Task Analysis

PowerPoint Slides to be used in conjunction with the Facilitator’s Guide
Recommended citation:

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Session Agenda

• Introduction
• Session Goals and Objectives
• Task Analysis
• Chained Behavior
• Detailed Task Analysis
• Teaching a Task Analysis
• Summary
• Evaluation
Introduction

• Listen to the audio that accompanies this slide at
http://mast.ecu.edu/modules/ta/introduction/.
For her students to gain the skill of purchasing a drink from a vending machine, Ms. Knight will need to break down the skill and teach each step individually. She must:

– figure out the best task analysis for this skill,
– then identify how she will teach the skill.
– To do this she will have to identify the chaining procedure to use as well as the prompt system to teach each step in the chain.
Session Goal

• Goal: to explain the importance of breaking down a skill into smaller parts in order to systematically teach each unit of a chained skill to students with disabilities.

• The module will explain how to write an effective task analysis and identify the appropriate chaining procedure and prompt system to use when teaching the task analysis.
Session Objectives

Participants will be able to:

• Select an effective task analysis.
• Identify the appropriate chaining procedure to teach a specific task analysis.
• Identify the advantages and disadvantages associated with each chaining procedure.
• Identify the appropriate prompting procedure to use with each task analysis.
Task Analysis

• When selecting a skill to teach, first think about the target skill and whether it is a discrete response or a chain of responses.

• Discrete responses involve a single step with a clear beginning and ending (e.g., activating a switch, saying hello).

• Chained tasks are skills that require multiple responses to complete (e.g., hand washing, division).
Task Analysis, continued

• Task analysis is the process of taking a chained task and breaking it up into teachable components or a set of discrete steps.

• Examples of skills that can be taught using a task analysis:
  – using a drink machine,
  – purchasing food at a fast food restaurant,
  – progressing through an algebraic equation, and
  – participating in a literacy lesson.
Task Analysis, continued

• Every discrete skill has:
  – a stimulus (or antecedent) followed by a
  – behavior (or response) followed by a
  – consequence.

• If that consequence is reinforcing to the student then the behavior is more likely to occur in the presence of that specific stimulus. This is called a three term contingency or an A-B-C.
Task Analysis, continued

Listen to the audio that accompanies this slide at

http://mast.ecu.edu/modules/ta/lib/media/slides02/SlideShow.html
Three term contingency

- Every *response* is preceded by a *stimulus* and followed by a *consequence*.

  S-R-C

- A *reinforcer* is a consequence that increases the recurrence of the response in the presence of this target stimulus.

- The stimulus becomes a *discriminative stimulus* for making the response.
Activity- Task Analysis

• Select two or three discrete skills you have been working on with students or others.

• Identify the stimulus, response and consequence for each skill.

• In pairs, share your S-R-C chains; partners “check” for agreement.
Chained Behavior

- A chained behavior is made up of:
  - a discriminative stimulus (antecedent) followed by
  - a behavior (response) followed by
  - a consequence, which then becomes the new antecedent to trigger the next behavior and so on.
  - A discriminative stimulus is the cue to respond.
- Let’s take a look at a chaining diagram.
Chained Behavior, continued

- Listen to the audio that accompanies this slide at http://mast.ecu.edu/modules/ta/lib/media/slides03/SlideShow.html
Chaining Diagram

$S_D$ - Discriminative Stimulus
$R$ - Response
$C_R$ - Consequence - reinforcer
Chained Behavior, continued

• Now let’s look at a specific example of a chained behavior.
  • Listen to the audio that accompanies this slide at
    http://mast.ecu.edu/modules/ta/lib/media/slides04/SlideShow.html
Example of a Chaining Diagram Using a spoon

“It’s time to eat.” Food and spoon are placed in front of student - SD

1. Pick up your spoon - R1
   - Spoon is in hand - C(r)
   - Spoon is in hand - SD

2. Put spoon in food - R2
   - There is now food on spoon - C(r)
   - Food on spoon - SD

3. Lift up spoon with food - R3
   - Spoon with food has moved from bowl to air - C(r)
   - Spoon is in air - S - Dee

4. Bring spoon to mouth - R4
   - Spoon is near mouth - C(r)
   - Spoon is near mouth - SD
Activity- Chained Behavior

• Draw a chaining diagram for hand washing (see generic example on next slide).

• Describe each step of the chaining diagram by labeling each as the following: discriminative stimulus (antecedent), response (behavior), consequence.
Detailed Task Analysis

• In the previous section of this module we discussed what makes up a chained skill. Let’s look more closely at what a task analysis is.

• The following slides are narrated at http://mast.ecu.edu/modules/ta/lib/media/slides06/SlideShow.html
Task Analysis

• Steps of a chained skill are broken down into a series of discrete responses (step by step) that are linked sequentially.

Example: Putting on Pants
1. Pick up pants
2. Locate zipper/button
3. Turn pants so that zipper/button is face up.
4. Hold the waist band.
5. Put one leg into corresponding pant leg… etc. (keep going)
Functions of a Task Analysis

- Identification of the teachable component parts
- Steps serve as a basis for data collection & system of measurement in evaluation of behavior change
- Steps set occasion for the way the task is taught (application of chaining procedures).
- Saves teaching time
- Allows more than one person to work with students
- Can be used as a home-school communication tool

Link between curriculum & methods
Detailed Task Analysis, continued

• Now that we have defined a task analysis and seen an example, let’s talk more about using task analytic instruction.

• The following slides are narrated at http://mast.ecu.edu/modules/ta/lib/media/slides06/SlideShow.html.
Using Task Analytic Instruction

• Selecting a goal
• Writing quality task analyses
• Selecting instructional strategies
• Choosing a data collection method
Writing Quality Task Analyses

• Watch someone perform sequence
• Determine critical steps
• Consider partial participation
• Field test task analysis
Detailed Task Analysis, continued

- We will look in more detail at each of these. Let’s look at the first step - Watch someone perform the sequence.
- The following slides are narrated at http://mast.ecu.edu/modules/ta/lib/media/slides07/SlideShow.html.
Watch Someone Perform Task

- Watch peers
  - Different people see what they do

- Watch experts
  - House keeper
Ways to Secure Peer Group Information

- Interview them
- Have peers respond to checklist items
  - preferred activities
  - styles of dress
- Observe peers in natural environment
  - Where do they go?
  - What do they do?
Detailed Task Analysis, continued

• After watching someone perform the sequence of skills, determine the critical steps to include in your task analysis.

• Consider partial participation:
  – Even though some individuals with severe disabilities cannot independently perform all steps of a given task/activity, they often can be taught to perform selected components or an adapted version of the task.
Detailed Task Analysis, continued

- Partial participation is used to help a learner be more active in a task, make more choices in how the task will be carried out, and provide more control over the activity.

• Take a look at an example of partial participation for making a blender drink.
Using partial participation within each step of a task analysis for making a blender drink.

<table>
<thead>
<tr>
<th>Task: Making a blender drink</th>
<th>Learner: Saundra</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Teacher’s Assistance</strong></td>
<td><strong>Learner’s Participation</strong></td>
<td></td>
</tr>
<tr>
<td>1 Announces activity</td>
<td>Lifts her head to listen</td>
<td>Active</td>
</tr>
<tr>
<td>2 Wheels Saundra to the cabinet</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3 Gets out the utensils</td>
<td>Grasps a spoon</td>
<td>Active</td>
</tr>
<tr>
<td>4 Wheels Saundra to the table</td>
<td>Releases the spoon on the table</td>
<td>Active</td>
</tr>
<tr>
<td>5 Shows fruits</td>
<td>Selects one fruit by grasping it and pushing it to the teacher</td>
<td>Choice</td>
</tr>
<tr>
<td>6 Shows beverages</td>
<td>Selects on beverage by grasping it and pushing it to the teacher</td>
<td>Choice</td>
</tr>
<tr>
<td>7 Puts the ingredients in the blender</td>
<td>Operates the blender with a switch when the chosen ingredients are in</td>
<td>Control</td>
</tr>
<tr>
<td>8 Spoons the blender drink into a glass</td>
<td>Indicates if ready to drink</td>
<td>Control</td>
</tr>
<tr>
<td>9 Holds out a straw</td>
<td>Places the straw in the glass and drinks</td>
<td>Active Control</td>
</tr>
</tbody>
</table>

Key: Partial participation may have the goal of encouraging the learner to be more active in the routine (Active), to make more choices (Choice), or to have more control of the routine (Control). These goals are shown for each step of the task analysis.

Detailed Task Analysis, continued

- The final step in writing a quality task analysis is to field test the task analysis.
- Listen to the audio for this slide at [http://mast.ecu.edu/modules/ta/lib/media/slides08/SlideShow.html](http://mast.ecu.edu/modules/ta/lib/media/slides08/SlideShow.html).
Field Test Task Analysis

- Have *stranger* perform the task
- Check back with experts
Activity - Detailed Task Analysis

• In small groups, select a skill from list below.
  – Making a sandwich
  – Completing an algebraic equation
  – Washing hands
  – Tying shoes
  – Finding a website
  – Ordering food from a fast food restaurant
  – Participating in the steps of an inquiry science lesson
Activity - Detailed Task Analysis, continued

• Draft a chain, complete with designated discriminative stimuli, responses and consequences.
• Then, consider how they could prepare for a task analysis.
• Draft a detailed task analysis for the chained skill.
Now that we have discussed strategies for writing a quality task analysis we need to think about teaching the task analysis.

Listen to the audio for this slide at http://mast.ecu.edu/modules/ta/lib/media/slides09/SlideShow.html.
Selecting Instructional Strategies

- Plan for generalization
  - Programming common stimuli
  - Training multiple exemplars
- Train in the natural environment
- Use a chaining procedure
- Use a prompting strategy
- Decide between group or individual instruction
Teaching a Task Analysis, continued

• Sometimes the goal is that responses within the chain be learned in some sequence until the entire activity is independent.

• This is called “chaining”.

• Consider the chaining procedure needed to teach the steps of a task analysis.
Teaching a Task Analysis, continued

• There are three types of chaining procedures:
  – forward chaining,
  – backward chaining, and
  – total task chaining.

• The following slides are narrated at
Chaining

• **Forward chaining**
  - Teach only the first step of the task analysis and do all the other steps of the task analysis for the student. After the student masters step 1, then only teach step 2, while maintaining step 1.

• **Backward chaining**
  - Teach only the last step of the task analysis. Do all the other steps of the task analysis for the student, until the student masters the last step. Then teach the second to last step only and expect the student to continue independently completing the last step of the task analysis.
Chaining

• Total Task Chaining
  - Student is given opportunity to perform each step every time opportunity.
  - For example: When putting on pants, the student has the opportunity to perform each step EVERY time he/she puts on pants.
Teaching a Task Analysis, continued

• Once the chaining procedure to be used is identified, think about how you will prompt each step of the task analysis.
• The most common ways to teach a task analysis are to use one of the following response prompting strategies:
  – system of least prompts,
  – most to least prompts, or
  – time delay.
Teaching a Task Analysis, continued

- **System of least prompts** is also known as least-to-most prompt system or least intrusive prompt system. This prompt strategy uses a prompt hierarchy in which prompts are provided, as needed, from the least intrusive prompt to the most intrusive prompt.
Teaching a Task Analysis, continued

• Listen to the audio for this slide at
Prompting Hierarchy

- Natural Cue
- Gesture
- Verbal
- Visual/Picture
- Model
- Physical (partial, full)
- Full Physical
Teaching a Task Analysis, continued

• In the system of least prompts the teacher selects about three types of response prompts and sequences in order of intrusiveness (e.g., verbal, then model, then physical guidance).

• Although “intrusiveness” is subjective, generally physical assistance is considered more intrusive than other forms of prompting.
Teaching a Task Analysis, continued

• Once the hierarchy of prompts is chosen, the instructor plans a constant wait time (usually 3 to 5 seconds) to be provided
  – after the discriminative stimulus and
  – between prompts to provide the student a chance to respond with the least intrusive prompt possible.
Teaching a Task Analysis, continued

• After the presentation of the stimulus, the instructor waits a predetermined amount of time (e.g., 4 seconds) for the student to respond independently.

• If the student does not respond, the instructor provides the first prompt in the predetermined prompt hierarchy (e.g., verbal prompt).

• Again, waits the predetermined time for the student to respond.
Teaching a Task Analysis, continued

• This process continues (e.g., model prompt) until the student responds or the most intrusive prompt in the hierarchy has been given (e.g., full physical guidance).

• If the student makes an error during the instructional trial, instructor blocks the error and redirects to the correct stimulus and the instructional trial would be over.
• When using the system of least prompts to teach the steps of a task analysis you would use this strategy for each step of that task analysis.

• The video at http://mast.ecu.edu/modules/ta/lib/media/slides12/SlideShow.html demonstrates a task analysis for using a vending machine. The instructor is using least to most prompts and total task chaining to teach this skill. The prompt hierarchy chosen for the system of least prompts was a verbal, model, and physical prompt.
Teaching a Task Analysis, continued

The task analysis in the video included the following:

– Put your dollar in the machine.
– Put your coins in the machine.
– Select your drink by pressing the buttons.
– Get your drink.
– Open your drink.
Teaching a Task Analysis, continued

• On the first step of the task analysis, the student did not respond to the natural cue of the drink machine in front of her so the instructor provided a verbal prompt.

• After the verbal prompt, the student started to place her money in the wrong slot. This required the instructor to implement an error correction procedure after the verbal prompt where the instructor modeled where to put the money.
Teaching a Task Analysis, continued

• The next step, put your coins in the machine, required a model prompt since the student did not respond to the natural cue or the verbal prompt.

• The third step, select your drink, also required a verbal prompt because the student did not respond to the natural cue or verbal prompt.
Teaching a Task Analysis, continued

• Steps four and five also required a model prompt.
• This was simulated to demonstrate teaching a task analysis. If this were a real situation, data should be collected to monitor any problem steps and to also see the progression from one prompt level to another (e.g., physical to model prompt) that shows the student is making progress on the skill.
Teaching a Task Analysis, continued

• **Most to least prompting**
  – Also called system of most prompts or most intrusive prompt system
  – Like system of least prompts, it also uses a hierarchy of prompts
  – Starts with the most intrusive prompt and systematically moves to less intrusive prompts as the student starts to respond more independently.
  – The instructor may stay at one prompt level (e.g., model prompt) for several instructional sessions before moving to a less intrusive prompt.
Teaching a Task Analysis, continued

• **Time delay**
  
  – a response prompting system where the prompt is faded using increments of time.
  
  – Typically one type of prompt is chosen (e.g., model) and used throughout instruction.
  
  – Time delay starts with a zero delay round—the prompt is delivered at the same time as the stimulus is presented so that the student can correctly respond without making an error.
Teaching a Task Analysis, continued

• For example, when teaching the first step of hand washing (i.e., turning on the water) the teacher would say “Turn on the water” while pointing to the on handle. After several rounds of zero-delay instruction, the teacher will add a time delay.
There are 2 types of time delays, **constant** and **progressive**.

- In **constant time delay** the increments of time added after presenting the target stimulus stays constant, or the same (typically 2 to 4 seconds).
- If student doesn’t respond within the set time, a prompt is delivered. Typically the prompt stays the same.
- In the example of hand washing, after the zero delay round the teacher would provide the task direction "Turn on the water." and wait 3 seconds for the student to respond. If the student does not respond after 3 seconds, the teacher will prompt the student by providing a model prompt.
Teaching a Task Analysis, continued

- In **progressive time delay** the increments of time added after presenting the target stimulus progressively increase. It can increase by increments of 1 second or of 2 seconds.
- If the student does not respond within the set amount of time for that specific trial, a prompt is delivered.
- Typically the increases in time have a ceiling that the teacher has set (e.g., 8 seconds).
Teaching a Task Analysis, continued

– For example, after completing several rounds at a zero-second delay the teacher will present the target stimulus of the sight word ‘precipitation’ and ask “What word?” and wait 2 seconds for the student to respond. On the next trial the wait time will increase to 4 seconds and the next trial to 6 seconds and so on.
Teaching a Task Analysis, continued

• Research has been conducted on which chaining procedure is the best. Let’s take a look at some advantages and disadvantages of each.

• The following slides are narrated at http://mast.ecu.edu/modules/ta/lib/media/slides12/SlideShow.html.
Comparisons of Chaining Procedures

• Each method is proven successful (McDonnell & McFarland, 1989; Spooner, Browder, & Mims, 2010)

• Backward chaining has a theoretical advantage because of readily available conditioned reinforcer to strengthen new response

• Comparisons of forward chaining & backward chaining: no differential effects (McDonnell & Laughlin, 1989; Spooner, Browder, & Mims, 2010)
Advantages of Total Task

• Each step practiced each trial
• Steps presented in natural order
• No repetition of single steps
• Makes sense from practical standpoint
Teaching a Task Analysis, continued

• Comparison studies of these chaining procedures have documented advantages in favor of the total task procedure (e.g., Kayser, Billingsley, & Neel, 1986; Martin, Koop, Tuner, & Hanel, 1981; Spooner, 1984; Spooner, Browder, & Mims, 2010).
Activity- Teaching a Task Analysis,

• In pairs or small groups, identify the prompting strategy that will be used to teach each step of the task analysis. Examples:
  – Washing Hands
    • Turn on water
    • Wet hands
    • Put soap on hands
    • Rub hands together
    • Rinse
    • Turn water off
    • Dry hands
Activity - Teaching a Task Analysis, continued

- Participating in a story-based lesson
  - Identify title
  - Identify author
  - Open book
  - Make a prediction
  - Identify target vocabulary
  - Anticipate the repeated storyline
  - Turn the page
  - Text point
  - Answer a comprehension question
Summary

• Teaching a skill that consists of multiple steps (i.e., a chained skill) for students with disabilities requires task analytic instruction.

• Systematically teaching the steps of a task analysis is called chaining. 3 ways:
  – Forward chaining,
  – backward chaining, and
  – total task chaining.
Summary, continued

• Chaining combined with strong prompting strategies (e.g., system of least prompts) often leads to faster skill acquisition and skill fluency.

• Ultimately these can lead to an increased quality of life
Session Evaluation

• A form for participants to evaluate the session is available in the Facilitator’s Guide.
Focus and Reflection Questions

1. How would you determine whether to use forward chaining or backward chaining for a task?

2. Think back to what you knew about task analysis before starting this module. What will help you remember each type of time delays: constant and progressive?
Application & Extension activities

1. Design a task analysis based on a motor skill for a student that requires passive participation for many steps due to lack of motor skills (e.g., getting a drink from a soda machine).

Identify areas where the student can be more active, have choice, or have control. See example in MAST’s Task Analysis module.
Application & Extension activities, continued

2. Independently write a task analysis for a skill that can be performed in the room.

• Pair up with a partner and exchange task analyses with each other. Each partner performs the other’s task analysis.

• Identify and discuss any problem areas of the analyses.
Self-Assessment

- A self-assessment with response feedback is available at http://mast.ecu.edu/modules/ta/quiz/. Participants may take this assessment online to evaluate their learning about content presented in this module.