

Mastery criteria for objectives

In school, we learn various specific information, but we often forget many things for various reasons. The focus should be on developing the ability to learn, access resources, and understand the connection between what is learned and the natural environment. The goal of education should be to equip students with skills that enable them to continue learning and understand how to educate themselves further.

The term "curriculum" is etymologically linked to the Latin word "currere," meaning to run. Education can often feel rushed, and there is a need to build a learning environment that genuinely accelerates learning. The curriculum can be seen as a product with subjects ranging from simple to complex or as a process that considers the child's strengths and weaknesses, adapting to their experiences.

As behavior analysts, the curriculum is viewed not only as a manual but also as a process and a practical thing that needs to be functional and logical for the child. An example is teaching prepositions and considering how to adapt it in the teaching process and whether it is relevant to the child's routines and age.

The discussion revolves around three main lenses: seeing the curriculum as a manual, a process, and a practical thing. Questions include the difference between learning a specific item and a learned skill, how to help children continue learning even when we're not around, and when we can confidently say, "It's enough. The skill is acquired." How do we determine that we have achieved our objectives with a child with autism? What are some non-arbitrary criteria for mastering objectives?

When discussing the structure of an intervention plan or curriculum for a child with autism, its composition includes the following sections, along with other details related to the teaching method:

1. Developmental Areas (like Imitation, Mand, Language Comprehension, Tact, Intraverbal, etc)

2. Programs for Each Domain/Area

- Imitation Programs (Imitating still movements, Imitating actions with objects, Imitating the speed of an action, Imitating a sequence of movements, etc.)
- Mand Programs (Requesting objects, Requesting actions, Requesting attention, Requesting information, etc.)
- Language Comprehension Programs (Understanding multi-step instructions, Identifying objects in the environment, Identifying people by name, Identifying categories, emotions, etc.)
- Tact Programs (Naming objects, actions, adjectives, pronouns, prepositions, adverbs, etc.)
- Intraverbal Programs (Describing experiences, Narrating past events, Making associations, Completing key phrases or songs, Asking questions on a topic, etc.)

And others.

3. Items for Each Program

Each program includes specific items or concepts that are significant for that program and relevant to the child's environment and age. These items are chosen based on which concepts will be practiced, introduced in training, and explicitly taught to the child in daily sessions, using structured or natural teaching methods. For example, if working on the Imitation program of motor movements we can teach the child to raise hands, clap, greet, spin, jump, etc.

4. Criteria for Mastery of Items

Criteria for mastery are established for each specific item being practiced. These criteria help determine when to cease teaching these concepts. For example, knowing when the child can independently imitate the movement of raising arms or describe a giraffe or narrate their activities at kindergarten.

Criteria most frequently used for various responses are:

- Percentage of correct responses in two consecutive observation sessions or three.
- A number of consecutive correct responses in a row.
- Three consecutive correct probes in three days or on the same day.
- Fluency in response (response rate within a time interval).

What does the literature say about these criteria? There is not a lot of literature on the effectiveness of these mastery criteria. The percentage of correct responses over a number of observation sessions is the most common method of measuring student performance according to Sarah M. Richiling and W. Larry Williams, Jim Carr, 2019, and most resources seem to have evaluated this measurement.

Measuring the level of performance (was the response correct or incorrect for a given task?) is often expressed as a percentage of correct responses/total number of responses. We usually target a percentage between 80% and 100%, establishing the number of measurement/observation periods of performance (in two or three consecutive observation sessions).

The most frequently used mastery criterion by practitioners, according to the study conducted by Sarah M. Richiling and W. Larry Williams, Jim Carr, 2019 was 80% correct responses in 3 consecutive observation sessions. According to the same study, percentages of 80% and 90% correct responses do not seem to support the maintenance of responses over time. Only those of 100% indicate a high percentage of maintenance, although not entirely for all participants. Regarding percentages lower than 90%, it is clear from other studies that they do not favor the maintenance of responses (Jessica L. Fuller^{1,2} and Daniel M. Fienup, 2018/ Laura Pitts | Marguerite L. Hoerger, 2021).

Equally, let's not forget that the Personalized Intervention Plan (PIP) we create is personalized for each child, so these percentages can be adapted from one child to another (for a child who learns slowly, you may want to have more consecutive observation days and a percentage of 100%; for a child who learns quickly, you may have a lower percentage or fewer observation

days; for a skill, you may be able to set a lower percentage than 100%, but for a target like using the toilet or dressing correctly, you cannot set less than 100%). However, reading the studies and from practical experience, it is noticeable that these percentages are often arbitrarily chosen and it can be deceptive to rely solely on them when it is also demonstrated through studies that they do not encourage much maintenance of results over time.

Generalization

A very important criterion that tests the mastery of a response is the generalization of the response. There are three pillars that indicate the stability of responses:

1. Generalization of situations
2. Generalization of responses
3. Maintenance of responses

Let's take them one by one.

1. Generalization of situations refers to the extent to which a response that has been demonstrated in a particular situation is manifested when the child is exposed to new situations different from those in which they have been previously.

Examples:

- a) Suppose a child has demonstrated the ability to engage in conversations with his therapist and then shows that in the kindergarten environment, with another child, they can also engage in conversation.
- b) A child who has demonstrated the ability to perform additions in school when they are presented vertically, one below the other, shows that he can still perform additions when at school, at the desk, but the additions are written on the board.
- c) A child raises his hand to answer questions during a common lesson at the center and demonstrates that he can also raise his hand when he is in kindergarten with their teacher.
- d) The child who recognized all the dogs in different pictures shows that it is easy for him to recognize dogs when they are presented in a book.

In all these situations, the environment, the context in which they received training and practiced, is different from the environment in which they are asked to perform the behavior. Depending on the program or skill we are trying to teach and the child's level, we can start by teaching in a more artificial environment, modified by us to facilitate learning, or in a more natural setting, closer to the one the child will encounter in real life. Regardless of where we start initially, the real test is the extent to which the child demonstrates the responses in natural environments, in real-life antecedents, when life genuinely demands them to respond in a certain way. They may have 100% correct responses in their room, at home, with a parent, but if they do not demonstrate them at the store, on the street, or at kindergarten when they need them there, it

means we need to program this relaxation of the environment and bring the response under the control of those types of antecedents or settings.

2. Generalizing the Response

Assuming that a student generates new responses that have not been explicitly taught but are functionally equivalent to those that have undergone training.

a) I was taught, for instance, to greet using the forms "Good morning," "Hi," "Good evening". However, I independently learned to add other greetings like "Salut!," "Haloo," "Ma che fai?," "Ola." All forms, both the ones taught and those generated by me, serve the same purpose and have the same function of initiating a conversation or gaining attention.

b) I taught a child that a certain animal is called a "dog" and explicitly provided this label. However, the child showed me, without me teaching directly, that the same animal can be named using labels like "catel," "puppy,".

c) I taught a colleague of mine to simply note down a child's responses on paper and calculate the percentage of correct answers at the end. But she independently created a completely new scoring table for the programs she teaches without my assistance.

d) I taught a child to write a text message on WhatsApp telling me about their vacation. One day, I receive an audio message from them on WhatsApp, describing their vacation. Both forms of response serve the same purpose, but one is explicitly taught, while the other is generated by them.

3. Maintaining a Response

A child demonstrates that he maintained a response over time by continuing to provide correct answers or perform a behavior even after part or all of our intervention has been withdrawn.

Examples:

a) We introduced a cleaning program every few hours in the center. Initially, we used a bell and verbal prompts. Over a month after the intervention was implemented, with no need for further prompts, the team continues to tidy up toys at the established intervals.

b) The child learned to wash their hands during training. Two years after learning that response, the child continues to wash their hands independently.

c) A child underwent toilet training at the age of 3. Now, at 6 years old, without the need for intervention, the child continues to go to the toilet independently when needed, without accidents.

d) A child learned to heat their food in the microwave two years ago. Today, they still do it without assistance every day.

When children demonstrate that:

1. they can perform what we have taught them in natural settings that require that performance, different from those explicitly taught by us,
2. they can generate new response forms, new ways of responding, ways that we have not directly taught them,
3. they maintain what they have learned at a given moment, have not forgotten, and continue to do it in the absence of our intervention,

it shows us that that specific response/item has been generalized and can be measured as mastery of that response. However, this does not necessarily mean that they have mastered the program or skill we are trying to teach them.

What is a response? A specific response is a specific topography, a specific behavior manifested when a specific stimulus is presented.

What is a skill? A skill implies a class of responses that are controlled by the same stimulus.

Here are some examples.

- For the Person Tact program, the targeted responses/items can include: mom, dad, the name of the therapist they work with, grandma, grandpa, sister/brother. However, the ability to tact people implies that the child continues to learn new names more easily, without intensive training, such as the names of classmates, the teacher, cousins, etc.
- For the Describe Objects program, the targeted responses/items can include: house, car, microwave, giraffe, lion, horse, for example. The ability to describe is demonstrated to the extent that the child can describe new items that haven't been previously taught, such as responding to requests to describe things like a washing machine, the bathroom, a cow, a dog, even though these were not explicitly taught. The child continues to learn to describe new things.
- For the Listen and Respond to Questions from Stories program, using stories like “The Three Little Pigs”, “Cinderella”, “Elsa and the Frozen Kingdom”, the ability to listen to stories is demonstrated when the child listens and responds to new stories like “Little Red Riding Hood” or the latest book you bought for him from bookstore.

Even if generalization it is an extremely important benchmark in mastering behaviors, as long as the child demonstrates the generalization only of what he has learned, only of the specific responses taught, which he carries over in time and in different and natural environments, but does not show that he can respond with the same ease when exposed to new problems, if he does not demonstrate that he can continue to learn without training or with minimal assistance in new responses belonging to the same program, then we cannot say that he has grasped the idea behind the program and that he has understood a certain type of solution to a certain type of problem. Often, we can confuse the generalization of responses with mastering the skill.

For example, I am working on the program of Imitating Motor Movements and have chosen the following movements to work with: raise arms up, jump, spin, clap hands, lift one leg,

clap hands on knees. The child I am working with demonstrates the generalization of these responses (does them at home, at kindergarten, in the center's circle, with me and the teacher, and even when I change the background music, continuing to perform them even two months after I stopped teaching them). But I notice that he does not imitate or attempt to approximate new, untaught movements (hopping on one foot, crouching, doing a somersault, putting hands behind back, marching). This leads me to believe that he may not have understood what it means to imitate.

So, we need to ensure that there is a generalization of the skill and its maintenance, rather than a strict expansion and maintenance of the learned concepts. We aim for the generalization of imitation as a skill, learning what it means to tact/name objects as a skill.

If we limit the mastery criterion of a program only to mastering a specific number of items, everything would be very arbitrary. Think of it as if I were saying: "After I teach the child to tact 40 objects, I stop. After I teach the child to imitate 20 motor movements, I move on to the next program. After I teach him to name 40 actions, it's all done." Why 40? Why not 10? Many programs have dozens, hundreds, maybe even thousands of items. What if we were to teach all possible additions, maybe all possible movements with objects, all fits or puzzles, all descriptions? It's impossible.

That's why children need to depend on how to generalize what we've taught them, how to maintain what we've taught them, and how to continue learning beyond the handful of items we've worked on.

We need a system that teaches children how to continue learning new actions, as opposed to teaching them a set of responses. We need to teach them how to learn further, without clear instructions from us, in a learning framework arranged by themselves. The question is: can they learn from their environment?

The mastery criteria for skills proposed by Francesca degli Espinosa are as follows.

A. There are programs with an infinite number of items: motor imitation, object imitation, vocal imitation, matching, reading texts/words, recalling past events, describing an object using three characteristics. These programs are not limited to specific topographies and can have infinite variations.

The mastery criterion for these abilities is demonstrated by the child correctly responding to novel probes that have not been previously taught. For example, if I taught the movements a, b, c, d, e, f, can the child immediately imitate movements g, h, i, j, k, l? Has the child grasped the concept of imitation?

If I taught the child to read the text from pages 2, 4, 7, 9, can they read text from pages 33, 67, 89 without prior training?

For some skills, we want to observe the emergence of new responses without direct teaching, as a result of having taught some individual responses from the same class.

Steps:

1. I choose certain items and work on them until mastery is achieved (independent responding, discrimination, using the measurements mentioned above).
2. Then, I verify the mastery of the ability by testing additional X pairs, items that were not previously taught. If the child performs well, it's good. If not, I expose them to more items, and after mastering those, I reevaluate.
3. Once this is accomplished, I can check for generalization or address specific issues if needed.

B. There are skills that require at least one teaching trial, at least one meeting with reinforcement to establish new responses in that skill. Examples include receptive objects, action naming, general knowledge question answering. Here, the topographies are important.

In these cases, we have programs with an infinite number of items that, as mentioned, require at least one teaching trial to generate new responses. Here, I can demonstrate the mastery of the ability to name actions, identify objects, etc., by looking at the number of trials it takes to learn a new concept. The acquisition rate can be a good guide. If, for example, they used to learn 3 objects in a week, how many are they learning now in a week/day/month? Has the learning process accelerated, taking less time to learn, possibly due to minimal exposure in the natural environment? This suggests that they can continue to learn to identify, tact, and respond to questions beyond the initially taught X items.

Steps:

1. I select a series of items that I teach until mastery is achieved (independent responding to them, in discrimination). I can use the mastery criteria for the named responses mentioned earlier.
2. Then, I verify the acquisition of the skill. I expose them to new items and observe how long it takes to learn new items. 1 trial prompt, 2nd trial transfer, 3rd discrimination. It could be 1-5 trials. But I need to see through this process that it demonstrates accelerated learning.
3. I check for the generalization of knowledge. If it's okay, that's wonderful. But if not, I schedule for generalization.

C. There are also programs that again require minimal training, where topographies are important, but where we have a finite number of items: colors, weather, seasons, pronouns, prepositions, months of the year. Here, the individual gains the ability when demonstrating that they have learned and generalized all items in the set.

Steps:

1. In this case, I take all the items from the program and teach all the responses.
2. Then, we check for generalization.

Conclusion remarks:

Teaching the ability is exposing children to unprompted items. This way, we check that the source of behavioral control is understood and effective. This shows us that the individual can continue to learn. This also increases our chances of generalization. Because you have a higher chance of generalizing if you understand the concept.