ABSTRACT
                The paper examines issues involved in providing
instruction to severely handicapped individuals in their natural
environments. Factors that influence the arrangements made for
instruction in community environments are classified according to
student factors (such as chronological age, post-school projections,
and unique learning and performance characteristics); activity
factors (complexity level and the extent to which features of the
environment can be replicated); and logistical factors
(staff-to-student ratios, transportation, and cost). A model is
presented to provide a systematic strategy for determining natural
cues and teaching procedures. Five steps in the model are identified:
(1) selecting the skills to teach, (2) deciding whether a natural
consequence should serve as the sole corrective procedure, (3)
selecting relevant natural cues, (4) determining the types of
teaching procedures to use in community environments, and (5)
determining the data collection procedures that will result in
meaningful programmatic change. (CL)

TEACHING STRATEGIES FOR
USE IN COMMUNITY ENVIRONMENTS[1]

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I. INTRODUCTION

Educators of severely handicapped students have seen the focus of curricular and research efforts shift from "how to teach" in the 1960's to "what to teach" in the early 1980's. The techniques of teachers such as Edouard Sequin (1864), Jean Itard (1894) and Maria Montessori (1912) influenced the early development of teaching strategies used by special educators. However, it was not until the last two decades that educators witnessed the emergence of educational strategies from which large numbers of severely handicapped students could benefit. The sixties were marked by the widespread influence of behavior analysts who proposed that teachers could be more effective by: describing behavior more precisely; establishing performance criteria; using elaborate measurement systems; and utilizing techniques such as contingent reinforcement, prompting, and shaping (Baer, Wolf, & Risley, 1968; Bandura, 1969; Skinner, 1968).

In the seventies, with a teaching technology in place, and more knowledge available about the learning and performance characteristics of severely handicapped students (Stokes & Baer, 1977), the foundation was laid for a shift in emphasis from "how to teach" to "what to teach." This period was marked with demonstration projects designed to prove that, through the application of task analysis and sequencing procedures, many complex skills could be broken down into manageable teaching units. Thus, severely handicapped students were successfully taught to perform tasks such as assembling 24-piece bicycle brakes (Gold, 1972, 1974); tying shoes (Martin, Kehoe, Bird, Jensen, & Darbyshire, 1971); and reading using fundamental word attack skills (Entrikin, York, & Brown, 1975).

During the early seventies, most curricula used with severely handicapped students evolved from theories or models of normal development. At that time, there was a tendency to organize curricular content into motor, social, cognitive, self-care, and possibly, prevocational domains. In the latter part of the seventies, this "developmental approach" to curriculum design was subjected to much scrutiny. As educators became aware of the vast discrepancy between the skills taught in classrooms and those required for independent functioning in nonschool environments, or those representative of the "Criterion of Ultimate Functioning" (Brown, Nietupski, & Hamre-Nietupski, 1976), the need for ecologically-oriented strategies became apparent. As a result, curriculum development strategies were generated for the purpose of securing information about the skills necessary to function in specific community environments. Logically, the curricular emphasis shifted again. This time, the shift was from "what to teach" to "where to teach."

Today, it is not uncommon to see, hear, and read about instruction that occurs in a variety of community environments, including restaurants (van den Pol et al., 1981); grocery stores (Wheeler, Ford, Nietpuski, & Brown, 1980); pinball arcades (Hill, Wehman, & Horst, 1982); and public transportation environments (Coon, Vogelsberg, & Williams, 1981; Neef, Iwata, & Page, 1978). Looking toward the future, it appears that the

focus of curr███████d research efforts is about to go full circle as
it returns to██████" of service delivery. However, this re-emphasis
on "how to t███████volved from concerns that are considerably different
from those th██████ the research conducted in the 1960's. That
is, educators ar█████ncerned with determining techniques that can be
effective when app█████ithin the natural contexts of community environ-
ments, as opposed to█████se which are utilized in relatively controlled
classroom settings. This, before discussing the techniques that should
enhance teaching effectiveness in community environments, a review of
contextually-based orientations to instruction will be presented.

A. Contextually-Based Orientations to Instruction

Persons functioning in community environments rarely are required
to perform skills out of the contexts in which they are appropriate. In
the past, a classroom teacher might have spent a 15-minute session pro-
viding repeated trials on the fine motor skills of reaching for and
grasping irrelevant objects. This isolated approach cannot be viewed as
preparation for the skills required to reach toward and grasp change
from the cashier at a check-out counter. The context of exchanging money
with a cashier involves the performance of a rapid succession of responses
in which one response logically sets the occasion for the next (Sailor &
Guess, 1983). It follows that in order to prepare a student to emit the
responses required in specific community environments a contextually-
based strategy that will draw upon the natural order in which such responses
typically occur is needed.

The work of Hart, Warren, and their colleagues (Hart & Risley, 1975,
1980; Hart & Rogers-Warren, 1978; Warren, Rogers-Warren, Baer, & Guess,
1980) exemplifies a contextually-based strategy. Their "incidental
teaching" strategies have been designed to elicit particular language
skills by taking advantage of existing opportunities and by creating
new opportunities for such usage. For example, Hart and Risley (1975)
systematically prompted and delivered materials contingent on child-
initiated verbalizations during free play.

Others have emphasized the need to teach skills in an order that
closely approximates that encountered in the natural environment (Guess
et al., 1978; Holvoet, Guess, Mulligan, & Brown, 1980). These authors
suggested that teachers establish "behavior clusters" as a means to teach
severely handicapped students to respond to natural contingencies. They
provided the following explanation of a "behavior cluster":

> A behavior cluster is a group of two to six behaviors that are
> sequenced in an order in which the behaviors commonly occur in
> the natural environment. In other words, behaviors are taught
> in context so that the student can also learn to respond to
> natural discriminative stimuli (Holvoet et al., 1980, p. 340).

A more environmentally-specific approach has been taken by Brown
et al. (1980) who recommend that teachers actually enter a community
environment and determine the skills required of nonhandicapped persons

as they initiate, proceed through, and terminate an activity. The information secured in specific environments would then provide the contextual basis for instruction. This approach, termed a "nonhandicapped person inventory strategy" was later expanded to include the recording of the natural cues and consequences under which the performance occurred (Falvey, Brown, Lyon, Baumgart, & Schroeder, 1980).

Although these strategies can by no means be considered exhaustive examples of contextually-based orientations to instruction, they do represent significant contributions toward the goal of effective intervention in community environments. Meaningful extensions of these orientations are now needed that will assist teachers when arranging for instruction in community environments and when making decisions about the natural cues and consequences that should be referenced during instruction. Each of these topics will be addressed in subsequent sections of this chapter.

II.. FACTORS WHICH INFLUENCE THE ARRANGEMENTS MADE FOR INSTRUCTION IN COMMUNITY ENVIRONMENTS

A variety of arrangements must be made in preparation for instruction in community environments. Initially, decisions must be made about:

a) the exact locations in which instruction will occur;

b) the amount of time that should be allocated to instruction in community environments;

c) the length of instructional sessions, the frequency at which the sessions should occur, and the time between sessions.

A desirable outcome of any educational program is to ensure that a student participates as actively as possible within the community environments in which he/she accesses now or will access at some point in the future. It is apparent that this outcome cannot be achieved by utilizing one particular strategy or by making decisions based on one variable. Rather, success depends on a variety of, a) student factors; b) activity factors; and c) logistical factors. Some of these will be described in this section in relation to how they might influence the arrangements made for instruction in community environments.

A. Student Factors

Decisions about the arrangements made for community instruction might be influenced by at least six student factors, including: chronological age; postschool projections; motoric, sensorial, health-related, and behavioral difficulties; performance history in community environments; parent/guardian information; and unique learning and performance characteristics. Each of these factors are meant to be considered synergically, since they are likely to influence instructional decisions in combination rather than in isolation.

1. **Chronological age**

Since a goal of instruction is to enable students to participate as actively as possible in community environments as adults, the provision of ample amounts of community instruction becomes increasingly critical as students get older. Students who receive a large amount of community instruction are more likely to graduate with the skills necessary to function in the ultimate settings of concern than those who do not. Therefore, the amount of nonschool instruction should increase with age. For example, while 5-year-old Susan spends most of her school day engaged in school-based instruction, 20-year-old Ralph receives all of his instruction outside of the school building in vocational, recreation/leisure, domestic, and community environments.

Not only should chronological age influence the amount of time ascribed to community instruction, but it should also influence the exact community locations in which instruction is provided. A prime example of how the chronological age of a student can influence the exact location in which instruction occurs is the vocational arrangement made for a severely handicapped adolescent in the Madison Metropolitan School District. A student who is in his/her last year of high school (20 or 21 years of age) is provided instruction in the exact vocational environment in which he/she is expected to function upon graduation (for more information on the vocational placement process see Brown et al., 1983; and Sweet et al., 1982).

Chronological age can also influence the length of an instructional session. For example, many teachers advocate increasing the length of a vocational session as a student's chronological age increases so that by the time a student is 21, he/she can endure an 8 hour workday.

2. **Post-school projections**

When the precise locations of residential and vocational post-school environments for a particular student are determined prior to graduation, instruction can be provided in those exact locations. Stanley, for example, is 19 years old and has just moved into a Westside group home where it is anticipated that he will continue to live after graduation. Therefore, his teacher plans to provide domestic training in that setting for the next 2 years, as well as recreation/leisure and community instruction in the neighborhood in which the group home is located. This will help to ensure that Stan will acquire the skills necessary to function in those specific environments upon graduation.

3. **Motoric, sensorial, health-related, and behavioral difficulties**

These variables have been used to either increase or decrease the ratio of school to nonschool instruction provided to an individual student. Too often, teachers use motoric, sensorial, health-related, and/or behavioral difficulties to justify a lack of community programming for a particular student. For example, a teacher offered that due to sensorial difficulties (e.g., deaf/blindness) two of her

students required substantially more school-based instruction than
did others in her class who did not experience such difficulties.
However, upon further examination of this rationale one might arrive
at a very different and more justifiable conclusion. That is, the
presence of sensorial difficulties may be a rationale for providing
significantly greater amounts of nonschool instruction because of the
poor generalization abilities often related to multiple sensory
deficits. Greta, for example, is a 14-year-old student who is deaf/
blind and profoundly mentally handicapped. She receives most of her
instruction in the nonschool environments in which she and her family
function, because of her multiple handicaps and the resulting inability
to transfer training from one environment to another.

4. Performance history in community environments

Perhaps, one of the most important factors to consider when arranging
for instruction in a community environment is the performance history
of a student. One can safely assume that students who have demon-
strated poor generalization from simulated to nonschool settings in
the past will probably continue to experience this problem. The
potential for success as a result of simulated instruction in school
settings for such students is doubtful. Instruction in actual community
environments is preferable. For example, Wanda's training history
over the past 5 years in school reveals that she rarely has been
able to transfer skills learned in school to community environments.
Her teacher has decided, therefore, to provide instruction to Wanda,
age 13, only in the community environments in which she will be
required to function in the foreseeable future.

5. Parent/guardian information

Parents and other caregivers can offer valuable insights and
information concerning a student's ability to function in community
environments. Mrs. Castana frequently reports that Jose engages in
activities at home that were first taught in school. For example,
after learning to tie his shoes in school, he was able to do so at home
when dressing in the morning. Whereas Jose was able to benefit from
school instruction for this particular activity, this benefit was not
realized in another activity. Mrs. Castana reports that he is still
unable to order his own food in a restaurant, despite the fact that
he has had 2 years of simulated in-school instruction in these skills.
Thus, while Jose may benefit from school-based instruction in some
areas, he may require community instruction in others.

6. Unique learning and performance characteristics

Several factors related to an individual student's learning style
should be considered when making instructional decisions related to
location. According to Brown et al. (1982), severely handicapped
students, when compared to nonhandicapped peers:

-acquire fewer skills in the same amount of time;
-have poor generalization or transfer of training skills;

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-require more instructional time and trials to acquire skills
 at meaningful performance criteria;
-acquire fewer complex skills;
-experience retention and recoupment problems; and
-rarely synthesize skills acquired in different contexts.

For example, consider Jennifer, a student who learns to perform
complex tasks only after large amounts of instructional time and
trials, retains few skills without ongoing practice, and rarely
generalizes acquired skills to new situations. The instructional
location decision which takes these factors into account would involve
training only in exact community environments. This situation is in
contrast to that of Jeffrey, who has demonstrated rapid skill acquisi-
tion and retention as well as good transfer of training across
environments. For him, the risks involved in providing school
instruction to supplement community training are minimal, as long as
verification of the desired performance occurs in the ultimate
environments of concern.

    Perhaps the learning and performance characteristic that has
received the most attention in the literature is that of generalization
(see Donnellan & Mirenda, in press, for a review of this issue).
Generalization is especially important within the context of this
discussion. That is, rarely does a teacher have the luxury of
providing instruction in all of the community environments that are
significant to each student in his/her class. If such a training model
were possible, then selecting the exact locations for instruction would
be a fairly easy task. This, however, is not the case. For many
students, the community environments in which they are trained are not
the exact locations in which performance is ultimately required. Thus,
the student's ability to generalize becomes an important factor to
consider when determining "where" to teach.

    Much of the research conducted in the area of generalization has
focused on facilitating generalization from a simulated training
environment to a specific community environment of concern. Several
researchers have reported that severely handicapped students who were
trained in bus-riding (Neef et al., 1978), street crossing (Page,
Iwata, & Neef, 1976), and fast food restaurant skills (van den Pol et
al., 1981) in training environments designed to simulate the actual
settings demonstrated good generalization to nontraining environments.
Other studies, however, have reported poor generalization despite the
use of this strategy. Coon et al. (1981) and Hill et al. (1982),
for example, reported that generalization from training to nontraining
environments was poor for students who were taught public transporta-
tion and pinball machine use, respectively, despite the introduction of
nontraining environment stimuli to the training settings.

    Very little of the research conducted in the area of generaliza-
tion has focused on facilitating generalization from one community
environment to another. In accordance with the practice of program-
ming common stimuli (Stokes & Baer, 1977). Livi and Ford
(1983) investigated the generalization performance of three severely

handicapped students who were taught to engage in meal preparation
and housekeeping activities in a nonschool domestic training environ-
ment. When the physical stimuli available in the students' actual
homes were used during instruction in the domestic training environ-
ment, 100% of the targeted skills generalized. In a study by Ford
(1983) which examined the generalization of eight severely handicapped
students from one department store setting to another; greater than 77%
of the responses acquired in the training environment generalized to
the novel department store. However promising these findings, the
researchers in these two studies pointed out the limited generalizability
of their findings to the broad class of students ascribed the label
"severely handicapped." The students participating in these studies had
a significant amount of previous community instruction in grocery
stores, restaurants, vocational sites, etc. In addition, most were
functioning intellectually in the moderate range of mental retarda-
tion. Thus, the findings cited must be interpreted guardedly when
applied to students who have not experienced such extensive community
training or who are less sophisticated intellectually. Additional
research is needed in this area to strengthen the information base from
which decisions about community instruction can be made. Table 1
contains a decision matrix that can be used as a guide when analyzing
the factors which influence the arrangements made for instruction in
community environments.

B. Activity Factors

Decisions about the arrangements made for community instruction might
be influenced by at least two activity factors: the complexity of the
activity; and the extent to which features of the environment and
activity can be replicated.

1. Complexity of the activity

Engaging in activities in the community often requires responding
to stimuli which are extremely unpredictable and complex. Consider
a busy intersection where street crossing will be taught. Some of the
stimuli a student must learn to respond to include curbs, curb cuts,
the actions of other pedestrians, the walk/don't walk sign, cars in
motion, and snow drifts. Adding to the complexity of this activity
is the extremely brief period between the point at which the stimuli
are presented and the point at which a response is required (e.g., a
"walk" sign is displayed and moments later a student must make a
response). The complexity of this and other transportation-related
activities has prompted many teachers to begin community instruction
with students who are as young as 5 years of age. Furthermore, the
frequency at which the sessions occur is often much greater (e.g.,
on a daily basis) than the sessions arranged for other activities.

2. The extent to which features of the environment and activity can
be replicated

Some community activities and environments can be more readily
simulated in school settings than others. Street crossing, for example,

TABLE 1

A Matrix of the "Student Factors" Which Influence the Arrangements Made for Instruction In Community Environments

Identify Student:	Chrono-logical Age	Post-school Pro-jections	Student Factors Motoric, Sensorial, Health-Related, and Behavioral Diffi-culties	Performance History	Parent/Guardian Information	Unique Learning and Performance Characteristics
How Might This Factor Influence: a) The exact locations in which Instruction will occur?						
b) The amount of time allocated to In-struction In commu-nity environments?						
c) The length of In-structional sessions, the frequency at which the sessions should occur, and the time between sessions?						

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is not conducive to simulation in school, because the stimuli present
in actual street environments are too unpredictable, varied, and
spontaneous. Other activities, such as swimming in the YMCA pool,
spectating at a high school football game, and browsing in a large
shopping mall may be virtually impossible to simulate in school.

Some activities, however, can be at least partially simulated in
school with a degree of success. For example, George, age 8, receives
instruction in a simulated McDonald's restaurant in the classroom,
which includes menus, signs, an ordering counter, trays, and seats
constructed to replicate some of the stimuli encountered at McDonald's.
He is able to transfer much of this training to McDonald's. The
skills that he has difficulty generalizing (e.g., reading the menu
on the lighted display above the counter, responding to the verbal
cue of the clerk, and maneuvering his way back to the table upon
receipt of his food) then become the emphases of instruction in the
actual community environment.

These activity and environmental factors must be considered in
combination with the previously mentioned student factors. A matrix
of "Activity Factors" which may influence the arrangements made for
instruction in community environments is presented in Table 2.

C. Logistical Factors

Undoubtedly, final decisions about instructional arrangements will be
influenced by at least three logistical factors: staff-to-student ratios;
transportation; and cost. Whereas many other logistical factors could
be discussed here, these three have been selected because they seem to
be encountered more frequently than others.

1. Staff-to-student ratios

Few classrooms are staffed with enough personnel to provide 1:1
instruction to each student throughout the school day. Typically,
if a teacher chooses to provide 1:1 instruction in the community,
it is at the expense of the other students who remain back in the
classroom. However, effective group instruction can occur in com-
munity environments. The effectiveness of group instruction will be
influenced by the size of the group and its make-up. For example,
consider a situation where a teacher is to provide instruction to four
students in a grocery store. This ratio might influence the selection
of the environment. That is, a large grocery store will be better
able to discretely accommodate a group of four than a small convenience
store. Furthermore, the make-up of the group should also be considered.
What if the four were all nonambulatory and in need of intensive
physical intervention by the teacher? Imagine the reactions of nonhandi-
capped shoppers who, upon entering Aisle 10, see four wheelchairs
together, and decide to move to another area of the store which is less
"crowded." Certainly, a 1:4 staff-to-student ratio is manageable,
but the homogeneity of the group might bring undesirable attention to

TABLE 2

A Matrix of the "Activity Factors" Which Influence the Arrangements Made for Instruction In Community Environments

Identify Environment and Activity:	Activity Factors	
	Complexity of the Activity	The Extent to Which Features of the Environment and Activity can be Replicated
How Might this Factor Influence:		
a) The exact locations in which instruction will occur?		
b) The amount of time allocated to Instruction In community environments?		
c) The length of Instructional sessions, the frequency at which the sessions should occur, and the time between sessions?		

their presence. Instead, a student in a wheelchair might be grouped
with three ambulatory students. In addition, 2 of the 4 students might
be selected because they are more fluent in their performance and
could thus engage in shopping without direct teacher intervention for
part of the time.

2. Transportation

The distance between school and a specific community environment
will also influence instructional arrangements. For example, grocery
stores; shopping malls, and restaurants might be selected because
their proximity to school enables students to walk or wheel to them.
This practice should not be considered restrictive if a student is
attending school close to his/her home and, therefore, is learning
to function in the environments he/she is likely to frequent during
nonschool hours.

Other decisions about community instruction are influenced by the
type of transportation available. For example, Sherry, 11, and
Joann, 12, are learning to ride a city bus to a vocational training
site which is located downtown. They receive training on Tuesdays.
The data related to their acquisition of street crossing and bus
riding skills in the downtown area were interpreted to mean that
additional training was needed. Thus, arrangements were made for
them to travel the same route downtown on Thursdays to the public
library, where they would receive instruction in recreation/leisure
skills previously identified as objectives in their respective IEP's.
Here, the need to increase the frequency of bus riding sessions was
one of the factors which influenced these community instructional
arrangements.

3. Cost

The cost of an activity should be considered when making arrange-
ments for community instruction. This is not to say that students
should be denied access to activities that require money. Rather,
costly activities should be scheduled in a manner that will minimize
the financial burden on the student and his or her family. For example,
what teenager, on a weekly allowance, can afford to go to a movie, eat
out in a restaurant, buy an item in a department store, play pinball,
and purchase food items from vending machines? Instead of arranging
for all of these activities to occur in one week, the costly
activities might be scheduled for instruction with more time between
them.

Unfortunately, logistical factors are often given priority over
individual student needs and activity variables. It is common to hear
comments such as "We can't provide instruction on a Friday night"
or "There is not transportation available" offered as rationales for
a lack of community instruction. Although these factors present real
scheduling challenges to the provision of community instruction and
cannot be ignored, they alone should not determine the arrangements

TABLE 3

A Matrix of the "Logistical Factors" Which Influence the Arrangements Made for Instruction in Community Environments

Identify Student: Identify Activity:	Logistical Factors		
	Staff-to-Student Ratios	Transportation	Cost
How Might This Factor Influence: a) The exact locations in which instruction will occur?			
b) The amount of time allocated to instruction in community environments?			
c) The length of instructional sessions, the frequency at which the sessions should occur, and the time between sessions.			

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made for community instruction. Recently, several authors have
reported strategies which address such logistical problems (see
Hamre-Nietupski, Nietupski, Bates, & Maurer, 1982; and Wehman & Hill,
1982). Creative problem-solving strategies must be generated to find
solutions to logistical barriers which unnecessarily limit the amount
and location of community instruction. A matrix of "Logistical Factors"
which may influence the arrangements made for instruction in community
environments is presented in Table 3.

Once decisions have been made about the exact locations in which
instruction will occur, the amount of time that should be allocated
to instruction in community environments, and the scheduling of the
sessions, decisions of a more precise nature can be made. One of the
many decisions that needs to be made within that environment pertains
to the cues and consequences that should be referenced during instruc-
tion.

III. A NATURAL CUES AND CONSEQUENCES DECISION MODEL

Community environments offer a rich variety of cues that rarely lend
themselves to the rearrangement strategies typically used in the class-
room. For example, in a classroom environment, a teacher may determine
that a four-choice discrimination task is "too difficult" for a student,
and may rearrange the stimulus array so that the student need only respond
to three items. However, the rearrangement strategy that proved successful
in the classroom may not be feasible when teaching discrimination skills
such as those necessary to select a can of peas from the canned foods
section of the grocery store or to locate a pen in the stationery section
of the department store. Instead, strategies must be considered that
facilitate a discriminative response by drawing a student's attention to
the most relevant natural cues[3] without rearranging the complex stimulus
array.

To provide a systematic strategy for determining the natural cues to
reference and the teaching procedures to use, a decision model has been
developed. This model includes decisions about natural cues as well as
decisions about natural consequences.[4] A series of questions or decision
rules has been formulated to assist teachers when: a) selecting the
skills to teach in a community environment; b) deciding whether a natural
consequence should serve as the sole corrective procedure; c) selecting
relevant natural cues; d) determining the type of teaching procedure
to use in a community environment; and e) determining the data collection
procedures that will result in meaningful programmatic changes. A
schematic representation of these decision rules, entitled, "A Natural Cues
and Consequences Decision Model" is presented in Figure 1. It should be

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[3]The stimuli that are generally available in an environment and serve
to elicit common discriminative responses are referred to here as
natural cues.

[4]The stimuli that are generally available in an environment after
a response has already occurred and serve to strengthen, maintain, weaken,
or eliminate that response are referred to as natural consequences.

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                              ┌─────────────────────┐
                              │ Conduct a Nonhandi-  │
                              │ capped Person        │
                              │ Inventory            │
                              └──────────┬──────────┘
                                         │
                              ┌──────────▼──────────┐
                              │ Conduct a Discrepancy│
                              │ Analysis            │
                              └──────────┬──────────┘
                                         │
                              ┌──────────▼──────────┐
                              │ Generate Individualized│
                              │ Adaptations          │
                              └──────────┬──────────┘
                                         │
┌──────────────────────┐     ┌──────────▼──────────┐
│ Entertain reasons for │     │ Select Discrepancies │
│ error other than a    │─ ─ ─│ for Instructional    │
│ failure to respond to │     │ Emphasis             │
│ natural cues and con- │     └──────────┬──────────┘
│ sequences:            │                │
│  - lack of training   │     ┌──────────▼──────────┐
│  - lack of motoric    │     │ Select Relevant      │
│    response           │     │ Natural Consequences │
│  - behavioral         │     └──────────┬──────────┘
│    interference       │                │
└──────────────────────┘                │
```

Factors:
- Training equivalent stimuli
- Learning characteristics of students
- Adaptations

Select Relevant Natural Cues

Factors to Consider include:
- Learning characteristics of the student
- Public Perceptions
- Safety

Should the Natural Consequence serve as the Corrective Procedure?   No / Yes

Allow Natural Consequence to Occur

Identify Salient Features of Cues

Use an ANTECEDENT teaching procedure: Do not provide the student with the opportunity to make an error. Instead, draw his/her attention to the natural cues before a response is required.

Use a CONSEQUENTIAL teaching procedure: Allow the student to make a response. If an error is made, redirect his/her attention to the natural cues. If a correct response is made, use a reinforcement procedure.

Does the student's performance improve at an acceptable rate?   Yes

Proceed as planned

Does the student's performance improve at an acceptable rate?   No / Yes

Use Fading Strategies

clear from this model that decisions about natural cues and consequences
merely form a subset of a larger set of questions that must be answered
when determining the most efficacious manner in which to teach a severely
handicapped student to function in a community environment.

A. Selecting the Skills to Teach

The first step of the decision model involves conducting a nonhandi-
capped person inventory, which essentially requires the sequential listing
of the skills demonstrated by nonhandicapped persons functioning in a
particular environment (Brown et al., 1980). This nonhandicapped person
inventory serves two purposes: first, to ascertain the natural order of
skills required of persons who generally engage in a particular activity;
and second, to prepare a criterion-referenced assessment tool with which
the performance of a severely handicapped student can be measured. The
performance by a severely handicapped student is then assessed and compared
to that of a nonhandicapped person. Following this, the discrepant or
"missing" skills from the repertoire of the severely handicapped student
are analyzed and targeted for instruction. This phase of the decision
process is referred to here and elsewhere (Brown et al., 1980; Ford et
al., 1983) as "conducting a discrepancy analysis."

Upon analyzing the discrepancies between the performance required
and that exhibited by the severely handicapped student, determinations of
"what to teach" can be made. One of the best ways to arrange for more
active participation in an activity is through the use of an individualized
adaptation that compensates for a specific performance discrepancy. That
is, if a severely handicapped student is unable to perform a particular
skill due to motoric, communicative, visual, or other deficits, an
adaptation might be created so as to allow for more active participation.
For example, a severely handicapped student may not be able to remember the
items to be purchased in a department store. Furthermore, he or she may
not be able to read a list of printed words. Instead, the student might
be taught to use a picture list as one way of addressing this discrepancy.
The reader interested in further examples and specific strategies for
generating a variety of individualized adaptations is referred to Baumgart
et al. (1982).

For students with many discrepant skills, it will be important to
determine which skills will be taught first. When selecting instructional
targets for students with limited response repertoires, Ford et al. (1982)
suggested that a teacher consider a number of factors. The following
series of questions capsulizes these factors:

Will performance of this skill occur frequently and on a routine
basis?

Will this skill occur across a variety of environments and
activities?

Will performance of this skill result in less involvement by
caregivers?

Will performance of this skill allow a student to further
develop motoric, sensorial, and communicative functioning?

Will performance of this skill allow a student to influence
the actions of others?

Will performance of this skill help to establish a primary
motivational source for engaging in the activity?

Will performance of this skill require that a student interact
socially with a nonhandicapped and/or handicapped individual?

Will performance of this skill enhance the development of a
life sustaining function?

The process of targeting skills should be influenced by the multiplicity
of a student's handicapping condition. Certainly, the performance char-
acteristics of one student will result in an entirely different determina-
tion of the skills selected for instructional emphasis than will the
performance characteristics of another.

B. Deciding Whether a Natural Consequence Should Serve as the Sole
    Corrective Procedure

Once the selection of target skills has occurred, an examination
of the natural cues and consequences is warranted. One of the first
questions posed in the decision model is, "Should the natural conse-
quences serve as the sole corrective procedure?" Rarely can this
question be answered affirmatively when severely handicapped students are
concerned. That is, most natural consequences do not occur with suffi-
cient magnitude and immediacy for their use to be considered an educa-
tionally sound corrective procedure. This seems especially true during
the acquisition phase of learning. For example, the response, "waiting
at a cash register that is not open," may result in the natural consequence
of experiencing an undue amount of wasted time, or receiving corrective
verbal feedback from another consumer. Upon making an error of this
sort, nonhandicapped persons may display signs of frustration or embar-
rassment and, at the next opportunity, may take greater care to perform
the skill correctly. However, for many severely handicapped students,
the provision of such incidental, consequential information alone is not
likely to have a significant impact on future performance. Given the
subtle nature of the corrective information and what is known about the
learning characteristics of severely handicapped students, a decision
may be made not to allow the natural consequence to act as the sole
corrective procedure.

Additionally, public perceptions may influence decision. For example,
Joe, a severely handicapped student, hands the clerk all the money he
has. The clerk indicates that the money offered is not enough to cover
the cost of the item to be purchased. After repeated questioning, Joe
communicates that he has no more money. Meanwhile, the people in line
behind him have waited for at least 5 minutes. Finally, Joe is told to

return the item to the shelf. Whereas this natural consequence may have an impact on Joe's subsequent performance, it is doubtful that this should be considered a viable corrective procedure, given the risk of engendering negative public perceptions.

Still another issue relates to the safety of a student. An obvious example of a natural consequence posing a safety problem is that of a student who steps off of a curb into the path of a moving car. The screeching brakes of the car may serve as an effective natural consequence for one who proceeds to cross a street without looking, but it hardly represents a safe instructional option. When a teacher decides that the natural consequence should not serve as the sole corrective procedure, the decision-making process shifts to a natural <u>cue</u> orientation (see the left portion of the schematic representation depicted in Figure 1, p.162).

C. <u>Selecting Relevant Natural Cues</u>

Each response made in a community environment is preceded by specific natural cues. For example, in a sit-down restaurant, a student must acknowledge the presence of the waiter and the verbal cue "Can I take your order?" (both natural cues) before touching the picture card he may use to communicate his food preferences. Using the decision model previously described, natural cues can be identified and selected for each skill targeted for instruction.

Zeaman and House (1963) proposed that a major factor influencing the poor performance of mentally retarded students on discrimination tasks is their failure to attend to the most relevant cues. Through the use of a backwards learning curve, they demonstrated that performance is generally at chance level until an abrupt change occurs, followed by acquisition of the desired discriminative response. According to Zeaman and House (1963) this abrupt change signified the point at which discrimination learning begins:

> ...the visual discrimination learning of mentally retarded
> children requires the acquisition of a chain of two responses:
> 1) attending to the relevant stimulus dimension; and 2) ap-
> proaching the correct cue of that dimension. The difficulty
> that retardates (sic) have in discrimination learning is related
> to limitations in the first, or attention, phase of this dual
> process rather than the second (p. 220).

More recent investigations of essentially the same theory have been conducted, and the results support the contention that severely handi- capped individuals have difficulty selectively attending to the salient features of visual stimuli (Boersma & Muir, 1975; Krupski, 1979).

A related finding within the context of discrimination tasks is that the more salient the relevant cue, the greater the likelihood that a student will attend to it, and the faster the rate of skill acquisition (Miller, 1979; Suchman & Trabasso, 1966). Many attempts have been made to

examine the saliency of cues in discrimination learning by severely handi-
capped students. For example, contrast, size, complexity, novelty, and
brightness are all features that have been identified as enhancing selec-
tive attention (Fantz, Fagan, & Miranda, 1975; Gibson, 1969; Lubker,
1967, 1969a, b; Stevenson, 1972).

Decisions as to which natural cues to reference during instruction
must be based on individual learning and performance characteristics.
Obviously, if a student is blind, visual cues would not be selected.
Furthermore, to enhance generalization, the selection of cues should
account for the notion of programming common stimuli (Stokes & Baer,
1977). In accordance with this notion, the cues that are available in
generalization or untrained environments might be incorporated into the
training environment. For example, examination of a department store
might reveal that "an array of filler paper" and "crayons" serve as relevant
natural cues for locating a notebook. This might be in contrast to the
training environment, where a sign with the printed label "school supplies"
is identified as the relevant cue. This information might lead to a
decision to reference all three cues during instruction in the training
environment. An example of a natural cue inventory used to produce this
information is presented in Table 4. This table contains a listing of
cues available in three department stores when performing the skills
necessary to "browse for" a notebook.

D. Determining the Types of Teaching Procedures to Use in Community
   Environments

The decision model presented in Figure 1 uses as its framework the
order of skills that naturally occur in a community environment (a
nonhandicapped person inventory). This framework provides the basis from
which skills can be targeted and natural cues and consequences can be
selected. Decisions still need to be made about the type of teaching
procedure to use in a community environment. More specifically, decisions
must be made about: 1) the prompting procedures used to accentuate the
natural cues; 2) the point at which the intervention should occur; 3) the
procedures used to strengthen a response; and 4) the procedures used to
fade instructional cues.

1. The prompting procedures used to accentuate the relevant cues

In keeping with the notion that the more salient the natural cue,
the more likely a student is to attend to it, educators have examined
the effectiveness of teaching procedures designed to accentuate the
salient features of cues and thus increase the rate of skill acquisi-
tion on discrimination tasks. Wolfe and Cuvo (1978) described two
categories of procedures used to accentuate relevant cues: within-
stimulus prompting and extra-stimulus prompting.

Wolfe and Cuvo (1978) described within-stimulus prompting as a
procedure which alters the stimuli which should trigger a response
so as to accentuate their critical features. They found that students
learned significantly more letters when they were trained using within-
stimulus prompting (i.e., accentuating critical features of the

Table 4

A Natural Cue Inventory of Three De[illegible]t Stores

| Natural Cues | | | Parallel Responses |
K-Mart Department Store	Capps Department Store	[illegible] Department Store	For Examining A Notebook
Aisles/areas that have not been examined	Aisles/areas that have not been examined	Aisles/areas that have not been examined	1. Turns in the direction of unexamined displays in search of item.
Items not desired	Items not desired	Items not desired	2. Scans and walks past displays that do not have the desired item until within view of the cues associated with the location of that item.
Filler paper, crayons	"School Supplies" sign, crayons	"School Supplies" sign, cork board, tape, folders, notebooks	3. Moves purposefully (e.g., fixates on array, turns deliberately) in the direction of the desired item.
Notebooks, folders, filler paper	Notebooks, folders	Notebooks, folders	4. Stands in front of the display of items and scans for the specific item desired.
A spiral notebook	A spiral notebook	A spiral notebook	5. Removes item from display and examines.
Yellow tag on front cover of notebook, 77¢	Yellow tag on back of notebook, 39¢	White tag on back of notebook, 59¢	6. Locates price (e.g., points, verbalizes, enters into calculator).
Shelf with same items	Shelf with same items	Shelf with same items	7. Returns the item to the appropriate location.

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stimuli, such as darkening the print of one letter) as compared to
extra-stimulus prompting (i.e., adding a topographically different
cue, such as pointing a finger).

Within-stimulus prompting is a procedure that has been used
effectively in many community instructional situations. Consider a
student who is learning to set the table in a domestic training site.
The task requires positioning a plate, napkin, knife, fork, spoon,
and glass on a placemat. An outline of each item is drawn on the
placemat to accentuate relative positions and unique shapes. As
learning occurs, these outlines are faded until the drawings are no
longer needed in order to perform the task in an acceptable manner.

Another example involves the task of locating a personalized time
card at work. All the employee cards, including the student's, have
labels printed across the top with the individual's identification
number, last name, and first name. Although the student has learned
to recognize his name in other contexts, it becomes obvious that he
needs instruction on this newly-encountered discrimination task. The
teacher decides to darken the letters of his first name to facilitate
the discrimination process. This within-stimulus procedure is used
with the intention of fading the darkened letters until the student
can discriminate among the original printed labels.

A final example of a within-stimulus procedure involves a student
who is learning to locate a box of cereal in a grocery store. A within-
stimulus prompt is provided by positioning the box in front of the
other cereal boxes. The intention is to fade the cue accentuation by
gradually moving the box back to its original location.

A distinction should be made between within-stimulus prompting and
the use of redundant cues. A within-stimulus prompt makes use of the
natural features of the stimuli themselves. The use of a redundant
cue often goes beyond the accentuation of natural features and adds
powerful but unrelated cues to facilitate a discriminative response.
For example, Gold (1972) demonstrated that through the use of redundant
cues involving color coding, a 15-piece assembly task could be completed
in half the trials needed by the students who did not use the color
coded parts. Two years later, Gold (1974) studied three different
procedures designed to fade the color cues. All three fading proce-
dures worked equally well. Perhaps, the significance of this latter
study lies in the acknowledgement that the efficiency of redundant
cue training must be counterbalanced with the time needed to fade those
cues. When the ultimate goal is for the student to respond to
naturally-occurring stimuli, the time required to fade the redundant
cues is an important factor.

There are, however, occasions when redundant cues are created
without the intention of fading them. Instead, they become integral
components of the task and can be referred to as adaptations, or more
specifically, as "material adaptations" (Baumgart et al., 1982). To
illustrate how the use of such cues differs from that of a within-
stimulus procedure, the reader is reminded of one of the examples of

a within-stimulus prompt given previously. The example involved darkening letters on a time card to facilitate the discriminative response of a student who was to find his card among those of his co-workers. One can easily see how the darkened letters could be faded until the student ultimately responded to the natural cue of his printed name. But consider a different student who is blind and is receiving training at that same vocational site. Her time card was adapted with a raised impression of a symbol which she learned to recognize as her name. When creating this adaptation, the teacher had no intention of fading it to the point where the student would be responding solely to the natural cue of the printed name.

While within-stimulus prompting and the adaptation of materials can be effective tools when providing instruction in some community environments, their limitations become obvious when considering their use in others. Although one might be able to convince an employer to color-code shelves in a stock room to simplify a vocational task, it is doubtful that such an adaptation would be received favorably by department store officials. Imagine trying to convince a department store manager to paint arrows on the floors of the aisles in order to provide redundant cues for severely handicapped students to shop in a systematic fashion! An alternative to within-stimulus prompting and adaptations of materials is what Wolfe and Cuvo (1978) have referred to as "extra-stimulus prompting."

Wolfe and Cuvo (1978) described extra-stimulus prompting as a procedure which adds a topographically different cue, such as pointing a finger, in an attempt to facilitate discrimination. Teachers often do this by providing verbal cues, gestures, physical guidance, modeling, etc. Ideally, extra-stimulus prompting should be carried out in a manner such that the critical features of the relevant natural cues are referenced. Most would agree that it is better to reference the natural cue than not; yet this orientation does not always exist in practice. For example, a female student was learning to use a public restroom located in a shopping mall. The teacher pointed to the appropriate door and said "Here is the bathroom," and then wheeled the student through the entrance. The teacher made no attempt to reference the relevant natural cue of the symbol (&) located on the front of the door. Nor did the teacher highlight the "skirt-like" shape in an attempt to facilitate the discrimination between the men's and women's symbols.

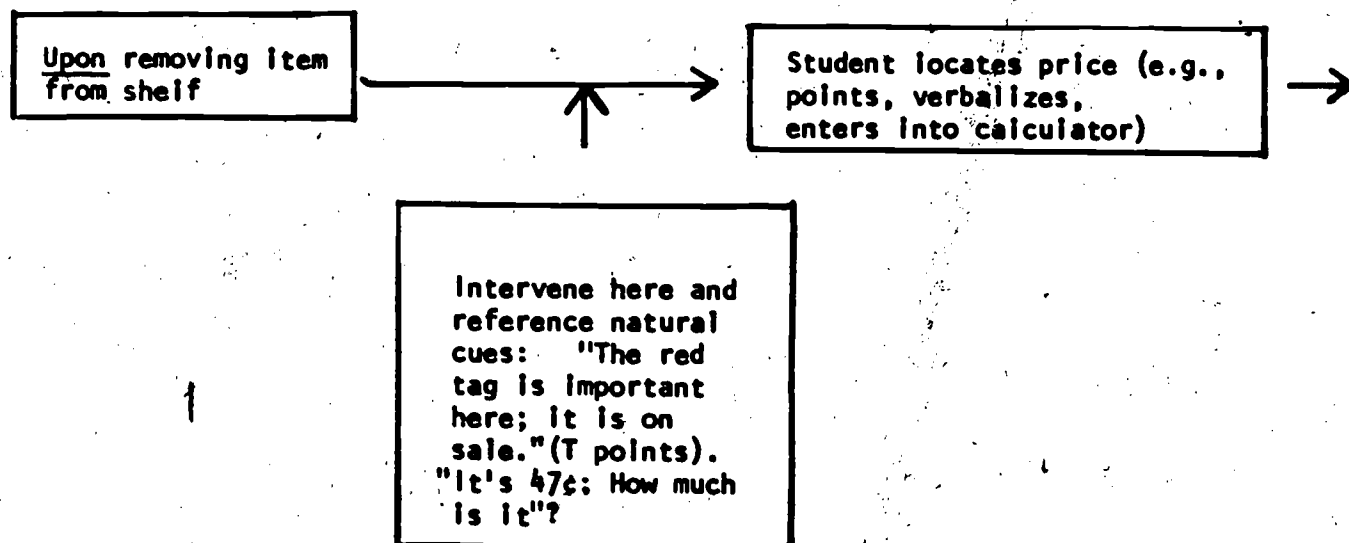## 2. The point at which the intervention should occur

Experience reveals that simply exposing students to community environments does not ensure efficient or successful skill acquisition. Individualized instruction accentuating the relevant natural cues must be provided if students are to acquire and maintain skills in community environments. The natural cues can be referenced at two points; before a response occurs (an antecedent teaching procedure); or after a response occurs (a consequential teaching procedure).

An antecedent teaching procedure refers to an intervention in
which a sufficient amount of information is provided before a
response is made so as to minimize the probability that an error
will occur. Variations of antecedent teaching procedures have also
been referred to as "errorless learning" (Sidman & Stoddard, 1967;
Tawney, 1972; Terrace, 1963). For purposes of intervening in
community environments, this strategy requires that the teacher use
some combination of verbal cues, gestures, models, and/or physical
prompts to reference the natural cue to which the student should
respond, immediately following the completion of the previous response
in the sequence. This is done in a manner so as to preclude an error
from occurring and ensure a correct response. In order to implement
an antecedent procedure, the teacher must know in advance the steps
in the skill sequence where the student will require intervention and
must be available to offer the necessary information before an error
occurs. Furthermore, when providing antecedent instruction, careful
consideration must be given to the temporal relationship between the
point at which a cue should become operative and the point at which a
response to that cue is actually required. This is particularly true
for cues which become operative long before a direct response is
required. For example, when purchasing gum in a department store,
a student receiving antecedent instruction would be prompted to recall
that "gum" is the desired item and to move in the direction of the
candy rack. The actual response of securing a package of gum from the
shelf may not occur until 30 seconds later, when the student is
actually in front of the candy and gum rack.

Example: Jacki is a 13-year-old student labelled moderately
mentally handicapped. She has been receiving instruction in a
grocery store setting for several months, and is able to per-
form all of the necessary skills except those related to
locating the price of items; she makes repeated errors in this
area. Her teacher decides to intervene before Jacki makes an
error by pointing to the price tag on each item immediately after
Jacki has removed the item from the shelf. In addition, her
teacher verbally references the natural cue by saying, "Here
is the price tag; it is 47¢. How much is it?" After several
sessions during which no errors have been allowed to occur, the
antecedent assistance is gradually decreased and faded out as
Jacki begins to recognize the price tag on her own. A sequential
presentation of an antecedent teaching procedure is depicted in
the upper portion of Figure 2.

Example: Roger is a 15-year-old student with autism who is
receiving instruction in riding the city bus. Because of Roger's
tendency to tantrum when he is corrected, and because of the safety
considerations involved in the activity itself, his teacher decides
to institute an antecedent teaching procedure. Roger is provided
with verbal and physical prompts before each step in the bus riding
sequence to ensure errorless performance. Over the next 6 months,
the intensity of the prompts is gradually faded until Roger can
perform the entire sequence independently.

An Antecedent Teaching Procedure

Upon removing item from shelf	→ ⬆ →	Student locates price (e.g., points, verbalizes, enters into calculator)	→	

Intervene here and reference natural cues: "The red tag is important here; it is on sale." (T points). "It's 47¢: How much is it"?

A Consequential Teaching Procedure

Upon removing item from shelf.	→	Student locates price (e.g., points, verbalizes, enters into calculator) either correctly or incorrectly or after 30 seconds of no responding

Intervene here and reference natural cues ("The red tag is important, etc.")
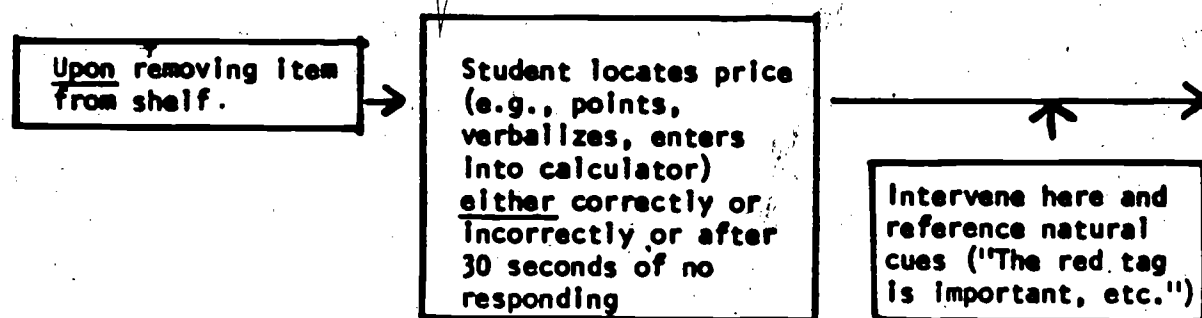
Figure 2. A sequential presentation of antecedent and consequential teaching procedures.

A consequential teaching procedure refers to an intervention in which a student is allowed to make a response without the provision of teacher prompts. If the student fails to emit the correct response within a preset latency period, then corrective information is provided. In other words, the intervention occurs after a response is made. A variation of this procedure has been referred to as an "increasing assistance" approach (Csapo, 1981; Gentry et al., 1979), and has been used effectively during the fluency-building phase of learning in particular. Since errors can occur, the teacher must be careful to use this procedure only for students who will not be negatively affected by making mistakes or by receiving corrective information.

Example: Sarah is a 10-year-old student labeled moderately mentally handicapped. She has been receiving instruction in a grocery store setting for several months. According to a preset performance criteria, Sarah has reached the fluency phase on the task of interpreting price tags. Sarah's teacher now feels that it is appropriate to use a consequential teaching procedure. Thus, Sarah is allowed to examine a package of candy for 10 seconds, and upon the absence of a purposeful response (e.g., pointing to a serial number or pointing to the red sale tag) the teacher intervenes by pointing out the correct price to her. A sequential presentation of a consequential teaching procedure is depicted in the lower portion of Figure 2 on page 171.

Example: Sam is a 19-year-old student who has cerebral palsy and is mentally retarded. In the past, Sam has demonstrated the ability to learn from his mistakes and to problem-solve in new situations. After first providing instruction using an antecedent procedure to build initial skills, Sam's teacher decides to use a consequential strategy during vocational training at the local hospital. Sam is allowed to make errors and to attempt self-correction when packaging sterile instruments, and consequential assistance is provided only after it is clear that Sam is unable to solve the problem by himself. In addition to encouraging Sam to use his problem-solving abilities, the use of this approach enables the teacher to offer more directive instruction to the other two students at the site.

3. The procedure used to strengthen a response

It is often necessary to use reinforcement systems other than those naturally available in community settings. Because of the complex and public nature of community environments, reinforcement procedures such as tokens, food rewards, lavish praise, and some types of physical affection may be inappropriate. If the use of such "artificial" procedures is critical to enable a particular student to make progress, nonstigmatizing methods of dispensing the reinforcements should be devised. Whenever possible, the use of such procedures should be paired with the naturally-occurring reinforcers available in a particular environment.

Example: Craig, age 16, is receiving instruction at the Sunco
gas station. Craig has a short attention span and requires frequent
reinforcement in order to stay on task and complete his job. He
enjoys watching the mechanic work on the cars in the shop, so his
teacher decides to incorporate this interest into his instructional
program. He is assigned to work as an "assistant" to the mechanic
in the garage, where he is instructed in cleaning tools, wiping
counters, sorting auto parts, sweeping and mopping the floor, and
so forth. Initially, he is given frequent breaks upon completion
of each small task, so that he can watch the mechanic work as a
reward for task completion. The work time is gradually lengthened
as Craig becomes more proficient and requires less reinforcement
for this efforts.

4. The procedure used to fade instructional cues

Fading procedures are used to systematically decrease the amount
of teacher intervention provided. These strategies are appropriately
used once the student has achieved some degree of mastery of the steps
in the skill sequence. The fading of instructional cues in community
environments can be accomplished through many strategies. Three ways
to fade instructional cues are discussed below.

First, fading instructional cues designed to prompt, correct, or
reinforce a response can be accomplished by decreasing the amount of
physical direction; by using indirect verbal cues ("What do you have
to do next?"); or by allowing a longer latency period between two responses
so that the student has the opportunity to initiate the second response
without the use of instructional cues.

Example: As Sean, age 13, begins to master the steps involved in
making the bed at the Travel Haven motel, his teacher gradually
decreases the amount of physical contact she provides to help
him smooth the top sheet, blanket, and spread; and uses fewer
direct verbal cues to help him move through the sequence. Though
Sean's performance rate initially drops, he becomes more inde-
pendent over the next 2 weeks, and within a month he is able to
make the bed independently within an appropriate amount of time.

A second procedure that can be used to fade instructional cues
involves modeling. This can be done in a slightly exaggerated way,
so that the student's attention is drawn to the correct response being
demonstrated.

Example: Michael, age 20, has made limited progress in learning to
order his food at the Hamburger Haven sitdown restaurant. He
seems to have become dependent on teacher direction for the skills
involved in ordering his food. In order to avoid strengthening this
dependence, his teacher decides to switch to a modeling strategy as
a means of fading her direct assistance. She selects this strategy
because she knows that Michael has excellent imitation skills. She
arranges for Michael to sit with two other students who she
believes will benefit from an indirect modeling procedure. During
the next several sessions at the restaurant, she places Michael and
his peers in a position where they can readily observe her as she

models the ordering routine. She slightly exaggerates her responses
to make them more salient; for instance, she says, "I think I'll
get the menu now" and reaches for it with a pronounced gesture;
and when the waitress comes to take the order, she gives her order
in a somewhat louder voice than usual. Throughout this procedure
she checks to make sure the students are attending. Upon observing
the teacher, Michael eventually initiates the necessary responses,
and is able to order without direct teacher assistance.

A final fading strategy involves decreasing teacher-student proximity.
It is common for a teacher to sit with a student in a restaurant, or
to accompany her to the break room at a vocational site, even when there
is little need for teacher assistance. Though relatively simple, a
strategy designed to fade physical presence is often overlooked even
after students have mastered select skills. Proximity fading is a
useful strategy which can be used unobtrusively in many community
environments.

> Example: Adrienne, age 14, no longer requires much direct instruc-
> tion in riding the public bus. Therefore, over a period of time,
> her teacher gradually moves away from Adrienne, so that she boards
> the bus on her own, sits by herself, and is allowed to independently
> initiate the responses involved in exiting at the correct stop.
> Eventually, the teacher stops riding the bus with Adrienne altogether,
> and instead follows the bus in her car and meets Adrienne at her
> stop. The teacher is available to assist Adrienne should she exper-
> ience any difficulty, but does not actively involve herself in
> giving instruction or feedback unless necessary.

The teaching procedures discussed in this section represent only
a few of the options available to those who plan and provide instruc-
tion in community environments. Determining which prompting proce-
dure(s) to use to accentuate the relevant cue, whether to intervene
antecedently or consequentially, how to strengthen a response, and
when to fade instructional cues will depend on which stage of learning
a student has entered. These stages and how they influence instruc-
tional decisions are discussed in the following section.

E. Determining the Data Collection Procedures That Will Result in
   Meaningful Programmatic Changes

In this section, data collection procedures will be described which
involve: 1) targeting a manageable number of skills; 2) using a four-
point measurement system to secure performance information on the targeted
skills; and 3) analyzing the data to ascertain which skills have been
acquired.

1. Targeting a manageable number of skills

The sequence of skills necessary to engage in a particular activity
can be quite lengthy. When the entire nonhandicapped person inventory
is used as a continuous assessment tool, it may become unmanageable
and, as a result, may lose much of its instructional value. In fact,

when attempts are made to record the performance of a student in relation to each skill in the sequence, it is often at the expense of instruction. Rather than treat each skill as a separate entity, a teacher might group many of the skills together because of their parallel functions. The designation of a parallel skill is based on the notion that the performance of one skill in a sequence may be topographically similar to another. Consider a student who is learning to browse in a department store. He or she is to examine records, magazines, hair accessories, and gum. The skills required to examine one item are very similar to those required to examine others. For example, the response of replacing "People" magazine on the rack in the department store involves identifying another item with the same cues (e.g., the same pictures on the cover; the label "People") or recalling its original location. Similarly, the response of replacing the Trident gum involves the identification of an item with similar cues (e.g., blue and white package; and label "Trident") or recalling its original location. Thus, a parallel skill entitled, "Returns the item to the appropriate location" can be designated. Table 5 presents an inventory of browsing in a department store which has been adapted to enable the measurement of parallel skills.

2. __Using a four-point measurement system__

Probably the most popular measurement system used by teachers involves the recording of a plus (+) if the student performs a skill correctly and a minus (-) if he/she does not. Although this may be adequate for some informational needs, it is less so when information about the nature of an error is desired. The denotation of a minus merely indicates that the student did not perform the skill correctly. It does not offer insight as to how the skill was misperformed, and thus, the teacher has little information that can be used to make future intervention decisions. Consider the shortcomings of this system as presented in the following example provided by Livi and Ford (1983):

> As a part of the activity of "making a sandwich," Shawn was to perform the skill, "Obtain a loaf of bread." A minus was recorded on the data sheet indicating that Shawn did not obtain the bread. But it did not indicate whether he:
>
> a) initiated the response by moving toward a location in which the bread would be likely to be found (e.g., cupboard, refrigerator, and breadbox);
>
> b) responded to the relevant natural cues which are specific to that site (e.g., the breadbox is the relevant cue, in that it is the place where the bread is located in the nonschool domestic training site);
>
> c) performed the actions in a topographically acceptable manner by opening the breadbox and grasping the loaf of bread; and
>
> d) performed the actions in a qualitatively acceptable manner by grasping the bread with reasonable pressure, removing the loaf, leaving the other contents inside the box and so forth.

Table 5

An Inventory Which Includes the Parallel Skills to Be Measured Across
All of the Items Examined in the Department Store

1. Enters the department store.

2. Arranges list (picture or written) and calculator (if appropriate) for ready use.

3. Examines item on list.

Parallel Skills	Items			
	Record	Magazine	Hair Accessories	Gum
a. Turns in the direction of unexamined displays in search of item.				
b. Scans and walks past displays that do not have the desired item until within view of the cues associated with the location of the item desired.				
c. Moves purposefully (e.g., fixates on array, turns deliberately) in the direction of the desired item.				
d. Stands in front of the display of items and scans for the specific item desired.				
e. Removes item from display and examines.				
f. Locates price (e.g., points, verbalizes, enters into calculator)				
g. Returns the item to the appropriate location.				

4. Searches for cash register by walking down main aisle in the direction of check-out counters.

5. Scans area, to left and right, and continues search by walking past aisles and areas that are not check-out counters; until within view of "front of store"; service desk

6. Turns in the direction of check-out counters.

7. Locates check-out counters.

8. Stands at the end of line.

9. Moves in line.

10. Places item on counter.

11. Greets - verbally or gesturally - the clerk.

12. Gives clerk money.

13. Receives change.

14. Picks up package.

15. Responds to other verbal cues of clerk.

16. Leaves the department store.

To provide more precise information about an incorrect res-
ponse, a four-point measurement system was developed which included:

a) the initiation of the response;

b) the response to the relevant natural cues;

c) the performance of the actions in a topographically accep-
table manner; and

d) the performance of the actions in a qualitatively accep-
table manner.

Using this four-point system, Shawn's performance on the skill,
"obtains a loaf of bread" might be recorded as:

Conditions	Skills	Initiates	Responds to rele- vant natural cue(s)	Performs in Topo- graphi- cally Acceptable Manner	Performs in Quali- tatively Accep- table Manner
A breadbox located on the counter	Obtains a loaf of bread	+	-	+	-

These data now offer much more precise information about Shawn's
performance. They indicate that he: a) initiated the response
(he opened the cupboard in search of the bread); b) did not
respond to the relevant natural cue (the relevant cue was the
breadbox, not the cupboard; c) performed the actions in a topo-
graphically acceptable manner (upon informing Shawn of the correct
location of the bread, he was able to perform the motions necessary
to remove it from the box); and d) did not perform the actions in
a qualitatively acceptable manner (Shawn exerted so much pressure
on the loaf that several of the pieces could not be placed in
the toaster).

3. Ascertaining the amount of learning that has occurred

One primary objective of instruction in the community for
severely handicapped students should be the acquisition of those
skills that will be important to their current or future func-
tioning. However, the maintenance and generalization of skill
performance are at least as important to the success of a program
as is the actual acquisition. Thus, a critical question that must
be asked is, "When should instruction be terminated in the training
environment so that measures of generalization and maintenance
can be instituted?"

Often, the decision to terminate instruction in the community training environment is based on a time-determined progression. That is, at the start of the semester or the school year, instruction in a particular community environment is scheduled for a preset period of time (e.g., grocery shopping instruction occurs each Tuesday morning for 2 months, at which time it is replaced by restaurant instruction). This scheduling practice is usually done to ensure that each student in the class has a reasonable amount of access to a wide array of environments. While such long term scheduling is important, attempts should be made to build in a certain degree of flexibility. Adjustments in the schedule are often necessary due to the unpredictable performance of students.

Student performance can be characterized by various stages of learning. Liberty, Haring, and Martin (1981) have described four stages of learning: the acquisition stage, the fluency stage, the maintenance stage and the generalization stage. Each of these stages can influence the decisions to terminate instruction in a community environment and to arrange for maintenance and generalization probes.

The <u>acquisition stage of learning</u> is concerned with the skills that are missing from the repertoire of a severely handicapped student. During this stage of learning, emphasis is placed on teaching the student to perform the targeted skills in a topographically correct manner in response to relevant natural cues. Here, little emphasis is placed on time dimensions, such as how long it takes the student to perform the skill or the latency at which a response occurs.

Example: Rachel, age 7, is receiving instruction in street-crossing twice each week on her way from school to the local library and shopping mall. One of the skills targeted in the street-crossing sequence is to push the "walk" button at four lighted intersections encountered during the walk. Rachel has now acquired this skill based on a preset performance criterion. That is, she is able to identify the intersections that have the "walk" buttons and push them without teacher assistance. Although she has learned these actions, it still takes her an inordinate amount of time to scan the environment, locate the button, and push it. Therefore, instruction is planned for the next stage of learning, which is fluency. During that stage, the latency and rate difficulties will be addressed.

The <u>fluency stage of learning</u> is concerned with the time dimensions of performance. Thus, while acquisition of a skill may entail the performance of a topographically correct response to a natural cue (e.g., reaching for the knife during a meal preparation activity), fluency may require that the action be performed within a reasonable time period (e.g., grasping the knife within 7 seconds).

Example: Crystal is a 17-year-old student who is diagnosed as
paraplegic and mentally retarded. She is learning to make a
peanut butter and cracker snack in a domestic training site.
For several weeks, her teacher has used an antecedent training
procedure to teach Crystal to prepare a snack (three crackers
with peanut butter). While she is able to perform many of the
actions necessary to prepare this snack, her rate is very
slow. Originally, the teacher planned to switch from the
"cracker" preparation to "sandwich" preparation at the end of 3
weeks. However, in Crystal's case, a decision was made to con-
tinue instruction to build fluency on the targeted skills.
When Crystal has become more fluent on the targeted skills,
generalization sessions will be held to determine the extent
to which the skills required to prepare a cracker snack transfer
to the sandwich-making activity.

The maintenance stage of learning is concerned with the perfor-
mance of previously acquired, fluent skills across time.

Example: Larry, an 11-year-old severely handicapped student, was
taught to function in a fast food restaurant. When he became
fluent in a select number of targeted skills, instruction was
terminated in that environment. Eight weeks later, Larry
returned to the restaurant in which he had been trained. Data
were collected to ascertain the extent to which the skills pre-
viously acquired were maintained. Greater than 90% of the skills
were maintained. Therefore, no further instruction was provided
at that site. Plans were made, however, to schedule mainten-
ance sessions until that environment ceased to be important to
Larry.

The generalization stage of learning is concerned with the
performance of previously acquired, fluent skills across persons,
places, and materials. Typically, generalization is said to have
occurred when the skills acquired in the training environment are
performed in a similar but novel nontraining environment.

Example: Jeanette is a 12-year-old student who is deaf and blind.
She has been receiving vocational instruction at the state office
building located in Capitol City. She has been working on pre-
paring mailings for the personnel department. Recently, she has
become quite fluent at this task. Consequently, the teacher has
decided to arrange for a generalization session. This arrange-
ment will involve moving Jeanette to a new department in the
building where she will be expected to perform a similar task but
under novel conditions.

IV. SUMMARY

The teaching procedures discussed in this paper are meant to be
representative of some of the options available to a teacher providing
instruction in community environments. The selection of a procedure

or combination of procedures should be based on an individual student's
learning style and rate, as well as on the requirements of the com-
munity environment. Unfortunately, this is not always the case. Proce-
dures are often selected at random, and the resulting instruction is not
nearly as efficient as it could be. Teachers must be aware that there
is a wide range of procedural options available, and that if students
fail to acquire skills in a community environment, the instructional
procedures, not the students, are likely to be at fault. Though non-
school instruction presents challenges not encountered in school-based
programming, a variety of procedures do exist which can be adapted and
applied in community environments.

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