USING THE FOUR STAGES OF LEARNING TO SUPPORT RESEARCH BASED PRACTICE

Bree Jimenez, PhD
University of Texas Arlington (Associate Professor)
& University of Sydney (Honorary Researcher)
Bree.Jimenez@uta.edu

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Importance of Assessing Student Performance

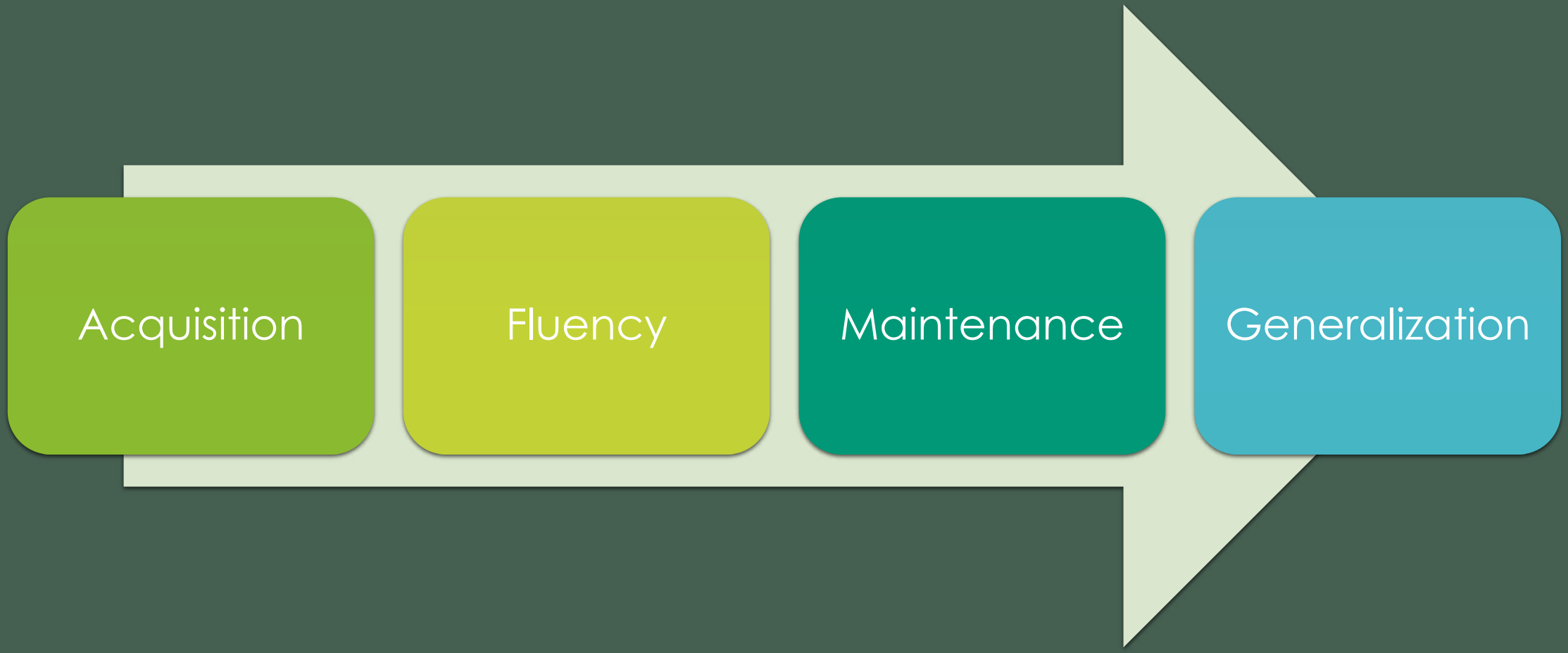
- As a proxy for ability/ understanding
- To identify barriers/ tools for adaptation
- To plan for optimal instruction (match pedagogy with student needs)

Mr Robbins

- Year 5 inclusive classroom
- Unit on adding fractions with unlike denominators
- Adam – ID, little knowledge or prior experience
- Flora – ADHD; inconsistent in responding and using strategies
- Morris - LD; already completed unit at previous school
- Gloria – ASD; using fractions at home to cook

Learning Stages Framework

(Collins, 2012; Haring & Eaton, 1978; Shurr et al., 2019)



Specify the level and intensity of supports needed at each stage will help students meet goals that provide access to the general curriculum”

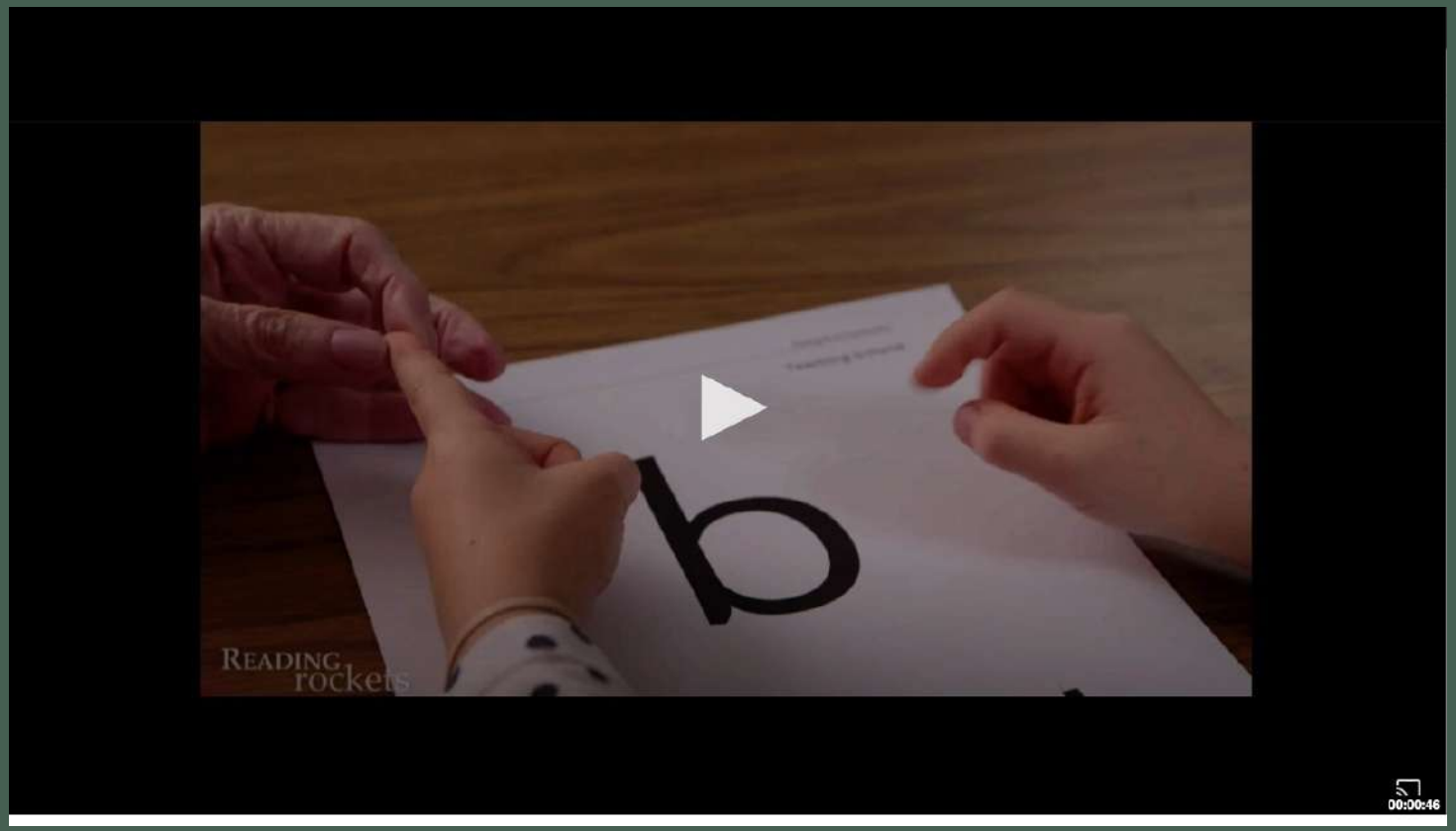
Table 1 **Questions to Determine Stage of Learning**

Acquisition
1. Does the student need help to complete the skill accurately?
2. Does the student omit steps or perform steps out of sequence?
3. Is the student's completion of the skill inconsistent?
4. Does the student need feedback or reinforcement after attempting the skill?
5. Does the student require prompting to begin the task?
6. Has the student performed the skill independently at 60% or with support at 100% accuracy?
*If an educator's answers to 1 through 5 are yes, the student is in the acquisition stage; if the answer to 6 is yes, the student is ready to move to fluency.

Acquisition

- Ability to do something with some degree of accuracy that could not be done previously (Alberto & Troutman, 2009; Collins, 2012)
  - ✓ Very early stages
  - ✓ Require support
  - ✓ Lacking independent accuracy

Acquisition Classroom Example "Identify the letter 'b'"



Specify the level and intensity of supports needed at each stage will help students meet goals that provide access to the general curriculum”

Table 1 **Questions to Determine Stage of Learning**

Acquisition	*Fluency*
1. Does the student need help to complete the skill accurately?	1. Is the student's completion of the skill inconsistent? or Does the student need to complete the skill faster?
2. Does the student omit steps or perform steps out of sequence?	2. Does the student tend to make errors completing the skill when given time constraints?
3. Is the student's completion of the skill inconsistent?	3. Has the student demonstrated accurate independent performance of the skill with over 60% accuracy, with the speed needed to make this skill generalizable?
4. Does the student need feedback or reinforcement after attempting the skill?	
5. Does the student require prompting to begin the task?	
6. Has the student performed the skill independently at 60% or with support at 100% accuracy?	
*If an educator's answers to 1 through 5 are yes, the student is in the acquisition stage; if the answer to 6 is yes, the student is ready to move to fluency.	*If an educator's answers to 1 and 2 are yes, the student is in the fluency stage; if the answer to 3 is yes, the student is ready to move to maintenance.

Fluency

- Speed and accuracy of response (Collins, 2012; Snell & Brown, 2011)
  - ✓ No longer brand new skill
  - ✓ Increase independence
  - ✓ Increase speed and efficiency

Fluency Classroom Example "identify how many syllables are in the word 'computer'"

Specify the level and intensity of supports needed at each stage will help students meet goals that provide access to the general curriculum”

Table 1 **Questions to Determine Stage of Learning**

Acquisition	*Fluency*	*Maintenance*
1. Does the student need help to complete the skill accurately?	1. Is the student's completion of the skill inconsistent? or Does the student need to complete the skill faster?	1. Can the student typically perform the skill when given a cue?
2. Does the student omit steps or perform steps out of sequence?	2. Does the student tend to make errors completing the skill when given time constraints?	2. Does the student perform the skill with a high degree of accuracy (>80%)?
3. Is the student's completion of the skill inconsistent?	3. Has the student demonstrated accurate independent performance of the skill with over 60% accuracy, with the speed needed to make this skill generalizable?	3. Has the student performed the skill with relative efficiency and speed more than once?
4. Does the student need feedback or reinforcement after attempting the skill?		4. Does the student's skill performance typically depend on the use of the same materials, context, or cues used in instruction?
5. Does the student require prompting to begin the task?		5. Can the student perform the skill days, weeks, or months after instruction?
6. Has the student performed the skill independently at 60% or with support at 100% accuracy?		
*If an educator's answers to 1 through 5 are yes, the student is in the acquisition stage; if the answer to 6 is yes, the student is ready to move to fluency.	*If an educator's answers to 1 and 2 are yes, the student is in the fluency stage; if the answer to 3 is yes, the student is ready to move to maintenance.	*If an educator's answers to 1 through 5 are yes, the student is in the maintenance stage; if the answer to 3 is yes, the student is ready to move to generalization.

Maintenance

- "The ability to perform a response over time without re-teaching" (Alberto &Troutman, 2009, p. 43)
  - ✓ Achieved at least one accurate and fast performance
  - ✓ Focus on repeated consistent performance
  - ✓ Independence over time

Maintenance Classroom Example "define the term 'habitat'"

Specify the level and intensity of supports needed at each stage will help students meet goals that provide access to the general curriculum”

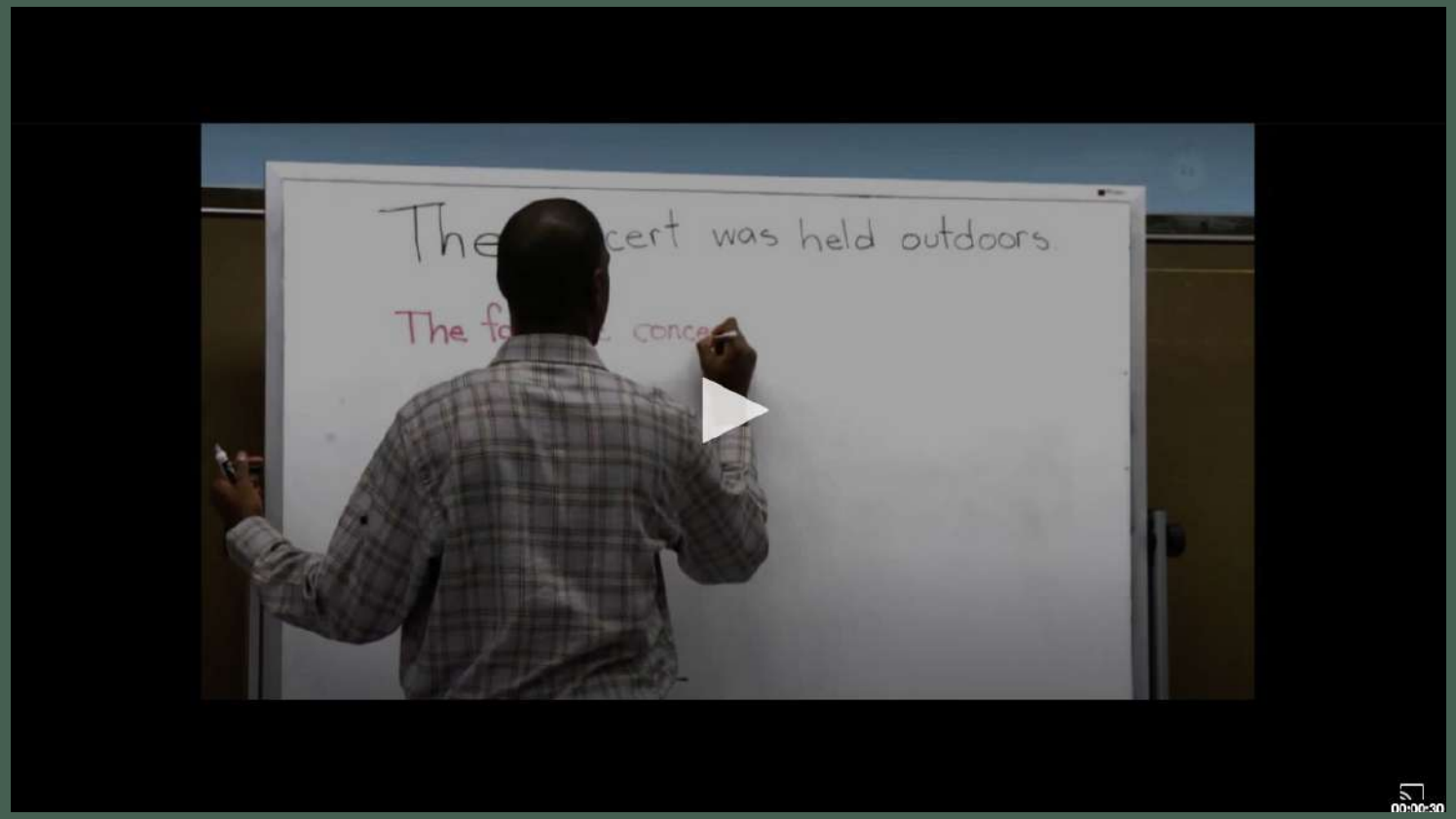
Table 1 **Questions to Determine Stage of Learning**

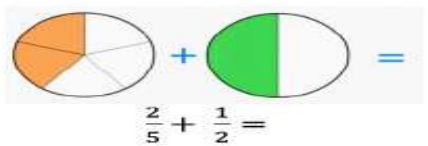
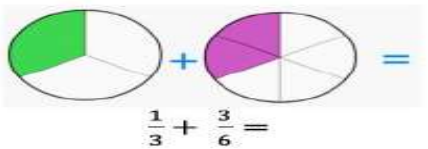
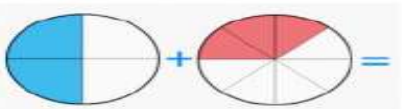
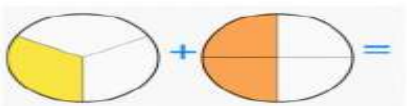
Acquisition	*Fluency*	*Maintenance*	*Generalization*
1. Does the student need help to complete the skill accurately?	1. Is the student's completion of the skill inconsistent? or Does the student need to complete the skill faster?	1. Can the student typically perform the skill when given a cue?	1. Can the student perform the skill when given a natural cue?
2. Does the student omit steps or perform steps out of sequence?	2. Does the student tend to make errors completing the skill when given time constraints?	2. Does the student perform the skill with a high degree of accuracy (>80%)?	2. In various situations, does the student perform the skill with a high degree of accuracy (>90%)?
3. Is the student's completion of the skill inconsistent?	3. Has the student demonstrated accurate independent performance of the skill with over 60% accuracy, with the speed needed to make this skill generalizable?	3. Has the student performed the skill with relative efficiency and speed more than once?	3. In various situations, does the student perform the skill with relative efficiency and speed?
4. Does the student need feedback or reinforcement after attempting the skill?		4. Does the student's skill performance typically depend on the use of the same materials, context, or cues used in instruction?	4. Can the student perform the skill with various materials, cues, or contexts?
5. Does the student require prompting to begin the task?		5. Can the student perform the skill days, weeks, or months after instruction?	
6. Has the student performed the skill independently at 60% or with support at 100% accuracy?			
*If an educator's answers to 1 through 5 are yes, the student is in the acquisition stage; if the answer to 6 is yes, the student is ready to move to fluency.	*If an educator's answers to 1 and 2 are yes, the student is in the fluency stage; if the answer to 3 is yes, the student is ready to move to maintenance.	*If an educator's answers to 1 through 5 are yes, the student is in the maintenance stage; if the answer to 3 is yes, the student is ready to move to generalization.	*If an educator's answers to 1 through 4 are yes, the student has achieved generalization.

Generalization

- Occurs when a student can apply a skill in a consistent and fluent manner in different ways or across multiple variables (i.e., people, materials, settings, situations; Collins, 2012).
  - ✓Various contexts, people, materials
  - ✓Problem solving
  - ✓Unique applications

Generalization Classroom Example "Identifying Adjectives"



Applying Assessment to Stages	Acquisition	Fluency	Maintenance	Generalization
Curriculum-based measurement (CBM)	Screen class to determine initial skill levels and form homogenous instructional groups or plan for targeted 1:1 instruction; ongoing progress monitoring data allows for determination of when specific criteria are met	Formats allow for tracking of fluency over time; for example, math fact fluency will help teachers know when students have mastered a skill and can apply knowledge to higher-order thinking tasks	Thin frequency of CBMs once fluency is achieved (for example, assess with a CBM every month instead of every week)	CBM scores will help determine if skills are still being learned when context of instruction varies (for instance, if students do subtraction with fractions and/or word problems)
Sample 1	$\frac{3}{5}+\frac{2}{10}=$ $\frac{1}{4}+\frac{2}{8}=$ $\frac{1}{2}+\frac{1}{5}=$ $\frac{2}{6}+\frac{2}{12}=$ $\frac{1}{3}+\frac{3}{6}=$ $\frac{1}{5}+\frac{7}{10}=$ $\frac{1}{2}+\frac{2}{5}=$ $\frac{2}{6}+\frac{3}{12}=$ $\frac{1}{3}+\frac{1}{2}=$ $\frac{1}{2}+\frac{1}{8}=$				$\frac{3}{4}-\frac{2}{8}=$ $\frac{4}{5}-\frac{7}{10}=$ $\frac{1}{2}-\frac{2}{5}=$ $\frac{2}{6}-\frac{3}{12}=$
Sample 2	 $\frac{2}{5}+\frac{1}{2}=$  $\frac{1}{3}+\frac{3}{6}=$  $\frac{2}{4}+\frac{3}{8}=$  $\frac{1}{3}+\frac{2}{4}=$			If Abby ate ⅓ of a pizza and Kaden ate ¼, how much pizza did they both each?

Adapted with permission from Wood et al. (2019).

Instructional Planning based on Learning Stages

Strategy	Acquisition
Task Analysis: breaking tasks into discrete steps or teachable components	
Modeling: demonstration of a behavior or skill	
System of Least prompts: systematic sequence of prompts (hierarchy) ordered from least intrusive to most intrusive	
Visual supports: any tools presented visually to provide assistance	
Constant time delay: a response prompting strategy designed to provide and remove prompts on a time dimension	
Massed Trials: multiple learning opportunities are provided in quick succession with no other activity in between	
Distributed Trials: learning opportunities occur across activities at natural times throughout day; may also be described as embedded instruction.	
Overlearning: continuing to practice a skill after mastery has been reached	
Support fading: gradual release of supports (stimulus or response prompts) to build independence	
Simulations: learning experience that that replicates real world situations	
Community-based Instruction (CBI): instruction in community environments providing students real life experiences	
Self-Monitoring: strategy that teaches students to self-assess their behavior and record the results	
Thinning schedules of Reinforcement: gradually increasing response effort required for reinforcement	
General Case Programming: systematic way of teaching examples that represent a full range of both stimulus and responses	
Incremental rehearsal: The pairing of known mathematics skills or facts with unknown and practicing the unknown	

Use

Use if needed

Not appropriate

(Jimenez et al., 2021)

ADAM

- Little to no understanding of adding fractions with unlike denominators, Limited prior exposure to this skill .
- DETERMINATION: acquisition stage.
- STRENGTH: conceptual understanding of parts to a whole, fractions, and addition.
- PRECURSOR SKILLS: finding equivalent fractions for two unlike denominators.
- INTERVENTION: focused on supporting Adam's accuracy and independence.
  - Explicit instruction and a task-analytic approach,
  - Mr. Robbins modelled—with a consistent, structured, verbal Think-aloud—how to use the concrete manipulatives (i.e., fraction tower) to find equivalent fractions for two fractions with unlike denominators, constrained to halves, thirds, fourths, fifths, sixths, eighths, tenths, and twelfths, and used the independent practice stage of explicit instruction as a means of formative assessment.
- DATA: Mr. Robbins noted Adam went from 0% accuracy of finding equivalent fractions for two fractions of unlike denominators to 100% accuracy with the concrete manipulatives (i.e., a support) across four sessions.
- DECISION: Adam had achieved the acquisition stage and was ready to move into the fluency stage of finding equivalent fractions. After fluency and maintenance with finding equivalent fractions, Mr. Robbins would follow a similar procedure for adding fractions.

Using the Four Stages of Learning to Assess, Set Goals, and Instruct

Bree Jimenez, University of Texas at Arlington, Jenny Root, Florida State University, Jordan Shurr, Queen's University, and Emily C. Bouck, Michigan State University

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email Bree.Jimenez@uta.edu for a copy

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