Individualized goals and objectives that reflect the unique needs and abilities of each pupil have been a part of good special education programs since long before they were mandated by PL 94-142, the Education for All Handicapped Children Act, in late 1975. Still, we are only beginning to understand what meaningful individualization actually entails. Far more than simply coming up with a different list of objectives for each child, it involves a delicate balance between the unique needs of the individual and the common demands of the world in which that individual lives. It is the purpose of this chapter to outline at least a few ways in which that balance might be achieved. Since individualized programs must rest on assessments of individual talents and needs, methods for adapting evaluation procedures are also considered.

COMMON DEMAND

While each child is unique, the demands placed upon children by the environments in which they find themselves are not. Workers in a particular job might be expected to work independently for periods of at least 30 minutes. Residents of a group home might have to accept responsibility for dressing themselves, keeping their rooms in order, and helping in the preparation of their food. People everywhere are expected to occupy themselves nonaggressively and nondestructively. Ignoring those expectations reduces the chances that an individual will be allowed to participate freely in the life of her community.

In order to account for the probable demands placed on a pupil, educators try to identify current and future settings for the individual, analyze the basic skill requirements for success in those settings, and develop a general curriculum to teach those skills (White and Haring, 1978). As necessary, the general program is adapted to meet individual abilities and needs (Kelly, Mohesky-Darby et al., 1990). Inappropriate objectives, such as visual discrimination tasks for blind students, are dropped from the curriculum. Objectives are broken down into smaller steps if they appear too complicated for the pupil to master all at once. Other objectives may be expanded if the pupil shows particular talent in a certain area, and still other objectives may be added to account for special circumstances or to deal with challenging behavior. Overall, however, the student's program will only be appropriate if it helps the individual to develop those skills necessary to meet the behavioral demands of his or her community. The degree to which meaningful program individualization can take place will depend heavily upon the manner in which those demands are described.

---

1 Adapted from a chapter originally published by White, O. R. (1980): Adaptive performance objectives: Form versus function. In W. Sailor, B. Wilcox & L. Brown (Eds.), Methods of instruction with severely handicapped students. Baltimore, MD: Paul H. Brooks. An attempt has been made to update the language and examples to better fit the context of special education today. Some of the material remains a little dated, but the basic principles are still applicable.

2 The development of material presented in this chapter was supported in part by grant G00772139 to the Consortium on Adaptive Performance Assessment (CAPE)/American Association for the Education of the Severely/Profoundly handicapped from the Bureau of Education for the Handicapped. U.S. Office of Education.

3 20 years after this chapter was first written, this still seems to be the case.
IDEALLY, the skills required for successful functioning in any given situation would be identified by a careful functional analysis of environmental demands and consequences. That is, careful experiments would be devised to determine which behaviors actually influence "success" in a given environment. The technology for completing such analyses has advanced considerably since this chapter was first written, and functional assessments and analyses are now required by law for developing plans to deal with "challenging behavior" (IDEA, 1997). The same basic technology can also be used to identify the environmental factors effecting any behavior, and for developing plans to ensure that individuals will successfully meet the demands their environment. Still, educators usually turn to an analysis of what seems "typical."

For programs serving older pupils with disabilities, the models of behavior are likely to be actual individuals who have proven successful in the target environment. For example, the behavior of "good" busboys might be observed if food service employment is being considered; "successful" residents in a group home could serve as models if that living arrangement was being considered. With younger pupils, where eventual adult environments are far less certain, the models are more likely to be general in character, like the Piagetian model of normal sensorimotor development, or the behavior of a pupil's typically developing chronological peers. It is assumed that the eventual success of our pupils is a function of the degree to which they can approximate the behavior of "successful" people. That may be true in principle, but in practice, too much attention has been given to the specific form of model behavior.

The "do exactly as successful people do" approach to goal setting overlooks the possibility that there may be more than one way to accomplish same basic end. For example, since people who shop for their own groceries are usually able to count money and make change, it seems reasonable that those skills would be part of an "independent living" curriculum. Imagine, however, working with a trainee who is 20 years old. He can count objects to match numbers up to 20, but has no addition skills and cannot discriminate among different denominations of coins and paper money, let alone group them according to equivalent value. Based upon experience with the trainee, it is concluded that at very best he could be taught to identify one or two denominations of money in the time before he must leave the program. Is it worth it? Many would give up and begin searching for placements where the individual would not be expected to handle money. Brown (1976) felt differently. The true critical function or purpose of counting money is simply to facilitate the purchase of items and services. Perhaps there are ways of accomplishing that end with specific behaviors that differ in form from those most people use. Brown designed a new program that involved only a few basic discriminations and behaviors:

1. Discriminating the difference in appearance between "one-dollar bills" and "other money."
2. Identifying the number to the right of the decimal point in a price tag.

The notion of defining skills or behaviors in terms of their consequences is really quite old (cf., Skinner, 1938). White (1971) gave a name to that process when he talked about defining skills in terms of their critical effects and, later, described the use of critical effect definitions in special education (White & Haring, 1976; White & Liberty, 1976). Brown (1976) expanded the concept and coined the term criterion of ultimate functioning. Finally, the Consortium on Adaptive Performance Evaluation (CAPE), in attempting to devise an adaptive curriculum-referenced assessment instrument for use with persons with severe disabilities, settled on the term critical function (Note 6). Although the specific meaning of each term may be somewhat different, all attempt to focus attention on the definition of behaviors, skills, goals, or objectives in terms of the function or purpose the behavior is supposed to serve, rather than on the specific form of the motor act used to achieve that effect.

Actually, there is some question as to whether Lou Brown or Barbara Service was originally responsible for this analysis of money-handling skills. As I first heard the story from Lou Brown, I'll let the manuscript stand as it is.
Counting objects to match numbers.

Responding appropriately to statements generically representing “one more,” “not enough,” and “too much” when applied in very specific situations.

In order to buy something, the trainee is taught to put those skills together:

1. Go into a store carrying a roll of dollar bills and locate the item to be purchased.
2. Identify the “whole dollar price” (the number to the left of the decimal).
3. Count out the required number of dollar bills from a roll.
4. Take one more dollar bill (to account for any “cents” listed to the right of the decimal on the price tag).
5. Go to the checkout counter, place the dollar bills and the item in front of the clerk, and wait for change.
6. If the clerk responds by saying anything that might be interpreted as “not enough,” as might be the case if taxes or other extra charges are added to the price, the trainee responds by placing another dollar on the counter.
7. Following the transaction, the trainee places the change (if there is any) in one pocket, any dollar bills in another pocket, picks up the item (ideally, with a polite “thank you”), and leaves.

If the trainee wishes to purchase more than one item, the same counting rules are applied to each item and the accumulation of bills is kept in a separate pocket. That may result in a “too much” statement from the clerk, but the trainee can respond just as he would when receiving change. When he begins to run out of dollar bills, the individual goes to a bank, drops the change on the counter and says, “Dollar bills, please.”

Such an approach to training does have limitations. The procedure is dependent upon a printed price (or the ability of the trainee to count bills to match a spoken number). The honesty of the clerk is important (but how often does anyone count their change?); and, unless training is extended to “dimes vs. non-dimes,” the trainee’s use of vending machines might be limited. Still, the trainee could purchase items with a minimum of assistance and without needing to know monetary equivalencies or addition. There is even a bonus — the trainee is actually likely to look less disabled! Rather than laboriously counting out nickels, dimes, and quarters at the counter, he simply strides up, hands the clerk some bills, and patiently awaits his change — very much like anyone else might do. Overall, it would seem a very attractive approach.

By placing emphasis on what he wanted the individual to accomplish, rather than the specific form of the behavior most people employ to accomplish the same thing, Brown was able to identify alternative behaviors that the trainee could master more easily. Actual training still concentrated on the development of specific behaviors, but they differed from what we would typically expect. The only meaningful relationship between those sets of behaviors lies in the fact that they both accomplish the same thing; that is, they allow the person to purchase an item.

“Making a purchase” is a relatively concrete act with an easily identified purpose. Some of the skills a child should learn are more abstract and their general purpose is less obvious. What could be done, for example, to modify a preschool objective like “puts together a three-piece puzzle” for a child who has no use of her arms or legs? What is the critical function she should achieve? There are several possibilities.

The puzzle might serve as one way to “occupy herself constructively” during free-play, as a means of developing some combination of eye-hand coordination or fine motor skills, or as a means
of demonstrating some concept (e.g., space-object relationships). If the value of the puzzle is primarily recreational, alternative forms of entertainment and leisure time activities should be found. If the purpose of the objective is to develop eye-hand coordination or fine motor skills, then training in the use of prosthetic devices should be explored. Most likely, however, the purpose of working with puzzles on a standard assessment is to evaluate concepts like space-object or part-whole relationships. Having the child manipulate the puzzle is only a convenient way of accomplishing that end with most children. The same thing might be accomplished if the teacher rotated each piece of the puzzle in turn and had the pupil nod when the pieces were positioned properly to be put in place. Alternatively, a puzzle with one missing piece could be placed on the table. The teacher could then point to each piece in a random assortment of pieces (only one of which fits) until the child blinks to indicate that the piece that will complete the puzzle has been found. There are many possibilities. Of course, most alternatives for completing the puzzle might be clumsier than the method used with normal children, but at least the alternatives allow some chance for pupil with physical disabilities to develop and demonstrate the same basic concepts.

IDENTIFYING TRUE PURPOSE OF AN INSTRUCTIONAL OBJECTIVE

Clearly, defining objectives in terms of their critical functions can be very useful in deciding which specific forms of behavior should be developed or used in order to achieve a balance between an individual's personal abilities and environmental demands. Before attempting to list the types of critical functions that might be considered, it will help to have some sort of organizational schema. The basic behavioral paradigm seems to suit that purpose well. Any discrete interaction between an individual and the environment can be described as a stimulus, followed by a response, resulting in an effect:

<table>
<thead>
<tr>
<th>STIMULUS</th>
<th>RESPONSE</th>
<th>EFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>The cue(s) that define how and when the individual should behave</td>
<td>Behavior or motor act of the individual</td>
<td>Result, outcome, or consequence of the interaction</td>
</tr>
</tbody>
</table>

As it turns out, most curricular objectives are primarily concerned with part, but not all, of the specific elements in the paradigm shown above. Some objectives will be concerned with the development of a wide range of physical response patterns (e.g., wrist-rotation, arm-flex, head-lifting), but less concerned with the specific stimuli that one might use to generate those responses or the specific effects (consequences) of those movements in any given situation. Other objectives are interested in developing concepts (i.e., differential responding to complex stimuli like printed words), but will accept a wide range of response types for demonstrating those concepts (e.g., vocalizations, pointing, signing, or even staring at the appropriate word when it is read). Finally, other objectives are mainly interested in the outcome or effect of an interaction, and are only secondarily interested in how that outcome might be achieved. For example, if a worker is paid to sort electronic parts, it might not matter whether a pincer grasp is used to pick up the parts or whether the worker slides the parts over the edge of a counter into bins suspended below. Color discrimination, size/shape discrimination, or a match-to-picture process to identify the parts might all be equally acceptable, just as long as the parts get into their proper bins. That is not to say that the form of the behavior used to demonstrate a concept or the concepts employed in achieving a certain critical function are of no importance to a task. Only certain aspects of any interaction are likely to be critical, however, so each of the other elements in the behavioral equation can be adapted to place the individual at his or her best advantage. In the following sections, each element of the paradigm is examined in detail.
Physical Ability

The purely physical abilities of an individual to receive information through the senses and to move various parts of the body define the “forces” that can act upon that person and which the person can bring to bear upon the environment. Any given sensory mode or motor movement might be used to achieve a virtually infinite range of critical functions. For example, sight is useful for guiding a person's movement through space and for such receptive communication skills as reading print, but it can also serve an expressive communication function like staring at objects in response to the question, “What do you want?” Since the range of those potential functions is so broad, it is probably best to simply work with the development of the visual sense per se rather than tie instructional or therapeutic efforts to any single type of interaction. Similarly, one might work to improve the general form of a pincer grasp, a leg extension, or the ability to discriminate low volume sound — all on the assumption that, if those basic physical abilities can be improved, a wide range of critical effects will be more easily achieved. There are three types of physical abilities we need to consider: reflexive behavior, sensory abilities, and voluntary motor behavior.

**Reflexes.** Reflexive behavior is determined by basic neurological development and represents an involuntary relationship between specific environmental stimuli and physical responses:

<table>
<thead>
<tr>
<th>STIMULUS</th>
<th>RESPONSE</th>
<th>EFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific light, sound, physical touch, or combination of stimuli that elicit the response.</td>
<td>Specific reflexive physical behavior elicited by the stimulus.</td>
<td>The effect of the reflex can be varied, but does not influence the probability of the reflex per se.</td>
</tr>
</tbody>
</table>

If we tap a child's knee in a particular way, the patellar reflex should cause the leg to jerk up. This reaction is “built-in” to our neurological systems. We are either born with a reflex or it develops (and later, perhaps, fades) as a result of physical maturation. The absence of certain reflexes may indicate neurological damage, and reflexes may either help or hinder other development, or even both, depending upon when they emerge and fade. For example, the tonic neck reflex (the tendency of one arm to extend and the other to flex when the head is turned to one side) is presumed to help an infant develop asymmetrical movement. If the tonic neck reflex does not eventually fade, however, it will inhibit the development of voluntary arm movements. Short of surgery, it is generally not possible to develop a “true reflex” where it does not exist, nor to artificially eliminate one that does exist. Still, there are reasons for the educator to be concerned with them.

First, knowledge of an individual's reflexive behavior may influence the selection of instructional targets. For example, a child who still has a tonic neck reflex will need special considerations in programs involving head and arm movements. Second, although it may not be possible to change a basic reflex, special programs might still be successful in training a person to inhibit or augment them. If an infant does not display the grasp reflex, for example, extra attention will be required to generate a voluntary grasp later in the child's development.

With a little instruction and guidance, teachers or parents can directly assess some reflexes. However, a complete examination and list of program implications will usually require a qualified physician, occupational therapist, or physical therapist.

**Sensory Abilities.** Educational programs should generally emphasize the use of an individual's preferred sensory modality and avoid a heavy reliance on weak modalities (White & Haring, 1976). For example, if a child has a visual deficit but normal hearing, supplementary auditory cues might be used when presenting new or complex learning material. Of course, we...
should also try to improve the usefulness of an individual’s weaker senses wherever possible, either by training or prosthetic devices.

The evaluation of sensory abilities is concerned primarily with the stimulus component of the behavioral paradigm. Virtually any response might be used to indicate a reaction to the stimulus, and any special consequence that is effective in maintaining the individual’s interest in the assessment or program could be acceptable:

<table>
<thead>
<tr>
<th>STIMULUS</th>
<th>RESPONSE</th>
<th>EFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selected light or sound.</td>
<td>Any behavior that can be used to indicate that the individual hears or sees the stimulus.</td>
<td>Any consequence that maintains the individual’s work with the task.</td>
</tr>
</tbody>
</table>

Simply noting whether an individual is “startled” or reacts in any consistent way to high intensity light or sound may be sufficient for preliminary visual or auditory screening. Complete examinations can be more difficult. Traditional methods for testing sight and hearing rely upon the subject to indicate (usually verbally or by pressing some button) when something can be seen or heard. It is assumed that the individual will want to respond appropriately. Individuals with severe disabilities may fail to respond in such situations because they lack the actual motor behavior requested, because they have not learned to respond to the directions provided, or simply because there is insufficient reinforcement for their actions. It may be necessary, therefore, to use other behaviors for testing—pointing, standing up, or even staring right or left — and train the person to engage in that behavior in response to at least some sound or light in order to earn a desired consequence. Training can then be extended to lights and sounds of varying intensity or frequencies to determine the individual’s sensory limits (c.f., Woolcock and Alferink, 1982).

With a little ingenuity and a lot of patience, individuals may demonstrate surprising abilities. For example, Stolz and Wolf (1969) actually trained a moderately retarded person who had been formally diagnosed as organically blind to discriminate a wide range of visual stimuli; Decker and Wilson (1977) were able to conduct meaningful auditory evaluations with 19 of 28 profoundly retarded children and adults previously thought to be “untestable;” and Fulton and Spradlin (1971) were able to ascertain the auditory thresholds of 5 out of 6 severely retarded children.

**Body Movements.** It’s possible for a child with very limited muscle and joint movement to accomplish many things, but a child with normal movement is generally far more effective and efficient. Therefore, regardless of the availability of prosthetic devices and adaptive procedures, some attempt should be made to expand and refine the range and quality of a child’s gross and fine motor behavior. Many of the tasks traditionally used to assess or encourage such development also involve the use of some discrimination or concept (e.g. “putting puzzles together” or “building three-block bridges”). That’s fine, if they work. If the individual appears to perform poorly with those tasks, however, then we should remember that the only critical component of the instructional paradigm when developing motor behavior is the response. Virtually any cues or consequence that can be used to evoke and encourage the response should be acceptable:

<table>
<thead>
<tr>
<th>STIMULUS</th>
<th>RESPONSE</th>
<th>EFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any cue that prompts or guides the individual to independently emit the desired physical response.</td>
<td>The specific motor act of concern.</td>
<td>Any consequence that will maintain the individual’s performance.</td>
</tr>
</tbody>
</table>
When developing the physical behavior of a student, a teacher should use whatever cognitive skills the individual already has (e.g., the concept of “imitation” following the command, “Do as I do…”) and try to arrange situations that are naturally reinforcing or highly motivating. In one case, for example, Mike Day (1976) was having no success in getting a child to hold an object when the usual request to do so was used. The child dropped objects placed in her hand. It wasn’t clear whether the child lacked the physical ability to hold the object, didn’t understand what was expected, or simply did not want to cooperate. To find out, Mike placed the child on a tricycle and gently pushed her forward. The child quickly grasped the handled bars to support herself. Now Mike knew that the child had the basic motor skills necessary for grasping an object, and simply needed further encouragement or instruction to follow the command “hold.”

Once an individual’s basic reflexes, senses, and gross/fine motor behavior have been assessed, programmatic concerns should be listed. Whenever possible, the following should be noted:

1. Sensory modalities (hearing, sight) that are of no functional use and should be avoided when designing instructional programs.
2. Sensory modalities that are weak but that might be enhanced with the use of prosthetic devices (e.g., hearing aids) and should be targeted for development.
3. Sensory modalities that are preferred (i.e., strongest, even if still weak) and should be used whenever possible for the presentation of new or complex learning material.
4. Motor skills that cannot or should not be developed now, because of a total lack of physical attribute (e.g., arms), the presence of inhibiting reflexes (e.g., the tonic neck reflex) or the lack of prerequisite skills (e.g., the head balance needed for walking), and the conditions under which those skills might be developed later (e.g., after the tonic neck reflex fades).
5. Motor skills over which the individual has reasonable control and that might be most useful in building and demonstrating other skills. For example, if the child has little other than good eye control, “staring” and “looking-at” behaviors might be used to indicate the solutions to discrimination problems.
6. Special health conditions that should be considered when working with the child, like seizure patterns, medication, or special handling needs for a child with abnormal muscle tone.

Putting all of that information together, appropriate goals and objectives can be developed for the individual’s physical development. The highest priority should be given to the development of at least one or two “tool movements” — behaviors that the individual can control with some certainty and use reliably to interact with the world (White and Haring, 1976). It is hoped that those tools will include such things as the formation of discrete vocalizations and fine motor movements, but even if they amount to little more than eye movements or gross pointing responses, each individual must have some behavior with which to influence his or her environment. After a few intact tool movements are identified or developed, attention can be turned to the improvement of other gross or fine motor behaviors that show some promise for development, would expand the range of “tools” available to the individual, or would allow the individual to appear more normal.

Conceptual Skills

Cognitive or conceptual skills represent the nonphysical tools that an individual may use to interact with her environment. Like the purely physical skills discussed above, any given concept may be useful in accomplishing a wide variety of critical functions. Being able to respond differentially to the color green, for example, might be useful for deciding when to cross a street, finding the appropriate wire in the assembly of an electronic device, or knowing what to expect when
someone says, “I’ll be by in a green car at 10 to pick you up.” Since a concept may be useful in accomplishing a wide variety of outcomes, the specific form or type of motor behavior and consequence used to develop the concept are more a matter of convenience than anything else.

<table>
<thead>
<tr>
<th>STIMULUS</th>
<th>RESPONSE</th>
<th>EFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>The cue(s) that represent the conceptual problem to be solved.</td>
<td>Any behavior that can be used to indicate the solution to the problem.</td>
<td>Any consequence that will encourage the individual to work.</td>
</tr>
</tbody>
</table>

It should be possible for an individual to respond differentially to complex environmental situations, solve problems, and direct his or her own behavior or the behavior of others by controlling only one differential motor act. True, it may be easier to assess problem-solving ability if a child can also move normally, but there are usually many alternatives. Mindy, for example, could only control her eyes. After 7 years of intensive physical therapy, she still could not reliably control any other part of her body. Using eye movements as her tools, however, she was able to communicate to Jean Kelly, her teacher, by staring at objects on a board — first pictures, and then words and letters (Kelly, 1977). After only 6 months of work (with no previous “academic” instruction), she was able to read at the first-grade level. Jean would position the book in front of Mindy. If Mindy had difficulty with a word, she would blink her eyes to guide Jean to the problem. To indicate when she was finished with a page, Mindy would close her eyes. After a story, she would spell out the answers to comprehension questions by staring at words and letters on her communication board. In short, it is not necessary to wait for a child to move normally before attempting to develop complex concepts and cognitive behavior. If normal movements are available, fine. If not, the teacher should work with any movement that the individual can control with some certainty.

Similarly, if it helps to make a “game” out of some instructional task, or if earning points, food, or trinkets while developing a concept maintains the child’s interest, those tactics certainly do not detract from the meaningful expression of a concept. Once the concept is established, control of the program can be faded to more natural cues and consequences.

There are two basic guidelines for setting concept development goals:

1. Eliminate any mention of specific motor acts in the goal statement whenever possible.

   As mentioned earlier, physically manipulating the pieces of a three-piece puzzle is only one way of indicating and understanding of space-object relationships. Similarly, a child with no arms or legs should not be required to recover a hidden object to demonstrate object permanence. Any means of indicating the location of a hidden object should be acceptable, such as staring at its location in response to the question, “Where is….” The goal, therefore, might be stated as “demonstrates object permanence with an object first shown to the child, then hidden under a blanket.” The method of indicating the location of the object (e.g., point, stating where it is, or simply staring at the location of the object) would be mentioned in the instructional or assessment protocol, but not be considered an integral part of the goal per se. Use common or normal movements for the demonstration of a concept whenever possible, but do not hesitate to deviate from them if it will increase the chances of the individual’s success.

2. Define the materials or stimuli required for the demonstration of the concept in the broadest terms possible.

   In an attempt to provide useful guidelines for people in the assessment of certain concepts, educators often become very specific in their description of materials. It is common, for example, to suggest that covering a child’s favorite toy with a cloth and seeing if he or she will recover it can be a good assessment of object permanence. Such suggestions can be helpful, but they sometimes unnecessarily limit the imagination of the teacher or tester. Almost any object of interest to the child
should be acceptable. In one case, a tester capitalized on a child’s fascination with his beard by covering himself with a blanket. It worked. The child reached out immediately and uncovered the tester’s face (Hogan, Siebert et al., 1977). Some care must be taken, however, to ensure that the basic difficulty of the concept being tested is not altered by changes in materials or stimuli. It might very well be easier to locate a large, breathing human being under a blanket than to find a small, motionless ball under a towel.

If it is necessary to use an adaptation that changes the level of difficulty of a concept, an increase in difficulty is generally more acceptable than a decrease in difficulty. For example, hiding an object by covering it with a towel would be meaningless for a blind child. The child might feel the object through the towel, but even if the object were recovered, it might only reflect simple curiosity, not that he or she actually knew that it was the same object recently felt without the towel. Alternatively, a ringing bell could be moved around the child and silenced at a particular point to see if the child could find it. Since auditory localization is generally more difficult than visual localization, it might take longer for the child to learn the skill. When the child did, however, the teacher could be reasonably confident that the pupil had demonstrated object permanence at a level of complexity at least equal to that expected of a “normal” child.

Whenever possible, the selection of concepts for assessment and instruction should be based upon an analysis of potential future placements. If most tasks in a workshop can be structured in a left-to-right sequence to use a match-to-sample procedure, then certainly those basic concepts should be included as part of the curriculum. Similarly, if an individual will have to interact with customers in a cafeteria, then at least some basic concepts in social behavior should be considered. If the pupil is too young to be considering definite future placements, general concepts might be identified by analyzing available developmental sequence charts, norm-referenced instruments, and/or the behavior of typically developing peers. Care must be taken, of course, to abstract the basic concepts implied by the items on those scales or behaviors, and to restate them in broader, adaptable terms. One might still suggest the use of standard procedures as one means of determining whether a child has a concept, but it should be made clear that alternative procedures and criteria might serve equally well.

After an individual's conceptual skills have been assessed, at least the following should be noted for use in program planning.

1. Concepts that the child has demonstrated using “standard” procedures (e.g., demonstrating space-object relationships with the usual three-piece puzzle). Since standard assessment procedures were employed, it will be easier to use the results of those assessments for any comparative analyses one might want to perform, like deciding whether the skill emerged at the age when it would be most commonly expected and whether the skills seem to be emerging in the same sequence expected with most children.

2. Concepts that the child has demonstrated using “adapted” procedures, like demonstrating space-object relationships with a head nod when the teacher points to the piece that will fit a puzzle. If care has been taken to maintain at least the same level of difficulty with the adapted procedures, one can be sure that the individual does have the concept involved and that the concept can be used in the development of other skills. However, since the adapted procedures may not be of equivalent difficulty, results of those assessments should not be used for comparisons with “normal” developmental expectancies.

3. Concepts that the individual failed to demonstrate, but that may simply be delayed due to basic physical limitations, as would be the case if a blind child failed to find a silenced bell to demonstrate object permanence. Attempts to retest those concepts should be postponed until the requisite physical behaviors or alternatives have been developed. For example, the teacher would first train the individual to find ringing bells, thereby demonstrating auditory
localization skills. Then the individual would be directed to find a silenced bell to demonstrate object permanence.

(4) Physical skills and sensory modes that were found most useful as “tool” behaviors for the adapted demonstration of concepts. For example, “staring at objects” might be listed if the individual was able to use that skill to indicate which blocks in a row were blue and which were red. That list of skills may prove useful in deciding how to arrange new adaptations for the instruction or assessment of other concepts.

The information is then analyzed to determine what concepts remain to be developed, and how they might be developed or assessed more successfully in the future.

**Critical Effects**

Although it is important to develop an individual’s physical and cognitive tool behaviors, it is equally important to remember that they are just *tools*. At some point the teacher must consider how those tools will be blended and orchestrated to accomplish significant outcomes. That leads to the consideration of skills where the *effect* of an interaction is of primary concern. The specific nature of the concepts or physical behaviors that the individual will use to accomplish the critical effect might be important, but virtually anything that works should be acceptable.

<table>
<thead>
<tr>
<th>STIMULUS</th>
<th>RESPONSE</th>
<th>EFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certain types of cues or materials may be preferred, but virtually any discriminative stimulus that works will be acceptable.</td>
<td>Some forms of behavior may be preferred, but virtually any response that works will be acceptable.</td>
<td>The result or outcome of the interaction is of primary concern.</td>
</tr>
</tbody>
</table>

Many desirable critical effects will be obvious. If, for example, an individual being trained to use a computer keyboard, the teacher must find that combination of physical skills and concepts that will enable the trainee to accomplish that task. A normal person might use his figures to type the keys in the usual fashion, and check his work by reading the characters appearing on a monitor. If necessary, however, a person with limited physical abilities and impaired vision could use a special switch and morse-code to enter the characters, and listen to a “computerized voice” to check his work. In either event, it is fairly obvious what the trainee must accomplish — the accurate encoding of information into a computer file.

In other cases the critical function of a skill will be somewhat obscured. “Independent walking,” for example, is a common goal in many curricula for individuals with disabilities. At first glance, it would seem like a physical tool behavior. Most tool behaviors, however, have a virtually infinite range of purposes. Wrist rotation allows a child to eat soup with a standard spoon, write with a pencil, turn a piece to fit into a puzzle, and use standard sign language. Walking, on the other hand, actually represents a complex combination of tool physical behaviors, including balance and flexion/extension of the legs, that has a relatively narrow range of purposes — the transportation of an individual from one place to another. If an individual does not have the tool behaviors that enable normal walking, alternative ways of accomplishing the same critical effect should be considered (e.g., crutches, wheelchairs, scooter boards, or even controlled body-rolling). Of course, not all methods of accomplishing something will be equally desirable. There are several factors to consider.

**Efficiency and effectiveness.** It is most important that the individual accomplish the critical effect *somehow*, even if the method used is highly unusual. Once the critical effect can be achieved, more emphasis can be placed on the development of those concepts and motor behaviors
that will increase the individual's efficiency. If the individual has all requisite tool behaviors and concepts, the most efficient method is frequently the “normal” method, but there are many examples where a simple task analysis of a skill has led to the elimination of redundant or inefficient steps (c.f., White, 1968; Crosson, Youngberg et al., 1974). Efficiency might also be increased through the use of special cues, artificial limbs, or mechanical devices, but care must be taken in the selection of prosthetic aids so as not to limit the application of the skill or to make the individual any more dependent upon those aids than is absolutely necessary.

**Range of Application.** Having targeted a general critical effect as an instructional target, like “locomotion,” the teacher should try to identify the various situations in which that critical function might be important. Adaptations useful in some situations may fail utterly in others. The basic motions involved in walking over level ground, for example, are readily adapted by the normal individual for locomotion over rough ground, up and down ramps or stairs, and up or down ladders. The use of a wheelchair may help an orthopedically impaired individual over level ground and ramps, but crutches or braces would be necessary for most stairs and rough ground, and the strong application of the individual's arms would be necessary to overcome ladders unless some very special prosthetic devices were developed. Finally, the variables of distance and time might be important. Over what distances might it be important to move? How rapidly? A motorized wheelchair might be almost as fast as a normal individual's walking gait, but would the battery carry the individual as far as a lighter manual wheelchair? There is no “best” answer. The particular needs of the individual must be considered, but as with basic efficiency, the behavior that most closely approximates that of normal individuals is also likely to prove the most generalizable.

**External dependencies.** Teachers should always strive to make an individual as independent as possible. The best possible adaptation is one that involves neither another person nor a special device. If that is impossible, or for some reason inadvisable, the use of prosthetic devices or procedures that the individual can obtain, arrange, and use without help from another person should be considered first. The individual might, for example, pick up one piece of silverware, place it in a bin, then find all similar utensils with a match-to-sample procedure before selecting another type of utensil. In that way, she would be providing her own adaptive stimulus. Failing that, perhaps a teacher could place one example of each piece in the sorting bins, then leave the trainee alone to complete the task. Similarly, if a wheelchair must be used, it is best if the individual can get into it, move it, and get out of it independently. If an individual needs help getting in and out, but can move the chair independently, that would still have considerable utility for the individual. Least desirable is an adaptation that requires the continued attention of someone else.

In some cases the need for continued interaction with another person is unavoidable. Successful expressive communication, for example, depends on the continued participation of another person with the appropriate receptive communication skills. An English speaking child needs to talk

---

6 Actually, there are often many ways in which the “typical” method for doing something can be improved. White, O. (1968). The analysis and programming of vocational behavior. Eugene, OR, Rehabilitation Research and Training Center in Mental Retardation, University of Oregon. found it necessary to restructure an assembly line task in a bakery to allow a person with severe disabilities to be successful. The restructured task turned out to be more efficient for the regular workers, as well.

Often the “typical” way of doing things was developed under conditions that no longer apply. For example, the “QWERTY” keyboard found on almost all typewriters and computers was developed in an era when typing too fast would jam the keys, and the keyboard needed to be designed to slow people. When jammed keys were no longer a problem, a fellow at the University of Washington named Devorak redesigned the keyboard layout to improve typing speed. Since so many people were already reasonably fluent on the “QWERTY” keyboard, however, the more efficient keyboard never became popular. The lesson is simple — don’t assume that the “typical” way of doing things is necessarily the best. Adaptations might benefit everyone, not just people with disabilities.
to an English-speaking listener. Short of teaching one person or the other another language, little can be done about that restriction. However, some adaptations impose additional restrictions on the range of people with appropriate reciprocal skills. If a nonverbal child is taught to sign, he or she will only be able to use that skill with other signing people. That might be an acceptable level of dependence, in view of the alternatives, but the teacher should be aware that the dependence exists and try to minimize its impact whenever possible. For example, the teacher might make sure that a deaf child can also communicate at least essential needs with pictures, written words, or common gestures that might be more universally understood.

Other development. Certain adaptations, while providing immediate benefit of some sort, may have detrimental effects on the development of other skills. O’Brien, Azrin, and Bugle (1972) found that they had no success in teaching a group of individuals with severe disabilities to walk until they were prohibited from crawling. Crawling, while initially an appropriate method of locomotion, had simply become so efficient that they saw no reason to walk. In the same way, a child taught to dress himself or herself with specially designed clothes may lag in the development of more generalizable skills; and the physically impaired person who is given a “swivel-spoon” has little reason to develop the wrist control necessary for using standard eating utensils. Certainly there is a place for crawling, special clothes, and swivel spoons, but care must be taken to balance their immediate usefulness with long term goals.

Appearance. The importance of appearance cannot be overestimated. Even if an individual cannot function normally, if he or she appears normal, there is likely to be less adverse reaction to his or her behavior. One of the best features of the approach discussed earlier for “purchasing an item” was that the individual appeared far more normal than if the exact change were laboriously counted, one coin at a time, or if the trainee continuously asked people to rummage through his or her money. Whenever possible, teachers should try to devise adaptations that are unobtrusive and normal in appearance, especially when the individual will be placed in an inclusive setting (White, 1994).

It will be difficult or impossible in many situations to find the ideal adaptation that balances all of the concerns listed above. The relative importance of each concern in most situations is reflected by its order in that list, but there are several factors that may alter those priorities:

The immediate usefulness of the skill. If a skill will be of immediate usefulness to an individual, then emphasis should probably be placed on the development of that skill in the most efficient and effective manner possible, even if other factors (i.e. adaptability, dependency, other development, and appearance) are adversely affected. For example, if an individual has an opportunity to gain paid employment contingent upon the ability to accomplish some particular task, then any prosthetic devices or other adaptations that can be developed to help that individual accomplish that task should be considered. Similarly, if the parents of a young child complain that they cannot wait long enough for their child to dress independently in the morning, it would be highly

---

7 There were other reasons O’Brien’s trainees didn’t walk. As it turns out, two of the main advantages to walking are being able to see more things than when crawling, and being able to carry things at the same time. O’Brien’s trainees lived in an environment where the windows were too high to look out, even if standing; and there was nothing in the room the trainees might want to carry. Changing those features of the environment turned out to be a strong inducement for walking. O’Brien’s study is an excellent example of a functional analysis of the critical effects different behaviors can achieve.

8 My mentor, Eric Haughton, once befriended a young man with cerebral palsy. He could walk with braces and crutches, but very slowly. Eric thought that he might learn to walk without the crutches, but he didn’t want to try. One weekend, when the boy was staying at Eric’s cabin, he called his mother in tears. “Eric hid my crutches,” the boy wailed. That weekend he leaned to walk without crutches. I’m sorry that I’ve forgotten the boy’s name, but I met him once when he was on his way to college (Harvard), and he was walking quite well.
desirable to investigate the use of special clothing or prosthetic devices that will speed up the self-dressing process so the child continues to develop some independence (White, 1985; White, 1985; White, 1985; White, 1985). Work should, of course, also continue to develop more generalizable skills.

**Time available.** If many years remain to work with an individual before he or she must leave the current program, emphasis should be placed on developing the most widely applicable and adaptable skills possible. For example, the development of fine motor skills should be given priority, rather than the exclusive use of prosthetic devices. As an individual nears the time for transfer to an adult environment, emphasis should be placed on the identification of those critical functions that will be most important for success in that setting.

**Consistency of demands.** The relative importance of efficiency and generalizability / adaptability will depend on the consistency of the demands that will be placed on an individual. If an individual is likely to be employed to perform the same basic task for a period of several months or years, the use of prosthetic cues or devices to facilitate that task is not likely to pose a major problem. If the nature of the task is likely to change quite frequently, it may not always be possible or economically feasible to prepare new prosthetic devices or cues continually for each task. If an individual will almost always use one particular vending machine, for example, training specific to that machine might be fine. If many different machines will be used, however, “general case” training might be necessary (Sprague and Horner, 1984).

**The availability or portability of devices or persons required by external dependencies.** External dependencies in the demonstration of a skill might be acceptable in some situations, but not others. For example, in an inclusive classroom where one teacher and one aide must divide their attention among many children, a dependency on special prosthetic devices might be acceptable, but a dependency on the continued attention of another person could pose serious problems. Similarly, prone-boards, vision enhancement devices like large-screen monitors, and special computer systems for expressive communication might be accommodated easily in a classroom, but such devices are not usually available on a street corner or at most job sites. If interaction with the nondisabled world is a high priority, then programs to reduce dependencies on “nonportable” prosthetics or people should also be a priority.

**ANALYZING EXISTING CURRICULA**

As mentioned earlier, an attempt should be made to define potential future environments for each pupil or group of pupils, to analyze the environmental demands of those situations, and then to develop a general curriculum to teach the skills that will meet those demands. Rather than concentrate on the specific behaviors that “successful models” in demonstrate the teacher should isolate the critical functions that those models are accomplishing. Programs can then be individualized in a rational manner.

The development of such a curriculum is far from easy. In many cases the teacher will not know exactly what environments an individual might encounter. Also, most curricula are arranged according to some general hierarchy that describes the sequence in which skills typically develop. If a skill is radically adapted at one point in the hierarchy, however, it might have an effect on the development of subsequent skills. A child must have head control before learning how to walk, but is head control necessary for locomotion in a motorized wheelchair? If a child is allowed to move about in a motorized wheelchair, how will that effect related objectives like the development of crawling skills or the use of braces? What effect will that have on objectives with completely different critical functions, like social skills? These and other questions must be addressed. The following may serve as guidelines:
Identify specific needs whenever possible. If specific environments of concern to the learner are known, every attempt should be made to identify the general skills that will facilitate success in those settings. If that is not possible, the teacher should begin by analyzing whatever curriculum guides or assessment devices have been used in the past. Presumably, the skills listed in those materials are representative of the skills that will be required in most situations.

Identify the critical elements in each skill. Try to decide whether the purpose of the task, curricular item, or assessment item is to demonstrate some concept (e.g., “space-object relationships”), to attain some sensorimotor tool skill (e.g., “head control”), or to achieve some important critical effect (e.g., “obtain an object” through whatever means).

Rewrite each skill description to reflect important elements. If the time and resources are available to rewrite each item in the general curriculum, then that should be done. The descriptions should be translated into statements that emphasize the critical elements of the skill to be developed. For example, “picks up raisin” might be translated into “demonstrates pincer grasp.” If time is not available to rewrite the descriptions, at least a little code might be used to indicate which elements of the skill are believed to be critical. For example, a little c, m, s, or e could be placed next to each item to indicate whether the objective of the skill is to demonstrate a concept, motor skill, sensory ability, or simply to achieve some critical effect. Those codes will then provide people with at least a general idea of the elements in the skill that might be adapted and those that should remain standard.

Describe at least a few ways in which the skill might be demonstrated. Ideally, describe how a “normal” individual would usually demonstrate the skill and one or more “standard adaptations” that might be used for children with common disabilities. For example, describe how object permanence might be tested with a normal child by covering an object with a towel, then how a bell might be used with a child who is blind. If some procedures for development or assessment of the skill are preferred, be sure to indicate those preferences. It might, for example, be better for a child to demonstrate certain expressive communication skills orally than with sign if both behaviors are equally possible.

Indicate the basic parameters that should be considered when developing “nonstandard adaptations.” Try to identify those stimuli or response dimensions that will make a concept more or less difficult, increase or decrease the efficiency of a motor response, or make a skill for obtaining a critical effect more or less generalizable or adaptable. For example, when describing an object-permanence objective, it should be noted that finding an object through auditory localization would be more difficult than finding an object through visual localization. Similarly, if the size of an object used in demonstrating a pincer grasp makes a difference, that should be explained; and if an individual will be able to work on a wider range of assembly tasks if he or she uses size/shape discriminations instead of color discriminations, those differences in preference should be described.

Develop a systematic way for people to record the results of adaptive assessments or program planning. A form developed by the Consortium on Adaptive Performance Evaluation (CAPE) provides an example of a form that might be useful (see Figure 1).

---

9 Some instruments are already available with “critical element” codes for each skill. One such instrument, the Uniform Performance Assessment System (UPAS, birth to 6-year scale) was developed at the Experimental Education Unit, Center for Human Development and Disabilities, Box 357925, University of Washington, Seattle, WA 98195. That instrument has since been updated by Kathleen Liberty of Christ Church, New Zealand (k.liberty@educ.canterbury.ac.nz).

**CAPE Adaptive Assessment Recording Form**

<table>
<thead>
<tr>
<th>Scale: RECEPTIVE COMMUNICATION</th>
<th>Assessment Data</th>
<th>Standard Results (x, C, P)</th>
<th>Adaptive Results (x, C, P)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. [S] respond to sound</td>
<td></td>
<td>S</td>
<td>R</td>
<td>P</td>
</tr>
<tr>
<td>2. [E] look toward verbalization</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. turn to sound:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[S] (a) to right</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[S] (b) to left</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. [C] respond to name</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. [E] respond to word/gesture</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. [E] respond to “come here”</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. [E] respond to “look here”</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. [C] respond to names of toys, clothes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(etc.)

**Item Focus Key:** [S] = sensory; [M] = motor; [C] = concept; [E] = effect

---

**Item listings.** Space is provided on the left-hand side of the form to list the items or objectives being assessed. Only key words are usually put in that space (e.g., “head control”). A much more detailed description of the desired skill is provided elsewhere. A key to the “focus” of each item (i.e., sensory, motor, concept, or effect) is also provided.

**Assessment data.** Next to the item listing, space is provided to record the individual’s performance on several assessment trials. The teacher might, for example, ask a child to sort 10 blocks according to size. The success of each trial would be recorded in the boxes provided.

**Standard results.** Unless it is quite apparent that an individual cannot perform a skill using “standard procedures,” some attempt to assess “normal behavior” should be made. The results of that assessment are recorded in the two columns labeled “standard.” One column, labeled “assess,” is reserved for indicating whether the individual met the criteria for success in a formal assessment situation — a time when a trained person carefully arranged a special situation and directly observed whether the individual responded appropriately. The other column, labeled “report,” is reserved for recording whether the individual has ever been observed, however casually, to demonstrate what appeared to be the skill in question. Perhaps, for example, the parents of a child say that they have seen their child rotate a doorknob without moving his arm, or the child’s teacher has noted that the child is able to eat soup with a regular spoon without spilling — implying that he must have wrist rotation. An apparent discrepancy between the results of formal assessment and reported observations will be very useful information for program planning. For example, the child who does not pick up an object when told to do so, but who has been seen to pick up objects on his own, probably only needs continued instruction in the meaning of the request, “pick up,” or needs to be motivated to apply the skill when requested to do so, rather than instruction in the physical skill per se. If the cues or prompts used to evoke the individual’s responses are important for determining how useful the skill is likely to be, then a special coding system can be devised to record the type of cues used. For example, CAPE allows the tester to code four different conditions: (+) if the individual displayed the skill without any form of artificial cues whatsoever; (c) if extra verbal or gestural cues were necessary in order to evoke the response; (p) if it was necessary to physically prompt the

---

*evaluating the progress of severely/profoundly handicapped children functioning between birth and 2 years.* A field-initiated research proposal, submitted to the Bureau of Education for the Handicapped, grant number G00772139, 1977. The work of CAPE has been extended by Diane Bricker, of the University of Oregon, and Dale Gentry, of the University of Idaho.
individual; and (-) if the individual failed to display the appropriate response under any circumstances. If one or more of those cues is unacceptable, the code for that type of assistance is removed from the list of acceptable codes provided on the form.

Adaptations. If the individual fails to reach criterion on the nonadapted standard task, adaptations should be attempted. Again, space is provided for recording the results of both a formal assessment of the skill and the observations of people who are familiar with the child. If a standard adaptation is employed, then a number is recorded that corresponds with the number of the adaptation on a list of possible adaptations provided elsewhere.

If a nonstandard adaptation is employed, like having a child stare up to indicate “yes” and down to indicate “no” as an expressive communication skill, then the implications of that adaptation are noted by checking one or more of the boxes provided to the right of the results section. The adapted element of the interaction is indicated by checking either (r) for response (e.g., staring up or down instead of saying yes or no) or (s) for stimulus (e.g., using sign language to make a request of the child instead of verbalizing instructions in a receptive communication task). The tester then notes whether the adaptation increased the individual's dependency on a person or object. For example, the up and down eye movements for “yes” and “no” require a person who knows what the code means, so (p) would be checked in the “external dependency” column. If a special body brace were used to maintain correct posture while walking, the (o) for “object” would be checked. If certain types of adaptations are unacceptable, then the boxes that correspond to those adaptations are deleted from the form. When testing for a purely physical response, adaptations in the nature of the response would be unacceptable, so the (r) box would be deleted from the form. Similarly, if dependency on a person were not acceptable for some type of interaction, the (p) would be removed from the “external dependency” column on the form.

Next, the overall utility of the adapted skill is noted. If the adapted skill will be as useful as the unadapted skill in most situations, (s) for “same” checked. For example, the usefulness of a color discrimination is not reduced just because the child had to nod his head to indicate that he could find the green blocks. If the adapted skill is less useful than the nonadapted skill, (l) for “less” is checked. For example, the skill of picking up a small object with a prosthetic limb is likely to be less adaptable than the use of a pincer grasp. If the implications of the adaptation are simply not known, as might be the case when trying to decide whether finding a man under a blanket is really the same as the locating of a small object under a towel for the demonstration of object permanence, the (?) is checked. Finally, space is provided for a few key comments that might help in interpreting the results.

By scanning down the assessment form, it should be possible to tell at a glance which skills remain to be developed, which skill elements (stimulus or response) are most likely to require adaptations when those skills are developed, and which adapted skills may require additional attention. By looking at just the results of the “standard” (unadapted) assessments, the teacher can determine the degree to which the individual appears to be behaving “normally.” By taking the best of the assessments — whether standard or adapted — the teacher can determine the degree to which the individual is able to accomplish the same things as other people, even if the individual does so in an abnormal way. Those comparisons will help to place the individual's development in a meaningful perspective.

There is one additional advantage to coding adaptive vs. nonadaptive testing results. Normally, an individual can only show progress by “passing” more items on an assessment. With adaptive assessments, it is possible that a person demonstrate progress in the nature of the critical functions achieved (i.e., the number of adapted or nonadapted items passed), and progress in “becoming more typical” (i.e., moving from passing an item with adaptations to passing the same
item without adaptations). Adaptive assessments are not only more sensitive to a person’s basic abilities, but to refinements in the expression of those abilities as well.

IN CONCLUSION

A great deal remains to be learned about the concepts and procedures involved in adaptive goal setting, assessment, and instruction, but there seem to be no lack of places to begin. Even if the teacher starts with only a single skill and approaches it from the perspective of “critical function” instead of “usual form,” the benefits to the individual may be great. The teacher begins by asking why? Why should an individual learn this skill? What will the pupil accomplish with it? If the pupil cannot accomplish that end by using the tools a normal individual might use, what are the alternatives? The answers to such questions can be crucial in the development of individualized programs that truly help people with disabilities meet the environmental demands of the world in which they live.

REFERENCES


EAHCA (1975) Education for All Handicapped Children Act, PL 94-142


IDEA (1997) Individuals with Disabilities Education Act Amendments of 1997, PL 105-17


White, O. (1968). The analysis and programming of vocational behavior. Eugene, OR, Rehabilitation Research and Training Center in Mental Retardation, University of Oregon.


