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ARABIC LITERACY AND NUMERACY STATE OF THE ART CONFERENCE DESK REVIEW EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

PURPOSE, RESEARCH QUESTIONS, METHODS, & SCOPE

The United States Agency for International Development's (USAID) Middle East Bureau commissioned this regional review of early grade reading (EGR) and early grade math (EGM) progress in Arabic-speaking countries across the Middle East and North Africa (MENA) region. Building on the 2013 *Topical Analysis of Early Grade Reading Instruction*, the purpose of the report is not to compare results across countries, but rather to identify and celebrate the progress countries have made in the last five years, and to identify best practices and/or gaps that exist, in order to inform future efforts across the region. This report contributes to furthering the goals of the 2017 Reinforcing Education Accountability in Development, or the READ Act,¹ and the U.S. Government Strategy on International Basic Education (Fiscal Year (FY) 2019-2023)² and November 2018 USAID Education Policy,³ all of which guide USAID's core development goal to improve quality education so that children and youth gain foundational skills to ensure self-reliance and skill development—expected drivers of economic growth. This research has been organized around two major questions and several sub-questions, as follows:

Research Question 1 (RQ1): What do the research-based literature and existing assessment data say about teaching and learning literacy and numeracy with a variety of learning groups across the Arabic-speaking countries in the MENA region today?

- What does the research on learning to read in Arabic—particularly the large body of research carried out by academics in the region—tell us about what works and what skills and sub-skills should be emphasized in Arabic reading improvement programs?
- What does the research on learning numeracy in Arabic tell us about what works and what skills and sub-skills should be emphasized in numeracy improvement programs?
- What are the missing resources that continue to inhibit EGR and EGM students to succeed in reaching literacy and numeracy benchmarks?
- What approaches to teacher training can be adopted/tailored for teachers of Arabic reading and numeracy? (e.g. pre-service, in-service, praxis)

Research Question 2 (RQ2): What is the current level of EGR and EGM performance in Arabic-speaking MENA countries according to targets (boys, girls, students in or out of school, marginalized, etc.)?

- Where has the most and least progress been made?
- What lessons learned and promising practices have been identified in USAID- and non-USAID funded Arabic literacy and numeracy efforts?
- What human resources development strategies have proven to be successful in terms of equipping teachers with the skills needed to support student-learning outcomes?
- What additional rigorous research could shed more light on effectively addressing gaps?

This report uses literature review as the primary research methodology to answer the questions above, drawing principally on project-based and donor-funded research and evaluation, as well as international assessment data and academic research from the last five years (since the publication of the *Topical Analysis of Early Grade Reading Instruction in Arabic* report in 2013).⁴ Where possible, the study also reviewed relevant Ministry of Education (MOE) reports and strategic frameworks. This study did not

¹ The READ Act text can be found here: <https://www.congress.gov/bills/115/congress/115th-congress/senate-bill/623/text>

There are several sections that focus specifically on basic education (literacy, numeracy), marginalized children and vulnerable groups, gender parity, etc. that will be taken into consideration for research and workshop preparations.

² https://www.usaid.gov/sites/default/files/documents/1865/USG-Education-Strategy_FY2019-2023_Final_Web.pdf

³ https://www.usaid.gov/sites/default/files/documents/1865/2018_Education_Policy_FINAL_WEB.pdf

⁴ PIRLS, PISA, TIMSS international assessment data.

include any primary or field-based data collection and relies solely on existing resources as described above, which can be considered a limitation. However, as the reports included in this study are recent and used a high degree of research rigor, this limitation has been sufficiently mitigated.

While the boundaries of the MENA region are often debated, for the purposes of this report, this review is limited to countries where Arabic is the most common language. These countries include: Algeria, Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, United Arab Emirates (UAE), West Bank/Gaza, and Yemen. As of 2019 Arabic was the first language of over 400 million speakers across the world, primarily among those who live in the MENA region. It is the fifth most spoken language in the world.⁵ Over the last five years, the estimated population of Arabic speakers across the MENA region has risen by over 18 million people. Given this vast population and the centrality of both reading and mathematics in academic achievement, work-readiness, and life success, improving reading and mathematics teaching and learning across the region is critical.

FINDINGS & CONCLUSIONS

There is much to be optimistic about in MENA countries' progress in early grade reading and math achievement. While absolute scores are still low, MENA countries have made enormous progress in both EGR (e.g., letter sound identification and simple word reading – due to greater phonemic and syllabic awareness and decoding), and in EGM basic skills (e.g. number identification, quantity discrimination, simple addition and subtraction). However, in EGR, higher order skills such as oral reading fluency (ORF) and reading and listening comprehension continue to be a challenge, while in EGM number pattern identification, more complex addition and subtraction operations, and word problems have not progressed to the same degree, according to Early Grade Reading Assessment (EGRA) and Early Grade Math Assessment (EGMA) scores across the region. Scores from other international tests, such as Progress in International Reading Literacy Study (PIRLS), Programme for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS) confirm these trends across both subjects.

Research based literature and assessment data suggest that there is room for improvement in how both literacy and numeracy are taught. Best practice methods for teaching literacy and numeracy differ significantly due to the inherent differences in the nature of the two skill areas. As presented in a “Meet the Authors” event sponsored by the Global Reading Network to launch the report *Towards the Design and Implementation of Comprehensive Primary Grade Literacy and Numeracy Programs*,⁶ intrinsic differences in the nature of literacy and numeracy skill development require different approaches to how lessons are planned and delivered:

In Literacy:

- Domains are nested
- Domains are interdependent and cannot be taught in isolation.

In Numeracy:

⁵ Lewis, M. P., Simons, G. F., & Fennig, C. D. (Eds.) (2013). *Ethnologue Languages of the World* (17th ed.). Dallas, TX SIL International. <https://www.ethnologue.com/>

⁶Evans, N., Srikantaiah, D., Pallangyo, A., Sugrue, M., and Sitabkhan, Y. (2019). *Towards the design and implementation of comprehensive primary grade literacy and numeracy programs*. A Working Paper by the Global Reading Network. Prepared by University Research Co., LLC. (URC) under the Reading within REACH initiative for USAID's Building Evidence and Supporting Innovation to Improve Primary Grade Assistance for the Office of Education (E3/ED). Available at www.globalreadingnetwork.net; Evans, N. S., D., Pallangyo, A., Sugrue, M. & Sitbkhan, Y. (2019a). *Towards the Design and Implementation of Comprehensive Primary Grade Literacy and Numeracy Programs*. Meet the authors. PowerPoint Presentation. University Research Co. LLC for the Global Reading Network. Washington, DC.

- Domains are not nested
- Children can develop spatial (geometry) or measurement skills without having developed an understanding of number operations.”⁷

Further, literacy skills are tied to the particularities of the language one is learning in; mathematical domains are more universal and consistent across contexts. Language particularities and the nested nature of domains can make the design and planning of literacy lessons quite complex. For example, for language teachers, multiple domains (i.e. phonemic awareness, phonics, listening comprehension, fluency, vocabulary, etc.) need to be taught in mutually reinforcing ways as opposed to discrete stand-alone elements.

For mathematics learning, the intrinsic differences in the nature of literacy and numeracy skill development, suggests that mathematic teachers must be well versed in instructional methods across all domains of mathematics as the domains are not as interrelated; thus, poor teaching in one domain can render students deficient in capacity in that domain, with no recourse for reinforcement.

Ultimately, MENA region governments and donors want to continue to build upon progress to achieve gains in higher order skills such as reading fluency and comprehension, solving complex problems, identifying number patterns, level two addition and subtraction.

EARLY GRADE READING

Since the publication of the *Topical Analysis on Early Grade Reading Instruction in Arabic* in 2013, new research continues to clarify and expand in greater depth the crucial factors for learning to read in Arabic. The development of working memory, inhibitory control, and attention control are foundational cognitive skills in reading and in many other activities. Two groups of higher-level skills build on these foundational skills: emergent literacy skills and language and cognitive skills. Both are essential building blocks in learning to read and are developed through word decoding and listening comprehension.

Reading interventions have focused more heavily on emergent literacy skills like phonological awareness, phonics, and word reading (decoding). However, there must be equal focus on developing students’ listening comprehension skills. Reading fluency depends on both accurate decoding and understanding the language in which one is reading, especially if it is the first language in which one learns to read. The important point here is that decoding does not uniquely support ORF. ORF is necessary to be able to read with comprehension; students who read slowly and haltingly do not have the working memory to focus on the message—on what is being read—as they are too focused on figuring out individual words. Hence, when a halting reader finishes a sentence, he or she is likely to have already forgotten the first part of the sentence. There are several linguistic factors that impact learning to read in any language and are thus important in looking at learning to read in Arabic.

Diglossia: Arabic is a diglossic language; that is, it has a “high” and a “low” form that can differ substantially. The “low” form, or dialect, is used for oral communication and the “high” form generally for written communication.⁸ Diglossia presents challenges for both students and teachers because children

⁷ Evans, N. S., D., Pallangyo, A., Sugrue, M. & Sitbkhan, Y. (2019a). *Towards the Design and Implementation of Comprehensive Primary Grade Literacy and Numeracy Programs*. Meet the authors. PowerPoint Presentation. University Research Co. LLC for the Global Reading Network. Washington, DC.

⁸ Asaad, H., Eviatar, S. (2014). Learning to read in Arabic: The long and winding road. *Reading and Writing*, 27, 649-664. doi:10.1007/s11145-013-9469-9; Leikin, M., Ibrahim, R. Eglbaria, H. (2014). The influence of diglossia in Arabic on narrative ability: evidence from analysis of the linguistic and narrative structure of discourse among pre-school children. *Reading and Writing*, 27, 733-747. doi:10.1007/s11145-013-9462-3; Maamouri, M. (1998). *Language education and human development: Arabic diglossia and its impact on the quality of education in the Arab region*. Retrieved from International Literacy Institute; Saiegh-Haddad, E., & Schiff, R. (2016). The Impact of Diglossia on Voweled and

must learn a very different form of Arabic in school from that which they speak in their daily lives. Several researchers liken learning Modern Standard Arabic (MSA) to learning a second language.⁹

Diacritics: In a diglossic language such as Arabic, research demonstrates that the use of diacritics can facilitate proper word pronunciation for beginning readers in Arabic. In general, student texts in the early grades use diacritics as a support to emergent reading skills. Generally, researchers credit diacritics with increasing word reading accuracy and comprehension. Recent research has focused more specifically on when diacritics are helpful in facilitating pronunciation and comprehension, such as learning isolated words, nonwords, in reading connected text such as sentences and passages, and when they slow down reading fluency.

Syntactical Awareness: Awareness of sentence construction is an aid to both decoding—figuring out an ambiguous word by its placement in the sentence—and in word comprehension. This is particularly true for Arabic because it has many homographs and most text in the upper primary grades is unvoveled or partially voveled. The context and position of a word in the sentence and the other words surrounding it give readers clues to its role in the sentence and thus its meaning. Children come to school with knowledge of syntax and exhibit this every day through their speech. In Arabic-speaking countries, where children speak a dialect of the language they will ultimately learn to read in, syntactic clues can be important in learning to read connected text. Some researchers advocate using a “sentence approach” to the teaching of reading that would more explicitly build on students’ existing knowledge of syntax. They also recommend pointing out common sentence patterns as a way to facilitate students’ abilities to derive semantic and lexical clues from sentence contexts.

Morphological Awareness: Arabic words are based on word roots and patterns, using roots that include the addition of affixes such as prefixes, infixes, and suffixes. Some affixes signal the subject of the verb, added to the beginning of the verb in present and future tenses and to the end of the verb in past tense, as well as the object of the verb, added to the end of the verb. Suffixes can signal possession when added to end of nouns. Likewise, prefixes, infixes, and suffixes also communicate different meanings associated with a common root word. Morphological awareness and knowledge of word patterns, including the use of prefixes, suffixes, and infixes, is critical, especially with unvoveled text. Researchers assert that morphological knowledge helps students unlock semantic knowledge and that morphological knowledge contributes to decoding, ORF, and semantic understanding of text. Morphological knowledge facilitates visual word recognition of the Arabic root and aids in the development of a “mental lexicon,” which speeds up reaction time in the word recognition process. Several researchers advocate an explicit focus on building morphological skills in the teaching of reading: “One pedagogical implication that may follow our findings is the need for direct instruction of morphological knowledge in elementary school by raising awareness to the meaning of linguistic derivation of the root morpheme and by exposure to it.”¹⁰ Lastly, and in relation to incorporating some focus on morphological awareness more directly into early grade instruction, Saiegh-Haddad and Schiff report that there are orthographical benefits that come from

Unvoveled Word Reading in Arabic: A Developmental Study from Childhood to Adolescence. *Scientific Studies of Reading*, 20(4), 311-324. doi:10.1080/10888438.2016.1180526

⁹ Saiegh-Haddad, E. (2004). The impact of phonemic and lexical distance on the phonological analysis of words and pseudowords in a diglossic context. *Applied Psycholinguistics*, 25(4), 495–512.; Saiegh-Haddad, E., Levin, I., Hende, N., & Ziv, M. (2011). The linguistic affiliation constraint and phoneme recognition in diglossic Arabic. *Journal of Child Language*, 38(2), 297–315.

¹⁰ Shalhoub-Awwad, Y., & Leikin, M. (2016). The Lexical Status of the Root in Processing Morphologically Complex Words in Arabic. *Scientific Studies of Reading*, 20(4), 296-310. doi:10.1080/10888438.2016.1180525

morphological knowledge: “Moreover, Arabic spelling, even in young children, was found to benefit from morphological awareness and morphological intervention.”¹¹

The multiple factors discussed above effect students’ ability to achieve reading comprehension in Arabic. Overall, these findings have important implications for learning to read in Arabic, suggesting that phonetic decoding—skills that are highly emphasized in donor-funded reading initiatives in the Arabic speaking world and advocated for by Ministries—are incomplete in terms of what needs to be considered. Further, they suggest that an explicit focus on expanding and reinforcing morphological awareness is important in learning to read in Arabic. Research suggests that there is a gap between these findings and their implementation in instructional content and strategies in early grade classrooms in the MENA region.

EARLY GRADE READING RESULTS

This review documents notable progress in reading results in the MENA region over the last five years. Much progress in early grade reading has occurred at the level of phonemic and syllabic awareness and decoding, as seen in the results of multiple EGRA administrations in Egypt, Jordan, Lebanon, Morocco and the West Bank. The results also highlight struggles in decoding, ORF and reading comprehension. On international reading tests, such as PIRLS and PISA, participating Arabic speaking countries have generally made consistent progress. Additionally, girls consistently outperformed boys on these tests. This could be related to varying stages of growth and maturation in girls and boys, or possibly the daily lives of girls versus boys. Overall, girls generally showed stronger performance than boys on early grade reading assessments.

Two countries reported reading data from a single EGRA or multiple assessments that used different instruments. In Iraq, results from a single EGRA indicate that students generally made progress from Grade 2 to 3, but not enough to become fluent readers. Data on Syrian students’ reading and math performance from robust studies are lacking, however, two small studies – one using the International Development and Early Learning Assessment (IDELA) tool and the second used the Annual State of Education Report (ASER) tool. These studies both constitute “emerging” evidence in terms of rigor. Nonetheless results indicate that children in war-impacted regions of Syria are not developing foundational skills in reading.

Early grade reading projects in Morocco, Jordan, Lebanon, the Web Bank, Yemen, and Egypt have succeeded in introducing phonics-based instruction and training teachers to use this approach. Projects have also successfully worked with MOEs to create additional reading materials, particularly for early grade readers, to support read-alouds, listening comprehension, and vocabulary building. Another important function of story reading, in addition to vocabulary-building, and is exposing children to MSA, including its syntactical conventions, endings, pronunciation, etc. It is critical, especially in diglossic contexts, to build listening comprehension skills, which are an essential part of learning to read.

ARABIC INSTRUCTION

Skills and sub-skills for Arabic reading. Recognizing word roots (morphology) are important in learning to read in Arabic and this skill needs to be more explicitly taught and not from a grammatical perspective. The same is true in recognizing sentence structures and patterns in Arabic. Verbal and nominal sentences are generally taught; however, the use of context clues that are inherent in each type

¹¹ Taha, H. (2016). The Development of Reading and Spelling in Arabic Orthography: Two Parallel Processes? *Reading Psychology, 37*(8), 1149-1161. doi:10.1080/02702711.2016.1193580; Shalhoub-Awwad, Y., & Leikin, M. (2016). The Lexical Status of the Root in Processing Morphologically Complex Words in Arabic. *Scientific Studies of Reading, 20*(4), 296-310. doi:10.1080/10888438.2016.1180525; Saiegh-Haddad, E., & Schiff, R. (2016). The Impact of Diglossia on Voweled and Unvoweled Word Reading in Arabic: A Developmental Study from Childhood to Adolescence. *Scientific Studies of Reading, 20*(4), 311-324. doi:10.1080/10888438.2016.1180526

of sentence should be better taught to aid comprehension. Additionally, more time is needed on the subject of reading, including having enough independent reading time (including time to read silently in class) and opportunities to write expressively. In mid-to-later elementary school, children receive a good amount of instruction in Arabic grammar, though it is often abstractly taught. Developing fluency and comprehension as a reader requires practice since reading is not a theoretical exercise; rather it is a practical skill.

Pre-service training. Many teachers are not yet fully prepared (by training or certification) to teach generally, and more specifically, to teach students how to read in Arabic. Both pedagogy (reciting materials and passages, memorizing grammar and spelling rules for example) and content and materials (such as, transitioning from dialects of Arabic to MSA) need to be addressed more effectively to successfully teach students to read. Traditional, rote methods of teaching Arabic are still in use and need to be modernized and adapted better to primary school-aged children.¹² Arabic language teacher preparation, although evolving, is still weak and in many cases the lowest performing students in teacher preparation programs are funneled into Arabic teaching.¹³ Furthermore, teachers receive inadequate field experience in pre-service training and insufficient ongoing professional development in teaching Arabic once they are in the classroom. In sum, there is a need to improve teacher-preparation programs that balance Arabic language content and pedagogical skills.

Instructional practices. Strategies to improve reading comprehension include developing clear and direct instructional guidance, training, and accompanying materials to use with early grade students. Comprehension strategies can be more difficult for teachers to incorporate into their lessons. They often involve instructional configurations that are harder for teachers to manage such as pair work, group work, silent reading, and modeling their own comprehension strategies, which is less commonly integrated into pre-service and in-service teacher training on teaching reading in Arabic.

EARLY GRADE MATHEMATICS

EGM is an expanding priority among governments and donors, and awareness of the enabling relationship between early grade math and reading skills is growing. The literature suggests that generally, the early grade mathematics skills that are the focus of instruction include: “(1) understanding, (2) computing, (3) applying, (4) reasoning, and (5) engaging.”¹⁴ The National Council of Mathematics, founded in 1920 and currently the world’s largest mathematics education organization throughout the US and Canada, more recently articulated five “Process Standards” which describe transversal skills critical to learning mathematics content, which are developed through excellent instruction. These are:

- Problem Solving: apply and adapt strategies to solve problems
- Reasoning & Proof: recognize, select, and use various types of reasoning and methods of proof
- Communication: communicate mathematical thinking to others
- Connections: recognize, understand, and apply interconnected mathematical ideas
- Representation: create and use representations to interpret mathematical phenomena

TIMSS measures mathematical knowledge in three domains: knowing, applying, and reasoning. Knowing covers basic mathematical operations, procedures, etc. Application refers to the ability to apply knowledge and understand problems on a more conceptual level. Reasoning focuses not merely on solving simple problems but on navigating unfamiliar and complex problems that might require multiple steps. In general, in the MENA region, much progress has been made in the knowing domain, but less has occurred in the application domain and even less in the reasoning domain. Research indicates that mathematics curriculum

¹² Taha, H. (2017). Arabic language teacher education. In A. Gebril (Ed.), *Applied Linguistics in the Middle East and North Africa. Current practices and future directions.* (pp. 269 - 287). USA: John Benjamins Publishing Company.

¹³ Ibid.

¹⁴ Matar, M., Sitabkhan, Y., & Brombacher, A. (2013). *Early primary mathematics education in Arab countries of the Middle East and North Africa.* Bonn and Eschborn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

structure and content may be hindering students' progress. Matar, in the 2013 German Corporation for International Cooperation (GIZ) publication *Early Primary Mathematics Education* describes early grade math curricula in the Arabic speaking world as generally "prescriptive" and points out that, "Most schools are provided with student textbooks and teacher guides that minimize the degree of autonomy of math teachers in organizing teaching and learning in ways that meet the needs of their students."¹⁵ With curricula that are frequently packed with content or information and an instructional guide that sets the pace for teachers, time for active pedagogies, checking student understanding, emphasizing concepts over processes and re-teaching material not well understood is scarce.

EARLY GRADE MATHEMATICS RESULTS

EGMA, TIMSS and PISA all indicate that achievement levels in primary level mathematics are generally improving. EGMA has not been administered multiple times in most countries across the region so scores represent a snapshot of where the region is or was at the time of administration. Only Jordan has carried out multiple EGMA administrations which demonstrated substantial improvement in EGM outcomes (particularly in conceptual mathematics task or doing math with understanding) from the first to the second administration.

The 2015 international assessments of PISA and TIMSS presented some disappointing results. Except for Qatar (which had a significant score gain), Arabic speaking countries tended to see their scores in mathematics drop. This occurred for every MENA country on the PISA and for Saudi Arabia (Grade 4 and 8 scores) and Jordan (Grade 8) on the TIMSS. The good news is that, except for Saudi Arabia and Jordan, the rest of the MENA region countries saw student TIMSS mathematics scores improve modestly.

Results from the 2015 TIMSS also pointed to interesting gender trends. Boys' scores were generally lower than girls' scores in most of the countries— Bahrain, Morocco, Oman, Qatar and the UAE; however, boys had much higher scores than girls in Qatar. In Saudi Arabia, the scores for both boys and girls in Grades 4 and 8 did not improve and boys showed lower performances than girls.

In short, TIMSS data, as well as EGMA and PISA data reviewed in this study indicate that there are significant gaps in student capabilities in early grade mathematics in the MENA region, particularly related to higher order and more conceptual skills mathematical knowledge.¹⁶

MATH INSTRUCTION

Skills and sub-skills for numeracy. Higher order skills are less emphasized by teachers and need to receive increased focus in the classroom. Variables related to school climate impact mathematics teachers (and probably others) and this in turn impacts student learning. Teaching is still somewhat rote, based on the memorization of formulas, lacking an emphasis on ensuring an understanding of mathematical principles.

Pre-service training. The TIMSS 2007 International Mathematics Report had a chapter that focused on issues of teacher preparation. The key finding was that throughout the region, but especially in lower income MENA countries, the vast majority of mathematics teachers do not have a university degree (in any subject). While a degree does not guarantee high quality instruction, it does speak to some level of professional and subject area knowledge and the same is true for in-service teacher professional

¹⁵ Matar, M., Sitabkhan, Y., & Brombacher, A. (2013). *Early primary mathematics education in Arab countries of the Middle East and North Africa*. Bonn and Eschborn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

¹⁶ Mullis, I. V. S., Martin, M. O., Foy, P., & Hooper, M. (2016). *TIMSS 2015 International Results in Mathematics*. Retrieved from Chestnut Hill, MA: <http://timssandpirls.bc.edu/timss2015/international-results/>; OECD. (2014). *PISA 2012 Results in Focus: What 15-year-olds know and what they can do with what they know*. Retrieved from Paris, France;; OECD. (2018). *PISA 2015 Results in Focus*.

development.

Instructional practices. Research from the US demonstrates that attitudes toward mathematics learning are highly influenced by teaching techniques.¹⁷ There is a relationship between student achievement in mathematics and students' attitudes toward mathematics. If students understand the content, they tend to like math; if they do not, they tend to dislike it. Understanding was linked to seeing the relevance of math to daily life, active learning (as opposed to teacher lectures), checking students' understanding (and explaining or re-teaching if students do not understand), teaching at a suitable pace (generally a slower pace that gives students time to grapple with concepts and not just memorize rules or formulas) and sometimes providing additional or supplemental instruction.¹⁸ This suggests that in the MENA region, mathematics teacher preparation programs that emphasize connections to real life, active pedagogies, appropriate instructional pacing, conceptual understanding and effective monitoring of students' understanding of the material could lead to gains in students' mathematical achievement.

Additionally, in mathematics, students would benefit from more hands-on activities and the availability of manipulatives in the classroom to work with. Finally, students need instruction that focuses on problem solving—whether the use of inference in reading or examining multiple ways to solve mathematics problems.

EGR AND EGM FOR CONFLICT-AFFECTED CHILDREN AND CHILDREN WITH DISABILITIES

Conflict-affected children. There are a few small studies with data on marginalized children in the region that indicate limited progress in EGR or EGM. However, literacy and numeracy outcomes for conflict-affected children are receiving growing attention, which is clearly a positive development. Conflicts in the MENA region are affecting children and youth for longer time periods and integrating focused learning outcomes, such as literacy and numeracy, with psycho-social support programs is now part of many humanitarian and development programs in these contexts in both formal and non-formal learning environments.

Children with disabilities. Progress has been slow in terms of literacy and numeracy outcomes for children with disabilities. Effectively teaching children with disabilities has emerged as an area educational policy makers are grappling with across the region and research indicates that there are common issues across countries,¹⁹ suggesting that common solutions could also be tailored and applied across MENA contexts. Common challenges across countries include the fact that children with disabilities are not accurately diagnosed or counted and those receiving special education are not tracked. However, parental recognition of the issue has also grown as evidenced by the nascent use of both home testing and behavioral therapy interventions for children with disabilities.²⁰ Significantly, teaching children with disabilities now seems to be more prominently on the radar of educational policy makers across the region, but education services for children with disabilities is still severely lacking.

RECOMMENDATIONS FOR ADDRESSING ACHIEVEMENT GAPS IN EARLY GRADE READING AND MATH

Students

- Expose children to MSA consistently, both inside and outside of the classroom.
- Ensure that children have time to read aloud and silently.

¹⁷ (2009). Domino, J. Teachers' influences on students' attitudes toward mathematics. *Research and Teaching in Developmental Education*, 26(1), 32-54.

¹⁸ Ibid.

¹⁹ Hadidi, M. S. A. K. (2015). Special Education in Arab Countries: Current Challenges. *International Journal of Disability, Development and Education*, 62(5), 518-530. doi:10.1080/1034912X.2015.1049127

²⁰ Ibid.

- Ensure that students have time to work with manipulables and engage in practice and problem solving themselves—individually and in pairs or groups—in the classroom.

Teachers / Instruction

- Continue to train EGR and EGM teachers in best practices, including how to better teach some of the higher-order or more complex skills of reading, such as comprehension, and monitor student performance in reading and not to monitor student performance in math.
- Continue to focus on phonological and phonemic awareness and phonics.
- Develop instructional strategies and materials to more directly develop and reinforce syntactical and morphological awareness.
- Focus instruction on more conceptual, higher order skills such as number patterns, Level 2 (i.e. more complex operations) in addition, subtraction, and word problems.
- Focus instruction on applying skills and reasoning and less on memorizing facts and procedural aspects.

Supervision

- Engage supervisors in mentoring teachers and helping to keep them on track in terms of using best practices in EGR and EGM instruction.

Materials

- Ensure a greater supply of engaging, grade and age appropriate reading materials for students to access and hands-on mathematics teaching aids, ideally that students can use themselves in the classroom.

Curriculum

- Consider curriculum revision to ensure that reading is taught coherently and comprehensively within the larger Arabic language curriculum.

Research

- Conduct further research on: 1) how best to design and implement remedial programs for children who have fallen behind in the early grades in reading and mathematics; 2) approaches to improve reading and mathematics outcomes for children with special needs; and, 3) approaches to providing reading and mathematics instruction and materials to children in crisis and conflict situations.

FUTURE RESEARCH QUESTIONS

More research on early grade reading and mathematics learning and instruction is clearly necessary to hone in on the most effective strategies and practices to achieve greater learning and skill development in these areas. Many outstanding research questions remain, which, if pursued, would contribute to and enlarge the knowledge base in promoting effective EGR and EGM instruction and learning. These questions include – among others – greater inquiry into assessment methods and tools, depth of reading instruction, integration of tailored EGR and EGM pedagogic strategies, how writing is taught and perceived in relation to EGR, how to better teach comprehension strategies, how school leadership can support EGR and EGM in the MENA region and finally, how do we translate the findings from the high quality experimental and quasi-experimental research on EGR and EGM in the region into curriculum, materials, pedagogical guidance and instructional strategies for use in classrooms?