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Paper 2 - Aligning reading assessment with national goals

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1 ABSTRACT

Monitoring Trends in Educational Growth (MTEG), initiated in 2012, is an international assessment program especially appropriate to those countries where education systems are in rapid development. Key aims of the program are to provide policy-relevant information about learning and the factors related to it, focusing on the needs expressed by the country; and to track growth in learning over time. Developed in partnership with the Afghanistan Ministry of Education, MTEG was administered at Grade 6 in 2013, and will be administered at Grade 3 later in 2015. The assessment of reading at Grade 3 draws on the five components of reading recommended in the 2000 US NRP Report, but with a strong emphasis on listening and reading comprehension. The MTEG approach in the assessment of reading is distinguished from that of other reading assessment programs that operate in low income countries: the focus of these programs is largely, sometimes exclusively, on decoding. MTEG reading supports the Afghan national curriculum emphases, not only on the development of literacy skills, but also more broadly on promoting and strengthening children’s ability to think and reason – abilities integral to reading comprehension. The aims articulated in the official curriculum are directed at bringing about social change, reducing poverty, and creating a more stable society. This paper will outline the MTEG reading assessment framework with particular reference to its application at Grade 3, present available results, and discuss issues arising from this approach to reading assessment in fragile situations.

2 INTRODUCTION TO MTEG

Monitoring Trends in Educational Growth (MTEG) is a service program run by the Australian Council for Educational Research. The program, which aims to establish or strengthen system-wide monitoring programs, is based on the following principles:

- A learning assessment should be targeted on identifying where students are in their progress along well-defined learning metrics. The sole purpose of the assessment should not be just to determine whether or not the student has met the curricular goals of the current year of instruction.
Effective education develops student skills, knowledge and understandings with the intention that they can be applied both within and beyond the classroom, into work and other areas of life. Such an education is said to have a literacy orientation and MTEG aims to assess with a literacy orientation.

Learning growth for all learners is the goal of all education systems and practitioners. Growth for all, regardless of their starting point, or their background, is the core of an equitable approach to education. MTEG aims to measure growth throughout schooling along well-defined metrics, from Grade 3 through to Grade 9.

The research questions associated with measuring student learning must be policy relevant. The research questions are developed with the goal of informing current policy issues.

Measures of student learning must be of high quality. Best et al. (2013) identified that high quality assessment programs were more likely to influence the policy process in developing countries; and, conversely, assessment programs perceived as having lower quality had little impact. Ensuring a high degree of technical quality gives weight to an assessment program by producing data that can be compared over time with reliability and a strong degree of validity.

2.1 The Afghanistan Context: national goals

In 2012, the Australian Council for Educational Research (ACER) and the Ministry of Education in Afghanistan established a partnership to develop a learning assessment system in Afghanistan, based on the MTEG service model.

An early step in that process was to determine how the national learning assessment would align with national educational goals. These goals were elaborated by the Ministry of Education as:

1. Acquiring and strengthening the learning skills as listening, speaking, reading and writing, using numbers and calligraphy in national and foreign languages.
2. Learning science, arts and modern technologies, and obtaining necessary individual and social skills.
3. Developing aptitudes for learning and self-evaluation in the learning process.
4. Promoting and strengthening the abilities of thinking, reasoning, study, research, diagnosis and innovation in academic, literary, cultural and technical contexts.
5. Gaining skills for solving and identification individual and social problems.

(Ministry of Education, 1390 [2011], p. 30)

By measuring reading, writing and mathematical literacy, MTEG contributes to the monitoring of the attainment of these policy goals. Progress towards these goals is measured over time. The schooling system is investigated for the value it is adding at each stage of schooling from Grade 3 to Grade 9. The relative outcomes of sub-populations (such as girls and boys; and urban and rural dwellers) are benchmarked to be re-examined over time. Also important from a policy perspective is an analysis of the degree to which factors such as school resources and levels of teachers’ professional development are associated with positive educational outcomes.
2.2 The Afghanistan context: capacity development

As noted, MTEG is a service rather than a product. That service is tailored to the specific needs of educational systems. Different systems require different levels of assistance with the design, implementation, analysis and reporting of a monitoring program. Within the Afghanistan Ministry of Education in 2012 there was virtually no capacity to develop and deliver high quality large scale assessment and only limited support available from external sources such as the University of Kabul. At the time, Afghanistan’s assessment experience was largely limited to teacher developed examinations used to select (or exclude) students for the next stages of education.

ACER’s MTEG provided a comprehensive service for Afghanistan that featured:
- design of an assessment framework;
- item writing for mathematical, writing and reading literacy;
- construction of contextual questionnaires;
- extensive trialling prior to the main study;
- item translations and linguistic quality assurance;
- booklet production, design and print (Grade 6 and Grade 9);
- computer tablets with built-in assessment application (Grade 3 only);
- sample design;
- scaling using an item response model;
- analysis using techniques appropriate for complex survey designs; and
- reporting that is appropriate for both technical and non-technical audiences.

A significant aspect of this service was the capacity development of Ministry staff in all of the above areas. Importantly though, MTEG was implemented as a partnership. It was the Afghanistan Ministry of Education who took the lead role in:

- establishing the Learning Assessment Team, dedicated to the implementation of MTEG, within the Ministry;
- providing feedback on content development for cultural and curriculum relevance;
- promoting the assessment program to local educational authorities and principals;
- administering the tests throughout the provinces;
- scoring the open-ended item responses; and
- liaising with policy makers, curriculum designers and teacher trainers.

In accordance with the design to measure progress over time, the first round of MTEG assessments was administered in 2013 for Grade 6 using pen and paper. The next round of testing is due in late 2015 for Grade 3 students using an offline app on computer tablets. Grade 9 testing is still to be scheduled. This paper focuses on the implementation of MTEG reading.
2.3 MTEG reading compared to other assessment projects in low-income countries

The MTEG approach to reading literacy is currently defined as ‘understanding, using and responding to written texts, in order to meet personal, social, economic and civic needs.’ The MTEG reading assessment is distinguished from that of other major assessment programs that operate in low income countries in two key ways:

1) **Assessment focus:** Many of the current testing programs, particularly those focused on early development in reading – for example, EGRA and ASER – are largely (sometimes exclusively) focussed on decoding. The ability to decode however does not automatically correlate with comprehension as outlined in the first of this symposium’s papers, ‘The Conditions of Reading Acquisition in Contexts of Low Literacy’: ‘... early development of reading comprehension skills requires extensive opportunities to learn how to interpret written texts. Children need to understand the meaning of words typically found only in texts, and become familiar with structures of text that differentiate written language from the spoken language that children ordinarily hear.’ and ‘If fluency is used an indicator of reading comprehension it needs to exclude meaningless “barking at print”’. (Anderson & Fearnley-Sander, 2015).

By not including comprehension in a reading assessment, the assessment structure runs the risk of not measuring the full extent of a student’s overall reading ability. Assessing comprehension levels also has value for other subject areas. Newman (1977) argued that for a student to respond to a written mathematics question he or she had to be able to complete five stages:

1. reading (decoding) the question or problem posed;
2. comprehending what it meant;
3. transforming it into mathematical equation;
4. processing and solving that equation; and
5. encoding (writing down) the answer.

Newman and successive studies by Casey (1978), Clements (1980), Watson (1980) and Clarkson (1980) all found that about 50% of the errors made by students completing written mathematics problems occurred at the reading, comprehension and transforming stage, with errors at the comprehension stage contributing the largest proportion of the three.

The MTEG reading literacy framework has been informed by the two pre-eminent international comparative reading assessment programs, the Programme for International Student Assessment (PISA) and the Progress in International Reading Literacy Study (PIRLS). PISA testing is targeted at 15 year olds and PIRLS is for students in Grade 4 (or equivalent). The MTEG framework targets Grade 3, 6 and 9 and ‘... is primarily described in terms of content (the text variables: text format and text type), context (the situation to which texts are relevant) and process (the cognitive processes readers use). As an adjunct, the inclusion of precursor skills contributes to elaborating the constituents of the domain at the early stages of reading development. The precursors are described in terms of constituent skills such as word recognition.’ (MTEG Afghanistan Assessment Framework, Draft Version 4, 2015, p. 22)
The ‘cognitive process’ referred to in the MTEG framework involves the core skills that underpin reading comprehension. They are:

- locate information within the text
- interpret (make meaning from the text);
- reflect (the reader situates the text within the wider context of his or her experience) and
- recognise words (word knowledge).


Like PISA and PIRLS, MTEG measures these skills across a range of fiction and non-fiction texts in continuous, non-continuous and mixed formats.

PIRLS has recently introduced PIRLS Literacy aimed at developing countries: ‘Initiated in 2011, PIRLS Literacy (earlier known as prePIRLS) is based on the same view of reading comprehension as PIRLS but is designed to test basic reading skills that are prerequisites for success on PIRLS, for countries where most children are still developing fundamental reading skills. PIRLS Literacy can be administered at the fourth, fifth, or sixth grade’ (PIRLS 2016). The PIRLS Literacy test however still requires students to decode the text independently in order to complete the comprehension test items.

Any reading assessment that relies on students’ independent decoding in order to measure comprehension runs the risk of failing to validly measure reading in students with insufficient decoding skills. A non-reading or pre-reading student can be cognitively processing the comprehension skill set outlined in PISA and PIRLS (such as linking together ideas, interpreting a character’s actions, and inferring the cause and effect of an event) as they listen to a story. Anderson and Fearnley-Sander argue that ‘... children learn how to interpret texts that an adult decodes for them well before they learn to decode for themselves’ (2015). They cite the USAID 2015 report that showed that for the 20 African countries who conducted the EGRA Oral Reading Assessments the majority of countries had more than 50% zero scores across all grades: that is, more than half the tested students could not read a single word. The comprehension skills (as distinct from decoding skills) of these students are consequently not measured.

The MTEG reading assessment differentiates itself in one way from all the assessments referenced in this section through its ability to assess both decoding and comprehension in the early years, including non- and pre-readers.

2) **Assessment Delivery**: The standard way to administer early years reading assessments is through a one-to-one interview process, where the administrator reads aloud questions or instructions and records individual student responses. In low income countries, factors such as lack of staff and problems with transport infrastructure can make the delivery and data collection time-consuming and prohibitively expensive. Students can also feel anxious in an interview setting and administrators are likely to read out scripts with differing levels of expression and speed, which compromises the reliability of the data.

The MTEG Grade 3 assessment is delivered on lightweight tablet computers. This enables test administrators to carry (and manage) sets of tablet computers and consequently
simultaneously test small groups of students. The assessment is pre-loaded onto the tablet computers. Once loaded, the test can then be taken anywhere offline and multiple student response data can be stored on the app. Data stored on each tablet can be uploaded to a central ACER server when the test administrator can arrange internet access.

The administration load is minimal. The test administrator needs first only to model to the group how to use the tablet (via a practice program), and then to hand out headphones and monitor the students. All of the test instructions and questions are narrated to the students through audio files embedded within the test system.

3 MTEG’S GRADE 3 TABLET BASED ASSESSMENT

The MTEG Grade 3 tablet assessment model evolved from previous work by ACER in computer-based early years reading assessment. In 2012 ACER designed and implemented a tablet-based assessment with 539 early years students in the Northern Territory in Australia. The Online Assessment Year 1 (OLAY1) sample group was made up of many pre-reading students from urban through to extremely remote areas in the Northern Territory and about one-third of this cohort had never worked on a tablet or computer before. The trial was successful and laid the groundwork for the MTEG Grade 3 Assessment in Afghanistan and a smaller study in Lesotho. Although the main study of the Grade 3 Afghanistan is due to be carried out later in 2015, an extensive field trial was completed in 2014 with 1738 students (after a smaller scale pilot), which indicated that the both the design and content will work successfully with the full Afghan cohort.

3.1 How it works: design to match user experience

The MTEG Grade 3 Assessment program comes with a very simple practice program. This program situates the student in a digital context and guides them through what it means to be able to receive and manage the information they require and then respond accordingly. This not only includes demonstration of the program’s two navigational features (see Figure 2), but also allows interactions that reflect any generic computer-based design: the ability to self-correct by ‘undoing’ an action, to re-read a text or re-listen to an audio (where provided) as often as needed, and to engage with some texts and tasks in a non-linear sequence. The program models the item formats students can expect to see in the assessment and allows them to interact with each one. The students initially watch the administrator go through the program and then try it themselves, encouraged to go through it at least twice.

Audio function: After tapping on the green ‘Start’ circle on the entry screen (see Figure 1), audio in either Dari or Pashto automatically begins and a male and female character explain the two navigation buttons (see Figure 2).
Figure 1: Entry screen to the Practice Program

Figure 2: Still images with automatic narration explaining how to use the audio and navigation icons
In most cases the test item instruction is accompanied with a ‘mouth icon’ that the student taps to hear the text read aloud.

The mouth icon audio provides two functions:

1. It tells the students what they are expected to do, eg. *Tap on the word that matches the picture.* or *Listen to each sound then tap on the one that is the letter ‘a’*. In traditional assessments students need to be able to read in order to know what to do even though the skills being tested in the item may be of a lower cognitive or learning level.
2. It increases the variety of ways that decoding and comprehension can be tested. A few examples are:
   - matching sounds and words to written letters and text
   - building words that have been read out
   - listening comprehension texts with audio-supported response options
   - independent reading comprehension (no audio) with audio-supported response options

There are also texts and test items that test reading comprehension and decoding and provide no audio support except the single instruction: ‘*Read this story by yourself, then answer the questions about it.*’

Figure 3 shows an example of an item from the practice program that directs the student to the tap on the word ‘mountain’ in the sentence below. In the practice program the written word ‘mountain’ also appears in the instruction text. In the assessment proper, on the other hand, the word being tested would be read out in the audio instruction, but be replaced with an ellipsis in the instruction text, so students are not able to match up the words.

![Figure 3: Item that directs the student to find a word in the sentence which highlights when tapped.](image)

**On-screen book:** The program also introduces the on-screen book, which first appears without any test items attached. Students can tap on page tabs or ‘swipe left’ in the book to move to the next page.
When students have finished reading the book they tap on the Next arrow and the test item slides in from the right-side of the screen, leaving the book still functional on the left-side of the screen (See Figure 5). This means that students have access to look through the ‘pages’ of the book to answer the questions and are not relying on recall or short-term memory to respond. They are using the book stimulus in the way it is used in real-life when searching for information. After listening to the options, students tap on the speech bubble to record their answer. Figure 6 shows a reading item that comes without audio support.
3.2 How it works – design of content development

A significant aspect for MTEG is the alignment of research-based educational outcomes with each country’s own culture and curriculum. There are two main reasons that it is important to strike this balance:

1. The look and feel of the content must be instantly familiar to the student, especially for the early years cohort. This settles the student into a context they can work with and helps improve the ability for cognitive processing, as shown in long-term research on schema theory (Bartlett, F., 1932; Anderson et al., 1977). In simple terms, schema theory suggests that new information is processed through the filter of the pre-existing schema of knowledge the individual has already created. ‘Schema theory can help explain failure to comprehend: there may not be enough clues to activate existing schemata, the reader may not have appropriate schemata, and failure to comprehend may result when the reader makes an interpretation but not the one intended’ (Clark, S., 1990). An example of this from the early development of the Grade 3 reading test was when a narrative set around children playing in a park with a parent supervising was proposed. Consultation with the Afghan team revealed that this context was unsuitable for the Afghan context. The team reported that parks are not set up in the same way as they are in many other countries, that boys and girls do not tend to play together, that boys and girls would play different types of games and it is unlikely that a parent would be present and supervising the children playing. An apparently simple question such as, ‘What are the children doing at the park?’ would therefore be likely to elicit confusion in Afghan students working through their own schema of behaviour in a park. The targeted reading skill can, however, still be measured by changing the setting of the question.

2. By establishing a familiar context in a reading test that matches the cultural background of the student, it helps alleviate student confusion when a less familiar concept then does appear in a test item. In Afghanistan, ‘thinking’ questions such as interpreting a character’s actions are far less likely to be asked, but are an important part of
comprehension and appear in the MTEG assessment. ‘To say that one has comprehended a text is to say that she has found a mental ‘home’ for the information in the text, or else that she has modified an existing mental home in order to accommodate that new information.’ (Anderson, R.C., & and Pearson, D.P., 1984). Grade 3 field trial results showed that these types of ‘thinking’ questions were more difficult for students, with only 20–30% of the students responding correctly to items that involved inference in contrast 55–75% that involved locating directly-stated information.

The MTEG Grade 3 reading assessment draws on the five components of reading recommended in the 2000 US National Reading Panel Report, but with a strong emphasis on listening and reading comprehension.

The first three of the five components focus on decoding written language into speech.

1. **Phonemic Awareness:** In *Research-Based Methods of Reading Instruction* (2004) Vaughn and Linan-Thompson describe phonemic awareness as ‘the ability to identify the phonemes (smallest identifiable units of sound) of spoken language, and how they can be separated (pulled apart or segmented), blended (put back together), and manipulated (added, deleted, and substituted).’ When used together in a sequence, phonemes take on meaning or instigate a change in meaning (Cruttenden, A., 2008, p. 41). For example the three phonemes /d/ /o/ /g/ become meaningful as the word ‘dog’; however if the phoneme /g/ is replaced with /t/, both the sound and meaning have been altered to make the new word ‘dot’.

2. **Phonics:** This is a process of ‘teaching reading that stresses the acquisition of letter-sound correspondences and their use to read and spell words’ (Harris & Hodges, 1995). In English, phonemes are directly connected to phonics instruction, ‘For the purpose of reading instruction, a phoneme is a single sound that maps to one or more printed letters’. (Vaughn et al., 2004, p. 8). This is not the case for all languages, however, such as those that are character-based.

3. **Fluency:** The ability to decode at a high level. ‘Fluent readers can read text with speed, accuracy and expression’. (National Reading Panel, 2000)

The final two components of reading address making meaning from what is read.

4. **Vocabulary:** ‘The proportion of difficult words (vocabulary) in a text is the single most powerful predictor of text difficulty, and a reader’s general vocabulary knowledge is the single best predictor of how well that reader can understand text’ (Anderson and Freebody 1981). Building on from Anderson and Freebody’s statement, other researchers have found that simply knowing the meaning of words alone is not enough, ‘reading comprehension depends on a wealth of encyclopedic knowledge and not merely on definitional knowledge of the words in the text’ (Nagy, 1988) and ‘Vocabulary instruction should aim to teach students the relationships that exist among words so that they are learned as part of a network of ideas’ (Moats, 2000, p. 192).

5. **Comprehension:** In its simplest terms, comprehension is the ability to draw meaning from spoken and written language (Vaughn et al., 2004, p. 136). The National Reading Report states that reading comprehension is a cognitive process that integrates complex skills and
cannot be understood without examining the critical role of vocabulary learning and instruction and its development. (Burns et al.)

What is apparent from all the researchers is that whilst fluency smoothes the way for comprehension to take place, it doesn’t guarantee comprehension. And that the first three components are stepping stones to enable the ultimate goal of reading, which is making meaning from written text.

### 3.3 Assessment content

In 2014 93 individual reading items were trialled for the MTEG Grade 3 reading assessment. As detailed in Table 1 almost half of these items reflected elements of comprehension whilst the others were focussed on decoding, reading fluently and print conventions.

<table>
<thead>
<tr>
<th>Reading Components</th>
<th>Number of test items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental print</td>
<td>4</td>
</tr>
<tr>
<td>Independent reading comprehension (paragraphs, sentences and word level)</td>
<td>27</td>
</tr>
<tr>
<td>Listening Comprehension of stories (paragraphs level)</td>
<td>17</td>
</tr>
<tr>
<td>Vocabulary (sentences and word level)</td>
<td>9</td>
</tr>
<tr>
<td>Phonemic Awareness</td>
<td>9</td>
</tr>
<tr>
<td>Phonics</td>
<td>27</td>
</tr>
<tr>
<td>Print Conventions</td>
<td>9</td>
</tr>
<tr>
<td>Fluency</td>
<td>read aloud a few short sentences</td>
</tr>
</tbody>
</table>

From this pool of 98 items, 58 have been selected to be in the main study. They will be delivered in a split-design where there are two separate tests that have a set of common items.

**Independent Reader Test**
- 20 reading and listening comprehension items at word, sentence and paragraph levels

**Emerging Reader Test**
- 18 decoding items including sound, letter recognition and environmental print
Before the student sits the test, the administrator asks each student to read aloud 1 to 3 short sentences, making sure each one reads a different text from the other students in the group (they also do not need to read in front of other students). If a student does not start to read, he or she is asked, ‘Are there any words you know?’, and then encouraged to point to them and read them aloud. Students who correctly read any five words or more are assigned the Independent Reader Test on the app. Students who only read one or two words or cannot read any words at all are assigned the Emerging Reader Test, also on the app. The fluency check is to be stopped after one minute.

Having two tests available means a greater range of the cohort’s abilities can be measured without the need for a single, much longer test. The overlapping set of 20 questions also means that students who are unable to read fluently are still able to be checked for both low-level decoding and the higher-level listening comprehension. These results can be directly compared to the fluent reader cohort through the commonly shared items.

3.4 MTEG Grade 3 field trial results

The field trial results showed that there was a good spread of item difficulties and the items showed good discrimination. The items were well targeted, with the average item difficulty and the average student ability of the sample being very similar. However, a significant proportion of items was too difficult for many students; these items will therefore not be included in the main study. The field trial results reveal that the majority of the items performed similarly for Pashto and Dari languages, and for male and female students. Items indicating gender or language bias have not been selected for the main study.

The field trial data also revealed that:

- both comprehension and decoding items were present across the full range of difficulty (easy, medium, hard);
- students found locating information an easier comprehension skill than interpreting meanings around characters’ intentions and feelings;
- responses for a simple reading text that the Independent Readers read without audio support was generally found to be easier than a more difficult listening comprehension text that was fully audio-supported and required no decoding – demonstrating that the two skills can be teased apart for testing purposes;
- students’ and administrators’ feedback confirmed that the students found the Practice Program accessible and engaging and were consequently able to sit the test with a satisfactory level of confidence and independence; and
- 79% of the sample responded correctly to the easiest item, 16% responded correctly to the hardest item.

4 DISCUSSION OF ISSUES

The two most significant operational issues faced in delivering the program to Afghanistan were the relevance of content and the logistical aspects of delivering the tests (whether they were on paper or computer tablets). The partnership that was established early with the Ministry of Education staff meant that there was a pragmatic approach to feedback. Although Dari and Pashto are the official languages, there still exist many local dialects and vocabulary that differ by region.
Care was taken to not use terms that would cause confusion. Through the training provided, the Afghan Learning Assessment team became adept at interpreting the data and increasingly promoted the importance of including ‘thinking-based’ test items not traditionally included in their teaching or testing of reading. The placement of such items in the test modelled their value to both students and educators. As happened in the first administration of MTEG learning assessments in Grade 6, it is expected that the analysis of thinking-based outcomes will lead to the provision of practical pedagogical advice for teachers (see 'Suggestions for teaching' in Lumley et al. 2014)

The local administrators, trained and supported by the Kabul-based Learning Assessment Team, distributed the tests for the Grade 6 field trial and main study and the Grade 3 field trial. The administrators carried out their tasks with a great deal of efficiency both in the time-frame they had and collection of metadata. Training of the administrators was included in the MTEG program and they were able to report quickly on problems in the field. For example, during the Grade 3 field trial, unreliable internet connection in Kabul was interfering with the downloading of the tests onto the apps. As the connection dropped out, tests were coming through with missing images and text. The software developers were able to find another way to segment the data so that even when there was a disruption to the connection during the downloading of the tests, no data would be lost.

5 CONCLUSION

The MTEG reading assessment program has shown signs of success in the Afghanistan context via its implementation and reporting at the Grade 6 level and extensive trialling at the Grade 3 level. This has been accomplished by finding a number of innovative and culturally relevant ways to work towards the expectations of the national education goals. The close working relationship with the Learning Assessment Team at the Afghan Ministry of Education has been an important contributing factor to this achievement through their valuable feedback as well as promotion and implementation of the assessment nationwide.

The Grade 3 tablet-based approach demonstrates that it is possible to collect data on reading comprehension in a highly standardised and efficient way. Another significant feature of the Grade 3 assessment is that it has found a way to assess and collect data on all five components of reading assessment even with students who are unable to decode through its use of embedded audio. The added emphasis on listening and reading comprehension in the assessments also incorporate valuable thinking and reasoning skills that are a fundamental aspect to understanding text. The combined result of the assessment's content and design is the output of quality data that covers a large spread of abilities. With the analysis of outcomes, this is vital for policy-makers and practitioners to lead practical pedagogical advice for developing these aspects of learning to read.
REFERENCES


