T U C C i

# **Draft**

# The Competent Learner Model©

# An Introduction

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## *Special Thanks:*

The guidance and assistance provided over the years by Dr. Esther Shafer and Dr. Daniel E. Hursh has duely sharpened and broadened my skills for describing and engineering learning environments. To both of them, my special thanks and sincerest hope for many future years of friendship and collaboration.

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As a matter of lineage, I am very grateful to the many Behavior Anlaysts who have not only inspired me, but who have shaped the field through their persistent and creative efforts and publications. Of them, I have been most influenced by the research and writings of Drs. B.F. Skinner, Murray Sidman, Fred Keller, Jack Michael, and Charles Catania.

Lastly, I want to show my appreciation for the administrators, staff, students, and parents of the Monterey County Office of Education, Special Education (Monterey County, Californina). I have learned so much through the dozen of years that I have worked with them and "studied" many aspects of engineering learning environments. Throughout this collaboration I have learned most of what I know about the 'practical' aspects of developing the Competent Learner Model (CLM).

# The Competent Learner Model©

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The foundations of the Competent Learner Model are the development of the seven ©Competent Learner Repertoires (CLRs), appropriate curriculum, effective teaching strategies, and ways to structure the classroom environment so that learning takes place in private or public educational settings. The seven CLRs are repertoires that all learners need in order to progress in educational settings and to function in daily life. These repertoires are based upon B.F. Skinner's (1957) analysis of functional language that provides a framework for developing communication, observing and listening skills, and the pre-academic skills of reading and writing.

**Competent Learner Repertoires**

One of the challenges facing educators is designing instructional systems that will prepare students to take their place in an ever-changing world. We will serve our students best if they acquire the competencies to continually renew their understanding of an ever-changing world. We must equip them with repertoires to act effectively in "novel" circumstances, the most common of all day-to-day conditions (Tucci, 1989).

Many years ago, B.F. Skinner (1953) suggested that educators must equip learners with a system of responses [repertoires] to act effectively in novel circumstances.

> "... the educational institution cannot be content merely with establishing standard repertoires of right answers but must also establish a repertoire with which the students may, so to speak, arrive at the right answer under novel circumstances in the absence of any representative of the agency." (Skinner, 1953, p. 411)

Skinner further suggested that ...

> "A culture is no stronger than its capacity to transmit itself. It must impart an accumulation of skills, knowledge and social and ethical practices to its new members. The institution of education is designed to serve this purpose." (Skinner, 1968, p. 110)

Therfore, an operational definition of repertoire in the context of educational settings must take into consideration the elements of the learner's knowledge, skilled responding, and social and ethical practices. For example, one could say that the **observer** repertoire is in strength if the learner "knows" what and when to report what he sees or hears, he can report very factually what he sees or hears ("skilled responding"), and he obtains written permission to report private events ("adheres to ethical practices"). That is, the learner knows what to do (knowledge), can do it well (skilled responding), and does it under appropriate circumstances (social and ethical practices). A **repertoire** is a dynamic entity consisting of a variety of response forms that are emitted under identifiable conditions. The unit of analysis when studying the establishing, strengthening, or weakening of repertoires is the probability that any of a number of specific response forms will occur under a given set of circumstances.

The critical focus of this model is the development of Competent Learner Repertoires. A competent learner is an organism who acts effectively in novel circumstances. The instructional staff focuses on developing a set of seven specific repertoires with which the learners must be equipped to be successful under a variety of instructional conditions. These learner repertoires are: talker, observer, listener, problem solver, reader, writer, and participator.

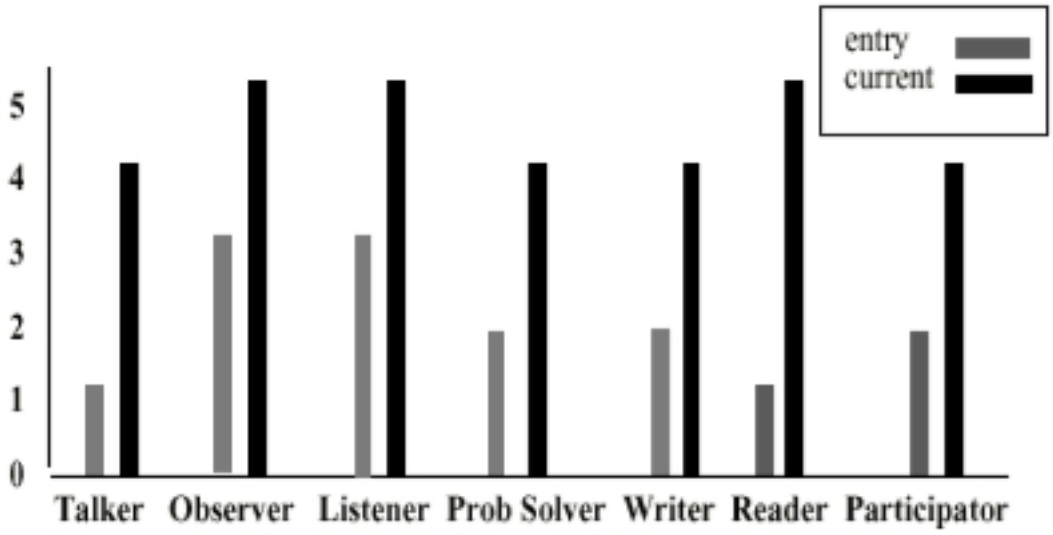


*Figure 1. Learner repertoires (status report)*

Prior to entering school, many children have not acquired the learner repertoires that allow them to be successful in the mastery of required subject matter (e.g., science, mathematics, and history). Our experience indicates that children not successful in school are the same ones missing several of these learner repertoires. Figure 1 illustrates a learner's repertoires before and after instructional programming to develop the competent learner repertoires.

The gray bar ratings indicate the learner's repertoires at entry into the program and the black bars are the ratings of the repertoires after several months of instructional programming. The higher the score the more capable the learner (i.e., a five indicates that the learner has mastered the competency representing the repertoire and performs it consistently, a three indicates that the learner has mastered the competency but rarely performs it, and a one indicates the competency is never exhibited).

Upon entry into the program, this learner was not a very competent learner as indicated by the low ratings. After several months of programming, he acquired the repertoires and performed them more consistently under a variety of instructional conditions. Refer to Table 1 for examples of some of the Competent Learner Repertoires©.

Table 1. Examples of Assessment Items for Some of the Repertoire (pre-1 Level)

| Code | Repertoire | Assessment Instructions | Learner Behavior |
|---|---|---|---|
| 0.002 | **Talker** (echoic) | T has preferred items displayed or is engaged in a preferred activity w/L & makes sounds that are related to item or activity . T is holding a cow & says "moo" , (pause),"Say, moo" . T gives the learner the preferred item or a "goodie" on the schedule of reinforcement required to maintain responding. | repeats the "playful" sounds related to preferred activities (e.g., repeats "moo" while L and T play with cow) |
| 0.102 | **Observer** (tact) | Teacher displays or touches one picture of a preferred or nonpreferred item and says, "What is this?".<br><br>**Common Words:** ball, soap, bike, shoe, cake, potty, doll, cup, apple, car, cookie, coat, dog, bus, spoon, tree, book, lunch, | labels picture of preferred and nonpreferred items (e.g., "tree") |
| 0.201 | **Problem Solver** (mand) | T provides L with **many** opportunities (about 15/hr.) **throughout day** to ask for a **variety** of "valued" and new items/ songs/ activities **across situations** (i.e., informal play, communicative temptations (e.g., things placed out of reach), and choice making). T may say,*"Show me what you want"*. T maintains periodic eye contact with L to indicate that he's "available". Sometimes, T may say,*"Wait"* &pause up to 10 sec. | asks for an item or teacher actions by using distinct forms of motor behavior (e.g., points to preferred item & looks at T) |
| 0.503 | **Participator** (semi-directed) | T is seated beside learner and instructs L to perform a firm task. T remains near (3-5 feet away) and closely monitors L's performance. T offers help when it's required for the L to be successful. Time to complete task should not be longer than a couple of minutes. | completes the task without prompts (i.e., upto 20 pieces at once) and accepts assistance (e.g., physical guidance) when necessary |
| 0.505 | **Participator** (non-directed -Transitions) | T announces that it's play time or "free time". T tells Ls to pick something to do. T helps the Ls select activities they can do with minimal assistance. When it is time to clean up, the T tells the Ls to put away the materials. T monitors very closely to assure success. T may assist by holding container in front...<br>**Free-Choice Activities:** Explores the objects; Constructs with objects; Activates objects; Plays w/functional objects; Uses tool to | selects a variety of object(s), USES each one for about one to two minutes, and puts object(s) away within 2 minutes without annoying or injurious behaviors |
| 0.601 | **Listener** (adheres to) | During transitions from "work" to "free-choice", T presents 5-7 FIRM single-step directions. T **pauses briefly** between each direction. A single-step direction may be given before, during, and after a transition, an assigned task or a lesson. Teacher remains near (1-5 feet away) to learner at all times to assure for success. | performs FIRM single-step actions as directed |
| 0.703 | **Observer** (sorting) | DO NOT USE containers. T gives learners a pile of **3 sets of similar pictures with 1-2 distractors** and says, "Put it where it goes". The 3-4 pictures in each set vary by only one attribute (i.e., color, size, or shape)<br><br>Sets of Common Pictures (minimum of 3/set):<br>snake, car, cow, fish, bird, dog, ball, shoe, OR cup. | sorts 3 sets of pictures to similar pictures (e.g., snake to similar snake or shoe to similar shoe) and puts 1-2 distractors aside |

A Competent Learner Repertoire Assessment (CLRA) instrument has been developed to allow teachers to determine the strength of their learners' repertoires. Preliminary data on the use of the CLRA in educational settings with regular and special education learners in various school districts in California and West Virginia suggest the following:

1. Teachers employ the CLRA to determine repertoires to be developed.

2. Teachers use the CLRA to continuously monitor learners' performance.

3. Teachers make instructional decisions based on CLRA data.

4. Learners equipped with the Competent Learner Repertoires perform more sophisticated functional actions (Deem, 1998).

5. Teachers report that the CLRA is extremely useful in pinpointing the needs of their learners and setting realistic objectives.

**Effective Teaching Strategies and Appropriate Curriculum**

The teaching strategies incorporated into the Competent Learner Model are based on the principles of applied behavior analysis and direct instruction. For learners who are ready to begin work in academic areas, programs utilizing direct instruction have been shown to be the most effective method of teaching these skills. The development of any repertoire begins with a thoughtful analysis of the structure of the subject matter for the stimulus-response patterns that have the most likelihood for generality of application (Engelmann & Carnine, 1982). For example, in the process of developing the repertoire of an equestrian, one isolates the knowledge the equestrian must possess, the skilled responses s/he must acquire, and the social and ethical practices s/he must emit. In the same vein the author has spent the past two decades isolating the knowledge, skilled responding, and social and ethical practices that are required for learners to functional successfully in instructional conditions. Throughout the development of the Competent Learner Repertoire Assessment (CLRA) she periodically asked experienced classroom teachers to verify the elements of each level of each repertoire. She has documented the repertoires required for success from preschool through first grade.

Skinner (1957) provides the fundamental principles by which the CLRA was developed:

> "The distinction between 'verbal operant' and 'word' is matched by that between 'verbal repertoire' and 'vocabulary'. A person is said to possess a vocabulary of so many thousands of words if these words are observed in his verbal behavior during a period of time. But a vocabulary is usually regarded as a warehouseful of inanimate tools from which the speaker makes appropriate selections as he speaks. We are concerned here not only with the fact that certain specific forms of verbal behavior are observed but that they are observed under specific circumstances. These controlling circumstances add a dynamic character to 'repertoire' which is lacking in 'vocabulary'." (Skinner, 1957, p. 20)

The process of establishing and strengthening repertoires requires the instructors to formulate, deliver, and monitor deliberate and systematic instruction until the learner can operate under more typical instructional conditions. The use of carefully designed learning activities that require the learner to respond accurately to the range and limits of concepts, principles, or problem-solving routines have been shown to result in the learner acquiring complex cognitive routines. "For decades, teachers have questioned whether writing can be taught. Our premise is that expressive writing is a set of skills that can be taught and learned much like any other academic skill" (Kameenui & Simmons, 1990, p. 421). In fact an entire learner-verified, introductory curriculum has been developed that teaches problem solving and writing (*Reasoning and Writing*, Engelmann & Davis, 1991). The following text, taken from Skinner's *Verbal Behavior,* provides the fundamental principles by which developing and strengthening of repertoires is accomplished:

> "...Some parts of a verbal repertoire are more likely to occur than others. This likelihood is an extremely important, though difficult, conception. Our basic datum is not the occurrence of a given response as such, but the probability that it will occur at a given time. Every verbal operant may be conceived of as having under specified circumstances an assignable probability of emission - conveniently called its 'strength'." (Skinner, 1957, p. 22 )

> "...The probability that a verbal response of given form will occur at a given time is the basic datum to be predicted and controlled. It is the 'dependent variable' in a functional analysis. The conditions and events to which we turn in order to achieve prediction or control — the 'independent variable' — must now be considered." (Skinner, 1957, p. 28)

> "...Operant reinforcement, then, is simply a way of controlling the probability of occurrence of a certain class of verbal responses. If we wish to make a response of given form highly probable, we arrange for the effective reinforcement of many instances. If we wish to eliminate it from a verbal repertoire, we arrange that reinforcement shall no longer follow. Any information regarding the relative frequency of reinforcement characteristic of a given verbal community is obviously valuable in predicting such behavior." (Skinner, 1957, p. 30)

In the past decades an extensive body of empirical knowledge has surfaced about the critical features of well-designed educational programming for learners and "at-risk" learners (Brophy & Good, 1986; Hofmeister, 1989; Hofmeister & Lubke, 1990; Rosenshine & Stephens, 1986). The same features of effective instruction also apply to the instruction of special education students with mild handicapping conditions (Bickel & Bickel, 1986; Christenson, Ysseldyke, & Thurlow, 1989; Larrivee, 1985). In special education, concern for meeting the students' individual needs has lead to subjecting students to unvalidated treatments designed to accommodate a wide range of individual learning styles. Most often, neither the assessment procedures nor the prescribed interventions have been validated (Fuchs & Fuchs, 1986; Gallery & Hofmeister, 1978).

The Project Follow Through Evaluation data (Stebbins, St. Pierre, Proper, Anderson & Cerva, 1977) has demonstrated that Direct Instruction and Behavior Analysis practices are effective practices for developing basic skills. The Competent Learner Model utilizes these Direct Instruction and Behavior Analysis practices. The emphasis of the model is to develop effective repertoires for the learners and their teachers by employing only validated instructional programming. The teachers learn how to develop, elaborate, and maintain repertoires while the learners are acquiring the Competent Learner Repertoires.

For learners who are **NOT** ready to begin work in academic areas, programs combining the principles of direct instruction and applied behavior analysis that include conducting a functional analysis, prompting, fading, shaping, and reinforcing appropriate behaviors are widely acknowledged to have the most success with children diagnosed with autism or PDD. The following content illustrates these practices for the naive learners. It is taken from the CLM Curriculum at the pre-1 level of programming.

The **CLM Curriculum's Scope and Sequence** chart illustrates what is taught at the pre-1 level of the CLM Curriclum (Refer to the next page to see the chart). Look at the top of the page and notice that 16 lessons will be taught. Locate the column labeled "1". In lesson one only two repertoires are being taught, the **0.505 Participator for non-directed conditions and the 0.201 Problem Solver (mand).** If you look at the chart you can see the boxes that contain a partial description of what will be learned when each repertoire is developed. At the end of each description of the repertoires are numbers that indicate the beginning and ending lessons respectively,

As you progress through the lessons more and more repertoires are beginning to be developed. The goal of the first few lessons of the Pre-1 level of the CLM Curriculum is to get the learner to engage in some basic interactions with adults:

- engage in relaxed, informal play with adults
- respond to simple instructions
- increase the frequency of mands (requests) in informal situations
- begin to complete simple tasks with preferred items

We want the learner to enjoy interacting with us and to be ready for formal teaching opportunities. In other words, in the first three lessons, we begin to establish basic learner repertoires. The teacher and learner in the picture above are engaged in a wider variety of playful situations now such as making marks with pens as they play 'bombs away'!!! Gradually, the teacher will begin to include a simple direction for the learner to follow while they are engaged in play, and the direction relates to what they are doing at the time. Occasionally, the teacher will call the child's name, approach the learner, and offer the learner a preferred item. Gradually, the learner can follow quite a few single step directions in the playful situations that are related to the activity.

# CLModel Tracking Sheet: Lessons 1-16

| LESSONS: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Participator** | 0.505 Selects, USES a variety of objects, & puts objects away in non-directed conditions within 2 minutes without annoying or injurious behaviors with T's help (1 - 16) | | | | | | | | | | | | | | | |
| | | 0.503 Completes one assigned task in semi-directed conditions w/T near; upto 20 parts/task (2 - 10) | | | | | | | | | 1.503 Completes 2 consecutive (tasks @ 5 min/task) in s-d (11-22) | | | | | |
| | | | 0.501 Performs 3 consecutive sets of 10 responses in t-d, 1:2 (3 - 14) | | | | | | | | | | | | | |
| | | | | | | | 0.504 Accepts/Gives objects to peers w/Tprompts (7-12) | | | | | 1.504 Takes turns w/pref item w/in 1 min (13-33) | | | | |
| | | | | | | | | | | 0.502 In Td, Answers on signal with FIRM items for 3 consec. sets of 10 (10-16) | | | | | | |
| **Problem Solver** | 0.201 Spontaneously asks for preferred items or T actions using motor or vocl beh minimum of 12/hr. & waits @ 10 secs for item/action (1 - 9) | | | | | | | | | 1.201 Spontaneously asks for missing item or T actions using phrases; waits 60 secs. (10-29) | | | | | | |
| | | | | | | | | | | | 0.203 Uses motor behavior to say "no" to an offer of a non-preferred item; tolterates 10 sec. delay of removing it (12-14) | | | | | | |
| | | | | 0.801 Manipulates an object to place it or remove it from its location; @ 10 parts/problem (4 - 9) | | | | | | | 1.801 Manipulates @ 3-4 parts of an object to get them to 'fit' together (10-31) | | | | | |
| **Listener** | | | 0.601 Follows series of 5-7 FIRM single-step directions across variety of situations with T near, 1-5 feet away (3-12) | | | | | | | | | | 1.601 Performs series of 7-10 FIRM two-step directions, 5-10ft(13-29) | | | |
| | | | | | | | | | 0.602 In display of 8, L touches pictures at a set fluency rate when pictures named (9-16) | | | | | | | |
| **Observer** | | | | 0.701 Imitates the modeled single-step action performed by T (4- 9) | | | | | | 1.701 Imitates the modeled two-step actions performed by Peers (10-33) | | | | | | |
| | | | | | | | | | | | | 0.702 Finds ea. matching pix & places it below matching pix in 2-3 pix display (13-16) | | | | |
| | | | | | | | | | | | | 0.102 Labels each picture in a field of 8-10 common items when T touches one (12 -16) | | | | |
| | | | | 0.703 Sorts 3 FIRM sets of similar pictures into separate piles and puts 1-2 distractors aside (4-13) | | | | | | | | | | | | |
| **Talker** | | | 0.002 Repeats components of sounds or words related to preferred activities (3-8) | | | | | | | | | | | | | |
| | | | | | | | | 0.001 Repeats @ 20 common words w/out item displayed for preferred or non-pref nouns, verbs, attributes (8-14) | | | | | | | | |
| **Reader** | | | | | | | | | 0.301 Repeats sounds or words when T is 'playfully' reading a familiar story or T says, "Say, dog' (13 - 16) | | | | | | | |
| **Writer** | | | | 0.401 Imitates direction or shape of the line once it is drawn by T on large paper w/markers... (4 - 12) | | | | | | | | | 1.401 Copies 5-10 pre-drawn lines/shape on unlined paper... (12-29) | | | |

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**Structuring the Classroom Environment**

An appropriate curriculum and strategies for teaching are only two aspects of the learning environment. New skills must be taught in the most appropriate setting and then generalized to new people and new settings. Each classroom contains a number of different learning areas [instructional conditions] which allow for varying amounts of teacher and peer interaction as appropriate for the learning task. Learners move from one area to another throughout the daily routine.

The instructional staff must have well-engineered learning environments to accommodate for the constant changes that will occur throughout each and every day. If any one of the instructional conditions are not arranged properly then the learner(s) are not likely to acquire the desired repertoires and may in fact engage in undesirable behaviors.

> "Ineffective teaching produces and exacerabates problem behavior. The key to prevention is the construction of [learning] environments that continuously... generate new behavior....". (Sidman, 1990)

**Engineered Learning Environments**

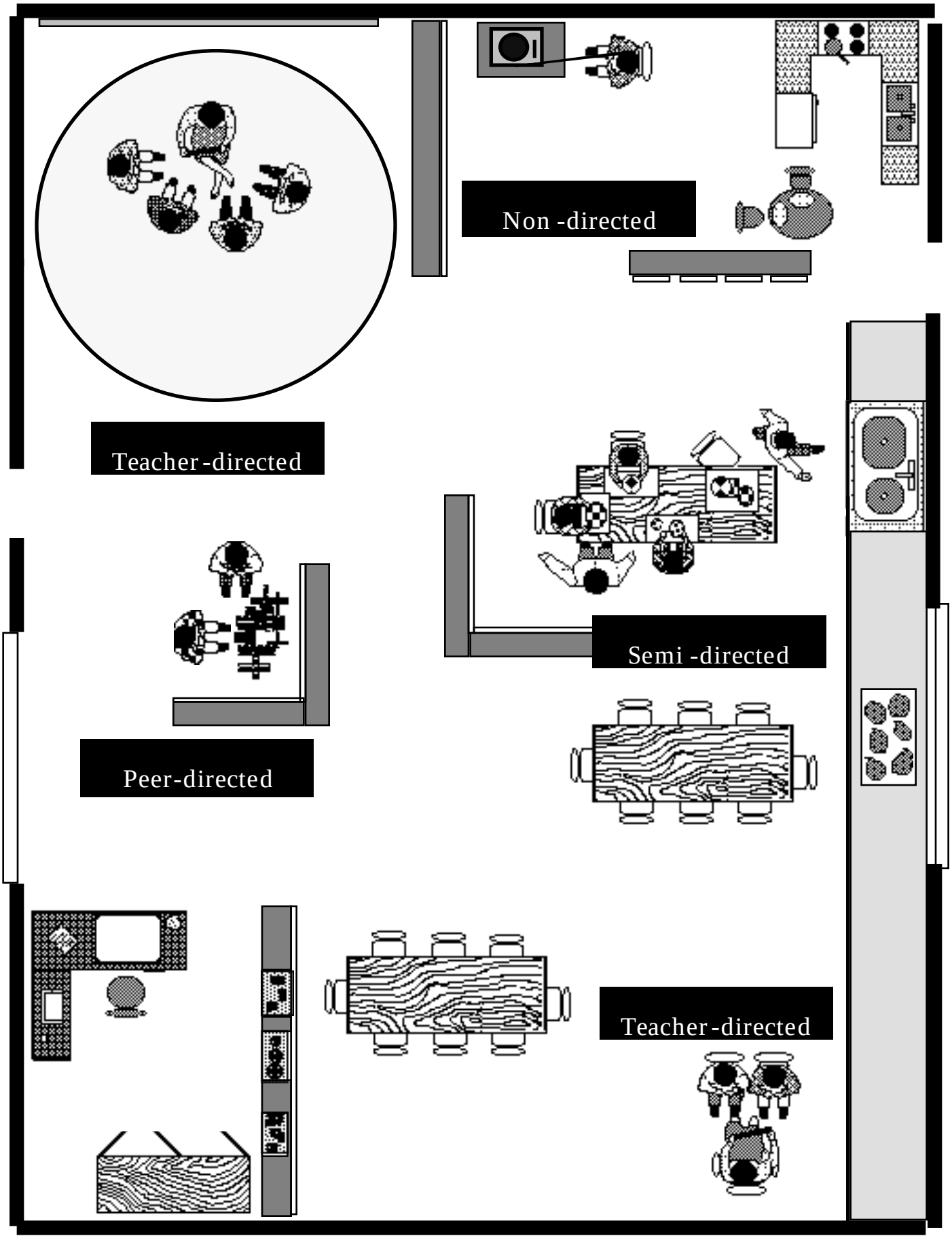
The teachers who adhere to the basic guidelines of the CLModel are taught to arrange and re-arrange the parts of instructional conditions to develop the desired repertoires. A well-engineered learning environment is made up of one or more instructional conditions that have been arranged to develop the desired repertoires. The teachers are taught to setup and run four types of instructional conditions: Teacher-directed, Semi-directed, Peer-directed, and Non-directed.

A basic premise of the CLModel is, "If the instructional conditions are arranged according to the best practices for any one of the conditions then it is more likely that the 'best' reinforcement contingencies will be arranged." If this is true then it is more probable that the desired repertoires are likely to be established and then strengthened.

This notion is supported by Skinner's definition of teaching.

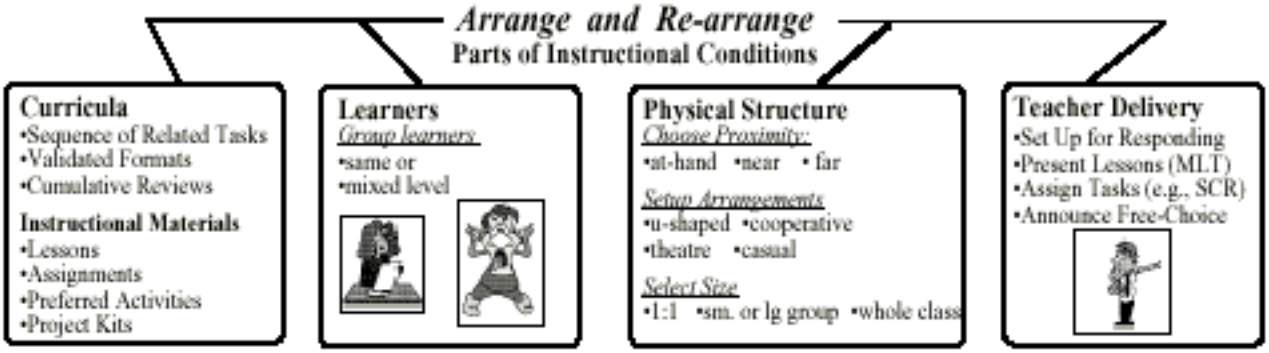
> "Teaching is the arrangement and re-arrangement of contingencies to facilitate learning"(Skinner, 1968)

In order to arrange the best instructional conditions, the teachers continually arrange and rearrange parts of the instructional conditions to construct "durable" instructional conditions; learners are more likely to participate when ample reinforcement is forthcomming.



In addition to **arranging** the most appropriate **curriculum** and **teacher delivery,** s/he must also arrange the **physical structure** of the classroom and **group the learners** for the instructional condition. If the learners are NOT successful then s/he must figure out what part(s) must be rearrnaged to set the occasion for the learner(s) to be successful. By arranging and rearranging these parts the teacher is arranging and rearranging contingencies to facilitate learning.

For example, Skinner (1968) suggests that a well designed curriculum sets the occasion for successful responding and an opportunity for the learner to be reinforced frequently. These are the "hidden" contingencies that often go unnoticed yet can be useful when arranging the parts of instructional conditions. All aspects of the CLModel take into consideration the importance of making these contingencies more conspicuous to the instructional staff.



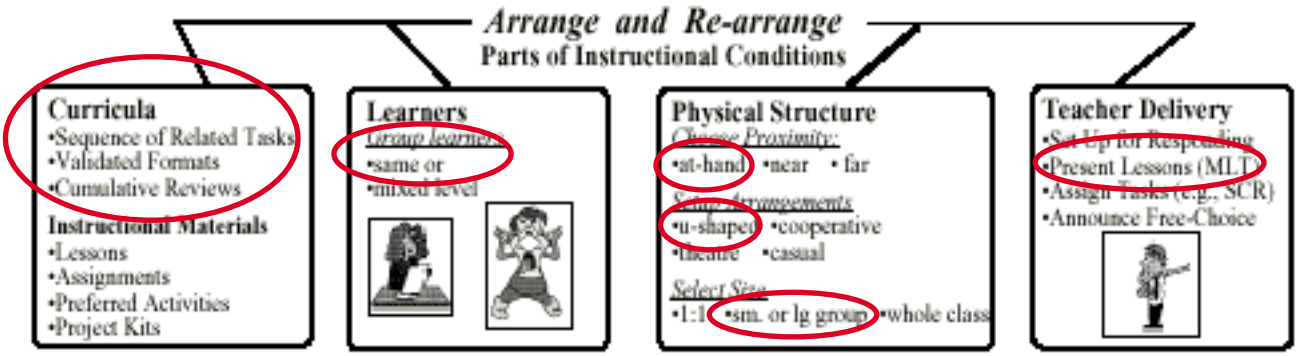

As behavior analysts, we have often tried to "explain" these contingencies by describing the basic principles of human behavior (e.g., The Law of Effect). I have found it much more teacher-friendly to illustrate the four parts of the instructional conditions that go into arranging the "best" instructional conditions.

Subsequently, by arranging these parts, the teachers are arranging and rearranging contingencies to develop the desired repertoires. As I acquire more value as a "behavior analyst", I have been able to motivate the staff to abide by the details of numerous contingencies of reinforcement (e.g., Leaning a schedule of reinforcement). I have found it necessary to "school" them properly by providing very well-designed instructional units to assist them in acquiring the behavioral "jargon" that helps make the contingencies most conspicuous (CLM Units on CDROM will be discussed in detail later in this paper).

Now, let's look at an aspect engineering a learning environment by constructing a teacher-directed conditon. Let's assume that we need to strengthen our learners' Reader repertoires. Study the defintion for Teacher-directed conditions listed below:

**Teacher-directed**
- present lessons or setup for responding (i.e., Teacher sets the occasion for each response & provides reinforcement for responses)
- proximity at-hand

Now, let's arrange the instructional condition. I'll begin by selecting SRA's Reading Mastery I curriculum because it adheres to the parameters listed (i.e., Sequence of related tasks, validated formats, and cumulative review).




Next, I'll determine how I will group my learners. Since SRA's curriculum guide suggests that same level groupings are best I will arrange such groupings as best I can. When I cannot do so, I must adhere to the guideline that says I must teach to the lowest performing learner(s). Next, I will arrange the physical structure. I will position myself at-hand, in a U-shaped arrangement (best way to monitor all the learners' performance) and I will arrange small group instructional conditions as much as possible. The last one I will arrange is the Teacher delivery part, I will present lessons as written.

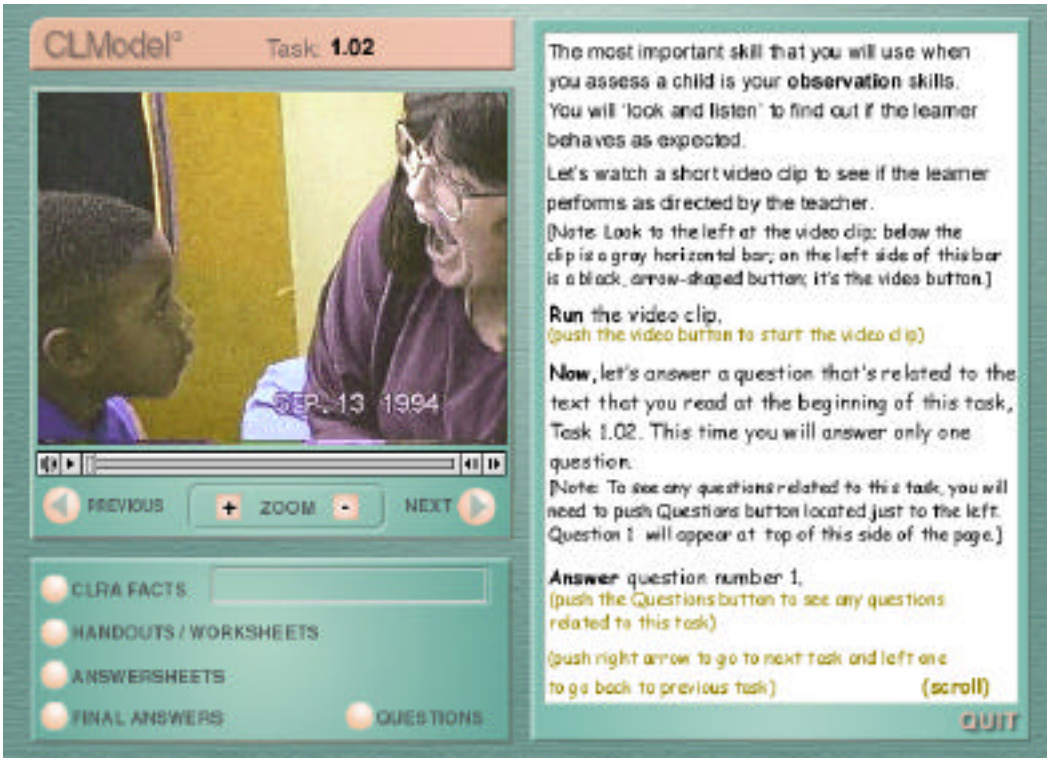
Preliminary data in educational settings with regular and special education staff in various school districts in California and West Virginia suggest the following:

1. By making these parts conspicuous to the instructional staff they "know" what part(s) to arrange and rearrange so that they can facilitate learning;
2. As the instructional staff learns about the best practices associated with each part they adopt the practices and work at acquiring "skilled responding".
3. The more skilled the staff becomes at arranging and rearranging the instuctional conditions the more the learners are successful during instruction.

**Training to Implement the Competent Learner Model**

If a school district wishes to adopt the Competent Learner Model, Tucci Educational Systems, Inc. can make available the materials for all aspects of the model. For example, a series of instructional units have been developed to teach the staff each aspect of the model. These CLM Units are now available on CDROMs (MAC or WIN). Each participant in the CLM Course of Study will have a coach to guide them to mastery.

In order to demonstrate mastery of the units, staff will complete a performance task for each unit with a learner of their choice before moving to the next unit. By the end of training, staff will be able to use the CLRAssessment, select lessons for each learner, arrange and rearrange parts of the instructional conditions, and will have mastered basic behavioral principles which are the basis of the CLM.




Once the CLModel is in place, it is important to make sure that teaching staff have the ability to maintain the model in their classrooms and to introduce new staff to the model. Toward this aim, some staff within the district will complete a further sequence of training events in order to become CLM coaches.

TucciOnline.com staff will continue to monitor progress of learners within the classroom and will offer additional training on a regular basis.

TucciOnline.com recommends the appointment of an in-house, district-wide Project Coordinator for the administration of the Competent Learner Model. The Project Coordinator must have sufficient authority to implement the system.

The dissemination of the model has been designed around an implementation model that fully utilizes the available resources of the school districts/programs. In-house experts are licensed to serve as Coaches and resources for the teachers and learners. They maintain access to the Tucci, Inc. organization and are continually in the "loop" regarding the use of the Systems and provided onsite coaching as needed. This model represents the lowest cost and most effective implementation of the system within a district/program. The implementation throughout a district/program is limited only by that district's available resources.

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