Assessment in Education: Principles, Policy & Practice
Vol. 15, No. 2, July 2008, 137–151

Facilitating participation in assessments and the general curriculum: level of symbolic communication classification for students with significant cognitive disabilities

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This study empirically evaluated a classification schema based on symbolic communication level use with students with significant cognitive disabilities. Ninety-five teachers of students with significant disabilities rated students' level of performance on 10 academic tasks. Cluster analysis suggested a range of two to four clusters solutions. Support was found for three clusters: symbolic (abstract), early symbolic (concrete), and pre-symbolic/awareness. The potential application of the classification system to planning general curriculum access and setting achievement expectations are discussed.

Recent federal policy in the United States has promoted access to the general curriculum for students with disabilities (Individuals with Disabilities Education Improvement Act [IDEA], 2004) and created expectations for all students to show adequate yearly progress on state standards in language arts/ reading, maths, and science (No Child Left Behind [NCLB] 2002). A similar policy went into effect in the United Kingdom in 2000 which revised the National Curriculum to 'include and provide meaningful learning opportunities for all pupils' (Wade 1999, 80). To respond to these requirements, states in the US developed alternate assessments for students with significant cognitive disabilities. The US Title 1 regulation on alternate achievement standards (US Department of Education 2003) made it possible for school systems to count up to 1% of students with significant cognitive disabilities as meeting the established competency levels when determining adequate yearly progress'. These alternate achievement standards can be assessed through alternate assessment, but these assessments must be aligned with a state's academic content standard, promote access to the general curriculum, and reflect professional judgement of the highest achievement standards possible.

The struggle to adapt general curriculum content for students with significant cognitive disabilities and define achievement expectations has been evident. Emblem and Conti-Ramsden (1990, 90) outlined the concern in the UK about whether or not the National Curriculum was realistically 'suitable for all' and the potential collapse of the system if the expectations were unrealistic for this population of students. Ford et al. (2001) noted that in the rush to assess all students on state standards in the United States, which was first required by IDEA (1997), educators sometimes defined anything, no matter how trivial, as an access goal. Subsequent research by Browder, Flowers, et al. (2004) provided evidence that some of the skills targeted for alternate assessments may not have been linked to academic content nor even have been functional to daily living. Curriculum experts found

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ISSN 0969-594X print/ISSN 1465-329X online

DOI: 10.1080/09695940802164176
http://www.informaworld.com

that some states' alternate assessment performance indicators had weak links to reading and maths content. In a further analysis of these performance indicators, Browder et al. (2003) found that some tasks either required no effort on the part of the student or were so vague that anything might pass as progress.

The poor alignment of early alternate assessments to state standards was not surprising, given the small body of research on teaching academics to students with severe disabilities (Browder, Spooner, Ahlgrim-Delzell et al. 2006; Browder, Wakeman, Spooner et al. 2006). There exist few research-based models for how to teach this population academic content beyond sight words and money. In contrast, some resources have emerged that provide examples of adapting academic content for students with significant cognitive disabilities (Jackson et al. 2003; Downing 2005; Browder and Spooner 2006).

Even with these emerging models, teachers may wonder how to adapt recommendations to students' varying abilities. For example, one student may be able to read sight words and use a wide variety of pictures to show understanding, while another may have no reading or picture recognition skills. Hammond and Read (1990, 27) outlined the need for balance within the system in the UK 'On the one hand, special education is to do with identifying each child's needs…On the other hand, the National Curriculum is about providing all children with access to a common body of learning'. In describing how to access the general curriculum, Browder, Ahlgrim-Delzell et al. (2006) recommended considering students' level of symbolic communication in planning what to teach. To plan for students who do not yet have symbolic communication, the teacher may consider how to introduce symbols while also relying on concrete representations like objects to ensure understanding. For example, a teacher might have the student create a science report by selecting objects. The teacher or a classmate may then help the student pair these objects with pictures or photographs to create a picture report. A student who already uses pictures for everyday communication might learn to recognise new pictures related to the science content. Students with a more abstract level of symbol use might be expected to develop the report using short sentences with computer-assisted word selection.

Students' symbolic level has been used for educational planning as early as the work of Piaget (1952). In contrast, basing educational planning on developmental levels or stages was rejected for students with significant cognitive disabilities in the late 1970s because it perpetuated education that was not chronologically age appropriate or functional to daily living (Browder, Spooner, Ahlgrim-Delzell et al. 2003). More recently, educators have used students' symbolic level to understand how to promote communication skills. Siegel and Wetherby (2006) described how some individuals with severe disabilities continue to communicate primarily through nonsymbolic responses. For example, a student may raise a cup to ask for a drink. Rowland and Schweigert (1990) described three levels of communication for students with severe disabilities: (a) pre-symbolic (e.g., primitive and conventional gestures), (b) concrete symbolic (e.g., symbolic gestures, tangible symbols, objects, and pictures), and (c) abstract symbolic (e.g., speech, sign language, printed language, Braille, abstract shapes, and abstract graphics).

It is important to note that students with significant cognitive disabilities at any of the three symbolic levels could be nonverbal. Students at an abstract symbolic level may use assistive technology like a Dynavox or Vanguard and be able to type or select responses with a wide range of vocabulary. Research on teaching nonverbal students to read illustrates how having some fluent use of symbol systems can build academic learning (Heller et al., 2002; Coleman-Martin et al. 2005). In contrast, students at a concrete symbolic level may rely on a more limited set of symbols. For example, Kozleski (1991) used a systematic prompting and fading procedure called time delay to teach individuals with severe cognitive and physical impairments to match objects with pictures on a communication board and then to use these pictures to make requests. Similarly, Dyches (1998) used a systematic system of prompting to teach four elementary schoolchildren with autism and severe cognitive disabilities to use communication switches.

Not all students with severe disabilities have acquired symbolic communication. Sigafoos and Dempsey (1992) note that many students with severe disabilities may rely on idiosyncratic movements for expression. Because not all students learn to use pictures and other symbols, Siegel-Causey and Guess (1988) developed an intervention approach for students who communicate nonsymbolically. Teachers may be able to help students move from a pre-symbolic to symbolic level of communication using methods such as referencing, time delay, and shaping (Arthur and Butterfield 1993). In contrast, teachers need options for students who do not yet use symbols to access the general curriculum while concurrently promoting increased communication competence.

While Rowland and Schweigert (1990) proposed three symbolic levels, some communication experts would propose a fourth level of students who do not yet show intentionality in communication. Wetherby and Prizant (1989, 77) defined intentionality as 'the deliberate pursuit of a goal'. Dunst and Lowe (1986) differentiated between pre-intentional and intentional communicative behaviours by the person's level of indication (e.g., alerting a partner versus indicating a need). For example, a student who bangs her spoon when hungry is showing more intention than a student who simply cries. Coupe et al. (1988) indicated that while a child may have facial expressions and body movements that respond to an external stimulus, his/her responses may not be intentional communication. They can be interpreted, however, if adults recognise these responses and attach meaning to them. For example, a child who wrinkles her face when tasting mustard can demonstrate her dislike for it; her reaction is to the stimuli, not to the individual giving her the mustard.

Intentionality is typically measured through behavioural observations (Bates 1979). Some students' physical challenges are extensive and make it challenging to judge responses as intentionally communicative versus a pre-locutionary response (e.g., a cry that is interpreted as discomfort), or that may even be involuntary movement or seizure activity. For students who do not yet show clear intentionality, assessment and instruction may need to focus on the level of the student's general response or awareness of the activity. For example, does the student open their eyes, make a sound, or stay actively awake instead of sleeping during instruction? Levels of awareness may be assessed systematically. For example, Guess et al. (1988) conducted research showing that assessments of the level of alertness used in infant research could be used to gauge the level of alertness of students with limited responses. This does not imply that the student would be taught an infant stimulation curriculum, but instead would be observed for level of alertness and intentionality during age-appropriate activities.

One of the frustrations teachers encounter in current requirements for students to have access to general curriculum content is that professional development materials and assessment protocols may be biased towards students with abstract, or at least concrete, symbolic use. Teachers of students who have not yet learned to use symbols, or who may have limited intentionality, may conclude that general curriculum access is not feasible given the lack of examples. Without consideration of students' symbolic levels, alternate assessment may also be biased towards students with abstract symbolic use. That is, students who rely on a more restricted range of symbols or who need objects and concrete representations may have no option for showing adequate yearly progress even with alternate achievement standards because the assessment is not inclusive of their communication system. Additionally, Miller (1992) noted the frustration of teachers within the UK related to the bias in assessments if a student was unable to speak but could communicate with support.

The option exists within current US federal policy to set multiple alternate achievement standards. States could have some differentiation within assessment items, format, or expectations for outcomes based on students' differing abilities. What is not currently allowed is setting an individual standard for each student (e.g., Individualised Education Programme (IEP) progress) because this falls short of a state standard for achievement (US Department of Education 2005). Setting achievement expectations based on students' symbolic level is an alternative to either setting an individual achievement standard for every student or simply expecting all students with significant cognitive disabilities to meet the same achievement standard. To meet requirements for a state alternate assessment to have technical adequacy needed for NCLB reporting, such a classification system based on symbolic level would be stronger if supported by research.

The purpose of this study was to evaluate a classification schema based on symbolic level using examples of how a student might respond to academic instruction. Teachers were asked to select two students in their classrooms and rate each on a survey of academic responses. Statistical analysis was used to determine whether these responses clustered into four hypothesised categories: (a) awareness (limited intentionality), (b) pre-symbolic, (c) early symbolic (concrete), and (d) symbolic (abstract). The potential contribution of the study was to provide a schema for describing academic achievement expectations that are inclusive of students with diverse communication abilities.

Method

Participants

A purposeful sample of 95 teachers was recruited from a south-eastern urban school district. Teachers of students with a variety of disabilities (severe/profound, autistic, trainable mental disabilities, etc.) were identified and invited to participate. All participants had to teach students who participated in an alternate assessment based on alternate achievement standards within the past year. Most of the teachers taught at the elementary school level (40%), followed by middle school (28%), high school (27%) or K–12 level (5%). Approximately half (46%) of the teachers taught students with moderate mental disabilities, one third (33%) of the participants taught students with autism, 11% taught students served in a cross-categorical setting, 7.4% taught students identified as severe or profound, and 3% were teachers of students with multiple disabilities. These proportions were broadly comparable to the proportion of students with each of these disability labels who take alternate assessments for the state where the participants taught during the 2004–2005 school year; that is, students with moderate mental disabilities were the largest group participating in alternate assessments and students with multiple disabilities were within the smallest disability label participating in alternate assessments.

Research design

A survey approach was used to collect teacher data in relation to the symbolic level of their students. Browder, Ahlgrim-Delzell et al. (2006) defined three symbolic levels that students with disabilities may use to communicate – pre-symbolic, early symbolic, and symbolic. Browder, Wakeman, Flowers et al. (2007) added an awareness level to describe students who may have limited intentionality even with nonsymbolic communication. Characteristics of these four levels are shown in Table 1. A theoretically based classification validity

Table 1. Defined symbolic levels options.

Four levels of symbolic communication
Awareness: May communicate by crying, vocalising; communication may be difficult to interpret; no clear cause and effect
Pre-symbolic: Communicates with gestures, eye gaze, purposeful moving to object, sounds; communication is purposeful (e.g., holds up cup for drink)
Early Symbolic (Concrete): Beginning to use pictures or other symbols to communicate within a limited vocabulary; primarily concrete symbols (e.g., eat, drink, outside, play, more)
Symbolic (Abstract): Uses vocabulary of signs, pictures, words to communicate. Recognises some sight words, numbers, etc. Some symbols are abstract (e.g., yesterday, happy, 9:00)

method was used to examine the number of levels of symbol use based on student performance level on academic tasks.

Instrumentation

A three-part teacher survey was designed for the purpose of this study. The survey instrument was five pages, consisted of closed-ended questions, and took approximately 10 minutes to complete. The three sections included: (a) student demographics, (b) a survey of academic responses, and (c) teacher selection of the student's symbolic level.

In the first section of the survey, the participants indicated grade level and student population taught. In the second part of the questionnaire, teachers were instructed to think about the characteristics of their lowest functioning student. Then the participants read 10 academic tasks and selected one response from four options that best represented the current performance level of their student. After the participants rated their lowest functioning student, they were instructed to think about their highest functioning student and respond to the same tasks. The specific academic tasks were activities frequently observed in classrooms, such as name writing, counting, and number recognition.

The four response options for each academic task were created to correspond to the four hypothesised levels of symbolic use. The response options were arranged in order according to the symbolic level; that is, (1) awareness, (2) pre-symbolic, (3) early symbolic, and (4) symbolic (4), but the symbolic level was not indicated on the survey. Two specialists in students with severe disabilities symbolic use reviewed the academic tasks and response options and agreed that the response options were consistent with the symbolic level. The reliability coefficient for the 10 tasks was .97. These 10 tasks were used in the cluster analysis and are itemised in Table 2.

In the final section of the instrument, the participants were provided with the characteristics of the four symbolic levels and asked to categorise their lowest and highest functioning student into the category that best fitted the student. Participants had an option of selecting 'no category', if the student did not fit into one of the four symbolic levels. The teacher rating of the student's symbolic level was used to validate the clusters formed in the cluster analysis.

Procedures

A contact person who was not a member of the research team gave the survey directly to each teacher in an individually scheduled appointment. The contact person read a recruitment letter to the teacher, made sure the teacher had students in alternate assessments based

Table 2. Ten tasks and response options.

1. Name writing (any writing utensil or assistive technology device)
   The student:
   a. Only gives fleeting or no attention to task; makes no mark.
   b. Attempts to (e.g., movement toward a device or utensil) or makes a mark on a page.
   c. Partially writes at least one letter of name/ attempts to write name.
   d. Writes first name.
2. Picture recognition
   The student:
   a. Does not identify pictures; inconsistent in looking at pictures.
   b. Looks at pictures, but does not identify them (e.g., Does not "Point to apple").
   c. Needs intensive instruction but learns new picture symbols.
   d. Recognises picture symbols after one or two exposures.
3. Pictures to communicate
   The student:
   a. Does not use pictures to communicate; inconsistent in looking at pictures.
   b. Does not use pictures to communicate but will look at pictures.
   c. Uses a specific set of pictures to communicate (less than 10).
   d. Able to use a wide variety of pictures to communicate.
4. Counting
   The student:
   a. Does not count, shows inconsistent responses to teacher count downs.
   b. Does not count, but responds to teacher count downs like 1,2,3 go!
   c. Imitates or "helps" teacher count up to 5.
   d. Can count to 5 or higher.
5. Number recognition
   The student:
   a. Does not recognise numbers; does not react to familiar routines with numbers.
   b. Does not recognise numbers but reacts to familiar routines with numbers (e.g., counting song; How old are you?). (
   c. Only recognises a specific number that has been taught (e.g., bus number).
   d. Recognises numbers 1–5 or higher.
6. Story comprehension
   The student:
   a. Makes little or no response when read a story.
   b. Smiles, looks at book or in other ways engages with reading of story, but inconsistent in identifying pictures on page.
   c. Shows understanding of story by locating picture described on page just after it is read (e.g., Find Red Riding Hood).
   d. Shows understanding of stories by answering literal comprehension questions verbally or with pictures (e.g., Whose house did Little Red Riding Hood visit? Grandmother or teacher).
7. Expressive communication
   The student:
   a. May cry when needs food or comfort, but does not show clear intention to communicate.
   b. Makes needs and wants known using objects, gestures, and vocalisations.
   c. Makes needs and wants known using small set of pictures or other symbols.
   d. Makes needs known and "converses" with a variety of words or pictures.
8. Categorisation
   The student:
   a. Shows little to no reaction when given an object to match.
   b. Matches one object to same type of object, but does not sort different objects.
   c. Sorts object if given model to follow (e.g., block with block; pen with pen).
   d. Categorises objects by a variety of attributes.

Table 2. *(Continued).*

9. Money
   The student:
   a. Shows no reaction to money.
   b. Will 'trade' money and receive purchase, but does not necessarily understand money has value (e.g., gives dollar to cashier).
   c. Recognises money has value to make purchase (e.g., tries to insert money to use vending machine or picks up money left on ground).
   d. Counts out dollars or coins for small purchase.

10. Calendar
   The student:
   a. Shows little to no reaction to calendar lesson.
   b. Puts picture symbol on current day on calendar when teacher points to day.
   c. Can answer ONE of these questions at least half the time – what day is it? What month is it? What day is this (number)?
   d. Finds and reads current date on monthly calendar.

on alternate achievement standards, and obtained informed consent. The contact person then gave the teacher time to complete the survey independently.

Surveys were collected upon completion and teachers were presented with a token of appreciation (i.e., a $10 gift card). Surveys were administered from February to March, 2006.

Data analyses

A combination of cluster analysis and descriptive statistics were used to investigate the agreement between the hypothesised number of groups and the empirical data. Cluster analysis was used to form clusters or groups of relatively homogenous students based on measures of similarity and/or differences with respect to the 10 academic tasks. In this study a hierarchical cluster analysis was conducted. Hierarchical cluster analysis allowed the researchers to determine how many clusters best fit the data. It was hypothesised that a four clusters solution would best fit the data (e.g., the four clusters would fall out as the four symbolic levels described earlier).

Since there are no absolute criteria for evaluating the adequacy of the clusters, several techniques were used to guide in determining the number and validity of the clusters. First, the proximity coefficients obtained from the agglomeration schedule were examined for sharp increases in value. Because large proximity coefficients indicate more distance between clusters, identifying the point of high proximity coefficients suggests an optimal number of clusters have been formed. After the optimum number of clusters was determined, the agreement between the cluster membership and the teacher rating of the student's symbolic level (third section of the questionnaire) was examined using percentage of agreement and kappa coefficient. Furthermore, a profile of the 10 tasks for each cluster was provided for a descriptive examination of the differences between clusters. One-way analyses of variance were used to examine differences between the clusters.

Results

Before the major analyses, the data were screened for quality of data entry, missing data, and outliers. Fifteen percent of the data were double entered and checked for accuracy; there was a 99.7% level of accuracy suggesting adequate reliability for data entry. Eight participants did not use the rating scale to categorise the symbolic level of their student (i.e., third section of the survey) but wrote comments about their student. These comments were reviewed by an expert in special education (the third author) who placed students in a category based on the comments. The expert was able to rate five of the eight students' symbolic level based on the comments. One teacher rated only one student; the remaining 94 teachers rated 2 students, resulting in a total of 189 student ratings. All values were within the expected range and no outliers were detected.

The percentages, means, and standard deviations of students at each symbolic level by item are reported in Table 3. Most of the students' level of symbol use across all 10 tasks was at the symbolic (abstract) level (47.1%), with 17.7% at the early symbolic (concrete) level, 16.0% at the pre-symbolic level, and 19.3% at the awareness level. When teachers were provided with the characteristics of the levels of symbol use and asked to rate their students, most of the teachers rated the student at the symbolic level (54.8%) with the fewest students rated in the awareness level (4.8%).

Results of the cluster analysis

The hierarchical clustering procedure in SPSS was used as the clustering method. Ward's method was chosen for linking the clusters and squared Euclidian distance was used as the distance measure. The 10 tasks from the questionnaire were the data used to form the clusters. The results of the cluster analysis and an examination of the incremental increase in proximity coefficients suggested that a range of solutions was reasonable, four to two clusters; that is, sharp increases in proximity coefficients were noted at the four, three, and two clusters solution. For all the cluster solutions, there were statistically significant differences ($p<.001$) among the clusters for the 10 task measures. Results of the significance testing (ANOVAs and Scheffé post hoc tests) are not reported here and are not of primary interest but are reported to inform the reader that all 10 tasks were different across all clusters. More detailed information will be provided in the profile analyses in the following section. Cluster membership for the four, three, and two cluster solutions were retained and used in the remaining analyses.

Table 3. Descriptive statistics of students' symbolic level across 10 tasks and teacher rating of student symbolic level.

	Awareness	Pre-symbolic	Early symbolic	Symbolic		
	%	%	%	%	*M*	*SD*
Name writing	15.1	22.6	13.4	48.9	2.95	1.15
Picture recognition	7.5	14.0	21.5	57.0	3.28	0.97
Pictures to communicate	10.8	17.7	16.1	55.4	3.15	1.07
Counting	26.3	5.4	10.2	58.1	3.01	1.30
Number recognition	24.2	11.3	6.5	58.1	2.99	1.29
Story comprehension	15.1	21.0	24.2	39.8	2.88	1.10
Expressive communication	15.1	25.8	5.9	53.2	2.98	1.18
Categorisation	15.1	10.8	30.1	44.1	3.03	1.08
Money	37.1	16.7	22.6	23.7	2.33	1.20
Calendar	26.3	15.1	26.3	32.3	2.65	1.19
Mean percentage	*19.3*	*16.0*	*17.7*	*47.1*		
Teacher rating of student	4.8	21.5	18.8	54.8		

Validation of cluster solutions

The percentage agreement and kappa coefficient (adjustment made for chance) were used to examine the adequacy of the cluster membership solutions. Results of the four, three, and two cluster membership were compared to the teacher ratings of the students' symbolic level. When comparing the three and two cluster membership solutions, the teachers' ratings were collapsed at the lower end of the symbolic level scale (i.e., awareness and pre-symbolic levels), which provided the symmetrical contingency table needed to calculate the agreement indices.

For the four clusters solution, there was 71% agreement between the cluster membership and the teachers' rating of symbolic level and a kappa coefficient of .56. The three clusters had an overall agreement of 90% with a kappa coefficient of .75 with the teachers' ratings (awareness and pre-symbolic were collapsed into one category). The two cluster solution had an overall agreement of 85% with a kappa coefficient of .70. Based on these results, three clusters appear to have the best fit to the teachers' ratings of student symbolic level.

Description of the three clusters solution

Before examining the three clusters solution that was supported by the cluster analysis, a plot of the 10 tasks' mean scores by the teachers' rating of students' symbolic level based on the four levels originally hypothesised is illustrated in Figure 1.

Students at the two lowest levels (awareness and pre-symbolic) have very similar trends and similar means across all the tasks. A one-way analysis of variance was used to examine differences between the teachers' rating of students' symbolic level on the grand means for the 10 tasks. The sample sizes, means and standard deviations for the means across the 10 tasks by teachers' ratings (based on four levels) of students and the three clusters solution are reported in Table 4.

There were statistically significant differences among the four symbolic levels, $F_{(3,\ 182)}$ =271. 01, p<.001, η_p^2=.82. Scheffé post hoc analysis indicated there was not a statistically significant difference between the awareness level and the pre-symbolic level (p=.42); there were mean differences for all other comparisons (p<.001). These results support the three

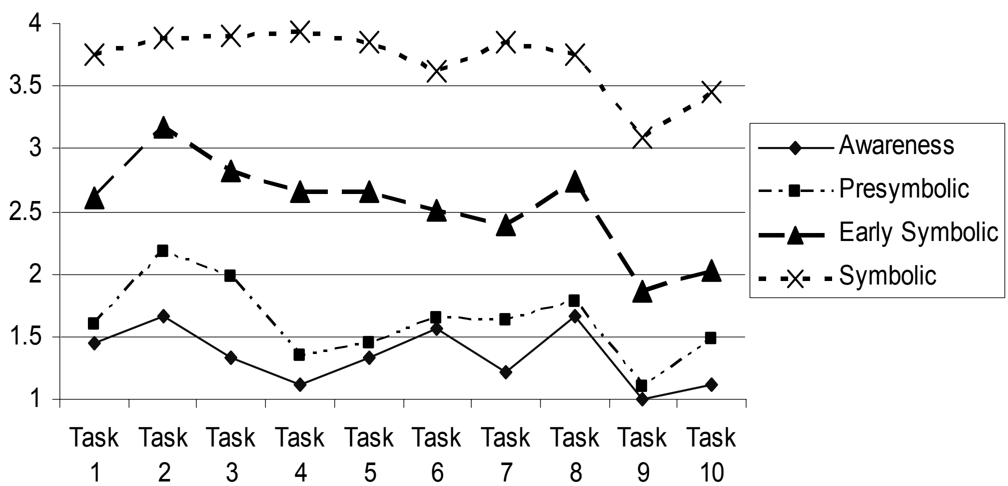

Figure 1. Means for the 10 academic tasks by teachers' ratings based on four levels of symbolic communication.

Table 4. Grand means and standard deviations across the 10 tasks by teacher rating of student symbolic level.

Symbolic level	*M*	*SD*	*N*
Teacher rating (4 levels)			
Awareness	1.34	.18	9
Pre-symbolic	1.62	.56	40
Early symbolic	2.55	.58	35
Symbolic	3.71	.34	102
Three clusters solution			
Awareness/Pre-symbolic	1.56	.36	58
Early symbolic	2.82	.34	35
Symbolic	3.79	.22	96

levels of symbolic communication solution. Since the results of the cluster analysis supported three levels of symbolic communication, we analysed the data collapsing the bottom two levels together which resulted in us looking for differences between the three clusters of symbolic levels.

A plot of the 10 tasks means for the three clusters solution is illustrated in Figure 2. Results of a one-way analysis of variance indicated statistically significant differences between the three levels symbolic levels, $F_{(2,\ 186)}$ =1072.47, p<.001, η_p^2=.92; post hoc comparisons indicated that there were differences among all the groups (p<.001). These results are not surprising given that the cluster analysis creates clusters by decreasing the variability within clusters and increasing the variability between clusters; recall that the F-statistic value is the ratio of the variability between divided by the variability within. What is of interest is the magnitude of difference between the groups.

Discussion

These results provide support for a classification schema based on symbolic level, but with three levels versus the originally hypothesised four. Specifically, the symbolic (abstract), early symbolic (concrete), and two lower levels (pre-symbolic/awareness) formed clear

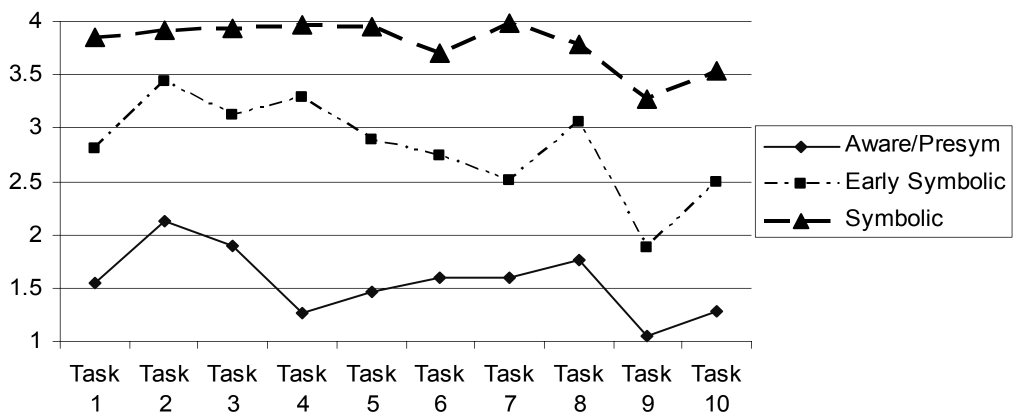

Figure 2. Means for the 10 academic tasks by teachers' ratings based on the three clusters solution.

differences as clusters. It is also notable that most teachers (92%) were able to classify their students by symbolic level (third section of the survey). The teachers' classification, after collapsing the two lowest levels, also concurred with the classification we derived from their responses on the academic task survey. In general, support was found that this population can be classified by symbolic level for purposes of academic planning. This was a first attempt to examine empirically a classification schema for this purpose and it is important to delineate the limitations of this study prior to identifying recommendations for practice.

Limitations and needs for future research

This study had both practical and statistical limitations. On a practical level, the theory of a classification schema was evaluated using teacher ratings of student performance, not observations of actual performance. Additional research is needed to determine if teacher ratings concur with observed performance for this population's academic performance.

More information is also needed on whether the number of respondents in each level of symbolic use is representative of the population of students who take alternate assessments. The classification schema utilised by many educational systems internationally is based on type of disability. For example, in the US students served through IDEA (2004) are classified using categories like specific learning disabilities, autism, mental retardation, traumatic brain injury, hearing impairments, visual impairments and others. Disability category is not necessarily the most useful approach to planning access to the general curriculum for students in alternate assessment nor necessarily related to achievement level. Students with autism, intellectual disabilities, or multiple disabilities may have abstract symbolic communication, early symbol use or be pre-symbolic. Our finding that most students in the participating school system were at the symbolic level is not surprising given that the prevalence of students with more severe disabilities, who are more likely to have earlier levels of symbol use, is usually much lower than other students. In contrast, it is possible that the sampling method may have over or under-represented the population. For example, asking teachers to select their lowest and highest students may have underrepresented students at the early (concrete) symbolic level (mid-range). Also, if the study had included teachers in a residential or hospital setting or who provide homebound instruction, there may have been more students at the pre-symbolic/awareness levels.

Recommendations for practice

Educators may find this classification schema useful as a conceptual framework for discussing the different levels at which students may access the general curriculum. Professional development resources could be developed illustrating how to plan for students at these various levels of symbol use. For example, the North Carolina Department of Public Instruction (2006) developed curricular extensions to their state standards based on students' symbolic level (http://www.ncpublicschools.org/ec). Browder, Wakeman, Flowers et al. (2007) illustrated how to adapt a state standard in English Language Arts for each symbolic level. They suggest that students who can use abstract symbols might read and summarise biographies using adapted text, pictures, and a template for writing. Students at the level of concrete symbols might select pictures that represent events in the life of the subject of the biography. The concept of biography might be scaffolded by first having the student select pictures to tell their own story. Students at a pre-symbolic level might begin with objects related to their lives; these might then be made into a picture (object photographs) story. Biographies of others could be introduced using similar picture stories.

A second potential application in the use of this classification schema is developing differential expectations for achievement on alternate assessments. Students who rely on pre-symbolic communication would not be likely to respond to a performance assessment using pictures and traditional academic materials unless these are paired with objects and a real life scenario. In contrast, some students with significant cognitive disabilities can read words, answer more abstract questions, and use a variety of symbols to express academic learning. These students need the opportunity to demonstrate their highest level of achievement so that expectations are not set too low. States may use the categories proposed here to consider whether their alternate assessments are inclusive of students at the full range of symbol use. These categories may also be useful in setting alternate achievement standards.

One important caution in either of these applications is to recognise that students' level of symbol use is not static. Students who begin a school year having little to no symbol use may acquire concrete symbols by the year's end. Our system is not intended to classify students for eligibility for services or even for eligibility for alternate assessments. Instead, it provides a starting place for planning access to the general curriculum and setting achievement expectations for the year. If used as a classification system for achievement levels of alternate assessments, the IEP team should reconsider students' symbolic level annually to identify what would be the highest achievement expectation possible for that student (e.g., Is the student still expected to access the general curriculum using primarily pre-symbolic communication or can more be expected this year?).

Another caution is that some students may not fit any of the three validated categories. In the current study, we did not find a distinction between students at the pre-symbolic and awareness level. In contrast, 26% (n=49) of teachers in this study made this distinction. As noted earlier, communication experts also sometimes distinguish between students who do and do not show intentionality in communication (Coupe et al. 1988; Wetherby and Prizant 1989). The limited number of students in these lower categories also reduced the statistical power to show any differences. Whether or not these categories are combined in future research on these levels, it may still be more practical to combine them for educational planning. That is, even for students who do not show consistent intentionality of communication, the teacher would probably still use objects in a meaningful context when teaching literacy, science, maths, or other content. It also may be beyond what is practical to develop alternate assessments for students at an awareness level. Even though alertness can be coded, it is debatable whether this indicates any academic learning. Identifying some voluntary, identifiable response may be essential to assessing academic achievement. Students may also not fit our hypothesised categories because of unique combinations of disabilities and abilities. For example, a student may not use picture symbols or understand abstract language, but have ability with numbers. It should be noted that we found students who had such wide variation in ability across types of academic content, suggesting that the classification schema may be useful for most students with significant cognitive disabilities, but options are still needed for planning for unique individuals; in this study, three teachers could not classify their students into any of the symbolic levels.

Summary

Creating access to the general curriculum and setting achievement standards for students with significant cognitive disabilities can easily lead to a system that is biased in favour of students with symbolic communication. While this may represent a large portion of this population, students with lower levels of communication competence also need the opportunity to access academic content and demonstrate learning. This classification system should be viewed as dynamic with students having the potential to move into higher levels of symbol use with instruction. Knowing a student's current level of symbol use may be helpful in creating ways for students to access academic content and demonstrate achievement.

Authors' note

Support for this research was provided in part by Grant No. H324U040001 of the US Department of Education, Office of Special Education Programs, awarded to the University of North Carolina at Charlotte. The opinions expressed do not necessarily reflect the position or policy of the Department of Education, and no official endorsement should be inferred.

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