

Designing from the Ground Floor



Alternate Assessment on Alternate Achievement Standards

Access and Alignment to Grade-level Content



National Alternate
Assessment Center

Access and Alignment to GRADE-LEVEL Content for Students with the Most Significant Cognitive Disabilities: A Training Module for Large-Scale Use

These training materials are designed to be used with a variety of stakeholder groups at the state and local level to engage in the construction of a coherent and effective system of instruction and assessment for students with the most significant cognitive disabilities. While this trainer package has been prepared for state-level technical assistance providers, the workshop is targeted for general and special education teachers, measurement and curriculum experts, and parents who are involved in the design and development of alternate assessments on alternate achievement standards for students with the most significant cognitive disabilities. The seven separate sections can be used individually for short, one-hour presentations, or sequenced together for longer workshops. The sections can be pulled apart to use in combination with other modules, in the same or different order than provided, or to stand alone to meet the unique needs of individual state-level technical assistance providers.

Training Outcomes for Access and Alignment to GRADE-LEVEL Content for Students with the most Significant Cognitive Disabilities: A Training Module for Large-Scale Use

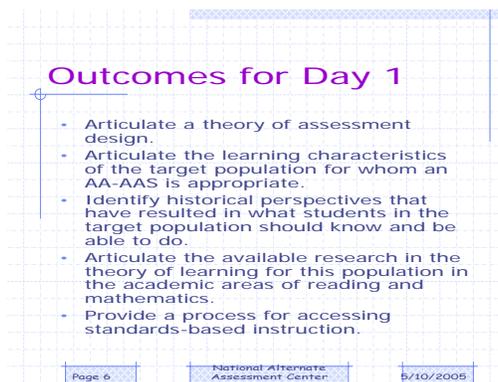
Following the complete series of presentations and workshop activities involving all seven parts, participants will be able to:

- **articulate the learning characteristics of the target population for whom an alternate assessment on alternate achievement standards is appropriate.**
- **articulate the available research in the theory of learning for this population in the academic areas of reading, mathematics, and science.**
- **identify historical perspectives that have resulted in what students in this population should know and be able to do.**
- **apply strategies for linking to grade-level content instruction.**
- **identify student work that reflects appropriate age/grade appropriate constructs in reading and mathematics.**
- **apply strategies for selecting reading and mathematics grade-level constructs and content targets to include in an alternate assessment.**

The Outcomes for Day One

These materials are designed as a train-the-trainer package. State-level technical assistance providers are encouraged to use these materials across multi-day workshops. Each module has a powerpoint presentation and accompanying narrative to guide the trainer through the presentation. Additional resources are also available with certain modules such as annotated bibliographies, participant handouts, and/or trainer handouts where appropriate. This section, prior to part one, gives trainers options to begin thinking about scheduling, materials, and how training may occur within a state.

Figure 1 outlines examples of outcomes for Day One of a multi-day workshop.



Workshop Products

As a result of using the entire set of modules, the following products should be drafted:

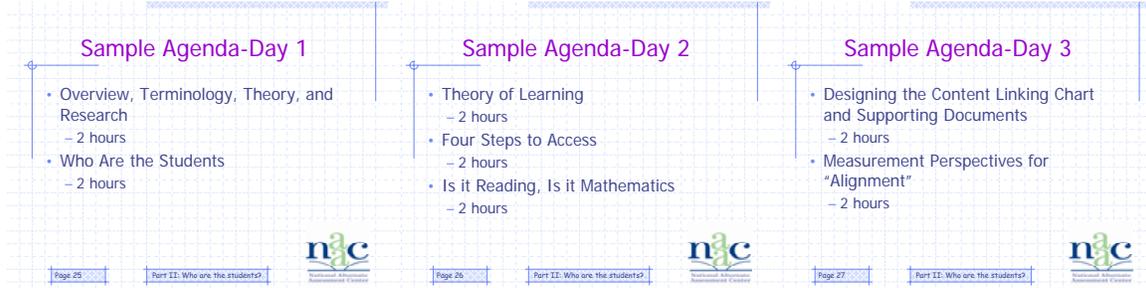
- 1) **sample instructional plans that are linked to grade-level content for students with the most significant cognitive disabilities**
- 2) **sample instructional plans that articulate the theory of Universal Design for Learning**
- 3) **sample Content Linking Charts for identifying appropriate age/grade level constructs and content targets in reading and mathematics**

Sample Agendas

This workshop has been compressed into a one and one-half day workshop especially designed for technical assistance specialists who are familiar with the issues and terminology in alternate assessment. As previously mentioned, individual pieces of the workshop may be used with a variety of constituencies. For example, State Assessment Technical Panels may be interested in Part II: Who Are the Students who take Alternate Assessments on Alternate Achievement Standards; Part III: Theory of Learning; and/or Part VII: Measurement Perspectives for “Alignment”.

Stakeholder groups including multiple constituencies will need up to three days and possibly a return visit to accomplish all of the outcomes. The Curriculum Maps are especially time consuming. The following sample agenda in Figure 3 is what the training might actually look like for a full three day stakeholder planning meeting.

Figure 3: Sample 3-day Agenda



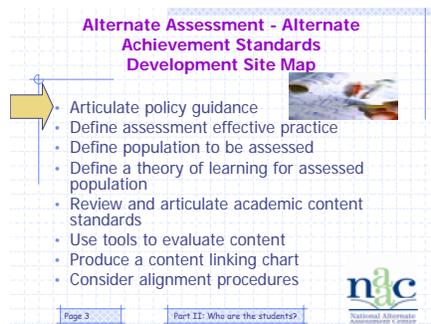
Participants & Set-up

At a minimum, special educators and content specialists in reading and mathematics at grade-bands (e.g., elementary, middle, and high school) are necessary to accomplish the work. Measurement experts, assistive technology experts, and parents of children with the most significant cognitive disabilities will also be valuable participants. In addition, it may be helpful to appoint a second, smaller team to review the work and provide feedback on the work of the stakeholder group.

The room should be set up with an overhead projector, sound system, and round tables to facilitate conversations. On day two, participants should be placed by role in groups of three to five individuals. At least two groups, one for reading and one for mathematics will be needed for each grade-band (e.g., elementary, middle, high school). More groups will be needed if additional content areas (i.e., science) are to be assessed.

Development Site Map

Figure 4: Sample Development Site Map

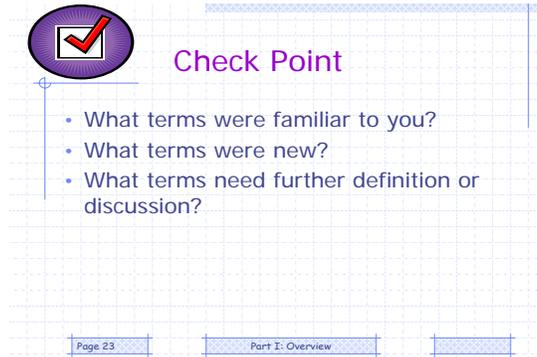


Developing and linking an alternate assessment to grade-level content involves the processes on the Development Site Map. These include: articulating policy guidance and defining effective assessment practice, defining the assessed population, reviewing and articulating academic standards for the population, using tools from measurement, designing the assessment blueprint, and verifying the design. In this workshop, we will focus primarily on the theory of learning and selecting the assessment content. The arrow indicates the areas discussed in the site map as the training progresses. It is recommended

that technical assistance providers use a large version of the site map located within the room to move participants through the training.

Check Points

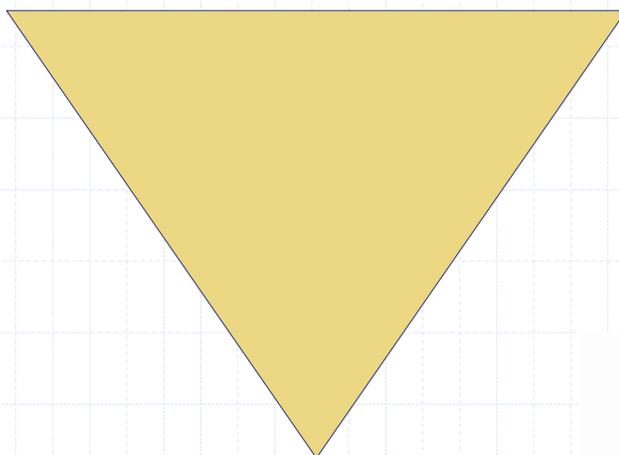
Figure 5: Sample Check Point



Checkpoints have been provided throughout the entire module. These are designed for either discussion or individual reflection. If using them for discussion, allow plenty of time to accomplish the discussion (15-20 minutes) and opportunity for sharing with other groups in the room. You may want to record participant responses on chart paper or an overhead projector.

Notes

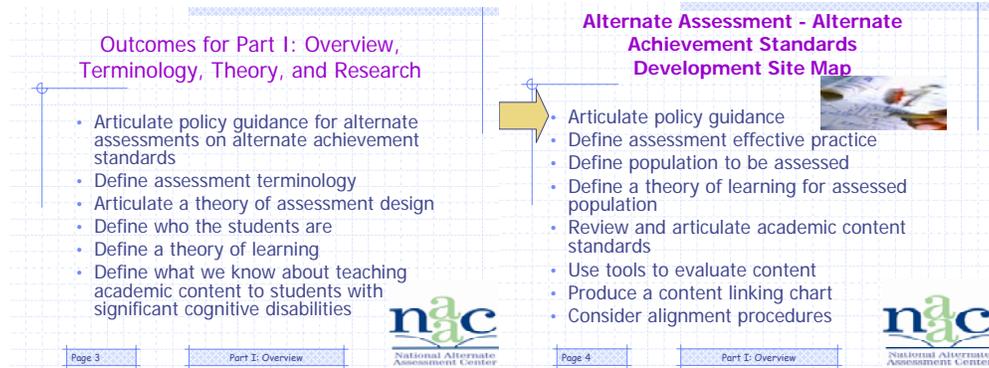
Part I: Overview, Terminology, Theory, and Research



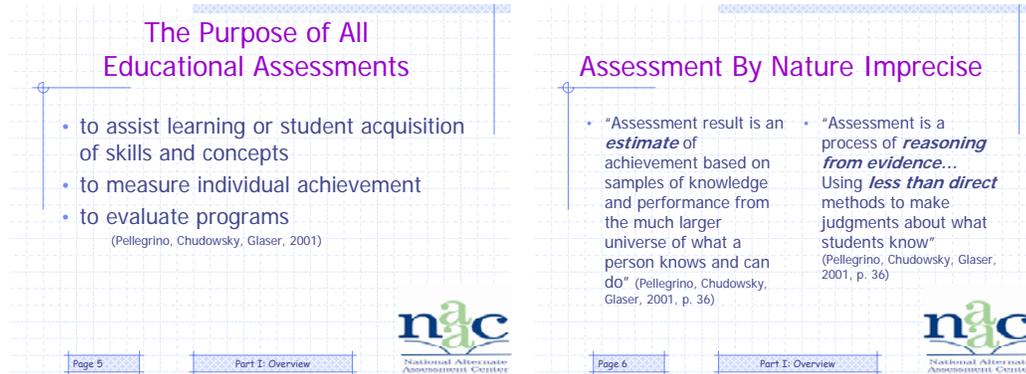
Part I: Overview, Terminology, Theory, and Research

Purpose of Part I

The purpose of Part I is to articulate principles of high quality assessment design, define a common terminology, examine theoretical principles upon which sound assessment systems can be built, and apply them to alternate assessments for students with the most significant cognitive disabilities.



Assessment Effective Practice



As Pellegrino, Chudowski, and Glaser (2001) remind us, educational assessment for *all students* may have the following purposes:

- assist learning or student acquisition of skills and concepts;
- measure individual achievement; and/or
- evaluate educational programs.

The purpose, however, of the No Child Left Behind Act of 2002 (NCLB) is the third bullet: the evaluation of educational programs. Unfortunately, when an assessment tries to accomplish multiple purposes, it generally doesn't provide high quality information for all three.

In addition, we want participants to remember that assessment by nature is imprecise, as it is at best an estimate of achievement based on samples of knowledge and performance and is a process of reasoning from evidence, using less than direct measures.

How Students with Disabilities Participate in Assessment

	General Assmt.	AA-GLAS	AA-AAS
Content Standards taught and assessed (access and alignment targets)	Grade level	Grade level	Grade level linkage to content standards
Achievement Standards	Grade level	Grade level	Alternate level
Participating Students	Most students, including those with disabilities (with or w/o accommodations)	Students with disabilities who need alternate way(s) to show what they know	Students with the most significant cognitive disabilities

Assessment Fairness/Accessibility

- Items/tasks provide an equal opportunity for all students to fully demonstrate knowledge and skills
- Assessments are administered fairly
- Results are reported fairly
- Results are interpreted fairly

(Peer Review Guidance, April 2004, p. 34)
<http://www.ed.gov/policy/elsec/guid/saaprguidance.doc>


 National Alternate Assessment Center


 National Alternate Assessment Center

Participation & Accessibility

Students with disabilities participate in assessment and accountability systems in three ways. Most students with disabilities participate in the general assessment with or without accommodations that are aligned to grade-level content and achievement standards. Some students with disabilities may participate in assessment through an alternate assessment that is also aligned to grade-level content and achievement standards. Finally, a few students with the most significant cognitive disabilities will participate in an alternate assessment that is linked to the grade-level content standards **and has** different definitions of proficiency (NAAC, 2004).

We also want to make sure that ALL assessments adhere to the fairness/accessibility standards by providing opportunities to demonstrate knowledge and skills, administer assessments fairly, and to ensure results are reported and interpreted fairly.

Universal Design for Learning



- General assessments that are valid and accessible for the *widest array* of possible users:
 - Reduce the need for accommodations
 - Reduce the need for multiple alternate assessments
- (CAST, 2002)



Page 9

Part I: Overview

Universal Design for Learning: Avoid Retrofitting



- Design assessments from the start based on the Principles of Universal Design for Learning
- As with any retrofitted solutions, accommodations in assessment can result in:
 - Limitations in efficacy
 - Compromises to validity



Page 10

Part I: Overview

Universal Design for Learning for AA-AAS



- Multiple means of expression.
 - Students must be able to show what they know and can do
 - Multiple means of representation.
 - Students must be able to access the content of the assessment
 - Multiple means of engagement.
 - Students may need more time, meaningful activities, and contextual orientation
- (CAST, 2002)



Page 11

Part I: Overview

Universal Design for Learning: Application to Assessment

- By considering student diversity during item construction, we should be able to minimize assumptions about student abilities which might interfere with the measurement of intended constructs.



Page 12

Part I: Overview

In addition, the principles of Universal Design for Learning (UDL) also apply to alternate assessments of alternate achievement standards in that general assessments are valid and accessible for the widest array of possible users. Adherence to these principles could both reduce the need for accommodations and reduce the need for multiple alternate assessments. Universal Design as applied to alternate assessment means that consideration should be given to multiple means of expression, multiple means of representation, and multiple means of engagement.

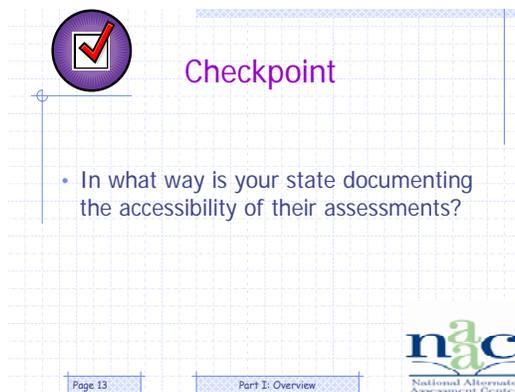
Just as in architecture, when the design from the beginning contains requirements to meet the needs of all users, thoughtful, functional, elegant design is the usual result. However, when forced to retrofit (make changes after completion of the design), the product is often less efficient, less effective, and frequently not to standard. In assessment, retrofitting solutions to accommodate students with disabilities may result in assessments that are no longer technically adequate. The validity and reliability of the measures may be compromised in retrofitting alterations. The end result, we may not be measuring what is needed, the standards, or student knowledge.

In adopting the principles of UDL when building assessments, the National Alternate Assessment Center (NAAC) will be considering student diversity from the start. In this way, those issues that interfere with measuring the intended constructs will be minimized.

UDL Principles:

1. Provide alternative formats for presenting information (multiple or transformable accessible media). Recognition
2. Provide alternative means for action and expression (write, draw, speak, switch, graphic organizer, etc.). Strategic
3. Provide alternative means for engagement (background knowledge, options, challenge, and support). Affective

Checkpoint



The slide features a purple circular icon with a white checkmark on a red background. To its right, the word "Checkpoint" is written in purple. Below this, a blue-bordered box contains a single bullet point: "• In what way is your state documenting the accessibility of their assessments?". At the bottom of the slide, there are three small boxes: "Page 13", "Part I: Overview", and the "nac" logo with the text "National Alternate Assessment Center" below it.

Notes

Defining Measurement Terminology

Defining Terms

- Academic Content Standards
- Academic Achievement Standards
- Alignment
- Alternate Academic Achievement Standards
- Appropriate Challenge
- Technical Quality
- Universal Design

Academic Content Standards

- Define what students are expected to know and be able to do
- Contain coherent and rigorous content
- Encourage teaching of higher order skills
- Must be grade-specific or may cover more than one grade if grade-level content expectations are provided for each of grades 3-8.

(Peer Review Guidance, April 2004, p. 2)
<http://www.ed.gov/policy/elsec/quad/saaprguidance.doc>

Academic Content Standards: Examples

- Detail facts
- Sequence events
- Use context cues
- Identify the purpose for a reading activity
- Communicate prior knowledge regarding a topic
- Ask questions about a literacy topic
- Identify similarities and differences across texts
- Categorize connections across texts
- List details about a topic
- Organize information while reading

Seven key terms are discussed: academic content standards, academic achievement standards, alignment, alternate academic achievement standards, appropriate challenge, technical adequacy, and universal design. These terms are often confused and it is important to clarify the differences. Academic content standards define what students should know and be able to do and are often grade or grade/band specific for grades 3-8. An example of a content standard from mathematics is: Students will solve equations. Examples of content standards from language arts are provided. The purpose of this workshop is to assist states in defining and linking their content standards in reading and mathematics for alternate assessments on alternate achievement standards for students with the most significant cognitive disabilities to appropriate grade-level content.

Academic Achievement Standards

- Answer the question "How good is good enough?"
- Must be **aligned** with grade level academic content standards
- Description of achievement levels (e.g., basic, proficient, advanced)
- Description of rationale and procedure used to determine levels (standard setting)

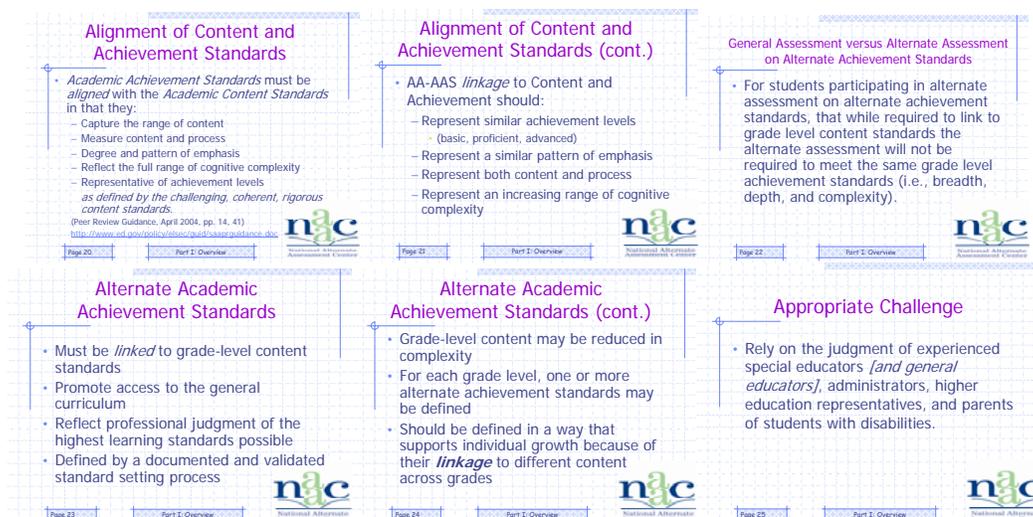
Academic Achievement Standards (cont.)

- Academic Achievement Standards have:
 - Performance Levels – labels of achievement
 - Performance Descriptors – describe each level of performance
 - Exemplars – samples of student work at each performance level
 - Cut Scores – scores that separate the performance levels

Example of Proficiency Description of 7th Grade Reading

PROFICIENT
 Student demonstrates overall knowledge of the text, including some inferential as well as literal information.
 Explains the literal and some inferential meaning of a passage taken from text appropriate for middle level students.
 Effectively uses word attack skills such as applying meanings of common prefixes and suffixes, knowledge of synonyms, antonyms, and homonyms, and multiple word meanings to aid in comprehending text.

Academic achievement standards are summary descriptions of *how well* a student should demonstrate proficiency in a content domain and is often described in at least three levels (e.g., Basic, Proficient, or Advanced). Alternate achievement standards also include descriptors of what student work reflecting the achievement looks like at basic, proficient, or advanced levels.



Alternate achievement standards must be linked to grade-level content in order to promote access to the general curriculum as required by IDEA 97. The key is to achieve an appropriate level of challenge as judged by experienced professionals and stakeholders who understand the learning characteristics and theory of learning around the population of learners with the most significant cognitive disabilities. The achievement standard must be defined through a documented, validated standard setting process. This may result in grade-level content that is reduced in complexity, depth, and breadth. There may be one or more alternate achievement standards. Alternate achievement standards should be linked and defined in such a way that supports individual growth across grade-levels. This workshop does **NOT** address the development of alternate achievement standards, except for developing summary descriptions of the selected content. It is important to remember for students participating in alternate assessment on alternate achievement standards, that while required to link to grade-level content standards the alternate assessment on alternate achievement standards will not be required to meet the same grade-level achievement standards in regard to breadth, depth, and complexity.

Alignment

Alignment in the measurement world commonly refers to the extent to which the academic content standards are aligned to academic achievement standards in the following five characteristics: 1) range of content, 2) measurement of content and process, 3) the degree and pattern of emphasis, 4) the range of cognitive complexity and 5) representative achievement levels. Alternate assessments on alternate achievement standards for students with the most significant cognitive disabilities must be **linked** to content and achievement standards in that the same achievement levels must be represented, the pattern of emphasis at each grade is similar, measurement includes both content and process, and represent an increasing range of complexity. The Peer Review Guidance (USDOE, April 28, 2004) suggests that an appropriate level of challenge can be determined by relying on the judgment of a diverse stakeholder group that includes special educators, administrators, higher education representatives, and families of

students with disabilities. Effective practice would emphasize the importance of including general education and content specialists in the work group.

Technical Quality

Technical Quality

- Content validity
- Relationship of assessment to other variables
- Consistency of student responses
 - Item analysis
- Internal structure
 - Statistical techniques used to verify reliability and validity
- Reliability

(Peer Review Guidance, April 2004, pp. 32, 33)
<http://www.ed.gov/policy/elsec/guid/naaprguidance.doc>

Page 26 Part 2: Overview n3c National Alternate Assessment Center

Technical quality encompasses at least five elements: content validity, the relationship of the assessment to other variables, consistency of student response, internal structure, and reliability. The first step in defining technical quality of alternate assessments on alternate achievement standards is to define content validity. The purpose of this workshop is to assist states in determining the appropriate academic content for alternate assessments on alternate achievement standards for students with the most significant cognitive disabilities.

Purpose of this workshop

- Is:
 - To assist states in designing alternate assessments based on alternate achievement standards for students with the most significant cognitive disabilities beginning with content.

Page 27 Part 2: Overview n3c National Alternate Assessment Center

Check Point

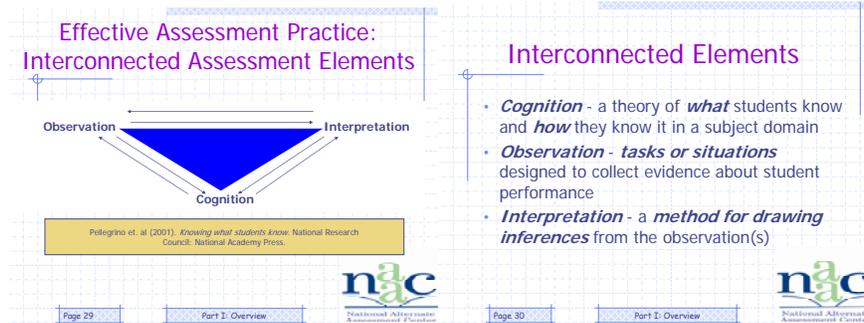
Checkpoint

- What terms were familiar to you?
- What terms were new?
- What terms need further definition or discussion?

Page 28 Part 2: Overview n3c National Alternate Assessment Center

Notes

Theoretical Foundation: The Assessment Triangle



An underlying conceptual model for the work of the National Alternate Assessment Center (NAAC) is the “assessment triangle”, based on the work of the National Research Council’s Committee on the Foundations of Assessment (Pellegrino, Chudowsky, & Glaser, 2001). This triangle explicates the key relationships between models of student cognition, observation of student work, and the inferences we can draw from these observations about what students know. This model focuses our attention on how assessment, including large-scale educational assessments, can reflect what good teaching and learning should look like.

The assessment triangle described by Pellegrino et al. (2001) consists of: “a model of student cognition in the domain, a set of beliefs about the kinds of observations that will provide evidence of the students’ competencies, and an interpretation process for making sense of the evidence” (p. 44). Pellegrino et al. defined three pillars on which every assessment must rest: “a model of how students represent knowledge and develop competence in the subject domain, tasks or situations that allow one to observe students’ performance, and an interpretation method for drawing inferences from the performance evidence thus obtained” (p. 2). They suggest that these pillars make up an *assessment triangle*, and that this triangle—cognition, observation, interpretation—must be articulated, aligned, and coherent for inferences drawn from the assessment to have integrity. For alternate assessments on alternate achievement standards for students with the most significant cognitive disabilities, we suggest that a theory of learning (cognition) of academic content has not been well articulated for this population and therefore is incomplete in the assessment design process. For this reason, we feel that it is necessary to begin this discussion on the “ground floor” starting with the cognition vertex of the assessment triangle and articulate how we know what students with the most significant cognitive disabilities know and can do in the content domains of reading and mathematics. Therefore, complete documentation of who the students are who take alternate assessments on alternate achievement standards is vitally important.

The theoretical foundation of the assessment triangle will be further addressed in Part 3: Theory of Learning. A connection between each subsequent part to a vertex or vertices will be identified so that the underlying framework of the assessment triangle can be visualized and conceptualized. The interpretation vertex does not have a primary connection to any part of the train-the-trainer module as that is not the purpose of these

particular materials and activities. However, it is important to remember that the vertices are inexorably linked and it is impossible to only address one without having any influence on the other two vertices.

Student Population for Alternate Assessment on Alternate Achievement Standards

More different than alike...
The number of students participating in alternate assessments on alternate achievement standards as compared to the total population of student learners and students with disabilities.

More different than alike...
The total student population receiving special education services broken down by disability category...

Participants in Alternate Assessments on Alternate Achievement Standards
The following videos will share examples of students who participate in alternate assessments on alternate achievement standards.

More alike than different

- It is *not* our purpose to develop a separate theory of cognition for students with the most significant cognitive disabilities, but rather to:
 - understand within the context of our current literature, what might be problematic for students with the most significant cognitive disabilities, within this most important vertex of the assessment triangle as it is defined for all students (Kleinert & Browder, unpublished manuscript)

Issues in Teaching/Assessing Students in Alternate Assessments on Alternate Achievement Standards

- Students with the most significant cognitive disabilities present problems with learning in these areas:
 - Attention to Stimuli
 - Memory
 - Generalization
 - Self-Regulation
 - Limited motor response repertoire
 - Meta-cognition and Skill Synthesis
 - Sensory Deficits
 - Special Health Care Needs

Students with the most significant cognitive disabilities represent only about 1% of the total assessed population; however the diversity of learning within this 1% is quite variable when considering assessment strategies. We find these students are more different than alike in terms of their response capabilities and may come from a variety of special education categories. Ultimately, however, it is important to remember that these children have the same general patterns of development as other children and the assumption of competence should always be considered first.

We have provided video tape case study examples of each of these categories to assist participants in identifying the target population. The mental retardation category represents the largest category of students who use alternate assessments; however, not all students with mental retardation will require an alternate assessment. We will introduce you to Ryan and Sarah. Both Ryan and Sarah experience significant cognitive disabilities, but the differences between them represent the diversity within this population of students. Both may experience difficulty with remembering new information, generalizing new information to novel situations, or applying skills to new problems. However, Ryan and Sarah vary in their diversity of support and response needs.

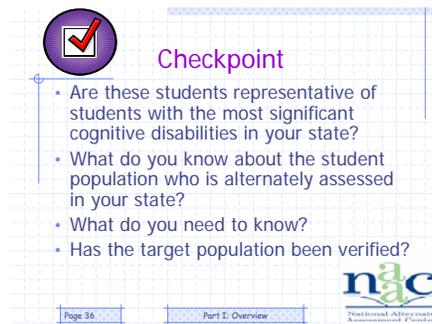
Similarly, we find participants in alternate assessment on alternate achievement standards in the category of multiple disabilities, as with the mental retardation category. However, not all students with this label will be assessed on alternate achievement standards. You will be introduced to Rhianna, Leslie, and Martha, three case study examples. All three demonstrate special health, mobility, and sensory needs. Finally, we introduce you to

Jordan, a student with autism. Again, not all children with autism will be assessed using an alternate assessment on alternate achievement standards. Students with autism experience difficulties in the following areas: attending to the salient features of a skill or concept, generalizing skills and concepts to new or novel situations, and self regulating or knowing when to use a skill or concept.

It is *not* our purpose to develop a separate theory of cognition for students with the most significant cognitive disabilities, but rather to understand within the context of our current literature, what might be problematic for students with the most significant cognitive disabilities, within this most important vertex of the assessment triangle as it is defined for all students. Without a careful consideration of these problematic issues for students with the most significant cognitive disabilities, it would not be possible to align the other dimensions of the assessment triangle (observation of student performance and interpretation of the meaning of that performance) into a coherent whole that fully gives credit to what students with the most significant disabilities can learn and do.

Generally, these students come with labels of mental retardation, multiple disabilities, and/or autism. However, they do not generally encompass the entirety of any of these categories. Specifically, students with the most significant cognitive disabilities experience difficulty in the following areas: attending to the salient features of stimuli, remembering new information, generalizing learned skills to appropriate contexts, self regulating behavior, meta-cognition, and skill synthesis. Some of these students may have limited motor response repertoires, sensory deficits in both hearing and vision, and special health care needs which may limit participation in school activities.

Checkpoint: Think, Pair, Share



Checkpoint

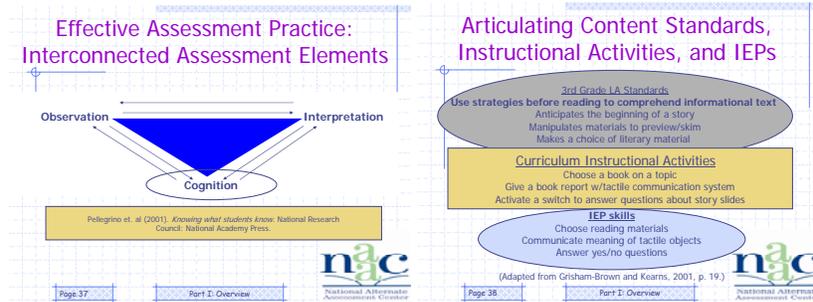
- Are these students representative of students with the most significant cognitive disabilities in your state?
- What do you know about the student population who is alternately assessed in your state?
- What do you need to know?
- Has the target population been verified?

Page 36 | Part 2: Overview | National Alternate Assessment Center

Trainer’s Note: For a more extensive discussion of the learning characteristics of this population and the implications for instruction and assessment, use Part II: Who are the Students who take Alternate Assessments on Alternate Achievement Standards.

Notes

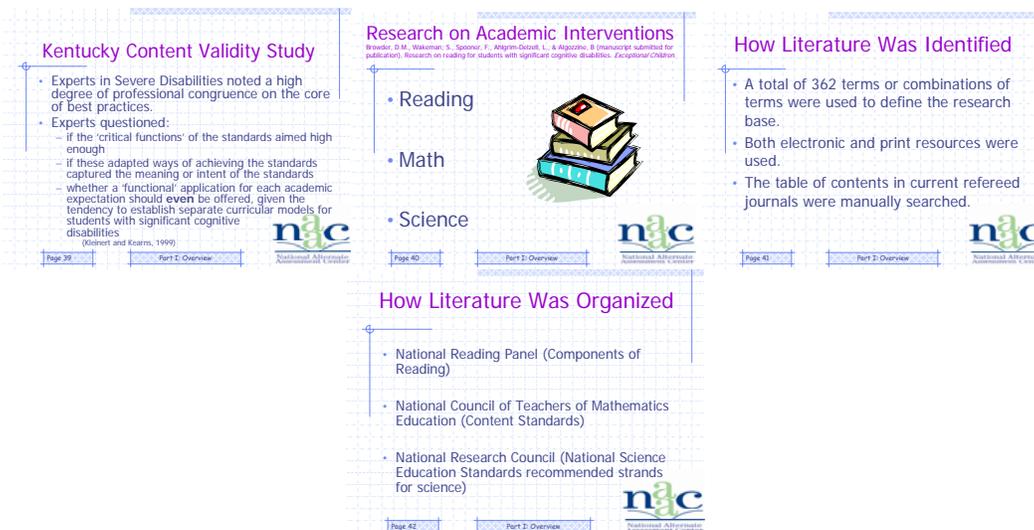
Theory of Learning for Students with the most Significant Cognitive Disabilities: Determining Competence in Academic Domains



The cognition vertex of the assessment triangle includes the theory of learning or the development of competence in the content domain areas of reading, mathematics, and science.

Because their learning is perceived to be so significantly different than typical children, the curriculum for students with the most significant cognitive disabilities has not traditionally focused on academic content but encompassed a separate curricular focus. Indeed, in many cases it is thought that the student’s Individual Education Program or IEP is the curriculum for each individual student. While the IEP certainly represents educational priorities and supports to achieve those educational priorities for the individual student, it does not represent the entire range of curriculum; nor does it represent the academic standards upon which a curriculum should be based (Giangreco, Cloninger, Iverson, 1999; Grisham-Brown, Kearns, 2001).

Therefore, we turn to the literature to determine what areas within the domains of reading, mathematics, and science have been taught.



First, in a survey of experts in severe disabilities, Kleinert and Kearns (1999) found the highest degree of congruence on the core of effective practices found in the performance domain. However, even though Kentucky’s alternate assessment has always had its foundation in the general curriculum standards, experts questioned whether:

- the ‘critical functions’ of the standards aimed high enough,
- if these adapted ways of achieving the standards captured the meaning or intent of the standards, and
- whether a ‘functional’ application for each academic expectation should **even** be offered, given the tendency to establish separate curricular models for students with significant cognitive disabilities.

A comprehensive literature review was conducted for empirically based research from 1975-2003 related to the instruction of students and adults with disabilities in the academic areas of reading, math, and science at UNC-Charlotte. The literature had to be published in peer-reviewed journal in English with at least one participant with diagnosis of significant cognitive disabilities (moderate, severe, mental retardation, autism, or developmental disability). The intervention in the literature had to use a recognized experimental or quasi-experimental design (including single subject designs).

Nationally recognized standards or components of the academic content areas were used to organize the literature. The National Reading Panel (2000) identified five components that make up the content of reading. These components included fluency, vocabulary, phonics, phonemic awareness, and comprehension. The National Council of Teachers of Mathematics Education began in 1989 and continued through 2005 to describe mathematical content standards around which the curriculum should be organized. Numbers and operations, algebra, geometry, measurement, and data analysis, and probability were recognized as skill areas necessary for students to be effective. Finally, in 1996, the National Research Council approved seven strands for science to help the nation’s students achieve science literacy. These strands consist of science as inquiry, physical science, life science, Earth and space science, science and technology, science in personal and social perspectives, and the history and nature of science.

Reading



We have not yet tried to teach this population to read....

- Kliever, C., & Biklen, D. (2001). "School's not really a place for reading": A research synthesis of the literate lives of students with severe disabilities. *The Journal of The Association for Persons with Severe Handicaps*, 26, 1-12.
- Joseph, L. M., & Seery, M. E. (2004). Where is the phonics?: A review of the literature on the use of phonetic analysis with students with mental retardation. *Remedial and Special Education*, 25, 88-94.

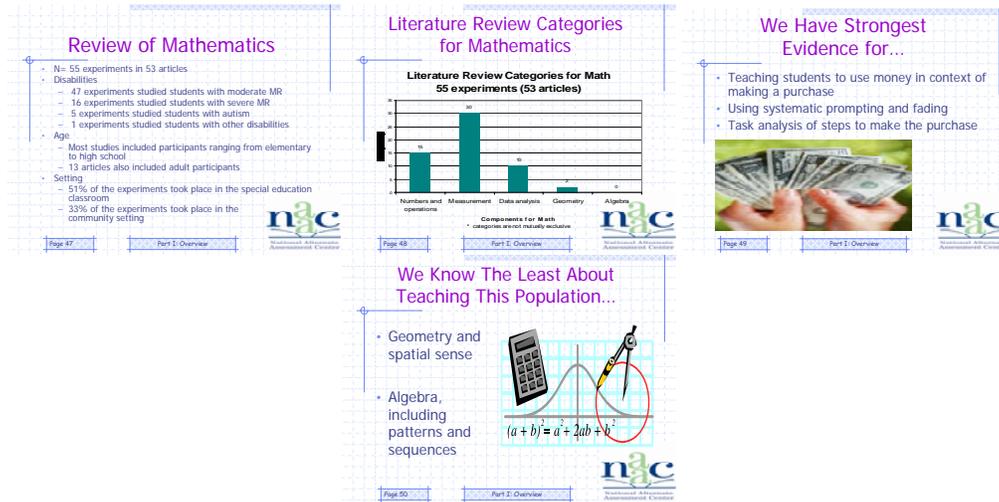
Page 46 Part 2: Overview nac
National Alternate Assessment Center

As you will see on the graphs for each slide, all data was categorized into the related academic areas for what is commonly accepted as the curricular focus. The five components of Reading, the five content standards for mathematics, and the seven strands for Science were used to identify areas of strength and weakness for instruction with students with significant disabilities. Studies were also analyzed using quality indicators identified by Gersten, et al. (2005) for experimental studies and Horner, et al. (2005) for single subject studies. As there were very few experimental studies with this population, we were unable to apply Gersten. However, we were able to apply the criteria recommended for quality within single subject research in special education (Horner et al., 2005) as there were 88 single subject design studies. Fifty-two (59%) met all criteria for quality indicators. An additional 27 (31%) had all criteria except a measure of procedural fidelity leaving only nine (10%) studies that missed two or more criteria. Of the 52 studies that met all criteria, 40 (77%) focused on sight word instruction. These 40 studies included 155 participants and were conducted in nine different geographic locations.

The teaching of sight words was included in the category of vocabulary. Fluency was less likely to be the reading of a passage and the recording of errors than it was the tracking of error rate over time for symbol identification. Comprehension may be the reading of safety signs in the community and selecting the correct gender specific restroom. Most studies related to phonics were conducted by two sets of researchers in the 1980s.

Kliever and Biklen (2001) described the need to get past what students are perceived as being unable to do and help them become involved in literacy through adapted and modified texts, materials, and routines. Joseph and Seery (2004) conducted a literature review of empirical studies that used phonetic strategies or instruction with students with mild or moderate retardation. Outcomes demonstrated that while the process of learning to read (i.e., phonetic instruction) is not being taught to students with mental retardation, these students may benefit from direct/explicit instruction in phonic analysis.

Mathematics



Notably, only-one third of the intervention studies were in the content area of mathematics. Experimental studies that focused on mathematics were predominately conducted with students with moderate disabilities. Over 80% of studies were either conducted in a separate classroom or in the community. This setting suggests that the type of instruction was on functional skills rather than academic content and is supported by the numbers in the graph.

Measurement included time and money. Numbers and operations included counting and number identification. Data analysis included self-graphing and self-monitoring data. Geometry was primarily the identification of shapes. There is very little about teaching students anything past shape identification. While traditionally these areas have been thought of as out of reach, extended standards and entry points created by curriculum specialists can help teachers find meaningful ways to address complex standards (e.g., understand the concepts of over/under related to spatial understanding, reading the mathematical equation of $7 > 3$ to a student and providing choices for responses allows the student an opportunity to demonstrate understanding of the concept of greater than or less than).

Science

Review of Science

- Least frequently addressed area
- Only found 10 studies; all single subject
- Total N=42 participants
- All in separate special education contexts: one in a summer program
- Nearly all were Science for Personal and Social Perspective (First aid and safety research)

Page 51 | Part 1: Overview | n3c

Literature Review Categories for Science

Literature Review for Science
10 articles, 10 studies

Page 52 | Part 1: Overview | n3c

We have the most evidence for...

- Teaching science using real life activity
 - Specifically First Aid and Safety
- Using systematic prompting and fading

Page 53 | Part 1: Overview | n3c

What we have the least of...

- Not a great deal for any category of science

Page 54 | Part 1: Overview | n3c

The one study for Earth and space science dealt with teaching the students about weather sight words. Most of the personal and social perspectives dealt with making correct responses or choices in safety situations (i.e., cooking, crossing the street). Information in the area of science is limited. Clearly there is a need for research in this area as the assessment of students in science is approaching. There will continue to be a need for extensive curriculum work to create appropriate, meaningful content standards for students with significant disabilities as well as a need for alignment of those standards to instruction and assessments.

Reasons for the problem

- Lack of literature defining academic outcomes for students with the most significant cognitive disabilities
- Variety of curricular philosophies in place across states

Page 55 | Part 1: Overview | n3c

The reason for this lack of definition in academic content is the lack of literature and the separate curricular philosophies encompassed within the developmental and functional eras.

Checkpoint



Checkpoint

- Does your alternate assessment on alternate achievement standards include:
 - Clear assessment content targets based on a theory of learning for the intended population in the content domains of reading and mathematics?

Page 56 Part I: Overview 

Trainer’s Note: We will be continuing the discussion about the curricular philosophies with a planned activity in Part III. If you would like to continue the discussion of the learning characteristics of students with the most significant cognitive disabilities, go to Part II: Who are the Students who take Alternate Assessments on Alternate Achievement Standards.

Notes

References

- Browder, D.M., Wakeman, S., Spooner, F., Ahlgrim-DeLzell, L., & Algozzine, B. (manuscript submitted for publication). Research on reading for students with significant cognitive disabilities. *Exceptional Children*.
- Center for Applied Special Technology. (CAST). (2002). www.cast.org.
- Education Week* analysis of data from the U.S. Department of Education, Office of Special Education Programs, Data Analysis System, 2002-03.
- Gersten, R., Fuchs, L. S., Compton, D., Coyne, M., Greenwood, C., & Innocenti, M. (2005). Quality indicators for group experimental and quasi-experimental research in special education. *Exceptional Children*, 71, 149-165.
- Giangreco, M., Cloninger, C., Iverson, (1999). *COACH: Choosing options and accommodations for children*. Baltimore: Paul Brookes.
- Grisham-Brown, J. & Kearns, J.F. (2001). Creating standards-based individualized education programs. In Kleinert, H. K., and Kearns, J.F. *Alternate Assessments Measuring Outcomes and Supports*. Baltimore: Paul Brookes.
- Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children*, 71, 165- 180.
- Individuals with Disabilities Education Act (IDEA) Amendments of 1997, PL 105-117, 20 U.S.C. § 1400 *et seq.*
- Joseph, L.M., & Seery, M.E. (2004). Where is the phonics. *Remedial and Special Education*, 25(2), 88-95.
- Kleinert, H. L., & Kearns, J. F. (1999). A validation of the performance indicators and learner outcomes of Kentucky's alternate assessment for students with significant disabilities. *The Association for Persons with Severe Handicaps*, 24(2), 100-110.
- Kleinert, H. K. & Thurlow, M. (2001). An introduction to alternate assessment. *Alternate Assessments Measuring Outcomes and Supports*. Baltimore: Paul Brookes.
- Kliwer, C. & Biklen, D. (2001). "School's not really a place for reading: A research synthesis of the literate lives of students with severe disabilities. *Journal of the Association of Persons with Severe Handicaps*, 26(1), 1-12.
- National Alternate Assessment Center (NAAC). (2005). www.naacpartners.org.

No Child Left Behind Act of 2001, Pub L. No 107-110, 115 Stat. 1425 (2002)

Pellegrino, J., Chudowsky, N., & Glaser, P. (2001) *Knowing what students know*.
National Research Council: National Academy Press.

United States Department of Education. (2004). *Standards and Assessments Peer Review
Guidance: Information and examples for meeting requirements of the No Child
Left Behind Act of 2001*. Washington D.C.: US Department of Education Office
of Elementary and Secondary Education.