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Education Data for Decision Making (EdData II):

Iraq Education Surveys– MAHARAT

Executive Summary: Analysis of Student Performance in Reading and Mathematics, Pedagogic Practice, and School Management

EdData II Technical and Managerial Assistance, Task Number 14
Contract Number AID-267-BC-11-00001
Strategic Objective 3
October 4, 2012

This publication was produced for review by the United States Agency for International Development. It was prepared by RTI International.

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Executive Summary: Analysis of Student Performance in Reading and Mathematics, Pedagogic Practice, and School Management

EdData II
Task Order No. 14

Prepared for
USAID/Iraq
Muhammad Helmi, COR

Prepared by
Aarnout Brombacher, Penelope Collins, Christopher Cummiskey, Pierre de Galbert, Emily Kochetkova, and Amy Mulcahy-Dunn
RTI International
3040 Cornwallis Road
Post Office Box 12194
Research Triangle Park, NC 27709-2194

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Abbreviations

CE	Cambridge Education
COR	Contracting Officer's Representative
DOE	Directorate of Education
EFA	Education for All
EGMA	Early Grade Mathematics Assessment
EGRA	Early Grade Reading Assessment
EMIS	Education Management Information System
GER	gross enrollment ratio
HDR	Human Development Report
IEMCA	Iraq Education Management Capacity Assessment
IMF	International Monetary Fund
ISTC	In-service Training Center
MAHARAT	Arabic word for "skills" (title of EdData II Task Order 14)
MOED	Ministry of Education
MSA	Modern Standard Arabic
NER	net enrollment ratio
PTA	parent-teacher association
RTI	RTI International (trade name of Research Triangle Institute)
SO	Strategic Objective
SSME	Snapshot of School Management Effectiveness survey
TIMSS	Trends in International Mathematics and Science Study
TO	Task Order
TTI	Teacher Training Institute
UN	United Nations
UNESCO	United Nations Educational, Scientific, and Cultural Organization
US	United States
USAID	U.S Agency for International Development

Acknowledgments

The authors wish to acknowledge the important contributions of the numerous people that made this study possible. Rodeina Abdel Fattah, Muhammad Helmi, and Stefanie Kendall of USAID/Iraq provided valuable guidance and support throughout the preparation and implementation of this study. Many departments and staff throughout the Ministry of Education also made important contributions to developing and implementing this study and helped assure that the instruments and methodologies were appropriately aligned to the Iraqi context. In particular, we wish to thank Dr. Nihad Al Juboori, Deputy Minister (Scientific Affairs), and Ms. Hana Ahmed Ghazi, Director General (Finance), from the Ministry of Education for their support. The MAHARAT team in Baghdad, Alaa Waheed, Dhuha Al Musawi, and Qutaiba Sabti, provided invaluable support throughout the study in liaising with the Ministry of Education and managing the implementation of training workshops and field activities. Field data collection and data entry were only possible thanks to Ali Taha, Adnan Al-Harazi, and the fine staff of Development Cooperation International (DCI) Iraq and Prodigy Systems. Additionally, we wish to acknowledge and thank the editors of this report, Ellen Lohr-Hinkel and Erin Newton, for their critical assistance in its completion. Most importantly, this work could not have succeeded without the cooperation and contributions of the Ministry of Education staff and the students, teachers, and principals included in the study, who, for obvious reasons, must remain anonymous.

Executive Summary

Education Background

Iraq's once strong and competitive public education system now suffers from the impact of sustained conflict over many years. Although rebuilding efforts are underway, there remain too few school buildings, and many that remain are in need of significant repair. Iraq's National Development Plan for 2010–2014 indicates that education funding is both insufficient and poorly allocated, with nearly 95% being spent on salaries and the remainder going toward capital investments.[1] This leaves little to no funding for improvements to the quality of learning, such as curriculum development and teacher training. Additionally, prior to this study, there was no research available on learning outcomes in the early grades.

Purpose and Design of the Assessment

Assessments of student learning in the primary grades, such as the Early Grade Reading Assessment (EGRA) and Early Grade Mathematics Assessment (EGMA), offer an opportunity to determine whether children are developing the fundamental skills upon which all other literacy and mathematical skills build, and, if not, where efforts might be best directed. This is vital information for countries that are working to improve the quality of education in their schools.

Of equal importance to understanding how well children have mastered foundational skills is an understanding of why certain schools succeed in teaching these foundational skills while others do not. The Snapshot of School Management Effectiveness (SSME) provides a multifaceted view of school and classroom characteristics traditionally associated with student performance.

[1] *National Development Plan*, p. 116.

To gain insight into both student facility with foundational skills and to better understand characteristics among Iraqi schools associated with this performance, USAID/Iraq, in partnership with the Ministry of Education (MOED), contracted with RTI International under the Education Data for Decision Making (EdData II) project to conduct the SSME, including the EGRA and EGMA, in a sample of primary schools in Iraq. The hope is that evidence-based information resulting from the survey can inform future education policy decisions, as needed.

The instruments used in this project—Iraq Education Surveys-MAHARAT—were adapted specifically for the Iraqi context during an adaptation workshop with the MOED. RTI's education specialists worked together with local Iraqi reading, math, and primary school experts and officials to design abbreviated versions of the Early Grade Reading Assessment (EGRA) and the Early Grade Mathematics Assessment (EGMA). In addition to administering individual oral assessments of students, RTI and its local partner DCI sent research teams to interview principals and teachers, conduct inventories of school and classroom resources, and observe reading and math lessons as part of the SSME survey.

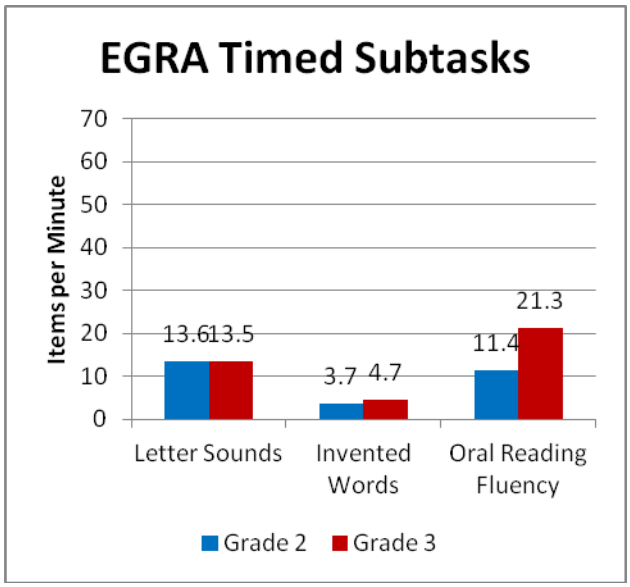
After a week-long training workshop in March 2012, research teams, composed of DCI staff and contractors as well as MOED staff members, visited a total of 54 public primary schools across Iraq. In each school, a grade 2 and a grade 3 teacher was randomly selected, and 10 students from each of these classes were randomly selected to take the EGRA and EGMA and to be interviewed about their experience with school. A total of 1,153 students were selected for participation in the assessments and interview. The selected teachers were interviewed, as was the principal of the school, and a researcher observed the selected grade 2 teacher teach a reading lesson and a math lesson. Researchers also took inventory of the school grounds and the selected classrooms. Data collection was completed at the beginning of May 2012.

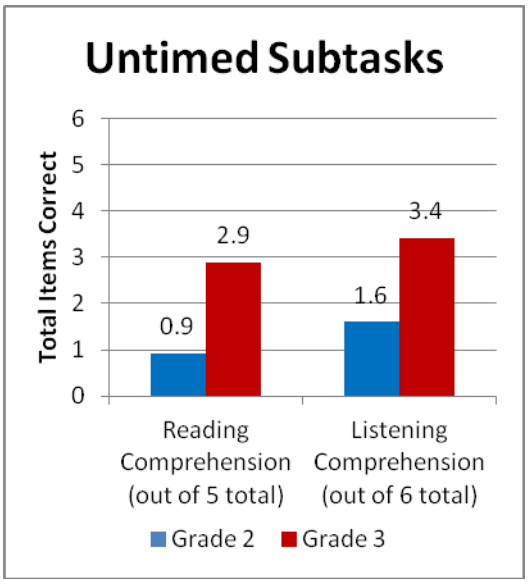
How Well Are Students Learning to Read?

The EGRA in Iraq, which was administered orally to individual students in Modern Standard Arabic (MSA), consisted of five subtasks: (1) letter-sound knowledge, (2) invented word decoding, (3) connected text oral reading fluency, (4) reading comprehension, and (5) listening comprehension. Letter-sound knowledge and the ability to read unfamiliar single-syllable words are foundational skills needed for fluent reading and comprehension. All subtasks except for reading comprehension and listening comprehension were timed. The time limit made it possible to assess whether students had achieved a desired level of automaticity in these skill areas. Timed subtasks were scored as correct letters per minute (clpm) or correct words per minute (cwpm), while untimed tasks were scored as total items correct. The reading comprehension subtask totaled 5 questions and the listening comprehension subtask totaled 6 questions.

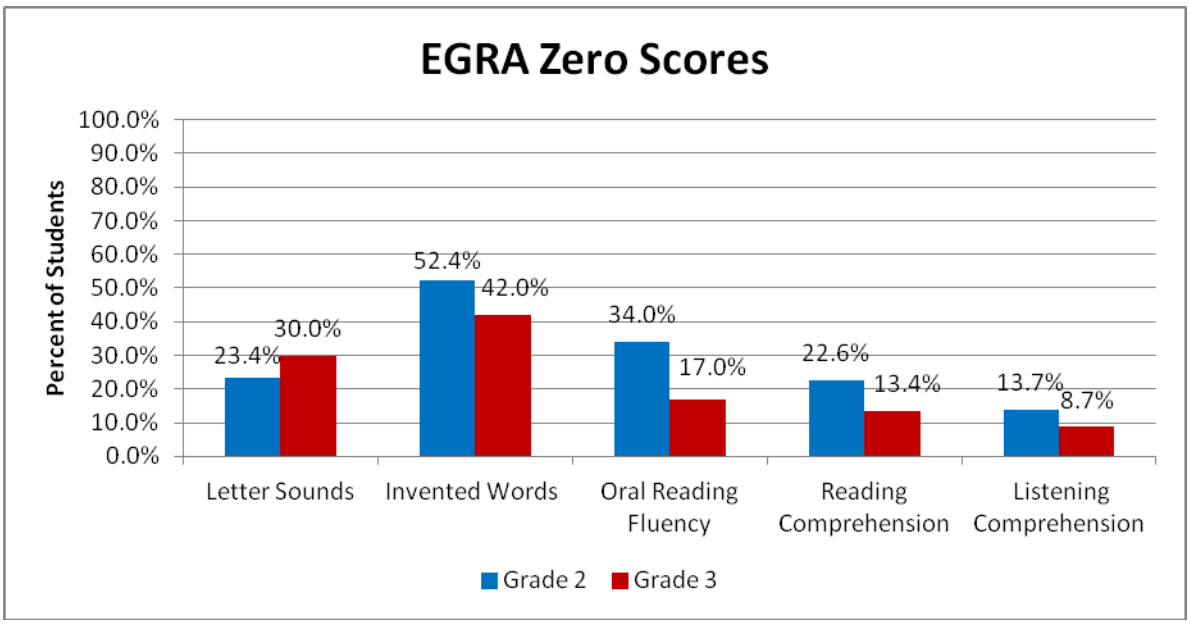
The figures below present EGRA scores by grade. The scores for the first three subtasks (letter sound knowledge, invented word decoding, and oral reading fluency) represent the number of correct items per minute. The scores for the last two subtasks represent the total number of correct items. The graph depictions of the scores show

grade progression from grade 2 to grade 3, except on the letter sounds subtask. For the oral reading fluency task, students were asked to read a short narrative story as quickly and accurately as they could. In grade 2, for example, students were able to read 11.4 words per minute, on average. By grade 3 they were able to read nearly 21.3 words per minute.

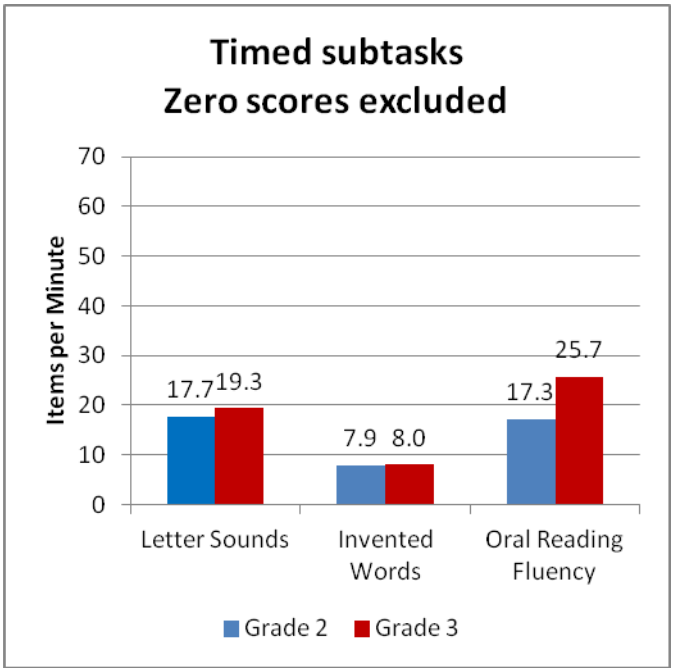


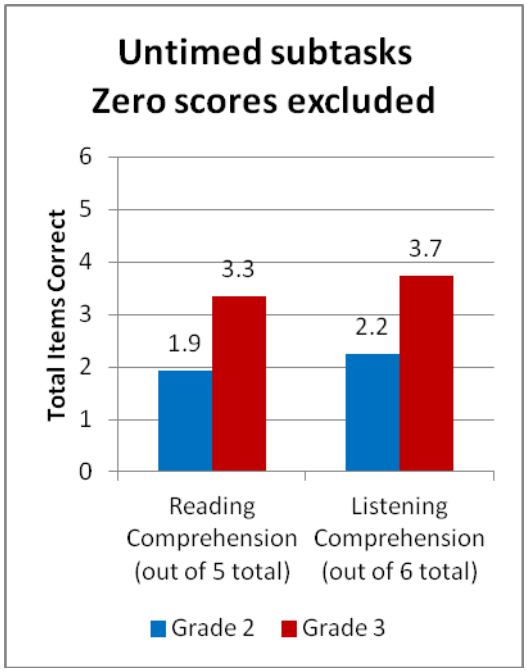


The next figure presents the percentage of students with zero scores, by grade and subtask. Students who were unable to perform a single item on a subtask received a zero score. Thus, for example, in grade 2, over one third of students assessed could not read a single word in the oral reading fluency subtask. In grade 3, 17% of students received zero scores on this subtask. Students struggled the most with the invented words subtask, with over half of grade 2 students unable to decode a single invented word.



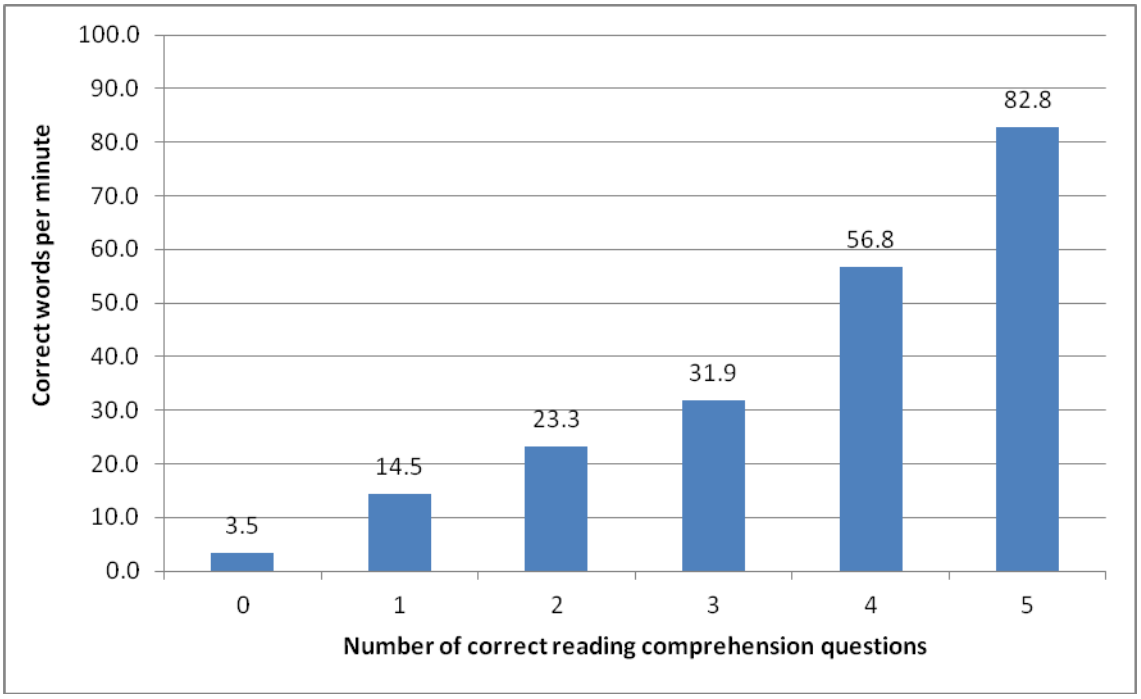
Because zero scores tend to bring total averages down, it is also useful to consider the scores of students who are able to correctly perform at least one item on a subtask. Thus, the next pair of graphs depict EGRA scores for these students (i.e., zero scores have been removed). Again, looking at the oral reading fluency subtask, we can see that students who could read at least one word scored 17.3 correct words per minute in grade 2 (compared with 11.4 when zero scores are included).





Research has shown that readers must read with a minimum speed in order to understand what they have read. The relationship between reading fluency and comprehension is clearly shown in the figure below. Students who were unable to answer a single comprehension question read at an average speed of fewer than 4 correct words per minute, and those able to answer all five questions correctly could read 82.8 correct words per minute on average.

Relationship between reading fluency and comprehension



It is generally accepted that when children are reading with comprehension, they can correctly answer 80% or more of their reading comprehension questions. Iraqi students who were able to answer 4 or more of the 5 comprehension questions correctly were reading at an average fluency rate of 56.8 correct words per minute. As reported above, the *average* reading speeds recorded were well below this rate and, therefore, too slow to permit students to be reading with true comprehension.

Overall, these results reveal that by the end of grade 3, the majority of students assessed had not yet acquired sufficient foundational skills to read fluently with comprehension.

How Well Are Students Learning to Do Basic Mathematics?

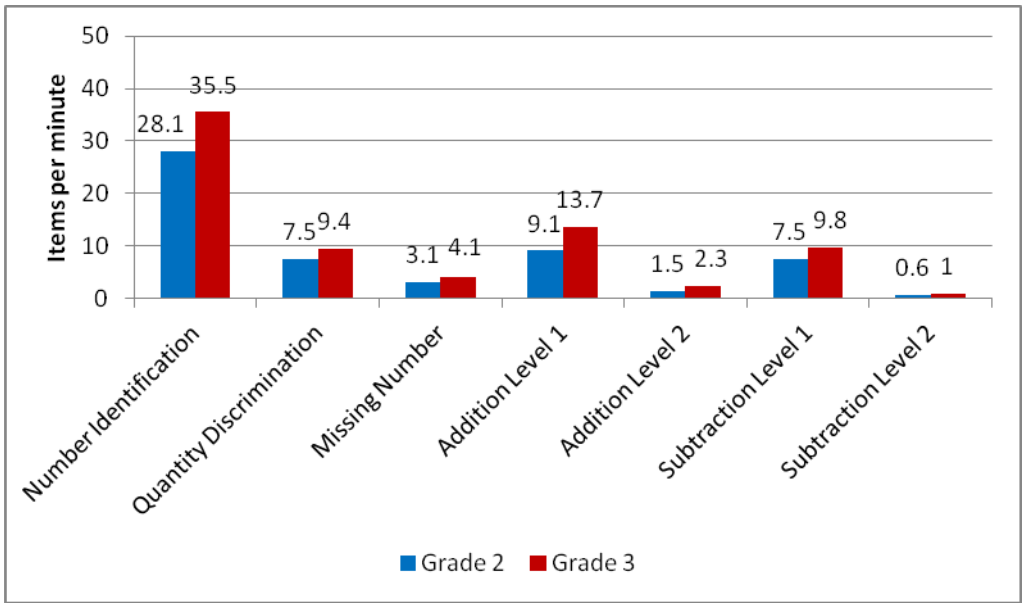
Students' understanding of foundational math skills was orally evaluated using the EGMA, which consists of six subtasks: (1) number identification, (2) quantity discrimination (that is, larger vs. smaller values), (3) missing number (number patterns), (4) addition and subtraction (level 1), (5) addition and subtraction (level 2), and (6) word problems. The level 1 addition and subtraction problems were *procedural* in nature[2] and involved single- and double-digit problems with sums or differences below 20. Students were asked to solve the problems without using paper

[2] In learning mathematics, *procedural skills* refer to the ability to apply a simple rule or standard algorithm to solve a problem. *Conceptual understanding* refers to a broader grasp of mathematical ideas. For the EGMA in Iraq, the level 2 problems were more conceptual than level 1 problems because the students had to understand what they were doing (these items did not represent memorized facts) and also apply level 1 skills. Level 2 problems were not purely conceptual, but were more conceptual than level 1, especially so for grade 2 and grade 3 students.

and pencil, and then give their answer. Level 2 addition and subtraction problems were more difficult, and required students to grasp mathematical *concepts* such as the bridging of tens. For these problems, students were permitted to use a pencil and paper to work out the solution. For each subtask, except for the word problems, students were asked to complete as many items as they could within a time limit. Both accuracy (number of correct items from items attempted) and automaticity (number of correct responses per minute) scores were reported. As with EGRA, by timing how quickly students perform these tasks, EGMA evaluates whether students have achieved a desired level of automaticity in these skill areas.

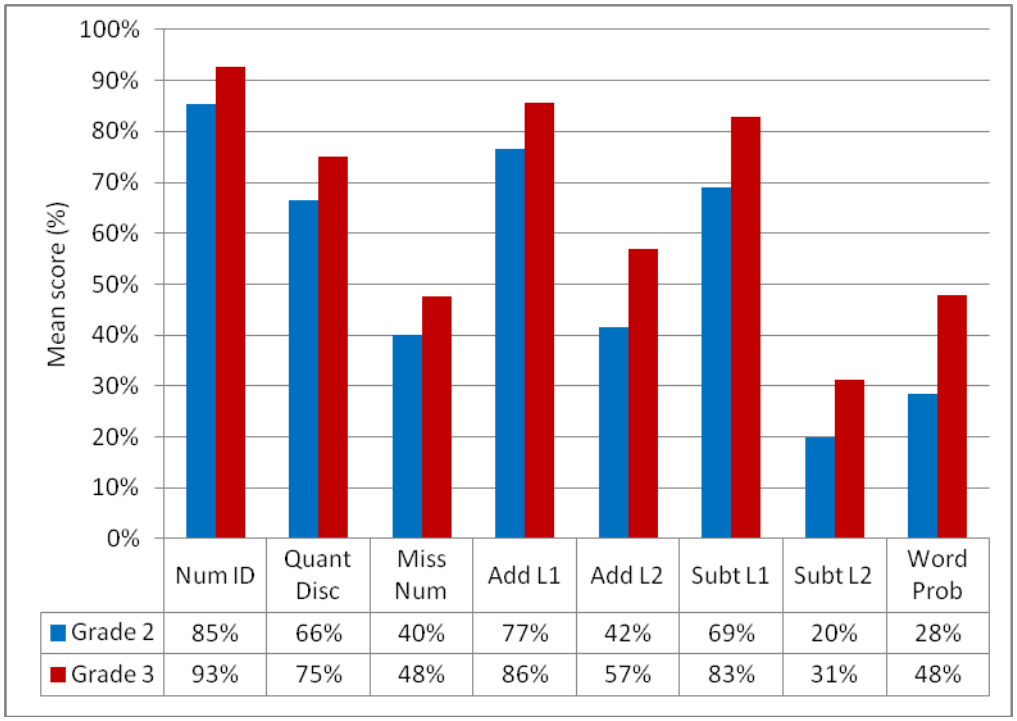
The figure below presents average EGMA scores per minute for each grade. The final subtask, not depicted in the graph, was a word problem subtask that was not timed. Students in grade 2 were able to name 28.1 numbers per minute and grade 3 students could name 35.5. Students were able to correctly answer 9.1 level 1 addition problems per minute in grade 2, and 13.7 problems in grade 3.

Average EGMA scores on timed subtasks, by grade



The next figure shows the percentage of correct responses out of those attempted. As with the EGRA, the graph shows progression from grade 2 to grade 3. This progression was greatest on the addition and subtraction level 2 tasks. The results create the general impression that the students were more successful on those subtasks that assessed procedural knowledge: number identification and addition and subtraction level 1. By contrast, the students performed less well on the subtasks that involved more conceptual understanding, namely the missing number, addition and subtraction level 2, and the word problem tasks.

Percentage of correct responses, by EGMA subtask

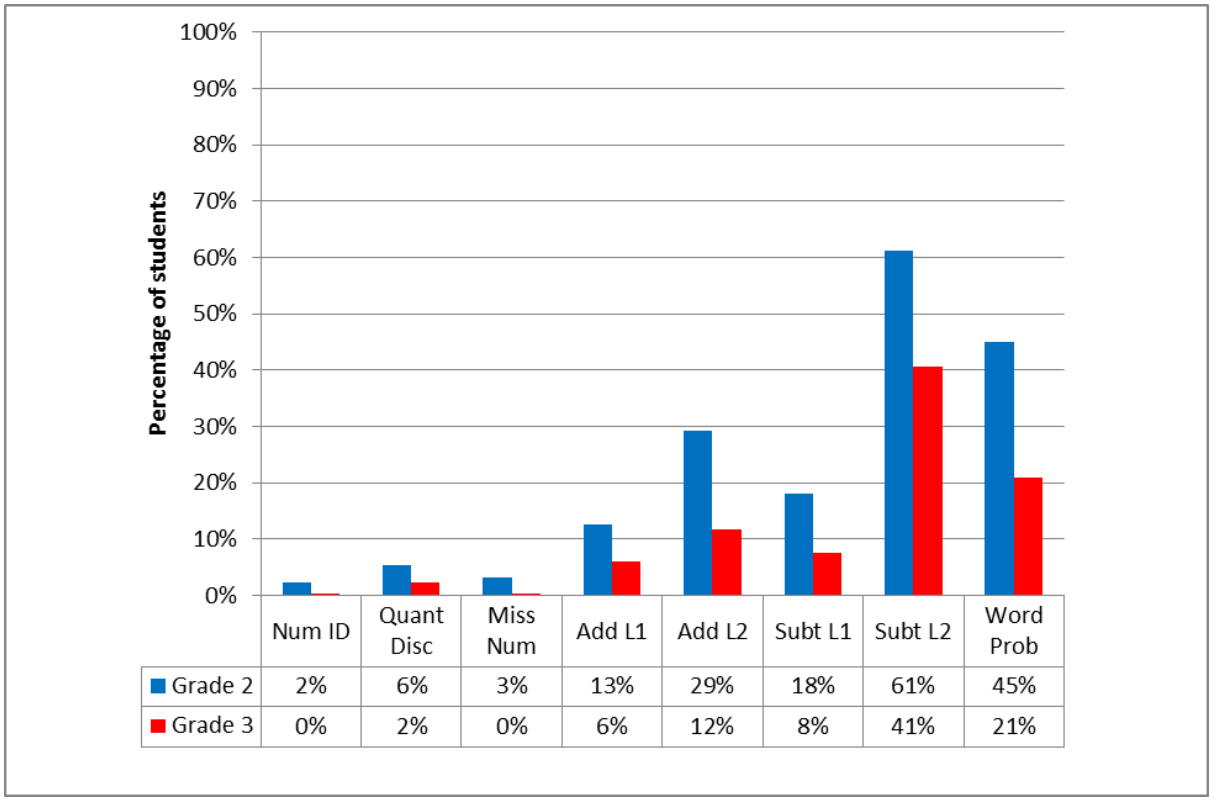


	Num ID	Quant Disc	Miss Num	Add L1	Add L2	Subt L1	Subt L2	Word Prob
Grade 2	85%	66%	40%	77%	42%	69%	20%	28%
Grade 3	93%	75%	48%	86%	57%	83%	31%	48%

As with the EGRA, it is also useful to consider the percentage of students receiving zero scores on the EGMA, as depicted in the figure below. As is shown, 13% of grade 2 students were not able to answer a single addition level 1 problem correctly, and 18% of grade 2 students were unable to answer a single subtraction level 1 problem correctly. These subtasks consisted of basic (procedural) addition and subtraction problems.

The percentage of zero scores increased on the more conceptual subtasks, with 29% of grade 2 students and 12% of grade 3 students unable to answer a single addition level 2 problem correctly. On the subtraction level 2 subtask, a majority (61%) of grade 2 students and 41% of grade 3 students were unable to answer a single problem correctly. Similarly, in the case of the more conceptual word problem subtask, a large percentage of the grade 2 (45%) and a fair percentage of the grade 3 students (21%) were unable to answer a single problem correctly.

EGMA zero scores, by grade



	Num ID	Quant Disc	Miss Num	Add L1	Add L2	Subt L1	Subt L2	Word Prob
Grade 2	2%	6%	3%	13%	29%	18%	61%	45%
Grade 3	0%	2%	0%	6%	12%	8%	41%	21%

These EGMA results in Iraq suggest that memorization plays a large role in the way that children know and learn mathematics. This suggestion is supported by the clear trend in the results showing students doing better on the items that relied on procedural knowledge—knowledge that can also be memorized—and markedly less well on the tasks and items that required both the understanding and the application of what should be procedural (rather than memorized) knowledge.

How Well Are Schools Being Managed?

The SSME findings revealed areas of strength as well as areas needing improvement in Iraqi schools. Despite the need for infrastructure repairs in many schools, the vast majority of principals and teachers said that they and their students are safe. Teachers and students do not suffer from a shortage of textbooks and exercise books, and although the school year is short and the necessity of shift schools serves to compress the time available for learning, little of that time is spent off-task on non-instructional activities.

Still, infrastructure problems are a concern, as over three-quarters of schools visited are in need of repair, with researchers observing broken windows in classrooms, damaged walls and roofs, and exposed wiring. More than half of schools visited had no working electricity, and over a quarter had no functioning water source. Toilet availability and cleanliness is another area in need of improvement.

Interviews with teachers and observations of lessons revealed a number of interesting findings. Half of teachers reported that they had received no pre-service training in

specifically how to teach reading and math. Possibly related to this, researchers found that although most teachers used various types of evaluation approaches to measure their students' academic progress, fewer than 10% of teachers reported using the results of these assessments to adapt their teaching or plan lesson activities. These findings may suggest a lack of understanding in how to make use of various methods of student evaluation, a lack of flexibility or freedom in how teachers make use of or follow the curriculum, or a combination of factors.

Teacher feedback is an essential part of teaching and student learning. By looking at students' exercise books, it was possible to measure the frequency with which teachers had marked or commented on students' work. Examination of the exercise books revealed a wide range in page coverage. Most contained at least some marks and comments by the teacher but only a minority of exercise books had marks and comments on all pages. Those that did were correlated with stronger reading performance among students. Additionally, teacher responses to student mistakes during class can reveal teacher-student dynamics. The majority of students interviewed reported punitive, rather than constructive responses from their teachers when they answered a question incorrectly, with half reporting being hit by their teacher. Students rarely asked questions during lessons suggesting that students either lack the opportunity to ask questions or that they are reluctant to do so.

Classroom observations of reading lessons showed that the largest proportions of lesson time were spent on advanced reading activities, such as reading texts and writing, but very little time was spent on more basic reading skills, such as letter sounds and reading isolated words. This instructional emphasis would be appropriate if students had mastered these foundational skills, but as the EGRA results have shown, students are struggling in these areas.

Interestingly, the observations of math lessons revealed that relatively large amounts of lesson time were spent on the basic skills of number identification and reciting number words—skills that correspond to students' best performance on the EGMA (number identification). Additionally, teachers were observed to mix these basic elements of mathematics with higher level (more conceptual) concepts such as addition and subtraction with 2 or more digits, fractions, and multiplication. Less time was spent on single digit addition and subtraction—problems that students showed moderate ability to perform on the EGMA.

Reading practice at school and at home is another important factor that the SSME investigates. Significantly, only 13.5% of schools visited had a library, and just 4.6% of classrooms were observed to have any books available to students other than their textbooks. Students in the few schools that did have a library were stronger readers. Having books at home other than textbooks was also uncommon, as 71.3% of students said they had none, and over a third reported never reading to anyone at home nor being read to by a family member. However, despite this some students and their parents were managing to practice reading at home, and both having books to read and reading at home are linked to stronger performance on the EGRA. Not surprisingly, parental involvement in their children's learning is associated with better student performance. Almost all teachers said parents were at least somewhat

involved in their children's schoolwork (although only 35% of teachers reported being satisfied with parental involvement). Similarly, nearly all students said their parents were aware when they made a good grade, which was positively linked with reading performance.

Finally, several components of the SSME are designed to measure time spent on-task during the school day. The school year in Iraq is short compared to many countries, at 32 weeks. Taking into consideration average number of school closings, short school days due to the shift system or sharing of facilities, and time spent at assembly or break instead of in class, the average number of hours available for learning is calculated to be 544 hours in a year (3.6 hours per day for a double shift school, multiplied by 151 days). This falls far short of the 850-1,000 minimum instructional hours recommended by the World Bank and UNESCO through the Education for All (EFA) initiative.[3] Thus, although teachers are not wasting time off-task during the school day, the calendar places a limit on how much overall instruction they are able to provide to their students over the course of the year.

Recommendations

Representatives from the MOED and Iraqi educators, together with researchers, worked together to develop several recommendations following detailed discussion of the study findings.

The study revealed room for improvement among teachers. The group recommended that teacher training (both pre-service and in-service) focus on the development of early grade-specific skills in teaching reading and mathematics and, in general, on developing a more child-centered pedagogy. In other words, teacher training needs to focus on developing both the subject content knowledge and the pedagogical content knowledge.

Additionally, the group recommended increasing the number of instructional hours per year. Although increasing the number of instructional hours per year is necessary, it is not sufficient—as much attention needs to be given to *what happens during these instructional hours* as to *providing these hours*.

Finally, the group recommended an increase in children's access to reading materials (in addition to textbooks), both at school and at home. This may necessitate a school library initiative, as well as a public awareness campaign to educate parents about their role in their children's education in general, and specifically about the importance of providing books for their children to read at home.

[3] EFA Global Monitoring Report, 2005, 0. 149.