Learning Characteristics Inventory (LCI) Report

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Introduction

Students completing an alternate assessment on alternate achievement standards (AA-AAS) represent less than 1% of the total student population and come from a variety of disability categories but represent students with the most significant cognitive disabilities. Researchers have found that the Individuals with Disabilities Education Act (IDEA) disability label allowing a student to receive special education services (i.e., autism, mental retardation, multiple disabilities) does not adequately describe the learning characteristics of this heterogeneous population (NAAC, 2005). The purpose of conducting the current research was to investigate the true learning characteristics of students participating in the AA-AAS in order for states to make informed, data-based decisions about the design and administration of AA-AAS. Two partner states joined NAAC at the University of Kentucky to participate in this research during the 2005-2006 school year. The following report outlines an overview of the literature pertinent to the findings as well as the research process and results for both participating states* (* to maintain anonymity, the states will be named State 1 and State 2).

Review of the Literature in Language Development and Reading

The following information, supported by a review of literature in language development and reading, should be considered when making decisions about the population of students who participate in the AA-AAS.

- Students with the most significant cognitive disabilities can acquire generalized use of objects (or object selection) to **communicate** preferences (Hetzroni, Rubin, Konkol, 2002).
- Language learners must use symbols repeatedly, interactively, and generatively during meaningful and ongoing activities in language-rich environments (Goossens, Crain, & Elder, 1992; Cafiero, 1998; Goossens et al., 1992; Romiski & Sevcik, 1996; Miller & Eller-Miller, 2002; Mirenda, 2003).
- Competent use of language for multiple purposes, audiences, and contexts facilitate the metalinguistic skills required for reading comprehension (Rankin, Harwood, & Mirenda, 1994).
- Use of graphic symbols for communication may facilitate specific components of print and word awareness, but the overall impact on beginning reading and reading comprehension may be minimal (Bishop, Ranking, & Mirenda, 1994; Rankin, Harwood, & Mirenda, 1994).

Methodology

All special education teachers in State 1 were sent an email inviting them to complete an LCI for each student they had participating in the AA-AAS during the 2005-2006 school year. In the email, teachers were offered three ways in which to complete the LCI:

1) Teachers could click on a link that directed them to the inventory where they could complete it for each child participating in the alternate assessment (thus a teacher with

three students in the alternate assessment would complete the LCI for each of them). If teachers completed the LCI online, they were asked to print the completion page and bring it to the scoring site when dropping off portfolios so they would not be asked again if they had completed the inventory for their student (s).

2) Teachers could complete the inventory by printing off the version attached to the invitation email. Teachers were asked to print the inventory for each student participating in the alternate assessment and bring the LCI(s) with them when dropping off portfolio(s) at their scoring site.
3) If teachers chose not to complete the inventory, forgot to bring it with them to the site, or chose to complete it upon arrival to the scoring site, inventories were available for them at the scoring site.

In State 2, all district administrators were sent an email from the Chief of the Bureau of Assessment. District administrators were asked to forward an attached email to teachers inviting them to complete an LCI for each student participating in the AA-AAS during the 2005-2006 school year. Teachers were given a three week window to complete the inventory for their student(s) and then the inventory was taken offline.

Instrumentation

The LCI was developed by researchers at NAAC in conjunction with experts in the fields of Occupational Therapy, Physical Therapy, Speech/Language Therapy, Deaf-blindness, Reading, Mathematics, and Special Education. The LCI went through an expert validation and changes to the categories were made given thoughtful feedback from the experts. The survey was then piloted with a small sample of teachers. Teachers were asked to choose a partner respondent and both were to provide an LCI for a single student so interrater agreement could be calculated. Interrater agreement was 84% and teachers made suggestions for changes to the categories. These suggestions were considered by researchers at NAAC, and a final version of the LCI was once more piloted with a small sample of teachers (and partner respondents). The interrater agreement was 95% indicating the instrument was valid to investigate the learning characteristics of students with the most significant cognitive disabilities.

The instrument includes 10 questions, nine that are on a continuum of skills in the areas of expressive communication, receptive language, vision, hearing, motor, engagement, health issues/attendance, reading and mathematics. The other question is a dichotomous variable that asked if students used an augmentative communication device. Teachers were asked to rate where each student in their class participating in an AA-AAS would rank on this continuum for each variable. Each item within each variable was given a numerical value (low to high with high representing more complex abilities) for data analyses purposes.

Data Analysis

During the 2005-2006 school year, there were approximately 1394 students who completed an AA-AAS in State 1 from grades 4, 8, and 12. The databases from the online survey and the hand-entered data from the paper surveys were combined. Teachers completed LCIs for 1120 students. The response rate was 80.34%.

During the 2005-2006 school year, there were approximately 2800 students who completed an AA-AAS in State 2 from grades 3-8 and 10. Teachers completed LCIs for 201 students. The response rate was approximately 7%. It is possible the response rate was reduced for two reasons: 1) time of year in which the inventory was conducted and 2) emailing teachers through district administrators (which required administrators to forward the email to teachers). Please see the recommendations section on ways to improve response rates in the future.

Descriptive statistics were performed on each of the ten categories of characteristics. Important findings are summarized in the bullets below for **State 1**:

In the area of Communication:

- 71.30% of the students in this sample who take the alternate assessment use symbolic language to communicate expressively.
- 17.20% use intentional communication with pictures/objects and/or gestures but not at the symbolic language level.
- 97.60% of the students have some level of receptive language response, including 46.70% who can follow 1-2 step directions presented through words only, 41.20% who can follow oral instructions when provided additional cues, and an additional 9.70% who alert to sensory input from another individual.
- 8.20% of the students have no clear use of words, pictures, objects, or signs to communicate expressively and a smaller percentage, 1.60% exhibit uncertain receptive responses to stimuli. In addition, this 1% - 2% appears to also have sensory issues in vision, limited engagement in social interactions, and low attendance rates.
- 18.00% of the students use an augmentative communication system in addition to or in place of oral speech.

In the content areas of Reading/Math:

- 2.40% of the sample read fluently in print or Braille and 13.70% read with basic literal understanding.
- An additional 67.30% of the sample, read basic sight words or demonstrate basic literacy skills (i.e., awareness of print or Braille).
- 2.60% apply computational procedures to solve real-life word problems in a variety of contexts, and an additional 57.20% can do computational problems with or without a calculator.
- An additional 18.80% of the sample can count with 1:1 correspondence to at least 10, with an additional 6.80% who can rote count to at least 5.
- Finally, 15.40% have no awareness of print or Braille, and 12.90% have no observable awareness of or use of numbers.

Important findings are summarized in the bullets below for **State 2**:

In the area of Communication:

- 63.20% of the students in this sample who take the alternate assessment use symbolic language to communicate expressively.

- 25.90% use intentional communication with pictures/objects and/or gestures but not at the symbolic language level.
- 98.40% of the students have some level of receptive language response, including 33.80% who can follow 1-2 step directions presented through words only, 54.20% who can follow oral instructions when provided additional cues, and an additional 10.40% who alert to sensory input from another.
- 10.90% of the sample have no clear use of words, pictures, objects, or signs to communicate expressively and a smaller percentage, 1.50% exhibit uncertain receptive responses to stimuli. In addition, this 1% - 2% appears to also have sensory issues in hearing, limited engagement in social interactions, and require personal assistance with most activities (please note these findings represent a very small N and should be considered with caution).
- 29.90% of the sample use an augmentative communication system in addition to or in place of oral speech.

In the content areas of Reading/Math:

- 11.90% of the sample reads fluently with basic literal understanding.
- An additional 61.20% of the sample, read basic sight words or demonstrate basic literacy skills (i.e., awareness of print or Braille).
- 4.00% apply computational procedures to solve real-life word problems in a variety of contexts, and an additional 37.30% can do computational problems with or without a calculator.
- An additional 24.40% of the sample can count with 1:1 correspondence to at least 10, with an additional 10.00% who can rote count to at least 5.
- Finally, 24.90% have no awareness of print or Braille, and 22.40% have no observable awareness of or use of numbers.

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Correlational analyses were also conducted between expressive language, receptive communication, and reading and math (Results for both states can be found in Table 11 of Appendix A). A bivariate Pearson correlation was used to investigate the relationship between expressive language and reading and math and receptive communication and reading and math. In State 1, a statistically significant correlation was found between the level of the student's expressive language and the student's level of reading ($r = .57$, $p < .01$). Therefore, students who were symbolic learners were also reading at a higher level than those who were not. A significant correlation was also found between the level of a student's receptive communication and level of reading ($r=.53$, $p< .01$). Consequently, students with a higher level of receptive communication were also reading at a higher level. At the same time, significant correlations were found between the level of a student's expressive language and mathematics ($r=.65$, $p< .01$) and receptive communication and mathematics ($r=.60$, $p< .01$). As a result, students with higher levels of expressive language and receptive communication were working at a higher level in mathematics.

Correlational analyses were conducted in State 1 to investigate the relationship between receptive language and engagement, motor, and health issues/attendance. These analyses resulted in significant correlations for receptive language and engagement ($r=.51$, $p< .01$) and motor ($r=.51$, $p< .01$).

In State 2, a statistically significant correlation was also found between the level of the student's expressive language and the student's level of reading ($r = .67$, $p < .01$) and between the level of a student's receptive communication and level of reading ($r=.56$, $p< .01$). At the same time, significant correlations were found between the level of a student's expressive language and mathematics ($r=.69$, $p< .01$) and receptive communication and mathematics ($r=.55$, $p< .01$). Overall, these results help us to understand how students are most likely processing language and academic tasks in each of the two states.

Correlational analyses were also conducted in State 2 to investigate the relationship between receptive language and engagement, motor, and health issues/attendance. These analyses resulted in significant correlations for receptive language and engagement ($r=.51$, $p< .01$) and motor ($r=.41$, $p< .01$).

Limitations of this study

One limitation of this study for both participating states is that it did not encompass the entire sample of students participating in the AA-AAS during the 2005-2006 school year. Many efforts were made to increase response rate (i.e., gathering the data online, requesting the data from teachers through district administrators in one state, sending the invitation email for completion of the inventory from the Chief of the Bureau of Assessment in one state). Still, only 7% of the students completing an AA-AAS were represented in the sample in one state and the other sample lacked 20% of the population. Consequently, results should be interpreted with caution.

Recommendations

Given the descriptive and correlational results of the LCI coupled with the information from the literature review in language development and reading, the following are recommendations for these states to consider when making decisions about the AA-AAS:

- Consider bias implications of the assessment for the 1% - 2% of the sample who appear to experience multiple challenges.
- Consider further study of the students who had a high level of reading and mathematics fluency.
- Consider further study of the students who had a low receptive communication level.
- Consider gathering the information from this inventory from every student through electronic entry or inclusion with submission of the AA-AAS. In this way, the responses could be gathered longitudinally across years and would represent the entire sample of students each year. States could also track changes in students' characteristics on the student level rather than by cohort using student identifiers.

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