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easyCBM Mathematics

Alonzo, J., & Tindal, G. (2009). *The development of K-8 progress monitoring measures in mathematics for use with the 2% and general education populations: Kindergarten* (Technical Report No. 0921). Eugene, OR: Behavioral Research and Teaching, University of Oregon.

In this technical report, we describe the development and piloting of a series of mathematics progress monitoring measures intended for use with students in kindergarten. These measures, available as part of easyCBM®, an online progress monitoring assessment system, were developed in 2008 and administered to approximately 2800 students from schools across the United States in March through June of 2009 using a common item design to allow all items to be estimated on the same scale within each grade level. We analyzed the results of the piloting using a one parameter logistic (1PL) Rasch analysis. Because the results of these analyses are quite lengthy, we present the results for each grade's analysis in its own technical report, all sharing a common introduction but unique methods, results, and discussion sections.

Alonzo, J., & Tindal, G. (2009). *The development of K-8 progress monitoring measures in mathematics for use with the 2% and general education populations: Grade 1* (Technical Report No. 0919). Eugene, OR: Behavioral Research and Teaching, University of Oregon.

In this technical report, we describe the development and piloting of a series of mathematics progress monitoring measures intended for use with students in grade 1. These measures, available as part of easyCBM®, an online progress monitoring assessment system, were developed in 2008 and administered to approximately 2800 students from schools across the United States in March through June of 2009 using a common item design to allow all items to be estimated on the same scale within each grade level. We analyzed the results of the piloting using a one parameter logistic (1PL) Rasch analysis. Because the results of these analyses are quite lengthy, we present the results for each grade's analysis in its own technical report, all sharing a common introduction but unique methods, results, and discussion sections.

Alonzo, J., Lai, C. F., & Tindal, G. (2009). *The development of K-8 progress monitoring measures in mathematics for use with the 2% and general education populations: Grade 2* (Technical Report No. 0920). Eugene, OR: Behavioral Research and Teaching, University of Oregon.

In this technical report, we describe the development and piloting of a series of mathematics progress monitoring measures intended for use with students in grades kindergarten through eighth grade. These measures, available as part of easyCBM®, an online progress monitoring assessment system, were developed in 2007 and 2008 and administered to approximately 2,800 students per grade from schools across the United States in November and December of 2008 using a common item design to allow all items to be estimated on the same scale within each grade level. We analyzed the results of the piloting using a one parameter logistic (1PL) Rasch analysis. Because the results of these analyses are quite lengthy, we present the results for each grade's analysis in its own technical report, all sharing a common abstract and introduction but unique methods, results, and discussion sections.

Alonzo, J., Lai, C. F., & Tindal, G. (2009). *The development of K-8 progress monitoring measures in mathematics for use with the 2% and general education populations: Grade 3* (Technical Report No. 0902). Eugene, OR: Behavioral Research and Teaching, University of Oregon.

In this technical report, we describe the development and piloting of a series of mathematics progress monitoring measures intended for use with students in grades kindergarten through eighth grade. These measures, available as part of easyCBM®, an online progress monitoring assessment system, were developed in 2007 and 2008 and administered to approximately 2,800 students per grade from schools across the United States in November and December of 2008 using a common item design to allow all items to be estimated on the same scale within each grade level. We analyzed the results of the piloting using a one parameter logistic (1PL) Rasch analysis. Because the results of these analyses are quite lengthy, we present the results for each grade's analysis in its own technical report, all sharing a common abstract and introduction but unique methods, results, and discussion sections.

Alonzo, J., Lai, C. F., & Tindal, G. (2009). *The development of K-8 progress monitoring measures in mathematics for use with the 2% and general education populations: Grade 4* (Technical Report No. 0903). Eugene, OR: Behavioral Research and Teaching, University of Oregon.

In this technical report, we describe the development and piloting of a series of mathematics progress monitoring measures intended for use with students in grades kindergarten through eighth grade. These measures, available as part of easyCBM®, an online progress monitoring assessment system, were developed in 2007 and 2008 and administered to approximately 2,800 students per grade from schools across the United States in November and December of 2008 using a common item design to allow all items to be estimated on the same scale within each grade level. We analyzed the results of the piloting using a one parameter logistic (1PL) Rasch analysis. Because the results of these analyses are quite lengthy, we present the results for each grade's analysis in its own technical report, all sharing a common abstract and introduction but unique methods, results, and discussion sections.

Lai, C. F., Alonzo, J., & Tindal, G. (2009). *The development of K-8 progress monitoring measures in mathematics for use with the 2% and general education populations: Grade 5* (Technical Report No. 0901). Eugene, OR: Behavioral Research and Teaching, University of Oregon.

In this technical report, we describe the development and piloting of a series of mathematics progress monitoring measures intended for use with students in grades kindergarten through eighth grade. These measures, available as part of easyCBM®, an online progress monitoring assessment system, were developed in 2007 and 2008 and administered to approximately 2,800 students per grade from schools across the United States in November and December of 2008 using a common item design to allow all items to be estimated on the same scale within each grade level. We analyzed the results of the piloting using a one parameter logistic (1PL) Rasch analysis. Because the results of these analyses are quite lengthy, we present the results for each grade's analysis in its own technical report, all sharing a common abstract and introduction but unique methods, results, and discussion sections.

Lai, C. F., Alonzo, J., & Tindal, G. (2009). *The development of K-8 progress monitoring measures in mathematics for use with the 2% and general education populations: Grade 6* (Technical Report No. 0907). Eugene, OR: Behavioral Research and Teaching, University of Oregon.

In this technical report, we describe the development and piloting of a series of mathematics progress monitoring measures intended for use with students in grades kindergarten through eighth grade. These measures, available as part of easyCBM®, an online progress monitoring assessment system, were developed in 2007 and 2008 and administered to approximately 2,800 students per grade from schools across the United States in November and December of 2008 using a common item design to allow all items to be estimated on the same scale within each grade level. We analyzed the results of the piloting using a one parameter logistic (1PL) Rasch analysis. Because the results of these analyses are quite lengthy, we present the results for each grade's analysis in its own technical report, all sharing a common abstract and introduction but unique methods, results, and discussion sections.

Tindal, G., Alonzo, J., & Anderson, D. (2009). *Local normative data on easyCBM® reading and mathematics: Fall 2009* (Technical Report No. 0918). Eugene, OR: Behavioral Research and Teaching, University of Oregon.

We developed equivalent, alternate forms of easyCBM® in reading (n=20 forms) and mathematics (n=13 forms) with different skills reflective of the National Reading Panel (NRP) and the National Council of Teachers of Mathematics (NCTM), respectively. We then took three forms to use as screening measures in the fall, winter, and spring so educators could identify students at risk of failure and establish benchmarks. In this report, we present normative data for fall 2009 on all measures in grades 1 through 8. These data reflect the results from several districts and are reported for all districts and disaggregated for each district.

Alonzo, J., Anderson, D., & Tindal, G. (2009). *IRT analysis of general outcome measures in grades 1-8* (Technical Report No. 0916). Eugene, OR: Behavioral Research and Teaching, University of Oregon.

We present scaling outcomes for mathematics assessments used in the fall to screen students at risk of failing to learn the knowledge and skills described in the National Council of Teachers of Mathematics (NCTM) Focal Point Standards. At each grade level, the assessment consisted of a 48-item test with three 16-item sub-test sets aligned to the essential focal points at that grade level. All assessments were scaled using item response theory (IRT) with a 1 PL model. We describe several summary statistics of the item, including the range of measure statistics, outfit, expected and observed performance, and overall person reliability indices. Our findings suggest all items functioned well and may be useful in identifying students in need of instructional supports.

Alonzo, J., Tindal, G., & Anderson, D. (2009). *Internal consistency of general outcome measures in grades 1-8* (Technical Report No. 0915). Eugene, OR: Behavioral Research and Teaching, University of Oregon.

We developed alternate forms of a math test for use in both screening students at risk of failure and monitoring their progress over time. In this technical report, we present results of the screener, used in the fall of 2009. The 48-item test was aligned to the National Council of Teachers of Mathematics (NCTM) Curriculum Focal Point Standards and was administered on a computer to all students from a single school district. The data were analyzed using Cronbach's alpha to reflect the internal consistency of the test forms. The results suggest sufficient consistency to use the scores in screening students within a district.

Liu, K., Ketterlin-Geller, L., Yovanoff, P., & Tindal, G. (2008). *Examining item functioning of math screening measures for grades 1-8 students* (Technical Report No. 0804). Eugene, OR: Behavioral Research and Teaching, University of Oregon.

BRT Math Screening Measures focus on students' mathematics performance in grade-level standards for students in grades 1-8. A total of 24 test forms are available with three test forms per grade corresponding to fall, winter, and spring testing periods. Each form contains computation problems and application problems. BRT Math Screening Measures were administered to 6,500 students during the 2006-07 school year. The Rasch Model in Item Response Theory (IRT) is employed to estimate the item difficulties and fit statistics of the test items. We describe this process and then present results of item difficulty and item functioning.

Jung, E., Liu, K., Ketterlin-Geller, L., & Tindal, G. (2008). *Instrument development procedures for mathematics measures* (Technical Report No. 0802). Eugene, OR: Behavioral Research and Teaching, University of Oregon.

The purpose of this study was to develop general outcome measures (GOM) in mathematics so that teachers could focus their instruction on needed prerequisite skills. We describe in detail, the manner in which content-related evidence was established and then present a number of statistical analyses conducted to evaluate the technical adequacy of these measures. The outcomes support the test development process and reflect a series of measures that have potential for use in elementary and middle school mathematics programs.

Martinez, M. I., Ketterlin-Geller, L. R., & Tindal, G. (2007). *Content-related evidence for validity for mathematics tests: Teacher review* (Technical Report No. 42). Eugene, OR: Behavioral Research and Teaching, University of Oregon.

Behavioral Research and Teaching (BRT) has developed a series of mathematics tests to assist local school districts in identifying students in grades 1-8 who may be at risk of not meeting year-end mathematics achievement goals. The tests were developed using the state mathematics standards for the relevant grade levels and administered to students in fall, winter and spring. In an effort to continuously improve the tests as well as to examine the validity of their uses, school staff from local districts participated in piloting and reviews of the tests from 2003-2006. The 2005-2006 teacher review documented in this technical report was

designed to systematically capture feedback on all test items based on the appropriateness of language, concepts, and graphics, as well as bias in language or graphics. This review provides content-related validity evidence for the uses of the test results as screening tools.

Ketterlin-Geller, L. R., Alonzo, J., & Tindal, G. (2004). *Use of focus groups to inform the construction of a universally designed mathematics test* (Technical Report No. 29). Eugene, OR, Behavioral Research and Teaching, University of Oregon.

Focus groups were used to examine the needs of students taking a computer adaptive math assessment. The assessment designed using universal design and item response theory. Focus groups included teachers, administrators, child advocacy groups, and 3rd grade students and parents from the following groups: students with disabilities, students in general education, and students learning English as a second language. Focus groups identified using the mouse, understanding directions and accessing the format of the items as sources of confusion. Additionally, a survey suggested that English Language Learners have differential access to computers. These findings will be used to revise the assessment.