

Rationale for STEP Literacy Assessment and STEP Data Visualizations

Introduction

Children, particularly in urban settings, begin school with a variety of strengths and challenges that impact their learning. Some arrive with a firm background in early literacy; others have had extremely limited exposure to books. Teachers and school staff have to respond in a strategic way to provide the kind of instructional support that students at these diverse points need in order for them to be successful as readers and writers. This is crucial especially during the early elementary grades as students are developing foundational skills and knowledge that they will build upon as they move across the grades. The diversity in students' beginning points as well as in their trajectories as learners over time places considerable demands on teachers to understand how individual children are processing information, how to organize instruction to accelerate their progress, and how to marshal other resources beyond the classroom to support their growth.

Impetus for Building a Developmental Assessment System

A consensus about the essential elements of early reading has emerged over the last 20 years. These include phonemic awareness, understanding of the alphabetic principle, word recognition and decoding, fluency, and comprehension. Numerous assessments have been created to measure each of these elements. Nonetheless, questions still remain about how these components fit together over time as a child becomes a more effective reader. It is insufficient to know, for example, that a student is having difficulty segmenting sounds if we don't also understand how this influences his or her attempts to decode words while reading connected text. It is the relationship between these components and how they change over time that provides the powerful insight which informs instruction. Simply knowing that the student is at risk because of weak phonemic awareness is essential, but not sufficient.

Developmental models of reading directly address these questions (Bear, 1991; Chall, 1983; Clay, 1991, 2001; Firth, 1985; Fountas and Pinnell, 1996, 2001). Although varying in their details, these theories share in a common view of reading as a complex process in which children learn to combine different sources of information to make meaning as they read. Each theory provides descriptions, at various levels of detail, of the skills and strategies that readers demonstrate as they move across different phases of development.

These stages in learning to read can be summarized as:

Emergent Readers

- Develop the ability to hear separate sounds in words (phonemic awareness)
- Know most letter names and associated sounds
- Read familiar text orally, matching word-by-word (often following with a finger)
- Use information from pictures for understanding and for support in words solving

Early Readers

- Recognize many high-frequency words automatically
- Use letter-sound information along with meaning and language to solve words
- Read easy text with some fluency and attention to punctuation
- Develop the ability to make inferences and interpret text using various strategies

Transitional Readers

- Use multiple sources of information flexibly while reading for meaning
- Begin to sustain silent reading of longer texts
- Use pictures for information but do not overly rely on them for comprehension
- Build meaning as they read stories, connecting earlier and later parts of a text

Self-extending Readers

- Problem solve words flexibly with minimal disruption of the flow of reading
- Sustain reading of texts independently over several days
- Try out multiple strategies to support comprehension in difficult text (e.g., test out own understanding by paraphrasing or self-questioning)
- Incorporate new information into their own understanding of a topic while reading nonfiction text

The task of a developmental *assessment* is to provide a window into how students are progressing across this continuum. Assessment of the separate skills and strategies

provides valuable pieces of information about emerging student readers. However, analyzing how these skills join to create a complete portrait of a reader that teachers could use to inform instruction is not as straightforward. Students exhibit considerable performance variation across these skills and how they apply them, even at the same grade level. A first grade student in the fall of the year might, for example, know letter-sound correspondence in isolation but not use first sounds in words. In short, individual assessments present teachers with considerable data, but how best to turn these data into useable information to guide subsequent instruction may remain unclear.

It is here where an integrated development framework for organizing the information contained in these various assessment components is especially promising. To support teachers' thinking about differentiated instruction, organizing assessments around developmental "steps" seems practical. Moreover, basic research in reading development lends some theoretical support for the idea that the discrete skills measured in the component assessments actually align in predictable, overall developmental patterns (Stahl and McKenna, 2000; Sainsbury, et al 1999; Ehri, 1995).

Correspondingly, a developmental measurement model, based in Rasch item response theory methodology, provides the necessary analytic tools for building and evaluating the adequacy of such an integrated assessment model (Kerbow and Bryk, 2005). Through this methodology, we can empirically test if the component skill difficulties arrange themselves in a sensible developmental order and whether the psychometric properties of the scale are consistent with a theoretical claim that an underlying developmental metric links these various assessment elements together.

Such a composite scale permits us to move beyond just describing students' individual scores on isolated assessments to be able to discern where they fit into a larger picture of how students develop an integrated ensemble of strategies for learning to read and construct meaning from text. For instructional support purposes, this scaling provides a mechanism for organizing the data from the separate reading assessment tasks into a set of "steps" that offer both a concise summary of students development to date and an

interpretive context that could meaningfully inform subsequent instructional decision making.

For research purposes, this composite scale affords us a single continuous measure for assessing students' overall reading improvement across the primary grades. This solves the typical "floor and ceiling effects" problems typically associated with analyzing data from separate assessment tasks. Moreover, it provides an empirically grounded validation of the theory-based developmental model.

To inform instruction, from this perspective, an assessment system must:

- Build on a theoretically based description of developmental stages of student reading and empirically establish a set of diagnostic criteria for understanding their progress;
- Be anchored in a developmental measurement model that allows us to explicitly link critical elements in reading development into an integrated literacy assessment system, rather than just providing a collection of loosely related assessment tasks; and
- Provide rich data-based descriptions of students' developmental profiles that facilitate classroom-level instructional planning while also affording the more detailed individual student-level data necessary for diagnosing the needs of particular student readers.

STEP Literacy Assessment as a Fully Integrated Developmental Model

Brief Description of the Assessment

The STEP (Strategic Teaching and Evaluation of Progress) Literacy Assessment provides a set of tools, tightly aligned with scientifically established milestones in reading development, to follow kindergarten through third grade students' progress. These tools are organized into a developmentally sequenced set of tasks which focus on the strategies and skills students need to expand their repertoire as readers. Figure 1 shows the assessment components and their sequence with the assessment system.

At the heart of the assessment is a set of leveled texts that increase in difficulty with each "step." During individual conferences of 10 to 15 minutes, the teacher records students' reading accuracy and fluency, observes their reading behaviors, and engages them in comprehension conversations about what they have read. Each Step, in conjunction with the leveled books, also includes assessment components that provide a deeper look into some specific skills that supplement what is learned from students' oral reading. That is, STEP explicitly joins the reading of authentic texts with assessments that focus on level appropriate individual skills such as letter-sound association, phonemic awareness, and word knowledge -- providing a complete window into the integrated development of the reading process. Thus, STEP is based on a developmental model that empirically combines essential skill assessments with authentic reading of leveled text.

The "steps" in readers' development are identified based on the empirical grounding of the underlying IRT metric that equates the various assessment tasks to understand their relationship. From this metric, targets are set for each assessment tasks associated with a Step. Students are then evaluated to determine if they have achieved a Step. Benchmarks with strong concurrent and predictive validity at each grade have been established to determine when students are at risk and in need of specific intervention.

Visualizations of the Data

Assigning students to a Step based on the assessment makes it possible to create displays of student progress that help to summarize the data at the classroom, grade, and school

level. An example of this is displayed for a level “Grade Wall” in Figure 2.¹ Each square represents a student and shows what Step he or she has achieved. In addition, the dots in each square indicate how many Steps a student has moved since the beginning of the year. Thus, you have a sense of both students’ current status as well as their growth during the school year on the same display. Students with “no dot” have not made progress and may warrant further investigation even if they started the year near the benchmark goal for the grade. In addition, it is possible to highlight students with different background characteristics. For example, male students may be highlighted and compared to female students to see if there is equity in achievement across gender.

From these summary “wall” displays, it is possible to drill down to look at detailed assessment information on individual or small groups of students. The next example shows the results of the assessment for one student and where the student did and did not reach the targets on each assessment task. This data is available for all the Step assessments that have been administered to the student so that teachers can look for patterns of development or struggle over time. The accompanying display shows an overview of the student’s progress. We see in this instance that the student spent considerable time on Step 5 before achieving Step 6. She has reached a plateau at Step 7, having been assessed at this Step on three occasions without achieving it. Each of these displays is designed to raise further questions about instructional implications.

(Additional examples of displays are presented in the appendix.)

Recent work toward moving the STEP Literacy Assessment to Palm administration opens multiple possibilities for deepening and strengthening the analysis of student reading development. Being able to sync data allows item level information to be available to create displays. (Currently, only summary scores are directly input into the existing software.) We could create a developmental map of assessment tasks based on the IRT analysis. (Figure 4 shows the components of the developmental scale and how they build as students reach higher achievement levels. See Kerbow and Bryk 2005 for a detailed

¹ These displays are called Wall displays because originally they were actually cards for each student placed on a bulletin board within the school. They were arranged by grade level and the Step the student had currently achieved. Student names were placed on the back of the cards to ensure confidentiality.

description.) Individual student's results could then be plotted on the map to highlight their strengths and weaknesses. Having running records directly available as well as student answers to comprehension questions also provides the detailed texture necessary to understand the patterns of particular students.

As we compile more of this detailed information in the database, we will continue to analyze the results independently to identify common places of difficulties that students experience and what their early indicators are. These results can be incorporated into the software and displays to bring them to teachers' attention. Thus, teachers will not only benefit for their own analysis but also from the broad information that we have available to "point them in the right direction" and to build pointed instructional interventions to support students.

Progress Monitoring

Teachers have several options for progress monitoring. Central to this will be using leveled text from their own classroom library. Since the most of these texts can be leveled using the same system as the books in the formal STEP Assessment, teachers can choose among books in their own classrooms from the appropriate levels. Data will include running records, accuracy and reading rates, and comprehension through retelling.

In addition to the leveled text, some of the skill assessments that are components of STEP could be made available for progress monitoring. Several strong candidates for this are the phonemic awareness assessments (rhyming words, matching initial sounds, and segmentation). Alternative forms are being developed for this purpose.

Contact information:

David Kerbow at University of Chicago: k-kerbow@uchicago.edu

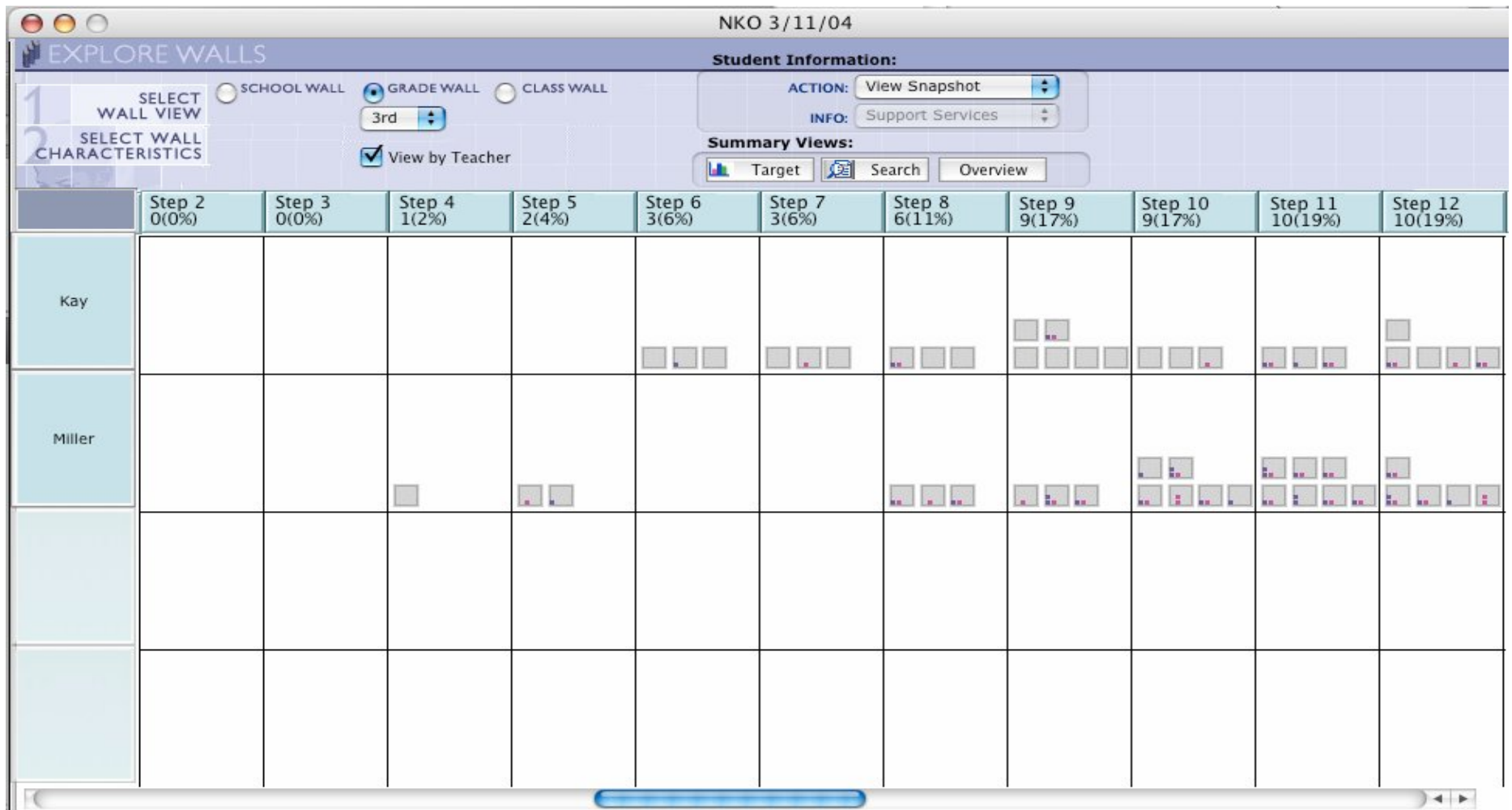
Website: www.iisrd.org

Figure 1
STEP Assessment Components

	Pre-Reading	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10	Step 11	Step 12
Story Retelling									✓	✓	✓	✓	✓
Comprehension Questions				✓	✓	✓	✓	✓	✓	✓-3 written	✓-3 written	✓-3 written	✓-3 written
Reading Rate and Fluency				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Text Level		✓-A	✓-B	✓-C	✓-E	✓-G	✓-I	✓-K	✓-L	✓-M	✓-N	✓-O	✓-P
Developmental Spelling		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phonemic Awareness													
Segmentation			✓	✓									
First sounds		✓											
Letter Identification													
Sounds		✓	✓	✓									
Names	✓	✓	✓										
Concepts about print	✓	✓											
Phonemic Awareness													
Rhyming Words	✓												
Name Assessment	✓												

Figure 2

Grade Wall Visualization



Grade Wall views show students within a grade by classrooms. The dots on each student's square indicate the number of Steps the student has moved since the beginning of the year. Thus, both status and growth are displayed together.

Figure 3
Individual Student Visualizations

Figure 4. Developmental Literacy Scale

