored by the Wisconsin State Board of Vocational, Technical and Adult Education and the University of Wisconsin-Stout, Center for Vocational, Technical and Adult Education

ATTACHMENT E

Rating Scales

Center for Vocational Technical and Adult Education
Group numbers based on the PRIMARY group for this analysis
Analysis on 06-Mar-90 at 05:12 PM. Data from file: ELEMENTS_89
Survey analysis of response to 6 questions, by 31 people

==========

Question: 1 - Clarity and appropriateness of workshop objectives.

==========

Group	Mean		Stand Dev		Number		Quartile			
	Omit	No Omit	Omit	No Omit	People	Checks	First	Median	Third	IQR
0	4.65	4.65	0.55	0.55	31	31	4.25	4.76	5.13	0.88

Omit	1	2	3	4	5	
0.00	0.00	0.00	0.03	0.29	0.68	People
0	0	0	1	9	21	

==========

Question: 2 - Applicability of Workshop Content.

==========

Group	Mean		Stand Dev		Number		Quartile			
	Omit	No Omit	Omit	No Omit	People	Checks	First	Median	Third	IQR
0	4.71	4.71	0.46	0.46	31	31	4.36	4.80	5.15	0.79

Omit	1	2	3	4	5	
0.00	0.00	0.00	0.00	0.29	0.71	People
0	0	0	0	9	22	

==========

Question: 3 - Delivery of Information/Modeling.

==========

Group	Mean		Stand Dev		Number		Quartile			
	Omit	No Omit	Omit	No Omit	People	Checks	First	Median	Third	IQR
0	4.58	4.58	0.50	0.50	31	31	4.10	4.64	5.07	0.97

Omit	1	2	3	4	5	
0.00	0.00	0.00	0.00	0.42	0.58	People
0	0	0	0	13	18	

==========

Question: 4 - Relevance of Activities.

==========

Group	Mean		Stand Dev		Number		Quartile			
	Omit	No Omit	Omit	No Omit	People	Checks	First	Median	Third	IQR
0	4.77	4.77	0.43	0.43	31	31	4.53	4.85	5.18	0.65

Omit	1	2	3	4	5	
0.00	0.00	0.00	0.00	0.23	0.77	People
0	0	0	0	7	24	

==========

Question: 5 - Attention to Your Efforts.

==========

Group	Mean		Stand Dev		Number		Quartile			
	Omit	No Omit	Omit	No Omit	People	Checks	First	Median	Third	IQR
0	4.35	4.50	1.34	0.68	31	31	4.00	4.67	5.08	1.08

Omit	1	2	3	4	5	
0.03	0.00	0.00	0.10	0.29	0.58	People
1	0	0	3	9	18	

Center for Vocational Technical and Adult Education
Group numbers based on the PRIMARY group for this analysis
Analysis on 06-Mar-90 at 05:12 PM. Data from file: ELEMENTS_89
Survey analysis of response to 6 questions, by 31 people

==========

Question: 6 - Use of Principles of Learning.

==========

Group	Mean		Stand Dev		Number		Quartile			
	Omit	No Omit	Omit	No Omit	People	Checks	First	Median	Third	IQR
0	4.58	4.58	0.56	0.56	31	31	4.11	4.68	5.09	0.98

Omit	1	2	3	4	5	
0.00	0.00	0.00	0.03	0.35	0.61	People
0	0	0	1	11	19	

ATTACHMENT F

Participant Comments

Elements of Instruction
Evaluation Form
February 5 - 7, 1990

Comments for Question #1 - Clarity and appropriateness of workshop objectives.

Clearly stated at beginning of each day.

Very appropriately clear in a.m., jello in p.m.

I finally do believe it was good to get the gestalt! My right brain feels stronger already.

This workshop ties in to the shortcomings of our district.

Objectives were stated and covered.

The coming together of the course seemed foggy at times.

Comments for Question #2 - Applicability of Workshop Content.

I can apply the principles immediately and begin to work on certain aspects.

Definite need in system (VTAE).

This workshop will be useful in upgrading our program and teaching techniques.

Content met needs.

Comments for Question #3 - Delivery of Information/Modeling.

Excellent modeling of various overt and covert participation strategies, this certainly did enhance learning.

Good delivery and modeling - because of time frame sometimes to fast.

Outstanding effort.

Was presented at a level that everyone could understand.

Too much too fast at times.

Talk and reinforced overlays and or passed out material.

Both Howard and Bill presented material well.

Excellent modeling of effective teaching.

Comments for Question #4 - Relevance of Activities.

Yes. Very effective especially liked the presentation exercises. Certainly forced us to tie things together.

Very.

Very good reinforcement.

More time for the activities.

As a workshop - great, but if it was possible to work on one curriculum lesson through the process.

Reinforced ? techniques used.

Use of name-call cards/fall-in work.

Very relevant.

Very enjoyable and meaningful.

Comments for Question #5 - Attention to Your Efforts.

Very comfortable in response to people.

Good - positive reinforcement most of the time.

Very student centered focus.

Met with any student and at any time they wanted to communicate.

Adequate.

Comments for Questions #6 - Use of Principles of Learning.

Excellent.

Time - not everyone learns at the same speed.\

Applied many principles.

Excellent.

Comments for Question #7 - What is the most significant thing you learned from the workshop?

To take a look at my own style of teaching and evaluate it.

Selecting the objective at the appropriate level.

The necessity to reinforce learning in several ways.

All of it.

Review and update of principles.

Exposure to the instructor model and the lesson design.

Lots of previously taught concepts were renewed.

Lesson design formula.

Teaching is not absolute.

It's been a long time since I took a methods class; I needed this.

To look at the total picture - all aspects.

The importance of Lesson Design.

How to better use both old and new teaching skills.

After not teaching for 23 years - how to plan a lesson.

Design of Lesson/Elements of Instruction.

Desk-top and continue to work toward the objective - improved teaching.

The elements of instruction.

The teaching techniques must be congruent with objectives.

A good lesson has a great deal of though and planning going into it and monitoring and adjusting is ongoing.

Decisions and where they occur and why the overall view or "macroness" of the workshop.

The volume of material was fantastic. Now go back and put to good use of application.

To be able to see what were doing and why.

That I am performing some things very well and now know how to improve at others.

Teaching to objectives and matching them to the level.

What I am doing is correct. I just have to fine tune and get the right connection words.

Put "teaching" back into a scientific approach.

The critical behaviors of a teacher.

Comments for Question #8 - Do you have suggestions that we should consider in planning the next workshop?

Have the notebooks in the same order as presentations.

Continue using the critical behaviors.

No.

Not at the moment.

Reorganize workbooks to match overheads and strenghen the students organization.

None.

Time management presents a problem....so much to do, so little time.

Have participant consider developing an "active plan" or have them implement the concepts in their own classroom/district.

Color code the tabs on the notebooks.

Enjoyed the schedule - appropriate breaks and time frame.

Ok.

Plan a lesson before presentation.

Outstanding - keep ups the good work.

As a workshop - great, but if it was possible to work on one curriculum lesson through the process.

Keep lesson plans at end - demo.

Afternoon sessions feel so rushed! Maybe not so many breaks in the morning.

Have more "punch" words for recall - such as "match" and "strengthen" and "12,365".

Have a list of all people with their names and addresses if we want to write and share information.

More time.

Larger tables.

Very well done.

There is too much content for the allotted time.

Flow chart of the model and workshop - when - where.

Comments for Question #9 - Your personal comments, suggestions and/or concerns:

Great workshop - gave me so many ideas.

I'm excited about the next workshop, concerned how can I motivate others "back home" to use.

Both of you were very good.

Good job gentlemen.

World help facilitate night studies.

In general felt workshop was really well done and feel now that I have a very good base to start from to get good base to sta.t from to get good skills developed to do my job.

I'll be back in March with eager appetite.

Thank you for a job well done!

I enjoyed myself.

Very good!

Very informative.

I enjoyed the workshop very much.

Please - only three people to a table - need room to operate. Great workshop!

Facilities, organization and workshop was outstanding.

Thanks - it was good.

Thank you.

Very valuable and I had a good review in some parts and new insights in several areas.

Great job instructors - you have a great handle on the Hunter method and it shows in your teaching expertise!

Any forms of evaluations were checked and comments were made constructively. Job well done! Meals and service and hotel were.....

Very good!

this was a super experience for me - it makes me feel great being an instructor and gives me some more tools to do a better job.

Sometimes your overheads didn't match our notebooks.

A lot of new terminology to remember in a short time.

Thank you - very helpful. Howard's use of d's rather than th's in pronunciation occasionally distracting. Loved Howard's "downhome" examples.

DOCUMENT RESUME

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AUTHOR Lee, Howard D.

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IDENTIFIERS Hunter (Madeline)

ABSTRACT

This document contains materials from a workshop on Elements of Instruction Vocational, Technical, and Adult Education (VTAE). The model used in the workshop was based on the teaching model resulting from the work of Madeline Hunter. The workshop consisted of formal presentations, opportunity for participants to put the content into their own words, and practice. Participants completed an evaluation form and rated each area above 4.5 on a 5-point scale. A four-page report is followed by these attachments: correspondence, a participant list, sample certificate, and participant comments. The largest attachment consists of the handout materials from the workshop. These are divided into nine sections: introduction; decision in teaching and introduction to elements; selecting objectives at the correct level; teach to an objective; monitor and adjust; principles of learning; lesson design; reference; and glossary. The section on principles of learning is further divided into motivation; rate and degree (active participation, reinforcement, anticipatory set, and closure); retention; and transfer. Each section begins with a list of learner objectives. Information sheets, excerpts from Hunter's work, and pencil and paper activities follow. (41 references) (YLB)

Final Report

Workshop Conducted for

Wisconsin State Board of Vocational, Technical and Adult Education

Howard D. Lee
Project Director

Center for Vocational, Technical and Adult Education
University of Wisconsin-Stout
Menomonie, WI 54751

ELEMENTS OF INSTRUCTION
VTAE WORKSHOP 90
June 1990

Project #30-107-150-230

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ELEMENTS OF INSTRUCTION-VTAE WORKSHOP 90
FINAL REPORT

Background

The Elements of Instruction VTAE workshop was conducted February 5-7, 1990, in Wisconsin Rapids. A similar workshop was conducted March 7-9, 1989, and requested again by the VTAE Instructional Service Administrators.

The workshop was based on the notion that effective instruction is directly related to recruitment, retention, placement and overall program effectiveness and thus vital to any school. The model used in this workshop is based on the UCLA Teaching Model, Essential Elements of Instruction, resulting from the work of Dr. Madeline Hunter. Dr. Hunter has translated psychology research along with hundreds of hours of observation and analysis into meaningful content easily understood by those in the teaching field. When coupled with an ongoing program of instructional supervision and live instructional conferences, this two-part process has been judged to be one of the most effective ways to heighten, maintain and refine instructional skills.

The process assumes that there is a body of knowledge which forms the underpinning of teaching. This body of knowledge is not limited to any one content area or learning situation, but rather, "It applies to every human interaction that is conducted for the purpose of learning." In contrast to many other models of teaching, the UCLA teaching model negates the need for a particular style of teaching . . . eliminating a "recipe" to follow for success. Instead, the model recognizes teaching as a process of decision-making, utilizing proven research to delineate what a teacher needs to consider before deciding what to do. Districts have seen that the UCLA model undergirds many other models of teaching (direct, indirect, discovery approach, cooperative learning, individualized instruction, etc.) because it identifies the decisions that all teachers make regardless of the chosen method of instruction. As such, it provides the base for other programs to build upon. The process acknowledges the fact that the most important educational element in our schools is the instructional skill of the teacher.

Many new and experienced instructors need help concentrating on improving instruction - studying research, integrating effective

instructional techniques into new curriculum programs, and highlighting instructional behaviors in teaching. The "Elements of Instruction," forms the theoretical base of knowledge describing how students learn and form this knowledge, how instructors can then make instructional decisions to increase the probability that students will learn.

Workshop Objectives

The objectives of the workshop were:

Develop an awareness of the Elements of Instruction as it applies to vocational, technical, and adult education by:

1. Defining criteria and critical questions relating to a profession and teacher responsibilities.

2. Identifying characteristics of teaching to an objective.

3. Selecting an objective at the correct level of difficulty.

4. Recalling the steps to monitor and adjust the teaching.

5. Identifying and demonstrating use of the principles and characteristics of learning.

6. Keeping a log of teaching actions for two weeks.

7. Analyzing and evaluating the teacher action with respect to the Elements of Instruction.

Workshop

The content of the workshop consisted of techniques in researched topics of Elements of Instruction as applied to vocational, technical, and adult education. Topics included: teach to an objective; selecting objectives at the correct level of difficulty; monitor and adjust, and principles of learning; including motivation, retention, transfer, set, active participation, reinforcement and closure.

Letters were sent to each district announcing the workshop in December 1989. At that time, background information, objectives, teams, registration and credit information were also included in the letter (see Attachment A).

Each VTAE District was invited to send three participants. It was suggested that a team be made up of two instructors and one first-line supervisor. This team would also participate in a three day follow-up Instructional Supervision workshop to be offered a few weeks after the Elements of Instruction workshop.

The workshop was conducted with formal presentations, opportunity for participants to put the content in their own words, and practice. Practicing was accomplished through sharing, worksheets and group activities. Each participant had an opportunity to practice what they learned by presenting a lesson and to observe other instructors as they presented instruction. Feedback from participants was gathered at the end of the first two days and adjustments made to accommodate participant's concerns.

Initially thirty-six signed up for the workshop from thirteen VTAE Districts. Thirty-two showed and participated in the three day workshop. Of the participants, eight were supervisors, two were curriculum specialists two were general education instructors, and twenty were occupational instructors (see Attachment B).

Participants were each provided with a three ring notebook (see Attachment C) with labeled dividers. Also provided were numerous articles, information sheets, worksheets and notebook paper. Many transparencies were developed and also mailed to each district for use. Each participant also received a Certificate of Completion (see Attachment D). All thirty-two participants signed up for a one credit course, 190-570 Elements of Instruction, through the University of Wisconsin-Stout. Based on the University of Wisconsin System Policy #22, the tuition fee was waived except for the segregated fee which participants paid.

Each participant completed an evaluation form. Questions and mean scores based on a 5.0 scale are indicated below:

1. Clarity and Appropriateness Of Workshop Objectives.	4.65
2. Applicability of Workshop Content.	4.71
3. Delivery of Information/Modeling.	4.58
4. Relevance of Activities.	4.77

5. Attention to Your Efforts. 4.50

6. Use of Principles of Learning. 4.58

The tabulated average rating was 4.6 (see Attachment E). Participant comments are attached and indicate excellent results (see Attachment F). Many expressed the lack of some district support by not sending anyone, or only sending one person to the workshop. Many asked if the workshop would be offered again.

ATTACHMENT A

Letters

November 9, 1989

(See attached list)

Dear (name):

The Wisconsin State Board of Vocational, Technical and Adult Education and the Center for Vocational, Technical and Adult Education, University of Wisconsin-Stout are conducting two staff development workshops:

- **ELEMENTS OF INSTRUCTION**
  February 5-7, 1990
  Mead Inn
  Wisconsin Rapids, WI
- **INSTRUCTIONAL SUPERVISION**
  March 5-7, 1990
  Mead Inn
  Wisconsin Rapids, WI

The purpose of the first workshop, ELEMENTS OF INSTRUCTION, is to heighten the skills of the instructor by providing knowledge and skills in the essential elements of instruction. Each district should consider sending a team of three people: two teachers (ACE - or part-time instructor may also be sent) and one first line supervisor, or department head. It is important that the first line supervisor be someone who has responsibility to evaluate/supervise instructors.

The second workshop, INSTRUCTIONAL SUPERVISION, will apply skills learned in the first workshop by providing a focus on improvement of instruction by the development of observation, analysis and conference skills. Participants will be able to reinforce the effective instruction of skills observed, and refine or add new skills.

Districts should plan to send the same first line supervisor to each workshop. One or both of the teaching staff who attended the first workshop should also plan to attend the second with the supervisor. A team will facilitate the comprehension, application and implementation of the new concepts and strategies learned.

The presenters for the workshop will be Howard Lee, Co-Director, Center for Vocational, Technical and Adult Education, University of Wisconsin-Stout and Bill Mamel, Consultant, Instructional Troubleshooters, Minneapolis, MN.

Credit Offered: One credit (either graduate or undergraduate) will be offered with tuition waived. A small UW-System institutional fee (graduate $10.40, undergraduate $13.28) will be the only charge. Registration for credit will occur at the workshop.

A confirmation letter will be sent to registered participants prior to the workshop.

The workshop grant will cover lunches and breaks. Other meals, travel and lodging expenses are the responsibility of each VTAE district. There will be no general registration charge for this workshop.

Please complete the enclosed registration form and return it in the envelope provided by **Wednesday, January 10, 1990.** Call the Mead Inn (715) 423-1500 directly for lodging arrangements, noting you are attending this workshop. A block of rooms have been reserved. We look forward to your involvement in this staff development activity. If you have any questions, please contact Steve Schlough at (715) 232-3793.

Sincerely,

Howard Lee, Co-Director
CVTAE, UW-Stout
218 Applied Arts Bldg.
Menomonie, WI 54751

Steve Schlough, Workshop Coordinator
CVTAE, UW-Stout
218 Applied Arts Bldg.
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dmd

Enclosures: Registration Form
Agenda

cc: Bob Johnson
James Urness

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ATTACHMENT B

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ATTACHMENT C

Handout Materials

ELEMENTS OF INSTRUCTION

TABLE of CONTENTS

Agenda

ELEMENTS OF INSTRUCTION VTAE WORKSHOP

Monday, February 5, 1990 Mead Inn-Wisconsin Rapids

WORKSHOP INSTRUCTORS:

- Howard Lee, Co-Director, Center for Vocational, Technical & Adult Education, University of Wisconsin-Stout
- Bill Mamel, Manager Operations Training, LORAM, Hamel, MN

7:30 - 8:00	**Registration**
8:00 - 9:00	Introduction, Objectives & Expectations - Howard/Bill
9:00 - 9:45	Decisions in Teaching and Overview of the Elements - Howard
9:45 - 10:00	**Break**
10:00 - 12:00	Selecting Objectives at the Correct Level - Howard
12:00 - 12:45	**Lunch with discussion**
12:45 - 2:45	Motivation - Bill
2:45 - 3:00	**Break**
3:00 - 3:15	Assignment - Howard
3:15 - 3:30	Closure - Bill

EVENING

6:30 - 8:00	**Consultation - Informal Discussion**

Agenda

ELEMENTS OF INSTRUCTION VTAE WORKSHOP

Tuesday, February 6, 1990 Mead Inn-Wisconsin Rapids

8:00 - 8:20	Review/Objectives - Howard
8:20 - 9:45	Teach to an Objective - Howard
9:45 - 10:00	**Break**
10:00 - 12:00	Rate and Degree - Bill • Active Participation • Reinforcement • Anticipatory Set • Closure
12:00 - 12:45	**Lunch with discussion**
12:45 - 1:15	Monitor & Adjust - Howard
1:15 - 2:15	Introduction to Lesson Design and Micro-teaching Demonstration - Bill
2:15 - 2:30	**Break**
2:30 - 3:15	Continue
3:15 - 3:30	Closure/Assignment/Review/Evaluation - Howard

EVENING

6:30 - 8:00	**Consultation - Informal Discussion**

Agenda

ELEMENTS OF INSTRUCTION VTAE WORKSHOP

Wednesday, February 7, 1990 Mead Inn-Wisconsin Rapids

8:00 - 8:30	Review/Objective - Howard
8:30 - 9:30	Retention- Howard
9:30 - 9:45	**Break**
9:45 - 10:45	Transfer - Bill
10:45 - 12:00	Micro-Teaching
12:00 - 12:45	**Lunch with discussion**
12:45 - 2:00	Continue Micro-Teaching
2:00 - 2:15	**Break**
2:15 - 3:00	Putting It All Together - Bill/Howard
3:00 - 3:30	Assignment/Feedback/Evaluation - Howard

ELEMENTS OF INSTRUCTION

Assumption of the Model

1.

2.

3.

4.

5.

DECISIONS IN TEACHING

The learner will:

1. Recall and explain the three decisions in teaching.
2. Identify the category of decision statements.
3. Write one decision statement for each category.

Hunter defines teaching as:

> **"a constant stream of professional decisions made before, during and after interaction with the student; decisions which, when implemented, increase the probability of learning."**

DECISION MAKING MODEL

1. Content Decision:

A.

B.

-
-

2. Learner Behavior Decision:

A. Input

B) Output:

1)
2)

3. Teacher Behavior Decision:

Teacher actions fall into four basic types:

1)

2)

3)

4)

Knowing the principles of learning and and using them appropriately is essential.

Principles of Motivation - Learning more if student is focused.
Rate and Degree - The speed and amount of learning.
Reinforcement and Practice - Teach more faster.
Level of aspiration - affects the rate and degree of learning
Retention and Transfer - How you get students to use the learning.

"Many people are seeking an instrument that will diagnosis, then will "tell us what to do." it is important that we remember this has not been accomplished in any profession that deals with the intricacies of a human being. The thermometer registers with considerable accuracy the temperature of the patient, but a doctor must decide which medication to use.

M. Hunter

DECISIONS IN TEACHING

Content Decision	Learner Decision	Teacher Decision

CRITICAL BEHAVIORS OF A TEACHER

Select Objectives at the Correct Level

Teach to an Objective

Monitor & Adjust

Use Principles of Learning
- Motivation
- Rate & Degree
- Retention
- Transfer

Avoid Abuse of Principles of Learning

DECISIONS IN TEACHING

Educators have finally arrived at the point that professionals in medicine achieved when the latter discovered that germs and not evil spirits were causing much of the problem. We now know many cause-effect relationships in teaching and learning. As a result, we can use those causal relationships to promote student learning in the same way the doctor uses his medical knowledge to promote health. In both education and medicine we are learning more each day even though there still remains much we don't know.

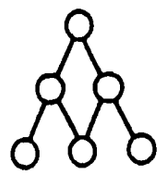
Whenever humans are involved, we are dealing with probability, not certainty. When the doctor prescribes, it is to increase the probability of the patient's recovery, not to guarantee it. In the same way, if teaching decisions and actions are based on the principles presented in this book and in the Mastery Teaching series of videotapes, the probability of students' learning will be increased but it will not be guaranteed.

There is no question but that genetic endowment and past experience influence students' learning but your own teaching decisions also have a powerful impact. Consequently, teaching is now defined as a *constant stream of professional decisions made before, during and after interaction with the student; decisions which, when implemented, increase the probability of learning.* Students learn more when they are taught effectively than they can learn on their own. *Even champions have coaches.*

For the last two decades, educators at the University of California, Los Angeles, have been studying teaching decisions and their implementation: the essence of the process of teaching. It was found that, regardless of who or what is being taught, all teaching decisions fall into three categories: (1) what content to teach next, (2) what the student will do to learn and to demonstrate learning has occurred, and (3) what the teacher will do to facilitate the acquisition of that learning. When those professional decisions are made on the basis of sound psychological theory and *if* those decisions also reflect the teacher's sensitivity to the student and to the situation, *learning will be increased.* Should errors be made in any of those three decisions, student learning can be impeded. Consequently, it is important for teachers to consciously and deliberately identify the decisions needing to be made in each category and base their decisions on research validated knowledge. Equally important is teachers' ability to "read" signals from students and to assess the learning situation so necessary adjustments will be made.

I The Content Decision

The first professional decision to be made is the answer to the question, "What will be taught." You may be thinking that decision has already been made. You're to teach English I, History of the United States, French II, Computer Science. Those subjects merely label the content area in which you, the teacher, need to make the critical decision about the particular part of that content you will teach *today.* To increase the probability of students' learning, that decision must reflect your knowledge of what that particular group of students already knows and what is next to be learned. The psychological generalization which guides your content decision is that basic concepts, simple generalizations and processes must be acquired before more complex learnings are achieved. Advanced processes and understandings are built on a pyramid of simpler ones.



complex understandings and processes

simpler generalizations and skills

simple concepts and behaviors

Therefore, to make the decision about the content you are going to teach successfully tomorrow, you need to determine which prior learnings are prerequisite to more complex ones and make sure those essential learnings have been *acquired* by your students (not "have been presented to") before advanced material is introduced.

Once the decision has been made about the "what" of teaching, the content decision, teacher and student effort should be directed to the acquisition of that new level of learning, not be dissipated on nonessential or tangential matters. It is tempting to spend class time on vivid or interesting "bird walks" that may distract attention from, rather than enhance understanding of more important issues. A typical example is, "By the way, that reminds me of something that happened _____." If "what happened" will help students understand what is being presented, by all means use the example. If what "happened" is tangential or only loosely related, don't waste time by introducing it. If you have lords of extra time or comedy relief needs to be introduced to brighten up the lesson, a "bird walk" might be forgivable, but most of us find that time and energy are in too short supply to be expanded on loosely associated material or random exchange between students and teachers. This does not mean you ignore students' nonrelevant

commer a sign of skill in teaching to dignify a student's extraneous contribution without letting it dilute the lesson. "That's an interesting point that will come a little later," usually will handle a tangential contribution.

Then by all means *do* come to it later, either with that student after class or with the group at a time when it is relevant. "You remember Harry cited an example of_____."

Lest you think disciplining yourself in terms of your content decision imposes rigidity to your teaching, it doesn't. It adds the professional rigor that leads to successful learning. Remember, *you're the decision maker* and if, during class, a *better* idea emerges, by all means pursue it.

You may wish to delegate the content decision to your students and let them decide when they have achieved sufficient mastery to move on but, as their teacher, you can't delegate your responsibility for the results of that decision and for its potential to increase or interfere with the probability of their learning.

II The Decision Regarding Learning Behavior of the Student

While the first decision of teaching is based on content, the *what* of teaching, the second decision is directed to the *student behavior* that makes learning possible, the student's *how* of learning. There are two aspects of a student's learning behavior. One aspect is focused on the input modalities the student will use to acquire knowledge or skill. Will (s)he read, discuss, listen, observe, do? *There is no one best way to learn*, and use of a combination of these input behaviors usually is more effective then relying on only one.

Another aspect of the teacher's decision about learning behavior is focused on students' output which validates acquisition of the knowledge or skill. That output must be *perceivable* so you know (not hope) that students have achieved and are ready to move on to the next learning or whether you must reteach or extend practice of the current learning. Also, that student output behavior must *validate* that learning has been accomplished. Output can't be such that students can bluff, guess or be lucky in their demonstration of accomplishment. As with the content decision, the input and output student behavior decision also can be delegated to students but *not* your responsibility for the results of their decision.

Your *instructional objective* specifies the first two teaching decisions of 1) content and 2) behavior of the learner and brings both of them to the level of conscious professional decision making rather than leaving them as vague intentions or wishful thinking.

To make those two decisions more identifiable, in the .les below, the specific content is capitalized and the validating student behavior is written in italics. All instructional objectives begin with, "The Learner will...(T.L.w.)

T.L.w. *state* the SIX CATEGORIES OF PLANTS and *describe* the CHARACTERISTICS OF EACH.

T.L.w. *write* his/her INTERPRETATION OF ARNOLD's POEM.

T.L.w. *respond in German* to the QUESTIONS ON PAGE 37.

T.L.w. *diagram* the ASSERTIONS AND CONCLUSION.

T.L.w. *discuss* the CHANGES WHICH RESULTED FROM THE TREATY.

T.L.w. *solve* the QUADRATIC EQUATIONS ON PAGE 97.

Having an articulated instructional objective, rather than intuitive or subliminal intent, accomplishes two things. First, it helps you focus your teaching on the learning behavior which you will use to validate whether students have achieved the intended learning. Second, it encourages you to identify the prerequisite learnings which must be taught (and learned!) in order for students to achieve the intended results.

III The Decision Regarding Teacher Behavior

The third decision in teaching (note that this is the *third* decision not the first) is directed to your own teaching behavior; what *you* will do to increase learning. If you deliberately use principles of learning which research indicates are accelerants to student achievement, you will have power to increase your students' motivation to learn, the speed and the amount (rate and degree) of their learning, and their retention and appropriate transfer of that learning to new situations requiring creativity, problem solving and decision making. Principles of learning constitute a powerful pharmacy of alternatives from which you can create an effective learning prescription. Knowing principles of learning and deliberately and artistically using them is the hallmark of the master teacher. This book and the accompanying series of Mastery Teaching videotapes were developed to present some of these principles to you and thereby to help you consciously achieve master teaching.

The responsibility for making these three decisions of, (1) content (what to teach today and tomorrow), (2) behavior of the learners (which input modalities students are going to utilize and the student output that will validate successful accomplishment) and (3) your teaching behavior (utilization of principles of learning to accelerate achievement) sounds like a lot of professional decision making. It is! These decisions, however, are already being made by you either purposefully, intuitively,

or by default every day you teach. As you read, you will find that you already are using much of what is described in this book or shown in the Mastery Teaching Videotapes, but now you will have categories and labels for the decisions you are making and you will know the research that supports them. You may also learn some new techniques which will make your teaching not only easier but more predictably successful.

Each chapter in this book and each module in the videotape series will focus on some aspect of professional decision making to help you become more conscious of why you do what you are doing and, as a result, you will become increasingly effective as a teacher.

After you study this book and view the videotapes, you should have deliberately constructed a professional launching pad from which your own particular style and artistry in teaching can soar.

Bon voyage!

I. Content
II. Behavior of the Learner
III. Behavior of the Teacher

Write the number that describes the teacher decision (the three teaching decisions are noted above) by each statement.

The teacher is deciding whether:

___ A. The content should be Chaucer or Shakespeare.

___ B. To stand by a student to increase that student's concern or move to the other side of the room to lower concern.

___ C. To tell students that they need not worry if at first things are not clear, that everyone has trouble at first.

___ D. To have students write a paper or take a test to demonstrate their understanding.

___ E. To have students validate their comprehension by making a diorama or a time line.

___ F. To start with the ideas of Socrates or those of Plato.

___ G. To have students read the chapter or view a film.

___ H. To teach photosynthesis or respiration.

___ I. To praise a student for what he has accomplished or chide him for what he has not.

___ J. To teach by using examples in the book or to create original examples.

___ L. To indicate the number correct on a student's paper or the number incorrect.

___ M. To teach the critical attribute of assumptions and conclusions.

What's Wrong with Madeline Hunter?

by Madeline Hunter

"Never worry about your enemies, it's your friends who will sink you" was advice given me years ago. How true! As I look at the implementation of some so called "Hunter Models" I cringe. Our clinical theory of instruction was developed on the premise that the teacher is the decision maker. Some zealots have turned the model into a rigid, non creative misinterpretation which "lays on" teachers a way of teaching rather than identifying research based, cause-effect relationships which help teachers make educational decisions. Knowing cause and most probable effect frees teachers for artistic and successful teaching.

Briefly summarized, ours is a model which a) identifies professional decisions teachers must make, b) supplies research based cause-effect relationships to support these decisions and c) encourages the teacher to use data emerging from student and situation to augment or correct decisions in order to increase the probability of learning.

No one can tell a teacher what to do. Ours is an effort to tell the teacher what to consider before deciding what to do. Teacher decisions in this model emerge from propositional knowledge: knowing what has an effect on student learning. Propositions are those generalizations, validated by psychological research, which identify behaviors that affect learning such as: "Massing practice increases speed of learning. Distributing practice increases retention of what has been learned." These generalizations guide teaching decisions. From these propositions, educators who use the model must develop procedural knowledge: knowing how to translate propositions into effective teaching practice. This

implies that a teacher will be able to design "massed practice" so it remains meaningful and interesting. Decisions also must be made about the length of time between "distributed practice" so it maintains maximum efficiency. Propositions are easy to learn, performance procedures are much more difficult. Unless propositions are translated into procedures, however, the "never use a preposition to end a sentence with" syndrome occurs.

Finally, this model demands conditional knowledge: knowing when to use each proposition and why existing conditions in content, student, teacher and situation would indicate its use with whatever modifications are necessary. This is the essence of translating science into artistry in teaching.

Known by several names (A Clinical Theory of Instruction, ITIP, Mastery Teaching, PET, Clinical Teaching, Target Teaching, UCLA model, Hunter model), this model identifies the decisions all teachers must make regardless of content, age or ethnicity of the learner, style of teacher or mode of teaching (direct, indirect, discovery, lecture, cooperative learning--you name it!). Our model is analogous to nutrition theory. Regardless of the menu, age of the eaters, type of meal, service or preference of the cook, food to be nutritious must incorporate those nutrients which promote health. Using nutrition theory, a skilled cook can produce a variety of meals, served in a variety of ways to accommodate the taste of the eaters. In the same way a teacher can accommodate preferences of learners and his/her own style as long as those elements that promote learning are incorporated in planning, teaching, and evaluating. These elements have been described in detail elsewhere.(1)

Lets examine some criticisms which are based on misunderstandings, and some problems arising from mutations which are no part of the basic model.

1) Hunter's is a rigid model which stifles creativity.

On the contrary, this model provides the launching pad from which creativity can soar. All creativity is based on structure from which artistry and freedom emerge. The propositions of this model are exquisitly used by the gifted teacher, never abused. The Taj Mahal is not a violation of the propositions of physics, engineering and design, but a beautiful manifestation of an architect's inspired use of those propositions.

2) The model was created to evaluate teachers.

Not at all! This model was created to increase teaching excellence. Learning to use this model has changed many marginal teachers into effective ones and effective teachers into masters. With the orientation of this model, an observer can pinpoint inappropriate teaching decisions and behaviors then offer productive alternatives. Rather than general admonishments, "You need to tighten up your discipline--make your lessons more interesting--create more motivation in your students--develop better class routines," this model equips observer and teacher with knowledge, skills and the practical assistance that makes excellence attainable.

We can't save them all, but when we accept defeat we know it is not for want of help that is research based and so practical that the teacher must have been unwilling to or incapbable of using the help offered.

3) The Hunter model is great for direct teaching but does not apply to discovery learning or cooperative learning.

Not so! This model undergirds the decisions made in every method of teaching. Teaching decisions may be delegated to the learner. Any style of teaching or learning may be used, but the teacher remains responsible for learning outcomes. The more skilled the teacher in using this model, the more independent and successful the learners can become and the greater is the variety of teaching and learning styles being used.

4) The Hunter model applies only to elementary teaching.

This model is equally effective in secondary and university teaching.(2) It applies to every human interaction which is conducted for the purpose of learning. A faculty meeting can be a classic example of violation of what is known about human learning. Faculty meetings, PTA meetings, School Board meetings, Rotary Club meetings, Scout meetings and grade level meetings are improved by conscious application of the principles of human learning. Parent conferences, assemblies, working with a disturbed or unhappy student, discipline of a group or of an individual student, all involve those same principles which affect human learning. An educator who can artistically implement principles of learning will be more successful with any of the above situations.

5) The Hunter model helps teachers who are having difficulty but is not needed by successful teachers.

A great many of the basic propositions in this model were identified by observing successful teachers. Psychological research enabled us to label these generalizations and explain why they worked. Teachers

moved from intuitive to purposeful behavior. They knew what they were doing, why they were doing it and did it on purpose. As a result, students' learning became more predictable and more successful. Teachers consistently express their gratitude for bringing this predictability to their planning and teaching. All professionals continue to grow as their knowledge, skills and artistry increase. Teachers are no exception. In the same way that use of this model speeds up learning for both slow and fast learners but does not make them equal, use of this model enables less expert teachers to become more effective and expert teachers to become proficient educational artists.

6) This model expects the impossible of the typical teacher.

Not at all! Student teachers learn to use theory to make productive teaching decisons with results that are gratifying to them, to their students and to their supervising teachers. Using this model results in more inspiration and less perspiration for all teachers. Knowledge and skill make all work easier to accomplish successfully and artistically. This model is not based on working harder but on working smarter.

7) "Elements of Effective Instruction" must be in every lesson.

Horrors no! That "white sauce receipe" for teaching was designed to help teachers plan. In no way can a teacher be judged by the inclusion of all those elements. In fact, many lessons will incorporate only a few elements as, over a period of time, students progress toward achievement of complex learnings. Any observer who uses a check list to make sure a teacher is using all seven elements does not understand the model.

8) If a little is good, more is better.

Probably not! Teachers can over reinforce, or "motivate" when that is not needed. Students can practice beyond productivity. Students can make decisions that are not facilitating to their growth. Educators must develop conditional knowledge to determine "under what conditions," procedural skills should be used. For example, if students are fatigued or bored by practice, that practice should be changed or discontinued even though students have not mastered the skill. It's "common sense", something which can be uncommon in education. Frequency counts are no more useful to teachers than to doctors. How many times pills or surgery are prescribed does not tell you if a doctor is making valid medical decisions.

9) Observers make judgments about a teacher's decisions without checking with the teacher as to the reasons for those decisions.

Checking the reasons for the teacher's decisions will often reveal excellent professional thought processes. One the other hand, an observer can frequently "see" what was not visable to the teacher who is busy teaching. (The general with binoculars in the lookout can see more of what's going on than can the soldier who is making it happen in the trenches.) Communication between teacher and observer as to the basis for each one's thinking results in learning for both.

10) Too much is expected too soon.

This model is deceptively simple in conception, incredibly complex in application. It is a quantum leap from "knowing" to artistic practice. Frequently, a teacher is "exposed" in a workshop to sequence theory, practice theory or whatever and then it is naively assumed that theory will appear magically and correctly in the teacher's subsequent practice.

Artistic performance, whether in music, writing, physical skills or teaching results from countless hours of practice with coaching to increase productive responses and remediate or elminate unproductive ones. Frequently after inservice, observation and coaching within the teacher's classroom are not available. Consequently, new learning may never get translated into subsequent teaching, or it appears in a form which is not as productive as would be desired. Artistic and effective teaching results from a well-planned staff development program. The stages necessary to translate knowledge into artistic practice have been described elsewhere.(3)

11) Promoters of the model want to begin with teachers.

Knowledge of effective teaching should first be learned by central administrators and principals, because the district's local leaders will make the greatest impact on teaching excellence. Administrators are not engaged in daily teaching so many have become "rusty" and have lost the skills they once possessed. Also, most of those former teaching skills were intutitive rather than articulate and theory-based so they cannot be transmitted. As a result, many administrators and supervisors attempt to clone themselves and get teachers to imitate the way they "used to do it." Instead, they need to use theory to help each teacher use his/her own style to achieve excellence.

In addition, administrators need to internalize skills so the administrator becomes a model of what is expected of teachers. Otherwise a "do as I say not what I do" situation exists.

12) Districts provide a "one shot" or one year exposure then move on to a new focus.

A major problem of inservice is the patch work effect of a little of this and a little of that so the the teacher sees no relationship between the patches. Our model provides the scaffolding on which each additional inservice focus can be added. These additions become an extension or refinement of the undergirding propositons of effective teaching. Seeing the relationship between the three categories of decisions which all teachers must make enables a teacher to assimilate, accommodate and use new professional information, techniques, organizational schemes, methods and discoveries. We can't just hope that professional integration will occur, we must provide for it.

13) Once teachers or administrators have had the training, they are "finished."

A professional is never finished learning that which increases professional effectiveness. Consequently, systematic and periodic renewal is essential for both teachers and administrators. In addition, even with coaching, undesirable mutations of practice emerge, spontaneous recovery of old habits occurs, and forgetting of some new learning is inevitable. For these reasons, all educators need scheduled renewal and revitalization.

14) Leaders are not adequately trained.

"Trainers" take a quick "crash course" to acquire the propositional knowledge of this model, then are expected to teach it to others. The trainers have not had time to internalize procedural knowledge so they can't translate propositions into their own teaching behaviors. In addition, they lack the conditional knowledge of knowing when and under

what conditions to use the generalizations. Frequently, trainers make the error of teaching "rules" to govern teachers rather than generalizations on which to base teaching decisions.

From original "exposure," usually a two year period is required to translate knowlege into valid and artistic practice. Short circuiting that time can result in the "never use a proposition to end a sentence with" syndrome where trainers are violating the very principles they are teaching.

15) <u>There has been no research to support this model</u>.

Every proposition of this model was derived from research in human learning. Any beginning psychology text identifies the research basis for the propositions. The model was originally validated in Project Linkage: a project funded by the California State Department of Education in a difficult Los Angeles innercity school. Outside evaluation demonstrated increase in student learning and teacher satisfaction, decrease in discipline problems and vandalism. Since then, major research studies (such as BTES and Effective Schools) have corroborated the propositions of this model. Many projects, however, have attempted to evaluate results from one short training or exposure without checking whether the propositions were translated into procedural and conditional teacher behavior in the classroom.

Models are judged on their ability to guide behaivor, predict outcomes and stimulate research, not on their being the final answer. This model was developed to accomplish all three purposes. If it has contributed to educators' use of research based knowledge to make and implement more successful professional decisions, and to the constant addition of new research based propositions which guide future actions

to increase teacher and student success and satisfaction in schooling, then the Hunter model will have served its purpose.

Footnotes

[1]Hunter, M. "Teaching is Decision Making." Educational Leadership, October 1979.

[2]Hunter, M. Mastery Teaching. Tip Publications, P.O. Box 514, El Segundo, California.

[3]Hunter, M. & Russell, D. "Critical Attributes of a Staff Development Program to Increase Instructional Effectiveness." In Press.

ELEMENTS OF INSTRUCTION

Critical Behavior of the Teacher

1.

2

3.

4.

5.

DEFINITION OF TEACHING

WHAT DOES IT MEAN TO YOU?

PLANNING A TEACHING EPISODE

Objective: Participants will apply their knowledge and understanding of Teaching to the Objective, Correct Level of Difficulty, Moniter and Adjust, Motivation and Active Participation by completing this worksheet.

1. If I want my students to proofread their work before turning it in, I _____

2. After I give directions to the class on work they are to do, I _____

3. While I am presenting information to the entire class, two students are talking to each other in the back of the room, I will _____

4. To increase participation of all students in a class activity, I _____

5. To increase the probability that the students will listen while I'm giving directions, I _____

SELECTING OBJECTIVES AT THE CORRECT LEVEL

The learner will:

1. Formulate a 2-3 part objective
2. Perform a content task analysis
3. Recall the 6 levels of Bloom's Taxonomy
4. Identify the three kinds of diagnosis activities

1. Formulate an objective: What are the two basic parts of an objective?

A.

B.

Write an objective with the two parts.

2. Identify the three complexity levels of behavior:

A.

B.

C.

3. List the six levels of the cognitive domain:

1)
2)
3)
4)
5)
6)

4. **Identify the five steps to do a task analysis:**

1)

2)

3)

4)

5)

5. **What three kinds of diagnosis are available that help determine what to teach?**

1)

2)

3)

COMPLEXITY LEVELS OF BEHAVIORS

PSYCHOMOTOR	COGNITIVE	AFFECTIVE
PERCEPTION	KNOWLEDGE	RECEIVING
SET	COMPREHENSION	RESPONDING
GUIDED RESPONSE	APPLICATION	VALUING
MECHANISM	ANALYSIS	ORGANIZATION
COMPLEX RESPONSE	SYNTHESIS	CHARACTERIZATION
ADAPTION	EVALUATION	
ORGANIZATION		

SELECTING ACTION VERBS FOR BEHAVIORAL STATEMENTS

WORDS OPEN TO INTERPRETATION

To Know
To Understand
To Appreciate
To Believe
To Have Faith
To Enjoy
To Communicate
To Empathize

WORDS OPEN TO FEWER INTERPRETATIONS

COGNITIVE

To Identify
To Recognize
To Recall
To List
To Match
To Discriminate (Between)
To Discriminate (Among)
To Calculate
To Solve
To Compare
To Differentiate
To Name
To Describe
To Write
To Evaluate
To Diagnose

PSYCHOMOTOR

To Remove & Replace
To Construct
To Select
To Measure
To Read
To Assemble
To Inspect
To Complete
To Diagnose & Prescribe
To Lift
To Carry
To Mend
To Disect
To Administer

AFFECTIVE

To Express Satisfaction
To Express Likes
To Express Preferences
To Be Cooperative
To Be Well Groomer
To Be Neat
To Be Prompt
To Follow Rules
To Care for Equipment
To Be Poised
To Be Pleasant
To Be Friendly
To Be Affirmative
To Respond Positively
To Be Attentive

EI-AV

BLOOM'S TAXONOMY OF COGNITIVE THINKING

LEVEL	THOUGHT PROCESS	BEHAVIORAL INDICATORS (OVERT)
Knowledge	Ability to recall and recognize facts, concepts or principles.	List, label, read, define, repeat, record, name, match
Comprehension	Ability to interpret, understand and grasp the meaning of information, to summarize in own words; to translate into a different form of communication.	Explain, show, identify, describe, tell, discover, infer, report, discuss, express, give examples.
Application	Ability to apply previously acquired knowledge and information to a new or concrete situation; to an unfamiliar situation; to a situation which has a new "slant".	Dramatize, operate, model, construct, relate, generalize, code, draw, calculate, reconstruct, illustrate, demonstrate. solve.
Analysis	Ability to "break down" material into its component parts so that organizational structure may be understood; perceive relationships and patterns; see cause and effect.	Deduce, compare, contrast, combine, discriminate, experiment, question, diagram, examine, distinguish, classify, outline.
Synthesis	Ability to analyze the parts and put them together to form a whole; to develop original ideas; propose options.	Create, imagine, plan, organize, predict, assume, translate, collect, hypothesize, design, derive, arrange, assemble, invent. compose.
Evaluation	Ability to make judgments based on evidence and determine the value of material based on definite criteria.	Appraise, judge, evaluate, validate, justify, criticize, select, assess, defend, rate, determine, decide and support decision, "yes or no".

Write in the correct level of Bloom's Taxonomy on the line provided.

Knowledge
Comprehension
Application
Analysis
Synthesis
Evaluation

_____ 1. Name seven states.

_____ 2. Design a house.

_____ 3. Classify flowers.

_____ 4. Drive a vehicle.

_____ 5. Summarize the discussion.

_____ 6. Judge a beauty contest.

_____ 7. Plan a family reunion.

_____ 8. Predict the outcome.

_____ 9. Define in your own words.

_____ 10. List all the presidents.

_____ 11. Choose the best option.

_____ 12. Organize your files.

_____ 13. Defend nuclear power.

_____ 14. Arbitrate a conflict.

_____ 15. Sketch a map of your community.

_____ 16. Distinguish between education and training.

_____ 17. Compare 1985 with 1885.

_____ 18. Diagnose a malfunction.

_____ 19. Program a computer.

_____ 20. Compare salt and sugar.

SELECTING OBJECTIVES AT THE CORRECT LEVEL OF DIFFICULTY **WORKSHEET**

Select one of the following objectives and do a task analysis:

1. **Know the meaning of the Pledge of Allegiance**

2. **Recognize the steps for lighting a welding torch**

3. **List the steps for making cooking pasta**

4. **Tear a sheet of folded paper**

TOPIC: SELECTING OBJECTIVES AT THE CORRECT LEVEL OF DIFFICULTY

DEFINITION: The part of the teaching - learning

FACTOR: Formulate an objective

-Content

-Behavior

FACTOR: Complexity of Behavior

-Cognition Taxonomy

-Psychomotor Taxonomy

-Objective Taxonomy

FACTOR: Task Analysis

-Start with an objective

-State qualifiers

-State baseline

-List essential components

-Consider independent and dependent sequence

FACTOR: Diagnosis

-Formal

-Informal

-Inferential

STEPS IN TASK ANALYSIS

1. **Start with an objective.** Make sure it has the two parts. You have to begin somewhere and the objective is where you begin. After you formulate the objective, you should be able to describe the successful learner at the end of the lesson.

2. **State quallfiers.** Clarify the objective so a fellow professional looking at the student response would know what constitutes evidence of successful achievement of that objective. We're talking about reasonable precision, not nit picking. Again, if you are writing a paragraph, will it contain a topic sentence, 5 or more related sentences, incorporate conventional spelling, punctuation, capitalization, indentation and correct grammar? You need to think about the content, the process the students will be going through, words they don't understand, and basically think about what is critical.

3. **State the bottom level or <u>baseline</u> of the task analysis.** This is the entry level behavior you infer is already possessed by the student. What does he/she know already before you even begin the instruction. If your inferences proves to be incorrect, you can always task analyze below this level. In the case of writing a paragraph, the base line might be that the student can write a sentence.

4. **List essential components.** What the student must be able to do to move from baseline to successful achievement. This process can be accomplished in several ways.

   A. **Do the task yourself.** Describe what you are doing or thinking. It often helps if you think in slow motion as you perform the task.

   B. **Observe or "image".** Let someone else perform the task and record what they are doing.

   C. **Examine or "image" the final product.** Infer what the student must have done to accomplish it.

   D. **Factor out essential components.** Subject each component you have identified to impeachment by, "could you do the final task without having achieved this component?" Pull only the essential components out from those that are related.

Example might be:

A. select topic
B. generate and write five sentences related to topic
C. sequence sentences with some order plus necessary transitions
D. generate a topic sentence
E. proofread

5. **Consider independent and dependent sequence.** Think about whether the learning is independent or dependent. Some things require a certain sequence because learning must be acquired in a certain order. Sequence dependent learning by determining which must be taught first, next, etc. At this time don't even consider how you would teach the learning, that will come later.

   Example: of dependent sequence
   First- decide on topic
   Second - write sentences in some sequence and then generate topic sentence or generate topic sentence and then write supporting sentences

   Example of independent sequence
   Edit transitions and conventions to form, spelling and language These skills may be incorporated into the initial writing or attended to at the proofreading stage.

No one task analysis is absolutely correct. It will vary with the setting and the students. If you were doing a task analysis on brushing your teeth, you might have only 12 steps for a kindergarten student and 50 steps for a special needs student.

TEACH TO AN OBJECTIVE

The learner will:

1. Identify the four actions of a teacher
2. Given an objective, identify congruent examples under each

List between 5-10 things that you do during a teaching episode which help students learn.

"Teaching to an objective focuses the teacher on the behaviors that are congruent with the lesson."

Remember, "congruent with" implies leading directly toward, not just "related to" or "associated with."

The four types of teachers actions are:

1.

2.

3.

4.

You can increase your effectiveness of teaching to an objective by using a balance of the four teacher actions.

TEACHING TO THE OBJECTIVE WORKSHEET

1. KNOW THE MEANING OF THE PLEDGE OF ALLEGIANCE

2. UNDERSTAND THE STEPS FOR LIGHTING A WELDING TORCH

3. TEAR A SHEET OF FOLDED PAPER.

4. UNDERSTAND THE STEPS FOR MAKING COOKING PASTA.

5. PLAY A BOARD GAME.

DIRECTIONS:

1. REWRITE THE OBJECTIVE IF YOU WISH TO MAKE IT MORE SPECIFIC (A TIGHTER VERB; LEVEL OF PERFORMANCE).
2. WRITE A ROUGH OUTLINE OF INFORMATION YOU WOULD PRESENT TO TEACH THE CONTENT.
3. WRITE 2 QUESTIONS YOU WOULD ASK STUDENTS ABOUT THE OBJECTIVE.
4. IDENTIFY ONE ACTIVITY YOU WOULD USE WHICH IS CONGRUENT TO THE OBJECTIVE.

DESIGNING ACTIVITIES/ACQUIRING INFO

LEARNING MAY OCCUR WHEN:

Observing the behavior of others

Observing the performance of others

Observing "things"

Fantasizing

Contemplating, reflecting, or mediating

Brainstorming

Role playing

"Acting"

Involved in sensual pleasures

Questioning others

Questioning one's self

Planning

Involved in intuitive thought

Experimenting

Interacting with a computer

"Using tools, materials, and equipment

Teaching others

Acting as a mentor

Sleeping

Analyzing dreams

Solving problems

In a hypnotic state

Involved in a "first-time activity"

Conducting research

Analyzing feedback

Imitating others

Playing games

Interacting with others

Debating

Practicing

Designing one's own experiences

Responding to feedback

Reading printed material

Listening to others

Sharing experience

By Accident

_____

_____

_____

_____

_____

_____

AND ON, AND ON, AND ON.....

ASKING QUESTIONS

TO AROUSE INTEREST AND CURIOSITY

At the beginning of an instructional episode, questions can be used as part of the set to focus the attention of the learner on the new learning

TO STIMULATE DISCUSSION

Questions at the Application level and above (Bloom) that are thought-provoking facilitate stating of reactions by the learner

TO CHANNEL THINKING

Questions can be used to direct thinking, keep the learner "on track", and focus on the objective.

TO OBTAIN THE ATTENTION OF AN INDIVIDUAL LEARNER

In this case, the question should be asked with the same feeling tone as others, and the response to the effort of the learner should be to dignify the answer.

TO HELP A TIMID PERSON TO EXPRESS THOUGHTS

It is important in this particular instance to allow sufficient time for the learner to respond

TO CHECK FOR UNDERSTANDING

Questions relevant to the material being covered will provide you with information as to whether you have accomplished what you intended to when providing information. Checking for understanding is the key factor in the Monitoring and Adjusting process

CHARACTERISTICS OF EFFECTIVE QUESTIONS

Questions which may be answered by a YES or NO should not be asked

Questions should have a specific purpose and be relevant to the subject

Questions should be stated as briefly as possible, and in the language of the learner

Questions should be restricted to one main thought, and not linked to other questions

Questions should be addressed to the entire group in order to obtain the maximum amount of active participation. If it is desired that a specific person answer, name the person after the question has been stated

Questions should be directed at the group randomly with an even distribution, and no particular order

Questions should not be used to antagonize the learner(s)

Questions should always be "answerable"

ASK QUESTIONS USING PLEASANT FEELING TONE

ALLOW THE LEARNER TO RESPOND WITHOUT INTERUPTION

ALLOW PROCESSING TIME FOR THE LEARNER BEFORE REQUESTING AN ANSWER

HANDLING QUESTIONS

* Some you will answer immediately.

* Some you won't answer at all.

* In answering questions you should be certain that you reply the question that was stated.

* Don't evade the question.

* If the question is not clear to you, ask to have it repeated or ask for some additional information.

* In a small group, everyone will probably hear the question. If the question is not heard by everyone, repeat it.

* The reverse question technique can be used if you want to get the individual or group to do some thinking.

* You may be asked a question you can't answer. Simply state that you don't know. You can offer to find out and let the person know. There's nothing wrong with admitting that you don't know or calling on someone else.

* If it is a question that will be answered later in the session, tell the group this.

* If it is an irrelevant question or one you shouldn't answer, simply state that it is something which does not pertain to the current subject.

DEFINITIONS OF FACTORS

TOPIC: TEACH TO AN OBJECTIVE

DEFINITION: The part of teaching - learning proves in which the teacher selects behaviors that are congruent to the intended goal.

FACTOR: Congruent Teacher Actions

-Actions selected by the teacher which are congruent to the learning objective and assist the learner in acquiring the new learning

-Teacher behaviors that promote the accomplishment of the intended goal

-Teacher actions that promote student behavior to reach a goal

MONITOR AND ADJUST

The learner will:

1. Explain the definition of monitor and adjust in their own words.
2. Identify the four steps in monitoring student progress.
3. Recall the difference between overt and covert behavior.

Teaching becomes more predictable when the teacher takes time to **MONITOR AND ADJUST.**

Monitor and adjust is . . .

The process for monitoring is . . .

1.

Overt monitoring can take the form of:

-
-
-
-

2.

3.

As you interpret the behavior, the decision may be:

A.

B.

C.

4.

The process for adjusting is . . .

A.

B.

C.

D.

Who do Teachers monitor?

TOPIC: MONITOR AND ADJUST

DEFINITION: The decision and action of the teacher to ascertain if learning is occurring as a result of appropriate teacher and learner behavior.

FACTOR: Monitor (Elicit and Check)

-Ongoing observation of student understanding of the lesson

-Process of eliciting feedback during instruction which enables the teacher to check student understanding

-Process where the teacher elicits and observable student response and checks for understanding to ensure incremental learning

-Teacher observations of student performance which indicate progress toward the objective

FACTOR: Adjust (Interpret and Act)

-Teacher ability to alter instruction based on student response

-A process of interpreting student response and acting on that interpretation

PRINCIPLES OF LEARNING

(from Madeline Hunter's Three Categories of Teaching Decision Making)

Factors which affect **MOTIVATION (INTENT)** to learn:

- Attribution Theory
- Intrinsic - Extrinsic
- Success
- Knowledge of Results
- Interest
- Level of Concern
- Feeling Tone

Factors which affect **RATE & DEGREE** of learning:

- Meaning
- Student Participation
- Degree of Original Guidance
- Hemisphericity
- Knowledge of Results
- Level of Aspiration
- Modeling
- Motivation (Intent)
- Observational Learning
- Practice Schedule (massed)
- Reinforcement
- Sequence / Length / Relationship / Position
- Set to Perform
- Transfer
- Vividness

Factors which affect **RETENTION** of learning:

- Meaning
- Degree of Original Learning
- Feeling Tone
- Practice Schedule (distributed)
- Transfer

Factors which affect **TRANSFER** of learning:

- Similarity

MOTIVATION (FOCUS)

DEFINITION: A classification of a group of variables (principles) of learning. These variables when utilized will activate a learner to do something to satisfy a perceived need or desire

PURPOSE: Gain or maintain the focus of the learner on the learning task with an intent to learn

VARIABLES:

Feeling tone
- Pleasant
- Unpleasant
- Neutral

Success
- Clarity of direction
- Difficulty of task
- Learner perception
- Interest
- Vivid
- Novel
- Unanticipated
- Meaningful

Interest
- Vivid
- Novel
- Unanticipated

Knowledge of Results
- Immediate
- Specific

Attribution
- Ability
- Luck
- Difficulty of task
- Effort

Intrinsic - Extrinsic (Relationship of activity to goal)

Level of Concern
- Proximity
- Visibility
- Time
- Material

MOTIVATION

Jot down specific examples for each of the variables of motivation

1. FEELING TONE

2. SUCCESS

3. INTEREST

4. KNOWLEDGE OF RESULTS

5. ATTRIBUTION

6. INTRINSIC - EXTRINSIC

7. LEVEL OF CONCERN

MOTIVATION

Write a statement or describe and action which will:

Indicate successful accomplishment of a task

Provide knowledge of results

Make the learner feel "comfortable"

Lower the level of concern

Improve a sagging level of interest

Increase internal satisfaction

Gain a great effort by the learner

INDICATORS OF ENTHUSIASM

PERSONAL QUALITIES	PERFORMANCE DEGREES		
DELIVERY	Poor variation in speech,monitone	Variation of tone, volume & speed, good articulation	Variations of tone & volume from whispers to excite, projections
EYES	Lack of eye contact, no contact with individuals or audience	Appeared interested, occasionally lighting up, shining, opening wide	Eye contact & facial expression synchronized to show numerous feelings
GESTURES	Never or seldom uses body, head & arms; often in a stationary position	Occasionally use of body, head & arms	Emphatic movement of body, head and arms to illustrate an idea
BODY MESSAGES	Never or seldom moves from one spot. Positively on one location	Moves freely in a variety of different directions	Designed and energetic body movements, change of pace frequently
FACIAL EXPRESSION	Expressionless, few smile lines, reserved	Expression fits situation; agreeable, sad, happy, etc.	Vibrant, broad smiles show many expressions
WORD SELECTION	Trite expressions, mostly nouns	Some adjectives used	Creatively descriptive, numerous adjectives, great variety
IDEAS AND FEELINGS OR IDEAS	Ignore feelings or ideas	Accepted ideas & feelings, some variation in response.	Vigorous acceptance of feelings, great variation in response
ENERGY LEVEL	Lethargic, dull, tired	Maintained even level, occasionally shows energetic spirit	Exuberant, gets energy from involvement and ideas, vitality plus

6.2 • Rate and Degree

6.2.1 • Active Participation	**Blue**
6.2.2 • Reinforcement	**Buff**
6.3.3 • Anticipatory Set	**Green**
6.4.4 • Closure	**Pink**

RATE AND DEGREE

DEFINITION: A classification of a group of variables (principles) of learning. These variables when utilized, affect the amount of learning and the rate at which it occurs

PURPOSE: Accelerate Learning

VARIABLES:

Anticipatory set
Reinforcement
Active participation
Closure
Motivation
Vividness
Meaning
Modeling
Practice schedule
Observation
Level of aspiration
Hemisphericity
Degree of original guidance
Transfer

EXAMPLES - COVERT

1. Visualize how the pistons in your car engine work.
2. Compute in your head the answer to 5 x 50.
3. Pretend you're a character in a book. How would you feel and what would you do?
4. Remember a holiday that stands out in your mind.
5. Picture yourself using the proper technique for a correct golf swing.
6. Think about all the things you have that are assets; that are liabilities.
7. Look for errors in capitalization in the sentences that are on the board.
8. Think about all the ways you could use burlap to decorate.
9. Follow along while the teacher reads the instructions.
10. Watch the technique I use in executing this dance step.
11. Say to yourself the 5 levels of the deciduous forest.
12. Suppose you're in a boat out on the lake and the only pair of oars you have falls overboard.
13. Create mental pictures of the donkeys walking along the Grand Canyon in the Grand Canyon Suite.
14. Close your eyes and smell a freshly-mowed lawn.
15. Guess what I have in this paper bag.

EXAMPLES - OVERT

1. Watch what I do and repeat it back to me.
2. Use role playing to simulate an event either individually or in small groups.
3. Thumbs up, thumbs down, or out to side to indicate yes, no, and I don't know.
4. Discuss with your neighbor before I call on someone to answer.
5. Point to the half notes in this piece of music.
6. Complete a worksheet.
7. Teach or help someone else with a particular classroom assignment.
8. Have students respond either as a group or individually (chosen randomly).
9. "Take the following dictation."
10. Compute the answer and check it on the calculator.
11. Demonstrate performance ...

ACTIVE PARTICIPATION

DEFINITION:	The action(s) of the teacher which cause the mind of the learner(s) to be consistently engaged on the learning task
PURPOSE:	Promote structuring/reorganizing new material with previously learned material which in turn accelerates learning
FACTORS:	Covert participation (not observable)
	Overt Participation (observable)

ACTIVE PARTICIPATION

Select a learning task which you might teach in your area of expertise:

_____

_____

_____

Write two teacher statements that would generate covert behavior:

1._____

_____

2._____

_____

Write two teacher statements that would generate overt behavior:

1._____

_____

2._____

_____

Write a teacher statement that will generate overt behavior from one student and covert behavior from the rest of the group:

_____

_____

_____

Write a teacher statement that will generate covert behavior from all students and then overt behavior from all students:

_____

_____

_____

REINFORCEMENT

DEFINITION: Responses by the teacher to the behavior of the learner which strengthen that behavior

PURPOSE: Change behavior by strengthening desired responses and/or suppressing undesired responses

FACTORS:

Positive reinforcement

Negative reinforcement

Extinction

Schedule of reinforcement

ADAPTED FROM MADELINE HUNTER

NEGATIVE REINFORCEMENT OR PUNISHMENT?

There are a few generalizations which are central to the understanding of reinforcement theory:

(1) REINFORCE means "to strengthen." We reinforce a behavior to make it stronger, which means to increase the probability or the frequency of that behavior. "Stronger" in the behavioral sense means that the reinforced behavior is more apt to occur than some other behavior or that the reinforced behavior occurs more frequently than it did in the past.

"For him, intelligent decision making is stronger than is tossing a coin," means that intelligent decision making is a more likely or a more frequent behavior than is coin tossing. It does not mean that intelligent decision making always occurs or that coin tossing never occurs. Another analogy might be, "Bill is the stronger player." This does not mean that Bill always wins over another player, but if you're betting money, your best bet is Bill.

(2) POSITIVE REINFORCEMENT means that something has been added (+) immediately after a behavior occurs. If that "something" is needed, pleasant or desired by the person, it is highly probable the behavior will be strengthened. Johnny says, "Please, may I?" Mother says "of course you may, you ask so politely." Johnny's polite asking will become more probable or more frequent. If Johnny whines and fusses to get his way and mother says, "yes," whining and fussing will become a more probable or frequent response. Whichever behavior (asking politely or fussing) is followed by getting what he wants will be the behavior that is strengthened.

We could diagram reinforcement as follows:

Behavior _____ + reinforcement _____
(becomes stronger)

When we say a behavior is "weakened," we mean that behavior has become less probable or less frequent. When a teacher says, "You get the next turn because you raised your hand." she is attempting to increase the probability or frequency of hand raising and decrease the probability or frequency of calling out answers or sitting without participating. Notice reinforcement merely changed the order of probability of the three responses:

Raising hand _____ + Reinforcer _____

Calling out _____

Sitting without participating _____

All three behaviors start out at the same strength. When hand raising was reinforced, it became stronger (more probable). Although the other two behaviors may remain at the same strength, in comparison, they now are weaker in probability (strength) of behaviors.

Let's look at another example. Bert usually whines to get what he wants, whining is more probable than asking "please, may I?" Mother has decided she wants to strengthen the more desirable asking. So, whenever he says "please, may I?" she gives him (adds) what he wants. As a result asking becomes more probable than whining. Asking has been positively reinforced (strengthened). Knowing how to use a schedule of reinforcement will enable mother to keep his asking behavior stronger without giving him whatever he wants for the rest of his life.

(3) NEGATIVE REINFORCEMENT means that something has been subtracted or taken away. The removal (subtraction rather than addition) has reinforced (strengthened) the behavior which the removal (of something undesired) immediately followed. Example: you get in your car and start the motor with an unfastened seat belt. An unpleasant buzzing occurs. You fasten the belt. The buzzing stops. Fastening the belt has been negatively reinforced (strengthened) because it removed (subtracted) an unpleasant noise. Note that the buzzing and behavior (not fastening the seat belt) were occurring simultaneously. A change of behavior (fastening the seat belt) cut off (subtracted) the buzzing and the new behavior was strengthened (negatively reinforced). The negative reinforcer was the removal of the buzzing sound.

All reinforcers are defined by their consequences. POSITIVE REINFORCEMENT means strengthening of the behavior that brought on the positive reinforcer. Asking "please" brought on (added) the desired permission and the response became more probable. NEGATIVE REINFORCEMENT means strengthening of the behavior that removed (subtracted) the negative stimulus. Fastening the seat belt removed the buzzing and fastening became more probable. Note that car manufacturers, not understanding reinforcement theory, have made the noise pleasant (chimes) and have turned off the noise automatically after a short period, thereby reinforcing ignoring the noise or "waiting it out" which removes the noise. As a result, for many people, both of those behaviors have become more probable than fastening the belt.

Negative reinforcement could be diagrammed as follows:

Not fastening seat belt _____ behavior changed

Buzzing _____ Buzzing stopped

Fastening seat belt

Not fastening the seat belt and the buzzing occurred simultaneously. Because fastening the seat belt removed (cut off) the buzzing, that behavior became stronger (was negatively reinforced).

Not fastening seat belt and waiting _____

Buzzing _____ (Automatic stop).

Because the buzzer stopped while the driver was doing nothing but waiting, "waiting it out" was strengthened,: because it got rid of (removed) the noise.

Let's look at a classroom example. Two girls are giggling and whispering. The teacher stops teaching and glares at the girls. The behaviors of girls giggling and teacher glaring are occurring simultaneously The girls stop giggling and start listening (new behavior) which removes the teacher's glare so listening is strengthen. Remember that reinforcers are defined by their results. If the listening behavior does not become more probable, negative reinforcement has not occurred regardless of how much glaring the teacher does.

Negative reinforcement is important because when the student changes behavior (fastening seat belts, stopping giggling, (s)he can remove the negative reinforcers. Negative reinforcement is dangerous because any behavior which removes the undesired stimulus (disconnecting buzzer, pretending to pay attention, lying, cheating, blaming others) will be strengthened.

(4) PUNISHMENT is the addition of undesirable consequences in an attempt to suppress a behavior. In Canada, you get a ticket (punishment) if you drive without a seat belt. The teacher may say to the giggly girls, "You will stay after school." In the case of punishment, the person is not able to remove this unpleasant stimulus by

changing behavior at this point. Only the police officer or the teacher can remove the consequences.

But, and here is where negative reinforcement and punishment become fuzzy, in the future, the memory trace of the threat of the punishment can become a negative reinforcer. To remove the chance of getting a ticket, the motorist may fasten the belt and experience the negative reinforcement of relief from worry about a ticket. The girls may want to giggle and talk, but they can remove the unpleasant possibility of staying after school by listening to the teacher, so listening has been negatively reinforced. Now, if the teacher understands reinforcement theory, (s)he will add a positive reinforcer to the listening behavior: "You girls are listening so carefully, you will know this so well you won't have to study for the test," thereby increasing through positive reinforcement the probability of listening behavior in the future.

KEY POINTS:

REINFORCEMENT means to strengthen a behavior; make it more probable or more frequent.

POSITIVE REINFORCEMENT means to strengthen a behavior by addition of something needed or desired immediately after the behavior occurs. The presence of something desirable acts as a reinforcer.

PUNISHMENT means the addition of an undesirable consequence in order to suppress a behavior. The memory or threat of a punishment can subsequently become a negative reinforcer.

NEGATIVE REINFORCEMENT means to strengthen a behavior by subtraction of something undesirable immediately after that behavior has occurred. The absence of something undesirable acts as a reinforcer.

HINTS ON MANAGING A SCHEDULE OF REINFORCEMENT

Start with behaviors that are easy to change.

Focus on only one behavior at a time in order to maintain a regular schedule of reinforcement.

When a new behavior is being learned, be consistent with reinforcers.

A regular schedule of reinforcement, where the desirable behavior is reinforced every time it appears, results in rapid learning.

An intermittent schedule of reinforcement, (where behavior is reinforced one tine and then not reinforced the next time and the intervals between reinforcers become longer and longer), develops a very durable behavior that is long remembered.

STEP 1: Identify (first for yourself and then with the student) the behavior to be changed and the new behavior that is to replace the old.

STEP 2: Decide what constitutes positive and negative reinforcement. Devise a strategy to get the new behavior and determine the way you will positively reinforce it.

STEP 3: Decide whether the old behavior is so strong you need to suppress with negative reinforcement or whether lack of any kind of reinforcement will extinguish it. If you decide to use negative reinforcement, determine what it will be. Remember, the student's behavior that removes your negative reinforcer, is being strengthened so be careful!

STEP 4: Develop a strategy to get the student to practice the new behavior and positively reinforce it on a regular schedule (Every Time).

STEP 5: As soon as the student has practiced the new behavior enough so it is more likely than the old behavior, remove any negative reinforcement so the old behavior can occur with no reinforcement and be extinguished.

STEP 6: Change to an intermittent schedule of reinforcing the new behavior (make the intervals between reinforcement increasingly long) so the new behavior will be resistant to forgetting.

STEP 7: Know that occasionally the student will slip back into his old behavior (spontaneous recovery) but now you know how to achieve the new behavior. How?

REINFORCEMENT

Write three statements which you could make to a learner who has demonstrated adherence to a policy regulation or practice.

1. _____

_____

2. _____

_____

3. _____

_____

Jot down a policy, regulation, rule, procedure, or practice which has been breached or violated on occasion in your area of responsibility.

_____

_____

_____

Write a statement(s), or describe the activity you would use to suppress the undesired behavior and strengthen the desired behavior.

_____

_____

_____

ANTICIPATORY SET

Please fill in the blanks:

Anyone interested in TE_____ is concerned about C_____. It's hard to imagine TE_____ SCH_____ without them. Although they can sometimes be bothersome, we T_____ them. When things go wrong, we sometimes blame the P_____, instead of accepting responsibility for the consequences ourselves.

Please complete the following series:

2 4 6 8 ___

ANTICIPATORY SET

DEFINITION: The action(s) of the teacher which stimulates the learner(s) to retrieve from memory prior skills, knowledge, and/or experience which is related to the new learning

PURPOSE: Focus the attention of the learner on the new learning which in turn increases the rate and quantity of new learning

FACTORS:

- Congruent to objective
- Connection to past learning and experience
- Learner participation (covert/overt)

ANTICIPATORY SET

Select a learning task which you plan to teach in your area of expertise:

Identify previous learning(s) to which you might "connect" the new learning:

Briefly describe how you will involve the student in the "set":

Check yourself: Was the activity relevant to the new learning? yes ___ no ___

In your own words, tell yourself why set is important:

CLOSURE

DEFINITION:	An activity conducted by the teacher which is designed to assist the learner to consolidate and organize what has been learned.
PURPOSE:	To accelerate learning by fostering clarification and insight
FACTORS:	Active participation Congruence

Adapted from Madeline Hunter, 1987

CLOSURE ON "CLOSURE"

Madeline Hunter

There is no question that the end of a lesson is important. It occupies the "end position" which is a prime time for learning. Nothing similar occurs immediately afterward that would erase that learning or interfere with its being remembered.

There is no doubt that ways of ending the lesson with artistry rather than, "Oh, we've run out of time," should be planned. Although some educators term the lesson ending as closure, psychologically speaking, closure refers to the "Aha" phenomenon where the student sees "how the whole think fits together" and closes down his/her thinking about it. We achieve closure when we seal the letter and mail it, when we finish the job, when we really understand how to do something.

Frequently, however, we do not want closure at the end of a lesson. "Tomorrow we will learn what happened" invites speculation. "We got a good start; tomorrow you'll clarify your understanding" stimulates further consideration. "You now know how to start; tomorrow we'll look at possible solutions" prepares for the next lesson. "Tonight, examine the headlines in the paper and see if there are examples of what we learned today," carries the student into a homework assignment. Any of these examples can be an effective ending to a successful lesson but no closure (or closing down of thinking) has been intended.

Let's look at some examples of effective endings of lessons and give them their correct psychological label:

> "You have made an excellent start on _____" gives knowledge of results and reinforcement.

"Let's summarize what we have done" supplies distributed practice and synthesis.

"Let's look at how taking notes, organizing our notes and creating an outline helps us in writing a report" relates part to the whole and gives a purpose to the lesson. This "pulling together" can occur anytime during a lesson as well as at the end.

"We have finished _____. Tomorrow we'll begin _____" builds an anticipatory set for the subsequent lesson.

"Do one more and hand it to me as you leave" is checking for understanding and, possibly, overlearning. It also serves purposes of raising level of concern, visibility of accomplishment, accountability, and places an important learning at last position.

"You now know how to use every kind of _____" gives knowledge of results.

If asked, "What did you learn today?" The students response could be distributed practice, possibly synthesis, knowledge of results for the teacher and preparation for questions from parents (public relations)

"Let's go over the steps one last time" is checking for understanding and/or guided practice.

"What have we accomplished in this lesson?" could be recall, synthesis or evaluation

Because the last position in a lesson is prime time (as there will be no retroactive inference), that time should be used wisely to accomplish a particular goal and not become a formula for closure. Beware of lesson endings, which can be "parroting" or untrue statements. "What did you learn today?" can elicit a response which is simply saying what the teacher wants to hear. If students don't know what they were working on, there was a problem earlier in the lesson. When the question is asked of several students, it becomes parroting.

"Be ready to tell what you have learned" introduces a new objective: "putting the learning in words." If you are not sure the learners know, it is better to ask several times throughout the lesson: "Tell me what you are working on now."

"We learned how to do two place multiplication" may or may not be true.

"Most of you learned how to _____" can elicit guilt or shame by those who have not.

In closing this brief discussion on closure we need to remember that the end of any sequence is an important time for learning and remembering as it has no retroactive interference. That end position may be devoted to summary, reemphasizing more important aspects, practicing again a part that needs it, or building a bridge into application or future learning. Like all other aspects of teaching decisions, the end position should not be a slot in which to place the mechanical behavior of "the teacher or learner restates the objective."

CLOSURE

Select a learning task which you might teach in your area of expertise:

_____

_____

_____

Describe two activities which you might conduct in order to achieve closure:

1. _____

_____

_____

2. _____

_____

_____

RETENTION TEST

A. List the three decisions in teaching:

1.

2.

3.

B. Identify the critical behaviors of a teacher:

4.

5.

6.

7.

8.

C. Recall the seven factors of motivation:

9.

10.

11.

12.

13.

14.

15.

D. What are the levels of Bloom's Taxonomy

16.

17.

18.

19.

20.

21.

E List four variables of rate degree

22.

23.

24.

25.

F. Total possible points = 25

_____ x 4 = _____
Number Correct (your total score)

Amount Retained = _____
% of Correct Answers

RETENTION

The learner will:

1. Recall the six factors of retention. (Meaning, Degree of Original Learning, Feeling Tone, Practice, and Transfer)
2. Recognize an example from each factor.
3. Give an example of each factor in their own teaching.

Retention deals with the factors related to memory. Retention helps students recall or remember relevant information.

ORIGINAL LEARNING + PRACTICE = RETENTION

Identify the six factors of retention.

1.

1) Relate to students past knowledge:

2) Structure and Organization:

A. Preview

B. Outline

C. Summarize

D. Grouping or categorizing

3) Similarities/differences:

4) Purpose:

5) Meaningful Processing:

2.

3.

1) Meaning:

2) Modeling:

3) Monitoring:

Four Factors of Practice

1) How Much?

2) How Long?

3) How Often?

4) How Well?

Does practice make perfect?
Practice per say does not make perfect.
It's perfect practice.

4.

5.

1) Teachers must highlight the critical feature of the performance to make sure students perceive them.

2) The modeling process must be accurate and unambiguous.

To overcome and stretch the right hemisphere, some generalizations are offered:

1. Provide many modalities or input in the classroom to match the number of differences in learning style that may exist.

2. Try to match new learning to the child's style of learning.

3. Try to strengthen the weaker hemisphere in students by providing activities simulating that side.

6.

Educational Theory			Into	Educational Practice	
Topic	Definition	Factor	•	Technique	Example
Retention	The ability of the learner to remember or recall events relevant to the objective	Meaning	•	Relevant to the Learners	
			•	Structure the Task	
			•	Use Mnemonic Devices	
		Degree of Original Learning	•	Teach it well the first time	
		Practice	•	Amount (how much)	
			•	Time (how long)	
			•	Frequency (how often)	
			•	Monitoring (how well)	
		Transfer	•	Teach for transfer	
		Modeling	•	Product	
			•	Performance	
		Feeling Tone	•	Pleasant	
			•	Unpleasant	
			•	Neutral	

Mnemonic Devices

1. Great Lakes
   - H uron
   - O ntario
   - M ichigan
   - E rie
   - S uperior

2. Planets

M y	Mercury
V ery	Venus
E lderly	Earth
M other	Mars
J ust	Jupiter
S ent	Saturn
U s	Uranus
N inety	Neptune
P izzas	Pluto

3. Arithmetic
   - A
   - R at
   - I n
   - T he
   - H ouse
   - M ay
   - E at
   - T he
   - I ce
   - C ream

4. Rhythm
   - R un
   - H ome
   - Y ou
   - T ired
   - H ouse
   - M ates

5.

Kingdom	K ings	K ind
Phylum	P lace	P eople
Class	C ats	C ome
Order	O ver	O ver
Family	F ire	F rom
Genus	G oing	G ermany
Species	S outh	S ometimes

6. Division of Fractions

   "Ours is not to question why, just invert and multiply."

7. Spelling of *their, there, they're:*

   a. All have <u>the</u> in them.
   b. *Here* and *there* are both <u>places</u>.
      There has *here* in it.
   c. *I* and *their* both refer to people. *I* is in *their*.

8. Colors of the Spectrum
   - R ed
   - O range
   - Y ellow
   - G reen
   - B lue
   - I ndigo
   - V iolet

9. Stationary - *a* as in stay
   Stationery - *e* as in letter

TOPIC: RETENTION

FACTOR: Meaning

-Student ability to integrate the learning into a base of knowledge

-Relationship of the learning to the student's own knowledge and past experience

-Relevancy of the learning as viewed by the learner

-Learning is important to the learner at a personal level

FACTOR: Degree of Original Learning

-Mastery of the initial learning

-How well the student learned the first time

FACTOR: Modeling

-Learner receives concrete representation of the learning

-Sensory representations of the critical attributes of the learning as perceived by the learner

FACTOR: Practice

-Opportunity for the learner to have repeated experiences with the new learning

-Repeated experiences of the learning over time

-Scheduled repetitions of the learning

FACTOR: Transfer

FACTOR: Feeling Tone (see motivation)

RETENTION SELF-TEST

1. IF YOU WISH LEARNERS TO REMEMBER THAT A MAP IS A SCHEMATIC REPRESENTATION OF THE WORLD, YOU PROBABLY WOULD HAVE HIM/HER BEGIN BY WORKING ON A MAP OF ... .

   A. HIS/HER TOWN.
   B. THE UNITED STATES.
   C. HIS/HER SCHOOL.
   D. A FOREIGN COUNTRY.

2. WHICH STATEMENT SHOULD YOU MOST EASILY REMEMBER?

   A. B + D = M
   B. A TEACHER CAN DELIBERATELY PLAN LESSONS SO THEY ARE BETTER REMEMBERED.
   C. THE LATEST RESEARCH INDICATES THAT FORGETTING IS INVERSELY CORRELATED WITH MEANING.
   D. EBBINGHAUS EXPERIMENTED WITH MEMORY IN THE LAST CENTURY.

3. SO CHILDREN REMEMBER WHAT THE PLEDGE OF ALLEGIANCE MEANS, YOU WOULD HAVE THEM ...

   A. SAY IT EVERY MORNING.
   B. USE A DICTIONARY TO LOOK UP DEFINITION OF KEY WORDS IN THE PLEDGE.
   C. MEMORIZE THE DEFINITION OF KEY WORDS IN THE PLEDGE.
   D. REWRITE THE PLEDGE USING THEIR OWN WORDS TO MAINTAIN ITS GENERAL MEANING.
   E. STUDY THE LIVES OF AMERICAN HEROES.

4. IF YOU WERE PLANNING THE MOST EFFICIENT WAY FOR YOUR STUDENTS TO REMEMBER THAT 8 x 7 = 56, YOU WOULD:

   A. PRACTICE IT ONCE EVERY DAY
   B. PRACTICE ON ONE DAY FOR A HALF HOUR
   C. PRACTICE IT WHENEVER IT WAS NEEDED IN A PROBLEM
   D. CONCENTRATE ON IT UNTIL EVERYONE KNEW IT AND THEN SPEND NO MORE TIME ON IT
   E. PRACTICE IT AT CLOSELY SPACED INTERVALS, AND AFTER IT WAS LEARNED, GRADUALLY INCREASE THE INTERVALS BETWEEN PRACTICE PERIODS ON SUBSEQUENT DAYS

5. STUDENTS DILIGENTLY WORKED ON THE MULTIPLICATION FACTS UNTIL BY CHRISTMAS EVERYONE KNEW THEM PERFECTLY. THEY THEN USED THE TIME TO WORK ON OTHER THINGS. JUST BEFORE EASTER VACATION A REVIEW TEST REVEALED STUDENTS HAD FORGOTTEN MANY FACTS. THIS WAS PROBABLY BECAUSE:

   A. LACK OF ADEQUATE DEGREE OF LEARNING
   B. LACK OF FEELING TONE
   C. LACK OF MEANING
   D. LACK OF POSITIVE TRANSFER
   E. LACK OF DISTRIBUTED PRACTICE

6. TO INCREASE RETENTION A TEACHER SHOULD BE SURE TO:

   A. COVER THE MATERIAL INCLUDED IN A COURSE
   B. SPEND EXTRA TIME ON THE IMPORTANT PARTS
   C. MAKE SURE THAT WHAT IS TAUGHT IS THOROUGHLY LEARNED BEFORE MOVING ON
   D. GIVE PLENTY OF DRILL
   E. GIVE MANY TESTS

7. IF ALL OF THE FOLLOWING WERE EQUALLY WELL LEARNED WHICH WOULD PROBABLY BE BEST REMEMBERED?

A. ALL REPTILES ARE COLD BLOODED
B. SOME SNAKES ARE TEN FEET LONG
C. A RATTLESNAKE HAS A DIAMOND PATTERN
D. RATTLESNAKES ARE FOUND IN CERTAIN STATES
E. SOME SNAKES LIKE MILK

8. ADULTS KNOW LITTLE ABOUT THE PARTS OF SPEECH ALTHOUGH MOST STUDIED THEM IN SCHOOL. THIS IS PROBABLY BECAUSE:

A. THEY DIDN'T HAVE ENOUGH PRACTICE
B. THEIR LEARNING WAS CONNECTED WITH UNPLEASANT FEELING TONES.
C. THE PARTS OF SPEECH HAD LITTLE REAL MEANING
D. SUBSEQUENT LEARNING HAS INTERFERED WITH THE MEMORY
E. THEIR ORIGINAL LEARNING WAS INADEQUATE

9. IF YOU CANNOT REMEMBER WHAT YOU HAD FOR DINNER A WEEK AGO LAST THURSDAY, IT IS PROBABLY DUE TO:

A. NEGATIVE TRANSFER
B. NEGATIVE FEELING TONES
C. POSITIVE TRANSFER
D. POSITIVE FEELING TONES
E. NEUTRAL FEELING TONES

10. WELL DESIGNED TESTS ARE VALUABLE IN PROMOTING RETENTION BECAUSE THEY:

A. IDENTIFY WHAT HAS BEEN WELL LEARNED
B. IDENTIFY WHAT HAS NOT BEEN LEARNED
C. ALERT THE TEACHER TO HOW STUDENTS' LEARNING IS PROGRESSING
D. CAUSE THE STUDENTS TO PRACTICE REMEMBERING
E. ARE BASED ON IMPORTANT GENERALIZATIONS

11. WHEN NEW TEACHERS DO NOT KNOW WHAT TO DO IN A LEARNING SITUATION, THEY USUALLY REVERT BACK TO WHAT THEIR TEACHER DID WHEN THEY WERE STUDENTS, RATHER THAN REMEMBERING AND USING THE THEORY THEY LEARNED IN COLLEGE OR IN-SERVICE COURSES. THIS IS PROBABLY DUE TO:

A. LACK OF MEANING IN THOSE COURSES
B. LACK OF APPROPRIATE PRACTICE WITH THE THEORY
C. NEGATIVE TRANSFER FROM THEIR PAST SCHOOLING
D. INADEQUATE LEARNING FROM THE COURSES
E. BOREDOM OR NEUTRAL FEELING TONES

Right-Brained Kids in Left-Brained Schools

Madeline Hunter

"Why should I read the directions? I can see how it goes together!" This obviously correct statement has baffled many a teacher as a student confidently confronted a bewildering array of pieces. And (s)he could "see" how it went together while his/her seemingly more able classmates struggled through decoding "attach narrow end of part A to rounded side of part B," in order to ferret out the knowledge that would guide their actions.

That same puzzling student would protest, "Don't tell me how to get there, draw me a map," while his/her bewildered teacher plead, "Don't show me a map, just tell me how to get there."

Teacher and student scratched their heads as each wondered how the other ever survived in this complex world. Each acknowledged the other seemed to have good sense, but "it's beyond me how (s)he thinks."

Such "differentness" in thinking, ways of remembering ("I don't remember what (s)he said but I can describe the room we were in." vs. "I don't remember where it was but I can tell you what (s)he said."), ways of attacking problems ("Let's lay it out on paper." vs. "Let's talk about it."), and styles of learning have been dealt with in the past by dumping those variations in the "people-are-different" basket. Now research in hemisphericity has begun to sort that basket into the categories of left- and right-brained thinking with promising and productive suggestions for teachers that could accelerate the learning outcomes of students.

Research in hemisphericity indicates that humans have two brains (hemispheres), each complete in itself. Unlike animals, man, at an early age, begins to differentiate the data processed by each of his brains. His left hemisphere "specializes" in data where significance is based in relationships that are built across time. You are using your left hemisphere as you relate what you are now reading to what you read in the previous paragraph and what you will read in the next paragraph. The left hemisphere has been called the temporal or propositional "if-then" brain because significance or relationships are perceived across time.

The right hemisphere in most humans "specializes" in data where significance emerges from relationships that must be perceived across space. You are using your right hemisphere when, from the surrounding visual environment, you are aware of where you are in the building, recognize a face, or understand diagrams or data displayed on a chart or graph. The right hemisphere has been called the visual-spacial or appositional brain.

The right and left hemispheres are connected by an impressive bundle of nerve fibers, the corpus callosum which transmits "messages" from one brain to the other to produce "integrated brain thinking." A somewhat similar analogy is that we have "assigned" certain responsibilities to our hands (holding the book with our left-hand while we point to the word or turn the page with our right-hand, cutting with our right-hand while we manipulate the material with the left). No matter how able we are with our right-hand, we do most things more efficiently and effectively if we also use our left-hand. In like manner, integrated brained thinking is the result of each hemisphere augmenting the information processed by the other.

Researchers suspect that individuals are born with a predisposition to prefer, or find it easier to use their right- or left-brain, however, as with handedness, practice has a great deal to do with skill. (Witness the right-handed pianist who plays beautifully with his/her left-hand, the typist who makes no more errors with his/her left than (s)he does with his/her right-hand, or the craftsman who needs both hands so uses them with almost equal dexterity.) Without practice, skills and processes can become stagnant so the comfort of using the dominant hand (or brain) often results in the subordinate hand (or brain) getting minimal use. As a result, the ineptitude which results from lack of practice is often incorrectly interpreted as lack of inherent ability.

This seems to be true of "brainedness." Because a student can "see" how it goes together, (s)he uses his/her more facile right-brain and may not give his/her left-brain the practice of reading and following directions. Because other students can get their instructions more easily from reading, they don't practice "seeing" if they can figure it out. The assumption that native ability is extended or diminished by practice is supported by current research which indicates that measured I.Q. can change with prescribed changes in experience. In no way, however, should these statements be construed as indicating that all difference in human performance is the result of experience. We still can't make every learner equal.

Hemisphericity plays an important role in the selection of occupations and hobbies. The architect, design engineer, accountant, farmer, artist, musician, etc., must deal comfortably with visual-spacial data. The philosopher, theoretician, salesman ("If I do this, then (s)he'll buy that") must handle temporal data and

synthesize those data across time into an idea or understanding. Many people are facile with both hemispheres (the Leonardo da Vincis of the world), and everyone uses both brains to varying degrees unless, as the result of an accident or surgery, they have only one.

For years, the relationship of the left- and right-brain to learning was considered relevant only to the remedial education of medical cases. It was from study of the pathology related to damage to one brain, or the severing of the corpus callosum (commissurotomy), that much of what we now know of hemisphericity has emerged. (Should the reader be interested in the medical and neurological aspects of hemisphericity, references are listed at the end of this article.)

Recently, hemispheric implications have been the subject of scrutiny by educators who were looking for more efficient and effective ways of promoting learning and for ways of remediating the learning of those obviously able youngsters who were not "getting it." The results of that scrutiny are powerfully suggestive of the conclusion that schools have been beaming most of their instruction through a left-brained, temporal input (reading and listening) and output (talking and writing) system, thereby handicapping all learners. Those who learned well through left-brained input had minimal or haphazard practice in using their right-brain. Those students who learned easier with right-brained input have been handicapped by having to use primarily their left-brain without the "backup" of the same information processed by the more proficient right hemisphere, "backup" that could be transmitted across the corpus callosum to augment and assign additional significance to the right-brained input message, thereby integrating the power of the two hemispheres.

Educators and brain researchers are becoming suspicious that the boy who knew everything about a carburetor, but couldn't read the test on carburetion systems or write the answers that he had already demonstrated in action that he knew, or the girl who did well in algebra, but almost flunked geometry, were both victims of our lack of understanding of hemisphericity. We are beginning to suspect that the student who can't remember what (s)he heard in the story, but can describe in detail a television program, and the one who is confused by the diagram, but can sequence perfectly the story (s)he read, are mirror images of the same phenomenon. In like manner, the student who can say the words in the book, but doesn't "comprehend" what has been read, or the student to whom the graph is a mystery, may represent our default in understanding rather than theirs.

Now what do all of these interesting findings mean to educators in the conduct of day to day schooling? First, they clearly mandate the responsibility for beaming instruction so that, whenever possible, information that is presented in a linear fashion across time (reading it or hearing it), is also presented in visual space (seeing or imaging it) so students have practice in integrating the information from their two hemispheres. Second, these findings suggest that whenever a student is not "getting it," the stimulus should be augmented or replaced with one that is beamed to the other hemisphere. Third, deliberate incorporation of practice that could increase facility in the use of each hemisphere singly and in concert should become an important educational objective.

Rather than elaborate diagnostic schemes to determine which brain a learner prefers, instruction to achieve these objectives includes:

1. Presenting stimuli simultaneously to both hemispheres.

2. Augmenting a stimulus by following it with information beamed to the opposite hemisphere.

3. Deliberate beaming to only one hemisphere for practice to increase fluency in processing one type of information.

Let's look at examples of each of these professional strategies:

1. Presenting stimuli to both hemispheres

Modeling often is an effective way to simultaneously augment the more typical verbal or written instructions by pairing the words with the visual input. Doing an example on the chalkboard while giving a verbal explanantion or having someone perform the act while hearing the directions, are possiblities for this pairing.

Examples:

"Now listen to what I'm thinking while I'm doing this problem. I can't subtract 7 from 3 so I need to regroup from the tens to the ones. I'll take a ten from _____" (while the work is being demonstrated on the chalkboard).

"Listen carefully while I give directions and watch what I am doing."

"Tell us what this graph is displaying."

"Watch me and listen to what I am thinking as I make a 'k.' I start at the top and make a straight line...."

"Say to yourself what you're doing while you're doing it."

The importance of modeling cannot be overemphasized. "Observational learning" can result from "seeing someone else do it." Successful teachers have been using this technique for years, but only recently have we known why the dual input of "seeing it" and "reading or hearing about it" was such an effective educational strategy.

2. Augmenting the stimulus by following it with information beamed to the other hemisphere when the student is not "getting it."

Obviously, hemisphericity is only one of the many reasons for learning difficulty. For the learner to be successful, the learning task must be at the right level of difficulty with all necessary subordinate learnings having already been achieved. The student must be motivated to exert learning effort. The learning should have been made meaningful and relevant to the learner. Practice should be appropriate to the task and to the learner. Changing hemispheric input systems, however, can aid and often remediate a learning problem.

Examples: Alternate

"Watch while I do one," and "You tell me what to do."

"Look at this, now find another one like it," and "I'll describe one, you describe another one like it."

"Look carefully so you match yours to mine," and "You say one like the one I say."

"Let's talk this one through," and "Let's act one out - do one without talking."

"Make a picture of 6 x 7," and "Describe this multiplication picture."

"How would you show that with dots?" and 'What do these dots show?"

"Find it on the map," and "Say what the map shows."

"We would graph it like this," and "How would you interpret this graph?"

"If we put it on a time line, where would it be?" and "If we translated the time line into words, we would say...."

"Do what I say," and 'Show me what I should do."

Of great importance in giving learners the "assist" of using both hemispheres, is asking the student to generate examples from his own experience. Not only does this add imaging which transfers learning from the past to give added meaning to the present experience, but it enables the teacher to check the accuracy and validity of the student's perception and understanding of the present learning.

Examples:

"Make up a word problem that will go with 250 $\div$ 25 = (or 4 + 8 =)."

"What things would Goldilocks try out in your house?"

"What traits do you have that make you like Columbus?"

"What have you done that is the same as _____?"

3. Deliberate beaming of instruction to only one hemisphere to enable students to practice handling unaugmented, nonintegrated input.

Examples:

"Read the directions and see if you can do it."

"Look at the diagram and see if you can figure it out."

"Look at this design and see if you can make one just like it."

"Listen to my directions and see if you can make the figure I am describing."

"Read the chapter and answer the questions."

"Look at this sequence of 3 pictures and draw what the 4th might be."

Schools long have realized the importance of augmenting the written or spoken word with chalkboard, pictures, diagrams, graphs, etc. As technology advanced, more sophisticated audio (left-brained)-visual (right-brained) materials became available to teachers.

The audio of spoken words (not music), while using the same language (left-brained) input system as reading, eliminated the barrier created by the necessity for possession of the skill of reading to decode letter symbols into sound - into speech - into meaning. Not knowing the neurological reason, those visuals were important. Unfortunately, however, "audio-visual" became an end in itself with millions of dollars being spent on materials that in some cases were poorly designed, ineffectively executed, and unintelligently used.

With the advent of television, which is primarily a right-brained input system (configurations of dots in space to which significance is assigned) and which is augmented by the temporal input of speech (often the same few words repeated over and over as in T. V. commercials), the whole world, literate and illiterate, is able to receive information without so much left-brained processing, and in spite of inability to surmount the hurdle of decoding written speech into meaning. With television, the right-brained individual can take his/her proper "place in the sun" with his/her left-brained, formerly advantaged, friends, in terms of "knowing about" and "understanding" both current issues and mankind's past. The "Ascent of Man" and the horrors of Vietnam are no longer privileged communications to the "ones who were there" or the left-brained scholars.

While language and linguistic markers are processed in the left hemisphere, it is interesting to note that the sonorous clues of timbre, intonation, pitch, etc., of the spoken words are processed in the right hemisphere (as is music). "Hearing what (s)he says" and "hearing what (s)he means" can be different messages, each processed in a different hemisphere and posing the problem as to which message

the receiver accepts as the valid one. Recently, nonverbal communication, the interpretation of kinetic (movement), iconic (images), and sonorous (sound) clues, has come into high visibility as a right hemispheric function. "Intuition" could be a manifestation of this kind of "knowing" without being told by words.

It is important for the teacher to note that his/her own verbal and nonverbal communication must deliver the same message or "what you do speaks so loudly I can't hear what you say" may result. The younger child is particularly responsive to nonverbal cues. For integrated perception and development of facility with both hemispheres, language, plus visual, and kinetic, plus sonorous clues constitute the most effective communicative process.

What is our final educational responsibility, we who are not neurologists, we who are not responsible for the re-education of victims of accident or those who evidence brain pathology, we who have the important responsibility for making learning more probable, more predictably successful, more efficient and more effective for those millions of students, from preschool through post secondary education, that are entrusted to our classroom guidance?

We must, of course, follow the paths of the researchers, translating, as soon as we are able, their findings into classroom practice. We must, with that translation, make available to every teacher, in language (s)he can understand, strategies that effectively and comfortably can be used in his/her classroom regardless of budget, organizational scheme, materials available, pupil-teacher ratio (granted all of those are important, but not determining variables). We must, in turn, present questions and concerns that will focus researchers on areas most productive in terms of learning

gain for students. And finally, we must incorporate in our dissemination of important information, our acknowledgment that "we must practice what we preach" and develop left-brained and right-brained input of the information, modeling by our own behavior the fact that neither brain is superior to the other, neither is the chosen one, both are essential to integrated thinking and this world would be a better, more accepting, more stimulating, and more fulfilling place for all of us if we accepted the difference, recognized the similarity, and acknowledged the right to learn of all students: Therefore, as a beginning step, we must deliberately incorporate those strategies which reflect research in hemisphericity into our daily teaching and augment (not replace!) with right-brained input, the predominately left-brained educational programs currently in our schools.

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WHOLE-BRAIN LEARNING

ALBERT PAUL MALVINO

WHOLE-BRAIN LEARNING is based on the idea that visual images are just as important as words when you are trying to learn something new. The reason is that the human brain is organized like a pair of computers. The left half of the brain is a symbol processor; the right half of the brain is an image processor. The data in these two brain halves must combine into a unified whole for deep understanding to take place.

THE TWO HEMISPHERES

When we look at the brain, it appears to be a single organ. But a closer examination reveals that it is two separate hemispheres joined by a bundle of nerve fibers called the *corpus callosum* (Fig. 1). The corpus callosum allows the two hemispheres to exchange information. Looking at the two brain halves, a philosopher might ask "Is there one mind here or two?" The traditional answer is one mind. But the one-mind model turns out to be as short-sighted as the idea that the world is flat. As you will see, a new Christopher Columbus claims that we have two minds, not one.

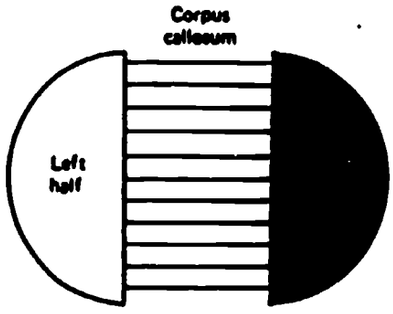

Figure 1. Structure of human brain.

THE DOMINANT LEFT HEMISPHERE

Before the 1960s, anatomists had already examined the brain and could see two distinct halves connected by the corpus callosum. Furthermore, it was already known that a crossover wiring existed between the brain and body.

CONTINUED ON PAGE 9

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For example, a serious injury to the right side of the head paralyzed the left side of the body, and an injury to the left side of the head paralyzed the right side of the body. Another curious phenomenon was that injuries to the left half of the brain rendered people speechless, but injuries to the right half of the brain did not impair speech. Because of this, people used to believe that the left half of the brain was the center of the intelligence, while the right half was a silent partner that did nothing but control the left half of the body.

DUALITY OF THE HUMAN MIND

Radical changes in brain theory began in the early 1960s. Dr. Roger Sperry (California Institute of Technology) had been experimenting with cats and monkeys trying to find out what the corpus callosum did. In his experiments, he cut the corpus callosum to isolate the two brain halves. To his astonishment, the cats and monkeys remained normal in every way.

These results prompted Drs. Bogen and Vogel to perform a similar operation on an epileptic patient. The patient's seizures had become so violent that death was near. Bogen and Vogel assumed that cutting the corpus callosum would reduce the severity of the seizures because the brain half originating the seizure would be isolated from the normal brain half.

The operation was more than a success. The epileptic seizures disappeared completely. Furthermore, the patient appeared normal in every way. Because of this historic operation, split-brain surgery became the method of choice for treating severe epilepsy. As a result, many epileptics had this kind of brain surgery. This allowed Dr. Sperry to extend his brain research to human beings.

What followed won a Nobel prize for Sperry. Although the split-brain patients seemed normal, they were not. Something was different, but it required special apparatus to discover. With the help of Dr. Michael Gazzaniga, Sperry examined dozens of split-brain people and came to the following conclusions:

1. The left half of the brain thinks in words and numbers.
2. The right half of the brain thinks in pictures and other nonverbal images.
3. The two brain halves are so different that it is more accurate to speak of a left brain and a right brain than of a single brain.
4. It is impossible to describe in words how the right brain works.

Drs. Galen and Ornstein (University of California Medical Center) confirmed the Sperry conclusions using a different experimental approach. Alpha waves occur in the brain when it is resting and beta waves appear when it is active. Galen and Ornstein discovered that someone reading a book had beta waves in the left brain and alpha waves in the right brain. Conversely, someone drawing a picture had beta waves in the right brain and alpha waves in the left brain. The conclusion: the left brain processes words and the right brain processes visual images.

IDEAL LATERALIZATION

Ideally, the left brain is the source of language, number, sequential thinking, logic, verbal memories, and verbal consciousness. The right brain is the source of visual images, music, spatial relations, intuition, visual memories, and nonverbal consciousness (Fig. 2). In the west we tend to think the self-talk inside our heads is our total consciousness. But people in eastern countries have long known that there is more to human consciousness than the self-talk of the left brain. In fact, many eastern philosophies distrust language because they claim it creates illusions and limits our perception of reality.

The east may be right. Apparently, vision has the power to create. The great achievers always visualized the results they were aiming at. The methods for getting there would then appear in the form of hunches, dreams, and intuitions. In short, the breakthroughs in science and other fields usually originate in the right brain. This is the same brain that before the 1960s was thought to be useless except for moving the left half of the body.

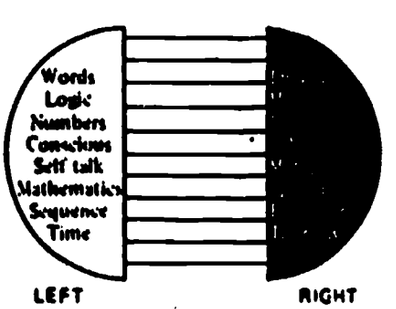

Figure 2. Ideal lateralization of human brain.

The left-brain/right-brain model applies to 95 percent of the U. S. population. You may be wondering why the left brain has emerged as the word processor and the right brain as the image processor. One explanation is this: For evolutionary reasons, infants tend to hear slightly better through the right ear. Because of the crossover in brain-body wiring, sounds enter the left brain more efficiently. This slight edge leads to the left brain specializing in word and other symbol processing, while the right brain handles image and other nonverbal processing.

THE PROBLEM WITH EDUCATION

Everyone knows something is wrong with traditional education. It's too narrow, too pat for the real world. It fails to train the subtle parts of the mind. It ignores wholistic and intuitive learning. Why is this? Because traditional education is still based on the pre-1960s model of the human brain. Too many educators still believe there is only one right answer to a problem, and even worse, that there is only one right way to solve a problem. In other words, most schools in the United States continue to educate a student as though he or she has only one brain. They do this by stressing calculations, formulas, logical analysis, sequential thinking, and all those functions associated with the left brain. This is unfortunate because human understanding seems to be based on vision.

The bulk of consciousness is centered in the right brain during the early years of life. After the left brain becomes proficient in language, a shift starts to take place in consciousness. The child begins to use the left brain more and more. At some point beyond the fifth grade, the educational system comes to emphasize left-brain learning almost totally, partly because words and numbers have been mistakenly identified with total human intelligence.

The higher one moves through

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the educational system, the greater the emphasis becomes on left-brain learning. If the right brain does get any stimulation in science classes, it is usually an accident, unless an outstanding teacher is involved. By the time someone graduates from college, he or she typically has a well-developed left brain and a withered right brain.

TOWARD THE WHOLE BRAIN

Based on my research, I have arrived at a hypothesis for how we understand things. I believe the following three steps are necessary to understand almost any concept:

1. A visual image of the concept must be stored in the right brain.
2. A verbal description of the concept must be stored in the left brain.
3. The visual and verbal memories have to be connected.

There may be exceptions, but as a guideline, I have found these three steps are necessary for understanding the concepts of science and technology.

These three steps are my definition of whole-brain learning, the type where something new is created in the brain. In other words, I believe the correlation of visual images and verbal descriptions produces a synergistic effect whereby the whole becomes greater than the sum of the parts. The idea is similar to a chemical reaction. When you combine hydrogen and oxygen, you get water. The water has new properties, quite different from either hydrogen or oxygen. Similarly, whole-brain learning means the visual and verbal data in the two brains combine to create a Eureka effect, a discovery of the full meaning of a concept.

APPLYING WHOLE-BRAIN LEARNING TO TECHNICAL EDUCATION

As a teacher and a writer for the past 20 years, I've been trying to discover what happens when real understanding takes place. I think my three-step hypothesis goes a long way toward answering the question. What follows are some suggestions for whole-brain teaching of technical subjects. These are guidelines to help you think

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about how you might adapt these ideas to your teaching style.

1. Start by accepting the *duality of human mind*, the notion that a human being has two minds or modes of thinking. To reach one of these minds you have to use words, numbers, logic, and formulas. To reach the other mind, you have to use pictures, diagrams, visual aids, and metaphors.

2. In the typical educational setting, the left brain is feasting, while the right brain is starving. Because of this, the simplest way to implement whole-brain learning is to use *more visual aids*. The old saying that a picture is worth a thousand words falls short of the mark. Some pictures defy verbal description. They contain information that only right brain can absorb. Because of this, a student can develop an intuitive understanding from visual images. Once the student has this intuitive grasp of the concept, you can add the technical terminology and mathematics that produce whole-brain understanding.

3. Time and time again I have asked students with difficulties to describe their problem. In almost every case, there was no visual image of the concept they were struggling with. Therefore, I've come to the conclusion that human understanding seems to be based on vision. Even the words we use confirm the idea of vision-based understanding. We have expressions like "Now I see" or "Do you see what I mean?" I think this is more than a coincidence. I think it is virtually impossible to understand anything without some kind of visual model. Geniuses like Newton and Einstein relied heavily on visual models for their mathematical derivations.

So another suggestion I have is this. When you are troubleshooting a student's difficulty, work on the *visual image* of the concept first. Make sure the student has some of kind of picture of what he or she is trying to understand.

4. One of the left-brain traps of technical education is the idea that every problem has only one right answer. Sometimes this is true and sometimes it is not. Based on my experience through graduate school, I think one-answer solutions are emphasized to the point that students stop looking for more than one right answer. This is unfortunate because most of the problems encountered in industry have *many right answers*. Often, the best solution to a real-life problem is the second or third right answer that you can find.

Being aware of the one-right-answer trap is a beginning. I would also ask open-ended questions that encourage more than one right answer. And I would also make up some homework problems that had several right answers.

5. Some people scoff at the idea of intuition, claiming it doesn't exist, or that it is logical thinking taking place at high speed. Such people don't know their left brain from their right. *Intuition* can be defined as those thinking processes that we cannot explain verbally because they take place in the right brain. Recall that Sperry's fourth conclusion was that we cannot explain in words how the right brain works. This means the right brain can process data without our being verbally aware of it. Since the right brain is nonverbal, it processes data on a different level of consciousness.

So, I would accept the existence of intuition and would try to develop it in my students. If you have any reservations about intuition, consider that even Einstein said "The really valuable thing is intuition."

6. Finally, I would try to develop *what-if thinking* (right brain) as well as sequential thinking (left brain) in my students. Sequential thinking is what we usually do. It is the kind of thinking where the result of each step is used in the next step. It is logical and mathematical. It is neat and clean and unforgiving. It is what a computer does. What-if thinking is different. This is the kind of thinking where anything goes and all things are possible. What-if thinking searches for more than one right answer. It is sometimes illogical, it breaks the rules, it makes mistakes, it is playful, it is sometimes foolish, and it is creative. □

LEARNING AND REMEMBERING

How People Learn

1% through taste

1-1/2% through touch

3-1/2% through smell

11% through hearing

83% through sight

How Much People Remember

10% of what they read

20% of what they hear

30% of what they see

50% of what they see and hear

50% of what they say as they talk

90% of what they say as they do a thing

How Long People Remember

Method of Instruction	Recall 3 hr. later	Recall 3 days later
A. Lecture Method only	70%	10%
B. Demonstration Method Only	72%	20%
C. Both Lecture and Demo	85%	65%

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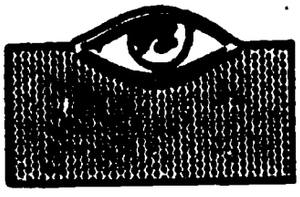
ALL THINGS BEING EQUAL YOU'LL REMEMBER --

THIS MUCH OF WHAT YOU HEAR

10%

THIS MUCH OF WHAT YOU SEE



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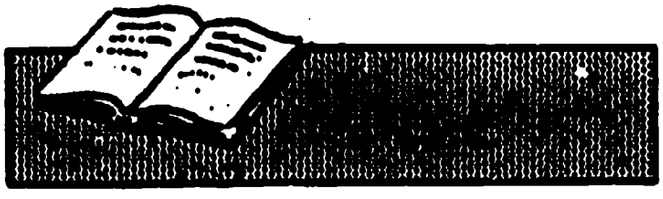
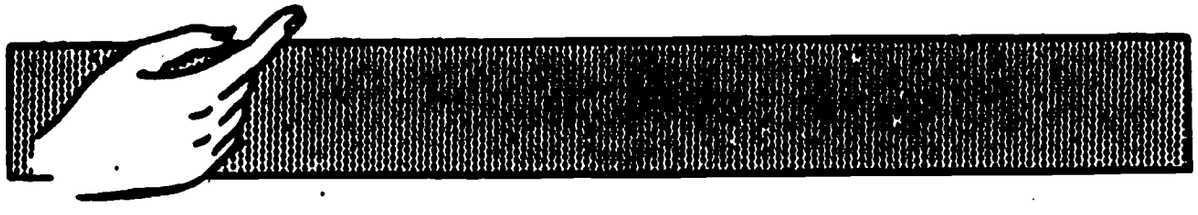
THIS MUCH OF WHAT YOU READ



50%

AND THIS MUCH OF WHAT YOU DO



90%

SO DO ALL YOU CAN!

BASIC TEACHING TECHNIQUES THAT WORK

GROUP DISCUSSION

When you want to involve all your students in exploring an idea, in organizing and articulating their thoughts, in developing critical thinking--try the technique of group discussion. This method can also be used to advantage after a lecture, a film showing or a symposium or panel discussion.

Some Discussion Do's and Don'ts

1. Prepare in advance a few questions students may want to ask about the topic. This will prime the pump...will help students think of questions of their own. Tell them you have anticipated a few questions, and either pass them out, write them on the board, or read them aloud.

2. Don't answer student questions yourself, if possible. Ask the class if anyone can come up with an answer. Ask for additional suggestions on handling the problem.

3. If students have questions or topics different from the ones you prepared, use theirs. Yours are just a kick-off point to get them going.

4. Don't let any one person talk too often or too long. Simply say, "Let's hear from someone else now," or "I'm sorry to interrupt but we must let others in on the discussion."

5. If some people do not talk (there are silent or shy ones in every group), throw them a question--"How would you handle a problem like this?"

6. When one topic seems exhausted or the time is about up, summarize what has been said and add you own thoughts or ideas--then go on to another topic. Don't devote more than five to eight minutes on any one problem.

7. Involve the students in your summary, by asking "What is one important thing you have picked up from this discussion?" If no one responds, you can say, "Well, I've learned...Who else has something he or she will remember from our discussion?"

DEMONSTRATION AND PRACTICE

There are times in most skill classes when talk and textbooks are not enough: the participants need to be shown how a thing is done, and need opportunities to practice the skill themselves.

Demonstration Do's and Don'ts

1. Explain the purpose of the demonstration. Make your explanation clear and simple. Make sure all students understand.

2. Make sure every member of the group can see what is going on.

3. Do not demonstrate too many steps at once. If it is a complicated procedure, demonstrate one segment at a time, and allow time for questions about that segment.

4. Repeat the procedure slowly, emphasizing key points, and again encouraging questions.

5. Allow time for every member of the group to practice the operation. while you move about the room, observing, assisting, and correcting individuals as they practice.

6. Limit comments and questions during the demonstration to what is actually being demonstrated. Tell students there will be time for questions on broader aspects of the subject later.

7. If appropriate, have a general class discussion of difficulties, variations, applications, after the demonstration and practice period. This will cue you to specific learning difficulties--which students need special help, and of what kind.

ROLE PLAYING

This technique helps students to actually experience a human relations situation, rather than simply read or hear about it. It is particularly useful in business education, in adult basic education, in family life education. By acting out a situation, people gain insight into their own feelings and those of others.

Some Role Playing Do's and Don'ts

1. Select the role-playing situation from a discussion topic, or from a problem a particular student has brought to the classroom. For example, John reported that he applied for a job, had a job-interview, but didn't get the job. He tells what happened during the interview. You can then ask "How could that interview have been handled differently? Would anyone like to play John's role and another the interviewer's role?"

2. As players act out the situation, ask them to comment on "How do you feel now as John, being interviewed?" and "How do you feel about John as the prospective employer? Would you hire him? What should he have done differently?"

3. Avoid rehearsing, but do set the stage for the players by describing the scene and answering any questions they might have--asking John exactly what he said and did, what he wore, etc.

4. Follow up by having the two players switch roles, one now playing the interviewer, the other the interviewee.

5. If someone does not want to be a role player, encourage him/her but don't push. But if this method is introduced in the right spirit, it usually rouses people's interest and they rarely refuse to cooperate.

6. Do not assign a role too close to a person's character, which could be

embarrassing. He/she will probably learn more by playing a completely different kind of person. A very assertive person, after taking the part of a very shy person, said it had been a useful experience.

7. Some amount of clowning or initial awkwardness is to be expected. But if horseplay gets out of hand, or shyness and silence take over, gently remind them of the time remaining, and ask them to get on with the problem situation.

8. Invite the rest of the group, who have observed the role playing, to give their opinions about what went on. Discussion should relate to how it feels to apply for a job, to be questioned, corrected, advised flattered, or whatever the role-playing sequence tried to portray.

9. If possible, give every member of the group an opportunity to be part of a role-playing sequence, rather than a mere observer.

10. Explain to participants that role-players should not "ham up" or overplay their roles. Every part should be undertaken as if it were real.

11. One way to involve more people: divide the class into small groups so that the number of people in each group equals the number of roles to be assigned, then appoint several as observers.

ASKING QUESTIONS

All students are familiar with teachers who feed them information and then ask questions about it. This is often merely the time-worn game of "Let's guess what the teacher wants us to say." However, skillful question-asking plays a vital part in teaching adults.

Asking Questions: Some Do's and Don'ts

1. Ask for more information. By asking the responder to be more explicit and perhaps more sure of his/her answer, "Can you give me an example?" or "When you say xyz, what do you mean?"

2. Make critical observations, to make the learner look at his/her answer in a more probing way. "Why do you think that is so?" or "How would you explain your answer to someone who feels just the opposite?"

3. Encourage silent members to comment if you think they might have the answer but are reluctant to speak up. "This is probably something you know quite a bit about, David."

4. Piggy-back new questions on top of the responses you get for your previous question. "OK, let's take that approach and take it one step further."

5. Try not to answer your own questions too often. After a while you will be performing a one-person show...with little learning produced.

6. Don't ask "Are there any questions?" We all know the silence that

typically follows this question. Here are some questions that are more likely to bring responses as you proceed through a talk or demonstration:

1. "Before I go on, does this make sense to you?"
2. "Am I going too fast?"
3. "I am not sure I am doing this right. Do my examples make sense to you? Do you need additional information from me?"
4. Ask "Are there any questions you want me to answer?" Wait for five seconds, then address a person who you feel has, or ought to have, a question: "Perhaps you could start, Henry?"

TRANSFER

DEFINITION: A classification of a group of variables (principles) of learning. These variables when utilized will assist the learner to use what has been learned in one situation in a different situation (possibly in a modified or generalized form)

PURPOSE: To shorten learning time and form the basis for creative thinking, problem solving, and higher mental processes

FACTORS: Similarity (Past to Present)
Simulation (Present to Future)

Higher order thinking requires the application of concepts, generalizations and discriminations to a new situation: a situation to which the person does not have a ready or automatic response. If we wish higher thinking to occur in students, we need to learn how to teach concepts, generalizations and discriminations so they contribute to the thinking required for creativity, problem solving and the making of responsible and satisfying decisions.

It is important to stress that "teaching" includes all modes of learning for which the teacher is responsible: direct instruction, deductive, inductive, discovery learning, cooperative learning, or individual learning, plus use of prepared, written or AV materials. A teacher plans, prepares for and programs students' utilization of these modes of learning. The concept of teaching certainly includes more than direct instruction. (Incidentally, this is a concept many people still have not acquired.)

At times we may wish students to discover concepts, generalizations and discriminations by themselves. At other times we will teach them to students. The important issue is not how concepts, generalizations and discriminations are acquired but that they are acquired. That achievement is primarily the result of the professional skill with which the teacher works regardless of the mode of acquisition.

TEACHING CONCEPTS

A concept is the name of a category rather than a specific instance. To develop a concept, regardless of whether we teach it or students discover it, we first must identify for ourselves the critical attribute(s), or properties, or functions of the concept that make that concept what it is: that determine which members are included in or excluded from that concept or category. "A square is a closed figure with four equal sides and four right angles." Note the critical attributes of a square are themselves

Knowledge of the concepts which are related in a generalization is an essential first step before the generalization can be understood and subsequently applied to a new situation.

To certify possession of a concept requires the learner discriminate, generate or select new instance of that concept. This extension of understanding is called "elaboration" and creates a network of relationships in the learner's long term memory. A network is more easily stored and retrieved from memory than are single instances.

TEACHING GENERALIZATIONS

Generalizations include rules, statements of critical attributes and probability statements. A generalization expresses the relationship between two or more concepts. ("Dogs can be friendly." "People live in houses." "Periods go at the end of declarative sentences." "A response which is reinforced increases in probability or frequency.")

To teach or to acquire a generalization, the initial examples or instances of that generalization must be clear and consistent. Then the student should be presented with a wide variety of circumstances in which the generalization is held constant. Only after the generalization is well learned are exceptions presented.

Let's look at a simple example: the generalization that "two of anything plus two more of the same thing equals four of that thing." We represent this generalization by 2 + 2 = 4. To teach that generalization, our examples should hold the generalization constant but present it in the widest possible variety of circumstances. "Two candy bars plus two candy bars equals four candy bars." "2 days + 2 days = 4 days." 2

concepts: closed, figure, four, equal, sides, right angles. Each of these concepts must be discriminated from other angles, equal from unequal. Then the square must be discriminated from a trapezoid, rectangle or other parallelogram regardless of size, color, position, thickness of lines etc.

The critical attribute of the concept "compromise" is that each party gets some of what s/he wants but not all of what s/he wants. If a boy wants to use the car every Saturday and his father wants him to work in the yard, it is a compromise if some Saturdays he gets the car and some Saturdays he works in the yard. The number of yard and car Saturdays is not the critical attribute. There could be 1 and 3 in a month or there could be 2 and 2. The latter ratio would be the critical attribute of father and son having equal rights to determine what occurs on Saturdays.

Sometimes it is not possible to articulate the critical attribute. Even linguists have not specified the critical attribute of a sentence in a way we can transmit it to a student. In such cases, through the use of examples, we have to develop an intuitive (non articulated) knowledge of the concept. "The ball is in the tree," is a sentence. "The ball," or "The ball is," (subject and verb) or "in the tree are not sentences.

Nevertheless the articulated or non-articulated (intuitive) critical attribute(s) of a concept must be understood by the student before valid discriminations can occur. Discriminations are made on the basis of presence or absence of critical attributes. "A circle is a continuous line with all points equidistant from the center." "A square is a four, equal sides, closed figure with four right angles." These critical attributes must be perceived either intuitively or consciously by the learner if s/he is to discriminate a square and a circle from other forms.

blocks + 2 blocks = 4 blocks. "2 minutes + 2 minutes = 4 minutes." "2 ideas + 2 ideas = 4 ideas."

When we are teaching the generalization that the letters c-a-t in that order spell "cat" we introduce "cat" on the bottom of the page, on the top and in the middle, in capital letters, in manuscript, in cursive, written on book jackets, on billboards, and on pictures.

When we wish the subject to discover the generalization. "When two or more subjects are joined by "or", the subject closest to the verb determines the verb form," we introduce examples such as: "Dogs or a cat is in the house." "A cat or dogs are in the house." "He or they or I am going." "I or they or he is going." "He or I or they are going." We will use the same subjects but vary the order, so we focus the student on the relationship between the verb and subject closest to it.

If we plan to teach this same generalization by direct teaching rather than by discovery, we may use the same examples but we will teach the rule rather than have students discover it. Practice will continue with, Harry or I am responsible." "Carrots or celery has fiber." "Either you or he goes with me." to make obvious the relationship of the verb form to the closer subject.

TEACHING DISCRIMINATIONS

Making a discrimination is a process which requires the opposite kind of thinking from generalizing. Discrimination requires that of treating perceivably similar things as if they are different.

To teach students to discriminate between concepts or to discriminate between generalizations, we hold surrounding conditions constant and vary the presence or absence of the critical attribute(s) which indicate it is or is not an instance of that concept or generalization. Then the student needs to support or impeach the correctness of the discriminative judgment by identifying the discriminator being used. This will be clarified by the following examples.

To discriminate between the concepts of "addition" and "subtraction," we would hold everything constant except the critical attribute which indicates which operation is appropriate (combining quantities is the critical attribute of the concept of addition, separating parts from a whole is the critical attribute of the concept of subtraction.) "How many pennies would you have if you had three pennies and found two?" vs. "How many pennies would you have if you had three pennies and lost two? "How many problems would you have done if finished 15 and then did 10 more?" vs. "How many problems would you still have to do if you had to do 15 problems and had already finished 10?"

To develop the discrimination between the generalization that "c-a-t spells cat" and other similar letter configurations we might ask the student to find the name of the animal that says "meow" in the following: can, cap, car, cat, cab, cad.

To test the students ability to discriminate between the concept of "cat" and "skunk" we would need to use pictures of a black and white cat and a skunk.

To develop the discrimination of which subject is closest to the verb, we would ask the students to circle the word that determines the verb form and underline other subjects that had no effect. To develop the discrimination of that rule from the rule, "Whenever

two or more subjects are joined by "and" the verb is always plural" we would use sentences such as: "He or I ___ going" and "He and I ___ going", then have the student select the correct verb form.

Problems exist in teachers' use of psychological generalizations because discriminators are not taught so teachers can differentiate times when a generalization should be used by the teacher and when it should not because the situation is different. As a result, generalizations in teaching can become false absolutes.

Let's look at a way we might apply the psychological generalization, "Mass practice for fast learning, distribute practice for long retention (remembering)." The concepts of "fast learning" and "long retention" are familiar to teachers. The critical attribute of the concept of "practice" is doing something again to increase accuracy or fluency. The critical attribute of the concept of "massed" is practicing several times without intervening activities. The critical attribute of the concept "distributed" is that other activities occur between practice periods.

Using this generalization as one thinks about teaching requires discrimination whether, at this point, learning is necessary and needs to become more accurate, or whether that learning has been reasonably achieved and the objective is students' automating and/or remembering that learning. As an example, when the concept of "square" is being learned, students will mass practice, identifying squares of various sizes, shapes, colors. Once students have learned the concept "square", distributed practice will be utilized as to identify squares with longer and longer time intervals between identifications so permanence of learning is achieved.

To teach the rule about "subjects joined by "or", we would give students many sentences with different subjects and varying numbers of subjects, holding the "or" which joins those subject constant (massed practice). Then we might review the learning the next day, skip a day, review, skip several days, review occasionally for long remembering (distributed practice). Eventually we would have students discriminate between sentences where subjects were joined by "or", and sentences when subjects were joined by "and".

SUMMARY:

To teach a concept, we identify (if possible) the critical attribute(s) of that concept and present that attribute in a wide variety of circumstances. The greater the variety of circumstances the more effective is the learning of that concept and the most accurately that learning will transfer to new situations.

To teach a generalization, we make sure students understand the concepts and the relationship among them. Then we hold the generalization constant in the widest possible variety of circumstances, the greater the variety of circumstances, the more mental operations on the part of the student and the more memorable and transferable that generalization will become.

To teach a discrimination, we hold the circumstance constant and vary only the presence or absence of the critical attribute(s) of that concept or generalization which the student must use to make the discrimination. The more discriminations a student makes when surrounding circumstances are similar, the more quickly the discrimination will be learned and the longer it will be remembered.

Teaching concepts, generalizations and discriminations effectively is a major contribution to students' ability to think creatively, to solve problems and to make responsible, satisfying decisions.

TRANSFER

Select a learning task from your area of expertise which has not been previously taught:

Write a statement or describe an activity which will make the "connection" from past learning on experience to the new learning (task listed above):

Write a statement or describe an activity which will assist in making the "connection" to future use of the new learning (task listed above)

HINTS ON PROMOTING TRANSFER

1. Look for knowledge in past experiences that will propel present learning.
2. Identify and label the similarities of the two learnings which make transfer from one appropriate to the other.
3. Use appropriate associations from the past and develop productive present associations.
4. Elicit the appropriate set to perform.
5. Make sure learning is achieved to an appropriate degree.
6. Identify and label key discriminators that make a situation what it is.
7. Practice transfer ... It is a critical attribute of "learning how to learn".

TEACHING CONCEPTS, GENERALIZATIONS, AND DISCRIMINATIONS

Madeline Hunter

All higher order thinking is based on the thinker's possession and use of concepts, generalizations and discriminations. Thinking is a performance behavior which results from having learned both the necessary content and the thinking process involved. The ability to generalize (perform by thinking) entails the use of concepts rather than specific items of information. To generalize correctly requires the ability to discriminate when a generalization is applicable and when it is not.

CONCEPTS GENERALIZATIONS AND DISCRIMINATIONS DEFINED

A concept is the name of a category (chair, red, mammals, courage) which includes many members. For example, a chair is a piece of furniture with a back, on which only one person typically sits.

A generalization is a statement of relationships between or among concepts. To generalize is to treat perceivably different things as if they were the same. (Elephants, whales and mice are all mammals.)

To discriminate is to treat perceivably similar things as if they were different. (A chair is not the same as a stool. A porpoise and a fish are not the same. A "b" is not the same as a "d".)

To generalize and to discriminate are mirror images of each other. Both are based on accurate concept formation.

Adapted from Doug Russell and Madeline Hunter - 1976

Planning for Effective Instruction
(Lesson Design)

Planning is acknowledged to be one of the most influential factors in successful teaching. Should there be a system to this planning or does one hope for a burst of inspiration from which effective instruction will automatically flow? While the writers are all for inspiration, we agree with Edison, that a certain amount of well-directed "planning perspiration" will work wonders in increasing learners' successful achievement. We believe that a systematic consideration of seven elements, which research has shown to be influential in learning and which therefore should be deliberately included or excluded in planning for instruction, will make a great deal of difference in learners' success or lack of it.

It is assumed that:

1. Content has been identified
2. The degree of competence has been chosen
3. A specific objective based on the student's previous learning has been selected.

Now the teacher is ready to plan for that instruction regardless of whether the plan is implemented by input from the teacher, by materials or by the student him/herself.

For each instructional session, the teacher must consider the following seven steps separately to determine whether or not it is appropriate for the particular objective, for the particular student, and whether it should be included, or combined with subsequent steps.

Components of Lesson Design

1. Anticipatory Set

   Anticipatory set is the result of an activity which occurs during the time that a student is physically arriving or mentally "shifting" gears from the activity just finished. Anticipatory set elicits attending behavior (deliberate focus) and a mental readiness or "set" for the content of the ensuing instruction. Planning an effective activity to develop anticipatory set will

   a) focus the students' attention,

   b) provide a very brief practice on previously achieved and (if possible) related learnings and/or

   c) develop a readiness for the instruction that will follow.

   This anticipatory activity should continue only long enough to get the student ready so that the major portion of instructional time is available for the accomplishment of the current objective.

2. The Objective and Its Purpose

This step involves communication which informs the student what he/she will be able to do by the end of instruction and why that accomplishment is important, useful and relevant to present and future life situations.

3. Instructional Input

To plan this step, the teacher must determine what information (new or already processed) is needed by the student in order to accomplish the present objective. Often students' are expected to achieve an objective without having been taught that which is necessary in order to do so.

Once the necessary information has been identified, the teacher must select the means for "getting it into the student's head." Will it be by the teacher, a book, film, diagram, picture, real object, demonstration? The possibilities are endless.

4. Modeling

It is facilitating for the student to not only know about, but to see examples of an acceptable finished product (model, diagram, graph) or a process (how to perform a particular procedure).

It is important that the visual input of modeling be accompanied by the verbal input so the student is focused on the essentials rather than being distracted by transitory or irrelevant factors in the process or product.

5. Checking for Understanding

The teacher needs to check for the student's possession of essential information and also needs to observe students' performance to make sure they exhibit the skills necessary to achieve the instructional objective. This can be done by:

1. Asking questions involving knowledge
2. Requesting a demonstration of the desired skill/task
3. Observing the desired behavior

6. Guided Practice

The beginning stages of learning are critical in the determination of future successful performance. Consequently, the students' initial attempts in new learning should be carefully guided so they are accurate and successful. Having instructed, teachers need to circulate among students to make sure the instruction has "taken" before "turning students' loose" to practice independently. The student needs to perform all (or enough) of the task so clarification or remediation can occur immediately as it is needed. In that way, the teacher is assured that students will be able to perform the task satisfactorily without assistance rather than practicing mistakes when working by themselves.

7. Independent Practice

Once the student can perform without major errors, discomfort or confusion, she/he is ready to develop skill by practicing without the availability of the teacher. Only then students' can be given an assignment to practice the new skill or process with little or no teacher direction.

Simply "knowing" the seven steps in planning for effective instruction will not ensure that hose steps are implemented with artistry. Simply having an "artistic knack" will also not ensure the elements that promote successful learning are included in instructional planning. Both the science and the art of teaching are essential

LESSON DESIGN

SET

OBJECTIVE

PURPOSE

INPUT

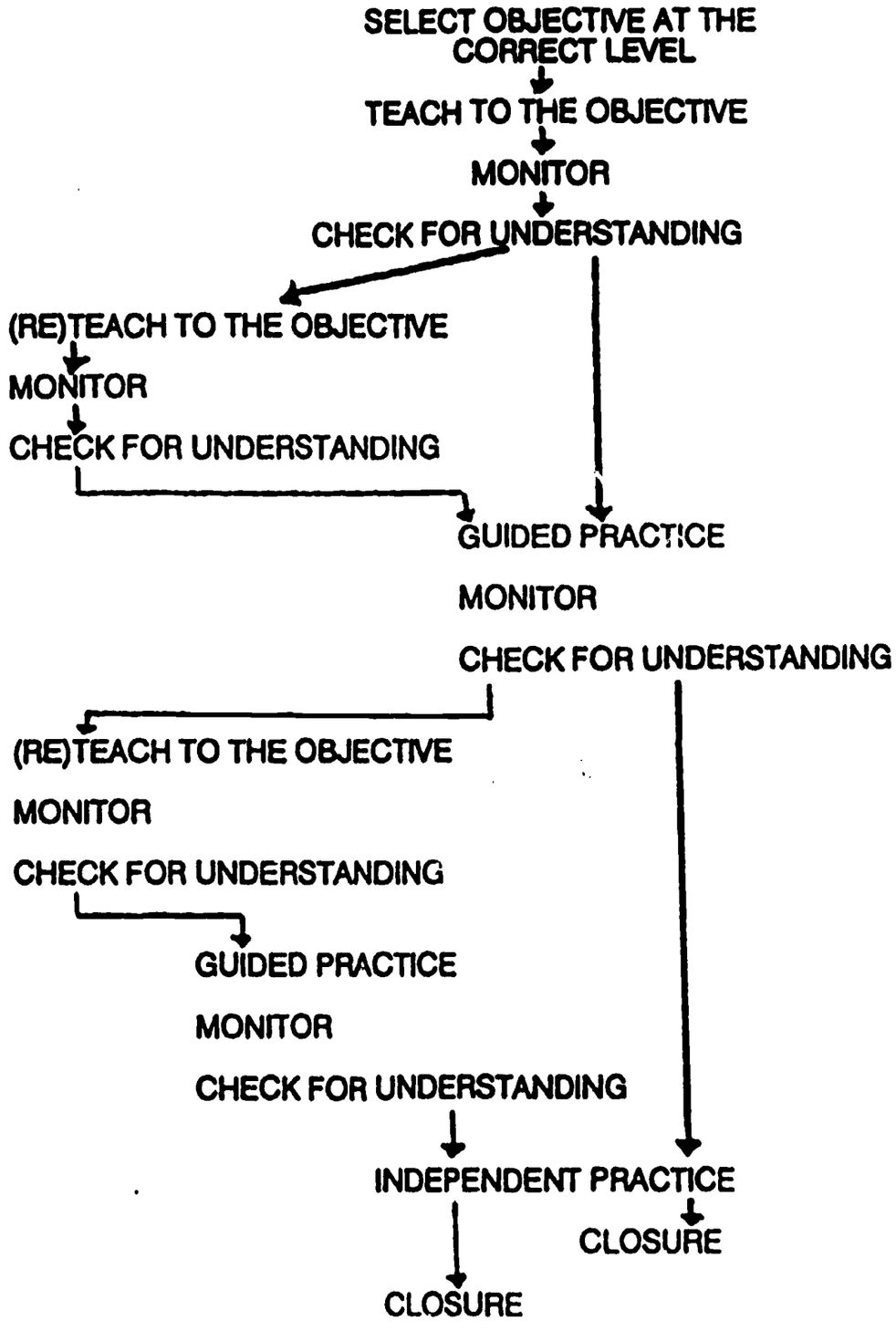
MODELING

CHECK FOR UNDERSTANDING

GUIDED PRACTICE

INDEPENDENT PRACTICE

[CLOSURE]


SELECT OBJECTIVE AT THE CORRECT LEVEL
TEACH TO THE OBJECTIVE
MONITOR
CHECK FOR UNDERSTANDING
(RE)TEACH TO THE OBJECTIVE
MONITOR
CHECK FOR UNDERSTANDING
GUIDED PRACTICE
MONITOR
CHECK FOR UNDERSTANDING
(RE)TEACH TO THE OBJECTIVE
MONITOR
CHECK FOR UNDERSTANDING
GUIDED PRACTICE
MONITOR
CHECK FOR UNDERSTANDING
INDEPENDENT PRACTICE
CLOSURE
CLOSURE

LESSON DESIGN

The components of LESSON DESIGN are . . .

1. _____

2. _____

3. _____

4. _____

5. _____

6 _____

7. _____

8. _____

TELL ME AND I WILL FORGET

SHOW ME AND I MIGHT REMEMBER

INVOLVE ME AND I WILL UNDERSTAND

LEARNING AND REMEMBERING

How People Learn

1% through taste

1 1/2% through touch

3 1/2% through smell

11% through hearing

83% through sight

How Much People Remember

10% of what they read

20% of what they hear

30% of what they see

50% of what they see and hear

50% of what whey say as they talk

90% of what they say as they do a thing

How Long People Remember

Method of Instruction	Recall 3 hr. later	Recall 3 days later
A. Lecture Method only	70%	10%
B. Demonstration Method Only	72%	20%
C. Both Lecture and Demo	85%	65%

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OBSERVATION PRACTICE SHEET

A set was utilized to focus student(s) on the new learning
Evidence: _____

_____

The objective for the lesson was communicated to the student(s)
Evidence: _____

_____

The purpose for learning the new material was communicated to the student(s)
Evidence: _____

_____

Information was provided which was relevant to the new learning
Evidence: _____

_____

Modeling was used when/if appropriate
Evidence: _____

_____

A check for understanding was used to determine if students understood the information/modeling
Evidence: _____
_____

Guided practice was provided when/if appropriate
Evidence: _____

_____

Independent practice was provided when/if appropriate
Evidence: _____

_____

Closure activities were used to determine if learning took place
Evidence: _____

_____

LESSON DESIGN PLANNING SHEET

How will I focus the student on the "new" learning:

How will I let the student know what is to be learning and why?

What information will be presented? How will it be presented?

Will modeling, demonstrating or giving an example be necessary? How will it be done?

How will comprehension of the information and/or demonstration be checked?

How will guided practice be provided?

How will independent practice be monitored?

How will mastery of the task be determined?

ELEMENTS OF INSTRUCTION
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What Teachers Should Know And Be Able To Do

Following are excerpts from Toward High and Rigorous Standards for the Teaching Profession, *a report issued by the National Board for Professional Teaching Standards:*

The National Board for Professional Teaching Standards seeks to identify and recognize teachers who effectively enhance student learning and demonstrate the high level of knowledge, skills, dispositions, and commitments reflected in the five following core propositions.

1. Teachers are committed to students and their learning.

Board-certified teachers are dedicated to making knowledge accessible to all students. They act on the belief that all students can learn. They treat students equitably, recognizing the individual differences that distinguish their students one from the other and taking account of these differences in their practice. They adjust their practice, as appropriate, based on observation and knowledge of their students' interests, abilities, skills, knowledge, family circumstances, and peer relationships.

Accomplished teachers understand how students develop and learn. They incorporate the prevailing theories of cognition and intelligence in their practice. They are aware of the influence of context and culture on behavior. They develop students' cognitive capacity and their respect for learning. Equally important, they foster students' self-esteem, motivation, character, civic responsibility, and their respect for individual, cultural, religious, and racial differences.

2. Teachers know the subjects they teach and how to teach those subjects to students.

Board-certified teachers have a rich understanding of the subject(s) they teach and appreciate how knowledge in their subject is created, organized, linked to other disciplines, and applied to real world settings. While faithfully representing the collective wisdom of our culture and upholding the value of disciplinary knowledge, they also develop the critical and analytical capacities of their students. Accomplished teachers command specialized knowledge of how to convey and reveal subject matter to students. They are aware of the preconceptions and background knowledge that students typically bring to each subject and of strategies and instructional materials that can be of assistance. They understand where difficulties are likely to arise and modify their practice accordingly. Their instructional repertoire allows them to create multiple paths to the subjects they teach, and they are adept at teaching students how to pose and solve their own problems.

3. Teachers are responsible for managing and monitoring student learning.

Board-certified teachers create, enrich, maintain, and alter instructional settings to capture and sustain the interest of their students and to make the most effective use of time. They are also adept at engaging students and adults to assist their teaching and at enlisting their colleagues' knowledge and expertise to complement their own.

Accomplished teachers command a range of generic instructional techniques, know when each is appropriate, and can implement them as needed. They are as aware of ineffectual or damaging practice as they are devoted to elegant practice.

They know how to engage groups of students to ensure a disciplined learning environment, and how to organize instruction to allow the school's goals for students to be met. They are adept at setting norms for social interaction among students and between students and teachers. They understand how to motivate students to learn and how to maintain their interest even in the face of temporary failure.

Board-certified teachers can assess the progress of individual students as well as that of the class as a whole. They employ multiple methods for measuring student growth and understanding and can clearly explain student performance to parents.

4. Teachers think systematically about their practice and learn from experience.

Board-certified teachers are models of educated persons, exemplifying the virtues they seek to inspire in students—curiosity, tolerance, honesty, fairness, respect for diversity, and appreciation of cultural differences—and the capacities that are prerequisites for intellectual growth: the ability to reason and take multiple perspectives, to be creative and take risks, and to adopt an experimental and problem solving orientation.

Accomplished teachers draw on their knowledge of human development, subject matter, and instruction, and their understanding of their students to make principled judgments about sound practice. Their decisions are not only grounded in the literature, but also in their experience. They engage in lifelong learning which they seek to encourage in their students. Striving to strengthen their teaching, board-certified teachers critically examine their practice, seek to expand their repertoire, deepen their knowledge, sharpen their judgment, and adapt their teaching to new findings, ideas, and theories.

5. Teachers are members of learning communities.

Board-certified teachers contribute to the effectiveness of the school by working collaboratively with other professionals on instructional policy, curriculum development, and staff development. They can evaluate school progress and the allocation of school resources in light of their understanding of state and local educational objectives. They are knowledgeable about specialized school and community resources that can be engaged for their students' benefit, and are skilled at employing such resources as needed.

Accomplished teachers find ways to work collaboratively and creatively with parents, engaging them productively in the work of the school.

LEARNER ASSESSMENT

According to the UCLA Model (Hunter), there are four Essential Elements of Effective Instruction. Name the four:

1. _____
2. _____
3. _____
4. _____

Anticipatory set is a "focusing" principle of learning. What are the critical attributes of anticipatory set?

1. _____
2. _____
3. _____

Teachers make many decisions as they plan their actions to conduct an instructional episode. In your own words, name the factors to be considered in designing a lesson:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

There are four major classifications for the principles of learning. Name them:

1. _____
2. _____
3. _____
4. _____

Thinking it over ...

I learned:

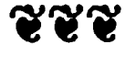
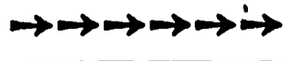
I liked...

and I ...

today was:

A problem I solved

I would have liked:

more about:

I would like to know

I am: *optional*

Name _____

School _____

I plan to:

Use reverse side for additional comments and suggestions. Thank you!

Adapted from a form developed by Sidney L. Hahn, University of Nebraska at Lincoln 1985

G L O S S A R Y

Active Participation: Active responding by a student. It may be thinking (covert) behavior or observable (overt) behavior. Active participation increases the rate and degree of learning. However, just any activity will not do. Only relevant student responding increases learning.

Affective Domain: Referring to learning involving interest, attitudes and values and the development of appreciation. Krathwohl has categorized objectives in this domain into: receiving, responding, valuing, organization, and characterization.

Analysis: Breaking material into parts and comparing or contrasting those parts. Analysis is the fourth level of Bloom's taxonomy, (knowledge, understanding, application, analysis, synthesis, evaluation). It enables a student to detect relationships among parts and the way they are organized.

Anticipatory Set: An activity designed to prepare the student for upcoming learning. Focus is provided on what is to be learned and previous learning/experience is tied to what is to be learned.

Application: Using appropriate generalizations and skills to solve a problem encountered in a new situation. The third level of cognition in Bloom's taxonomy (knowledge, understanding, application, analysis, synthesis, evaluation). Activities designed at the application level provide practice in the transfer of learnings.

"Birdwalking": To wander off the objective during teaching so that time is wasted and learners lose focus of the learning.

Bloom's Taxonomy: A classification of cognitive objectives into 6 levels: knowledge, understanding, application, analysis, synthesis, evaluation. Serves as a guide in writing objectives, diagnosing student behaviors, and planning activities to extend student thinking.

Check for Understanding: An overt activity in which the instructor ascertains to what degree the student comprehends the new instructional input/information.

Closure: Actively eliciting feedback from learners during appropriate intervals within the lesson in order to determine if learners grasped critical atributes of the learning. Closure is most appropriately used at the conclusion of an instructional objective. Closure can be achieved through Checking for Understanding.

Cognitive Domain: Refers to that area of student learning related to knowledge (knowledge of content, knowledge of concepts, knowledge of generalizations, and knowledge of processes).

Concept: A name for a class of objects or events Example: square is the concept name for any object having 4 equal sides and 4 right angles. A student understands a concept when she/he can discriminate between examples and nonexamples of the concept.

Condition: One component of a behavioral objective that defines that defines limitations, materials, or equipment utilized for instruction and practice during a lesson.

Congruent: Used to describe teacher action and decision when in agreement, harmony or correspondence to a selected objective.

Consequence: Anything not needed or desired by the learner. A consequence following an undesirable behavior may suppress that behavior.

Contaminator: Something that interferes or distracts from the learning; sometimes intentionally done to determine if learners can discriminate correct from incorrect information.

Covert Behavior: Student responses that are not observable. Thinking about the desired learning. This level of active participation takes less time than an overt response but it cannot be monitored by the teacher. Allowing time for covert behavior (thinking) can increase the quality of the overt response.

Critical Attribute: The unique characteristics or elements of a specific learning which make that learning separate and distinct from any other learning.

Diagnostic Survey: A method(s) of determining where a student's learning left off and new learning begins. May be informal (asking oral questions) or formal (written pretest). Usually designed from the task analysis (the sequential learnings leading to the final objective) using questions from easy to more difficult. Used to determine "correct level of difficulty".

Elements of Effective Instruction: A classification system of teacher decision making developed by Madeline Hunter. When teachers make consistent and conscious decisions during instruction, they increase the probability of student learning. The following are the four categories:

1. Select objectives near the correct level of difficulty
2. Teach to objectives
3. Monitor and make adjustments
4. Use principles of learning

Evaluation: The level of thinking at which a person makes a judgment based on sound criteria. There is no right or wrong answer. Evaluation is the sixth level of Bloom's taxonomy (knowledge, understanding, application, analysis, synthesis, evaluation). It involves a combination of all the other levels of the taxonomy.

Extinction: The absence of any reinforcers. To ignore behavior that has occurred results in reduction in the frequency of that behavior. A variable of reinforcement.

Extrinsic Motivation: A variable of motivation. Increases focus by using reinforcers (rewards) not related to the learning itself. Incentives for learning tasks are established by someone other than the learner. The child focuses on a task in order to receive a payoff. Examples: doing task to earn a grade, points, star, etc.

Feeling Tone: The atmosphere or climate created by the teacher in the learning environment. Students interact in this environment according to their perceptions of the tone.

Goal: A subjective statement of what is desired (usually long range).

Guided Practice: During the lesson the student practices what has been taught with close teacher monitoring to catch any mistakes before students practice independently. It gives the students successful original learning, promotes retention, and allows the teacher to monitor.

Hemisphericity: Refers to the specialization of the right and left hemisphere of the brain. The left side processes information that is sequential or verbal. The right side processes spatial or visual information.

Individualized Instruction (personalized): Meeting the needs, interests, and abilities of learner.

Interest: Something vivid, different, or meaningful to the learner. One of the variables of motivation. When elements of a lesson are interesting it focuses the learner on the task.

Intrinsic Motivation: When the task is the reward itself for a learner, the learner is motivated to stay on task, i.e., a student reads a book because she/he loves to read. A variable of motivation.

Knowledge: The student recalls or recognizes information. The lowest or first level of cognition in Bloom's taxonomy (knowledge, understanding, application, analysis, synthesis, evaluation). The student needs information that she/he can recall before using that information at higher levels of cognitive complexity.

Knowledge of Results: Providing the student with feedback about the adequacy of his/her response. This feedback should come immediately after student responses and it should be specific in terms of what the student has done well and what she/he might do to change. A variable of motivation. It helps students focus on the task when they know how well they are doing.

Learning: One component of a behavioral objective that defines the specific content component (information, skill, or process) taught in a lesson.

Learning Styles: An individual's way of acquiring and processing information and experience.

Lesson Plan Format: Step by step process for instruction, review, or diagnosis of a specific learning.

Level of Concern: The degree to which expectations are perceived by the learner. The level may be raised or lowered depending on the desired effect by the teachers.

Level of Difficulty: That the particular learning step being taken toward the objective is an achievable one by the learners--not an objective that is so difficult its achievement is impossible or one so easy it requires no learning effort or it has already been achieved.

Massed Practice: Short, intense practice periods which occur very often after new learning has been taught. Scheduling practice periods aids retention. Promotes fast learning during initial stages of learning.

Meaning: When new learning relates personally to the student in a language which is understood and is perceived as being of value to the student.

Meaningful Processing: Causing students to do more that just read or hear the material one more time. Having students actually demonstrate understanding or ability to apply information will promote retention.

Modeling: Teaching using visual-spatial activities. Will increase rate and degree of learning as well as retention. Learning acquired by modeling activities is processed in the right hemisphere of the brain.

Monitor and Adjust: A process whereby the teacher elicits overt behavior from the students, checks that behavior, interprets it, and decides on appropriate adjustments. Adjustments may be in terms of content, teacher presentation, or principles of learning. It is the third category of teacher decision making in the Effective Elements of Instruction. Allows the teacher to check on the learning of students and to change instruction appropriately (teaching diagnostically).

Motivation: Refers to the focus, attention, or persistence of student behavior. One of the principles of learning. Elements of motivation that can be used to increase focus are: success, knowledge of results, interest, level of concern, and intrinsic/extrinsic motivators.

Objective: The goal toward which teaching is directed. A clear statement the content, thought process, and behavior of the learner. It may also contain the conditions for testing and the performance level required.

Overt Behavior: An observable form of student involvement. One level of active participation. Overt behavior is elicited from students so the teacher can check for understanding, establish closure and provide knowledge of results (monitor student progress). It increases the learning by keeping students actively involved.

Performance Level: Minimum competency expectation to measure achievement of a given learning.

Positive Reinforcement: A strategy used to strengthen productive behavior or change non-productive behavior into productive behavior.

Post Test: Assessment of achievement at the end of a lesson.

Practice: An activity in which the learner develops proficiency by repeating an action. Practice may occur under the close supervision of the teacher (guided) or without supervision (independent).

Pre Test: A brief diagnosis before a lesson to determine if the learning is appropriate for the learners in the group.

Principles of Learning: Fundamental processes identified by psychologists that improve the efficiency of learning; e.g. motivation, retention, active participation, and reinforcement.

Proactive: A Brophy Characteristic factored out of the research to describe effective teachers. Refers to behavior initiated by the teachers themselves--in contrast to reactive behavior that less effective teachers exhibit in situations when students do something that forces them to make some sort of immediate reactive response. Proactive teachers predict possible undesirable situations or behaviors before they occur and attempt to solve or prevent them from occurring.

Psychomotor Domain: Refers to the area of student learning associated with the combined function of body and mind.

Retention: The act of remembering or retaining learning. One of the principles of learning. Variables affecting retention (discussed in this book) are: meaning, modeling, meaningful processing, and practice.

Schedule of Reinforcement: Refers to the relationship between the number of times a behavior occurs and the number of times it is reinforced. A regular schedule (reinforcement after every occurrence of the behavior) makes for fast learning. An intermittent schedule (reinforcing behavior periodically) makes the behavior more persistent and more resistant to forgetting.

Script Taping: A handwritten descriptive narrative of the lesson. It is an objective and non-evaluative technique for collecting observable descriptive data about teacher and student behavior.

Sponge Activities: Activities relevant to the objectives designed to enhance learning during slow or "wait" times.

Success: Refers to the feeling of achievement when one accomplishes a task. A variable of motivation. Success is more probable if tasks are set at the appropriate level of difficulty.

Synthesis: Refers to the putting together of parts into a whole using creative and original thinking. The fifth level of Bloom's taxonomy (knowledge, understanding, application, analysis, synthesis, evaluation). The student must draw upon elements from many sources and put them together into a pattern new to the learner.

Task Analysis: An identification of the sublearning necessary to accomplish a given objective. The process of task analysis involves breaking a learning down into enabling skills and knowledge, and sequencing the list. Can be used to diagnose for correct level of difficulty, as a guide in teaching to an objective, and for monitoring and adjusting.

Teach to an Objective: The part of the teaching-learning process in which the teacher chooses behaviors that are relevant to the intended objective. These behaviors (questions, directions, activities, explanations, responses to learner efforts) lead to the accomplishment of the objective and increase a student's time on task.

Transfer: Using previous or "old" learning in a new situation. Allows learners to build on and expand previous learning.

Understanding: Refers to the student grasping the meaning of the intended learning. This is the second level of Bloom's taxonomy (knowledge, understanding, application, analysis, synthesis, evaluation). Evidence of comprehension or understanding includes being able to translate the information into another form of communication, interpreting by summarizing, and extrapolating or predicting based on trends indentified.

ATTACHMENT D

Certificate of Completion

Elements of Instruction VTAE Workshop

Certificate of Completion

This is to certify that

Participated in an 18 hour workshop February 5-7, 1990, Wisconsin Rapids, Wisconsin

Howard Lee, Project Director/Instructor

William Mamel, Instructor

A project sponsored by the Wisconsin State Board of Vocational, Technical and Adult Education and the University of Wisconsin-Stout, Center for Vocational, Technical and Adult Education

ATTACHMENT E

Rating Scales

Center for Vocational Technical and Adult Education
Group numbers based on the PRIMARY group for this analysis
Analysis on 06-Mar-90 at 05:12 PM. Data from file: ELEMENTS_89
Survey analysis of response to 6 questions, by 31 people

==========

Question: 1 - Clarity and appropriateness of workshop objectives.

==========

Group	Mean		Stand Dev		Number		Quartile			
	Omit	No Omit	Omit	No Omit	People	Checks	First	Median	Third	IQR
0	4.65	4.65	0.55	0.55	31	31	4.25	4.76	5.13	0.88

Omit	1	2	3	4	5	
0.00	0.00	0.00	0.03	0.29	0.68	People
0	0	0	1	9	21	

==========

Question: 2 - Applicability of Workshop Content.

==========

Group	Mean		Stand Dev		Number		Quartile			
	Omit	No Omit	Omit	No Omit	People	Checks	First	Median	Third	IQR
0	4.71	4.71	0.46	0.46	31	31	4.36	4.80	5.15	0.79

Omit	1	2	3	4	5	
0.00	0.00	0.00	0.00	0.29	0.71	People
0	0	0	0	9	22	

==========

Question: 3 - Delivery of Information/Modeling.

==========

Group	Mean		Stand Dev		Number		Quartile			
	Omit	No Omit	Omit	No Omit	People	Checks	First	Median	Third	IQR
0	4.58	4.58	0.50	0.50	31	31	4.10	4.64	5.07	0.97

Omit	1	2	3	4	5	
0.00	0.00	0.00	0.00	0.42	0.58	People
0	0	0	0	13	18	

==========

Question: 4 - Relevance of Activities.

==========

Group	Mean		Stand Dev		Number		Quartile			
	Omit	No Omit	Omit	No Omit	People	Checks	First	Median	Third	IQR
0	4.77	4.77	0.43	0.43	31	31	4.53	4.85	5.18	0.65

Omit	1	2	3	4	5	
0.00	0.00	0.00	0.00	0.23	0.77	People
0	0	0	0	7	24	

==========

Question: 5 - Attention to Your Efforts.

==========

Group	Mean		Stand Dev		Number		Quartile			
	Omit	No Omit	Omit	No Omit	People	Checks	First	Median	Third	IQR
0	4.35	4.50	1.34	0.68	31	31	4.00	4.67	5.08	1.08

Omit	1	2	3	4	5	
0.03	0.00	0.00	0.10	0.29	0.58	People
1	0	0	3	9	18	

Center for Vocational Technical and Adult Education
Group numbers based on the PRIMARY group for this analysis
Analysis on 06-Mar-90 at 05:12 PM. Data from file: ELEMENTS_89
Survey analysis of response to 6 questions, by 31 people

==========

Question: 6 - Use of Principles of Learning.

==========

Group	Mean		Stand Dev		Number		Quartile			
	Omit	No Omit	Omit	No Omit	People	Checks	First	Median	Third	IQR
0	4.58	4.58	0.56	0.56	31	31	4.11	4.68	5.09	0.98

Omit	1	2	3	4	5	
0.00	0.00	0.00	0.03	0.35	0.61	People
0	0	0	1	11	19	

ATTACHMENT F

Participant Comments

Elements of Instruction
Evaluation Form
February 5 - 7, 1990

Comments for Question #1 - Clarity and appropriateness of workshop objectives.

Clearly stated at beginning of each day.

Very appropriately clear in a.m., jello in p.m.

I finally do believe it was good to get the gestalt! My right brain feels stronger already.

This workshop ties in to the shortcomings of our district.

Objectives were stated and covered.

The coming together of the course seemed foggy at times.

Comments for Question #2 - Applicability of Workshop Content.

I can apply the principles immediately and begin to work on certain aspects.

Definite need in system (VTAE).

This workshop will be useful in upgrading our program and teaching techniques.

Content met needs.

Comments for Question #3 - Delivery of Information/Modeling.

Excellent modeling of various overt and covert participation strategies, this certainly did enhance learning.

Good delivery and modeling - because of time frame sometimes to fast.

Outstanding effort.

Was presented at a level that everyone could understand.

Too much too fast at times.

Talk and reinforced overlays and or passed out material.

Both Howard and Bill presented material well.

Excellent modeling of effective teaching.

Comments for Question #4 - Relevance of Activities.

Yes. Very effective especially liked the presentation exercises. Certainly forced us to tie things together.

Very.

Very good reinforcement.

More time for the activities.

As a workshop - great, but if it was possible to work on one curriculum lesson through the process.

Reinforced ? techniques used.

Use of name-call cards/fall-in work.

Very relevant.

Very enjoyable and meaningful.

Comments for Question #5 - Attention to Your Efforts.

Very comfortable in response to people.

Good - positive reinforcement most of the time.

Very student centered focus.

Met with any student and at any time they wanted to communicate.

Adequate.

Comments for Questions #6 - Use of Principles of Learning.

Excellent.

Time - not everyone learns at the same speed.\

Applied many principles.

Excellent.

Comments for Question #7 - What is the most significant thing you learned from the workshop?

To take a look at my own style of teaching and evaluate it.

Selecting the objective at the appropriate level.

The necessity to reinforce learning in several ways.

All of it.

Review and update of principles.

Exposure to the instructor model and the lesson design.

Lots of previously taught concepts were renewed.

Lesson design formula.

Teaching is not absolute.

It's been a long time since I took a methods class; I needed this.

To look at the total picture - all aspects.

The importance of Lesson Design.

How to better use both old and new teaching skills.

After not teaching for 23 years - how to plan a lesson.

Design of Lesson/Elements of Instruction.

Desk-top and continue to work toward the objective - improved teaching.

The elements of instruction.

The teaching techniques must be congruent with objectives.

A good lesson has a great deal of though and planning going into it and monitoring and adjusting is ongoing.

Decisions and where they occur and why the overall view or "macroness" of the workshop.

The volume of material was fantastic. Now go back and put to good use of application.

To be able to see what were doing and why.

That I am performing some things very well and now know how to improve at others.

Teaching to objectives and matching them to the level.

What I am doing is correct. I just have to fine tune and get the right connection words.

Put "teaching" back into a scientific approach.

The critical behaviors of a teacher.

Comments for Question #8 - Do you have suggestions that we should consider in planning the next workshop?

Have the notebooks in the same order as presentations.

Continue using the critical behaviors.

No.

Not at the moment.

Reorganize workbooks to match overheads and strenghen the students organization.

None.

Time management presents a problem....so much to do, so little time.

Have participant consider developing an "active plan" or have them implement the concepts in their own classroom/district.

Color code the tabs on the notebooks.

Enjoyed the schedule - appropriate breaks and time frame.

Ok.

Plan a lesson before presentation.

Outstanding - keep ups the good work.

As a workshop - great, but if it was possible to work on one curriculum lesson through the process.

Keep lesson plans at end - demo.

Afternoon sessions feel so rushed! Maybe not so many breaks in the morning.

Have more "punch" words for recall - such as "match" and "strengthen" and "12,365".

Have a list of all people with their names and addresses if we want to write and share information.

More time.

Larger tables.

Very well done.

There is too much content for the allotted time.

Flow chart of the model and workshop - when - where.

Comments for Question #9 - Your personal comments, suggestions and/or concerns:

Great workshop - gave me so many ideas.

I'm excited about the next workshop, concerned how can I motivate others "back home" to use.

Both of you were very good.

Good job gentlemen.

World help facilitate night studies.

In general felt workshop was really well done and feel now that I have a very good base to start from to get good base to sta.t from to get good skills developed to do my job.

I'll be back in March with eager appetite.

Thank you for a job well done!

I enjoyed myself.

Very good!

Very informative.

I enjoyed the workshop very much.

Please - only three people to a table - need room to operate. Great workshop!

Facilities, organization and workshop was outstanding.

Thanks - it was good.

Thank you.

Very valuable and I had a good review in some parts and new insights in several areas.

Great job instructors - you have a great handle on the Hunter method and it shows in your teaching expertise!

Any forms of evaluations were checked and comments were made constructively. Job well done! Meals and service and hotel were.....

Very good!

this was a super experience for me - it makes me feel great being an instructor and gives me some more tools to do a better job.

Sometimes your overheads didn't match our notebooks.

A lot of new terminology to remember in a short time.

Thank you - very helpful. Howard's use of d's rather than th's in pronunciation occasionally distracting. Loved Howard's "downhome" examples.