Assessing Children’s Cognitive Development and Learning
Gloria Maccow, Ph.D., Assessment Training Consultant
Objectives

- Describe cognitive factors that are related to learning;
- Describe developmentally appropriate assessment of cognitive abilities;
- Describe how teachers can link assessment data to instruction and intervention.

In Early Childhood Programs, . . .

some children learn the pre-academic skills we present;
some children do not.
In Early Childhood Programs, . . .

some children wait their turn;
others respond before you complete the instructions.

What child factors account for such differences in performance?
Beminger, 2007

Curriculum and Instructional Materials

Teacher’s Instruction (Pedagogy)

Learner’s Skills

Individual Differences in the Processes in Learner’s Brain

The Learner: Cognitive Development

Piaget’s Stages of Cognitive Development

Sensori-motor (Birth to 2 years)
Pre-operational (2 to 7 years)
Concrete operational (7 to 11 years)
Formal operational (11 to 15 years)

(Santrock & Yussen, 1992)
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Information Processing

Information from the environment → Sensory and Perceptual Processes → Memory → Thinking → Language

(Santrock & Yussen, 1992)

Information Processing

• memory
• problem-solving
• reasoning

Brain
Mind
Cognition

Output

Input

(Santrock & Yussen, 1992)
Areas to Assess
(Developmentally Appropriate)

Skills
Social-Emotional Competencies
Behavioral Competencies
Pre-Academic Skills
Process of Learning
Collecting, Sorting, Storing, Remembering Information

Sensory-Motor Functions and Learning

**Input**
- Is the child able to see the information? Is visual acuity within normal limits? What about visual discrimination?
- Is the child able to hear the information? Is hearing acuity within normal limits? What about auditory discrimination?

**Output**
- Is the child able to respond in writing? Are fine motor abilities within normal limits?
- Is the child able to respond orally? Are language production abilities within normal limits?
Attention and Learning

Does the child . . .

- selectively attend to certain stimuli while ignoring competing, irrelevant stimuli?
- sustain attentional focus for a prolonged period?
- shift attentional resources from one activity to another?
- respond to more than one task simultaneously – divided attention?

Process of Learning and Remembering

<table>
<thead>
<tr>
<th>Encoding</th>
<th>External information is transformed into mental representations or memories and stored in STM.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consolidation</td>
<td>Information from immediate memory is solidified into long-term memory stores.</td>
</tr>
<tr>
<td>Retrieval</td>
<td>Information is brought into conscious awareness.</td>
</tr>
</tbody>
</table>

- Immediate
- Working
- Semantic
- Delayed
Visual-Spatial Processes and Learning

- Much of what is presented in school has either a visual-spatial or language basis.
- Visual-perceptual skills play a major role in the development of a child’s handwriting skills, and fluency in math and reading.
- For example, a student may be able to name individual letters in a word (visual analysis, b-e-d), but she may be unable to integrate the letters to say the word (visual synthesis, bed).

Language and Learning

Receptive
- Children must understand words and sentences to perceive and process information.

Expressive
- They must use words to show they can retrieve information from memory.
Language and Learning

Early development of reading depends critically on whether the
- receptive phonological component of the *aural* system and the
- expressive phonological component of the *oral* system
are developing in an age-appropriate manner (Berninger, 2007).

Executive Functions

- Mental functions associated with ability to engage in behaviors that are:
  - Purposeful
  - Organized
  - Self-regulated
  - Goal-directed
- Internal supervisory guide for learning and performance in the classroom.
Executive Functions and Working Memory

- Many executive function tasks also require working memory—actively holding information in memory during cognitive tasks.
- Children with poor working memory may lose the “thread” and forget parts of the instruction, or even their own intention in the face of competing stimuli.

Cognitive Processing Speed and Learning

- The ability to perform automatically—with little or no effort—improves dramatically as children get older.
- Automaticity is linked to speed and processing capacity; as an activity is completed faster, it requires less processing capacity.
- As processing capacity increases, it becomes easier to complete tasks that were previously considered to be difficult. (Santrock & Yussen, 1992).
### Prosocial Behavior Ratings

**Definitions of Prosocial Behavior:** Behavior directed toward other persons that involves effective communication skills, cooperative acts, self-control in difficult situations, and empathetic or supportive responses to others who experience a problem. For example, children who consistently act in a prosocial manner, compromise in conflict situations, invite others to join activities, volunteer to help others, and tolerate others are appealing.

**Instructions:**

1. Complete these evaluations once after several weeks of classroom experience with your students.
2. Add each student’s traits for each of his or her performance level. Unless other students are likely to be assigned to each performance level, there is no need to assign equal numbers of students across the five performance levels.
3. For each skill-performance area, read the definition and the performance level descriptions. Select the performance level that best describes the current level of functioning of each student in your classroom. Select 1, 2, 3, 4, or 5 to each student in the appropriate column for each skill area.

**Students at each performance level will demonstrate most of the following traits:**

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>very little communication or cooperation skills</td>
<td>frequent difficulty communicating or cooperating with others</td>
<td>occasional difficulty communicating or cooperating with others</td>
<td>good general cooperation with others</td>
<td>excellent skills to communicate and cooperate with others</td>
</tr>
<tr>
<td>autistic difficulties initiating and sustaining conversations or social interactions at an age-appropriate level</td>
<td>frequent difficulty initiating and sustaining cooperative conversations or social interactions with others</td>
<td>occasional difficulty initiating and sustaining cooperative conversations or social interactions with others</td>
<td>adequate skills to initiate and sustain conversations or social interactions with others</td>
<td>excellent skills to initiate and sustain conversations or social interactions with others</td>
</tr>
<tr>
<td>little to no self-control</td>
<td>little to no self-control</td>
<td>occasional loss of expected self-control</td>
<td>adequate self-control</td>
<td>excellent self-control</td>
</tr>
<tr>
<td>little concern for others</td>
<td>little concern for others</td>
<td>some concern for others</td>
<td>high level of concern for others</td>
<td>excellent concern for others</td>
</tr>
</tbody>
</table>

**Sample Data:**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Rating</th>
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Early Reading Diagnostic Assessment Second Edition
Grade K
Student Profile

Teacher: A. Miller
School: Taylor Elementary
Student: Jonathan A
Date of Testing: 11-19-02

Skill Clusters by Subject

- Phonological Awareness
  - Composite: 2.5, 60-64 percentile range
  - Knowledge of Letters and Sounds: 2.5, 60-64 percentile range

- Phonics
  - Letter Recognition: 2.0, 6-8 percentile range

- Fluency
  - Passage Fluency: 2.5, 64 percentile range
  - Comprehension Fluency: 2.5, 64 percentile range

- Vocabulary
  - Comprehension: 2.5, 64 percentile range

- Reading Comprehension

Percentile

- Emerging
- Basic
- Proficient

Note: Targeted instructional intervention is recommended for students whose scores fall in the shaded areas. See chapter 5 of the Administration Manual for an explanation.

Targeted Instruction Plan

<table>
<thead>
<tr>
<th>Skill Clusters</th>
<th>Qualitative Information and Observations</th>
<th>Instructional Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phonological Awareness</strong></td>
<td>Able to supply missing rhyming words. Unable to provide deletion or insertion sounds or syllables in spoken words.</td>
<td>Read patterned texts with rhythm and alliteration to and with student. Match words with same beginning sound, using procedures such as singing songs.</td>
</tr>
<tr>
<td><strong>Phonics</strong></td>
<td>Recognized two lower case letters of the alphabet. Unable to pick out a letter from his name.</td>
<td>Use magnetic letters or letter tiles for letter recognition work, beginning with student’s name.</td>
</tr>
<tr>
<td><strong>Fluency</strong></td>
<td>No fluency measures administered. Student is unable to read words and has not established basic concepts of print.</td>
<td>Use repeated shared readings of simple patterned stories to model fluent reading and oral print awareness. Model fluent reading of real-aloud books.</td>
</tr>
<tr>
<td><strong>Vocabulary</strong></td>
<td>Expressive vocabulary appears less developed than receptive.</td>
<td>Discuss, illustrate, and use concept words from read-aloud books and shared reading (dictate/illustrate stories, make/illustrate picture dictionary).</td>
</tr>
<tr>
<td><strong>Comprehension</strong></td>
<td>Unable to retell a story sequentially or accurately answer questions about a story he has just heard.</td>
<td>Read stories to student. Engage in discussions. Model strategies for answering questions. Practice supported retellings.</td>
</tr>
</tbody>
</table>
Recommendations

Figure 4.2 Jessica’s OLAI-2 Results and Oracy Instruction Plan

Results

- Stage II overall
- Stage III Print Concepts
- Story Retelling skills at Stage I
  Very few words, sentence fragments
- Fight tendency
  Impulsive and focused on getting through

Oracy Instruction Plan

- Oral Language
  Expand and refine sentences and vocabulary
  Daily shared reading activities with high-interest topics
- Discourse Skills
  Explicit teaching of story elements
  Weekly retelling activities using modeling
- Learning Behavior
  Structure activities for immediate success
  Build challenge with discussion about flexible behavior
Psycho-educational Interpretation Chart
Student's Name: Sample Student
Age: 3:10
School: Early HeadStart
Test: DAS-II
Chart Adapted from Guilford County Schools, NC

Psycho-educational Interpretation Chart
Student's Name: Sample Student
Age: 4:7
School: Pre-K
Test: WPPSI-IV
Chart Adapted from Guilford County Schools, NC

Verbal Comprehension SS = 69
Nonverbal Reasoning SS = 73
Spatial SS = 72
Early Number Concepts PR = 3
Recall of Digits Forward PR = 2
Recognition of Pictures PR = 3

Verbal Comprehension = 132
Visual-Spatial = 112
Fluid Reasoning = 114
Working Memory = 97
Processing Speed = 91

Eligibility Determination

Instructional Planning
Summary

Assessment Process

- If a child is not performing a grade-level skill, identify the cognitive factors that are necessary for and related to performance of the skill.
- Assess the cognitive factors to determine why the child is struggling with the specific skill.
Learning Depends on . . .

- sensory-motor functions,
- attentional processes,
- visual-spatial processing,
- language processes,
- memory and learning processes,
- executive functions, and
- speed and efficiency of cognitive processing.

References


References


Customer Service

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Comments and Questions

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