Validating Curriculum-Based Measurement Oral Reading Fluency (CBM ORF) Applicability To Evaluate Arabic Readers' Performance

Saeed Saad Alqahtani
Prince Sattam bin Abdulaziz University
saeedalqa@live.com

Abstract
While curriculum-based measurement (CBM) accurately indicates reading skills, such as progress monitoring and early detection of reading difficulty, it has yet to be developed for Arabic. This study aimed to develop and validate a curriculum-based measurement for oral reading fluency (CBM-ORF) tailored to assess Arabic language students' reading abilities and create preliminary norms for students from second to sixth grades. Methods and Procedures: Various forms of the CBM-ORF were developed and administered to a sample of 414 students. After data analysis, the students' readings were rated by teachers to compare the CBM-ORF with an independent measure. Outcomes and Results: The results indicate that the CBM-ORF exhibits strong reliability and validity, making it a valuable tool for monitoring progress and identifying reading difficulties in Arabic readers. Furthermore, ORF norms have been established and proposed. Conclusions and Implications: This study emphasizes the absence of a valid reading tool for Arabic language students. It offers resources for teachers to make data-driven decisions, especially for students with learning disabilities.
Keywords: Arabic; Curriculum-Based Measurement; Oral Reading Fluency; Assessment; Validating; Reading Difficulties

INTRODUCTION

Assessing the reading levels of Arabic students and identifying those with reading difficulties pose significant challenges. Current practices involve teacher judgments or formal curriculum assessments. Both often fail to provide teachers with reliable indicators of student performance and identify students at risk of failure and hinder effective progress monitoring (Grigorenko et al., 2020). This issue is even more critical when considering early interventions for young learners expected to encounter reading difficulties (Fletcher et al., 2019). Failure to identify reading performance issues can exacerbate reading difficulties as students advance through their schooling (Hart et al., 2013). Consequently, curriculum-based measurement (CBM) has been suggested as a reliable measure to address these challenges (Deno, 1985).

Developed by Deno and colleagues in the 1970s, the CBM is a light assessment tool utilized as an indicator of basic academic skills (i.e., reading, spelling, writing, and mathematics) (Deno, 1985). These tests included simple, yet standardized tasks (e.g., one-minute reading) and procedures to evaluate student performance. CBM is used for several crucial purposes, including screening students to monitor their progress (Hosp et al., 2007) and making important educational decisions such as identifying at-risk students in need of additional support (Deno et al., 2009). Research has shown that such interventions can lead to improved academic outcomes for students (Stecker & Fuchs, 2000; Stecker et al., 2005). The CBM stands out for its efficiency and sensitivity in detecting changes

(Deno, 1985, 1992) and exhibits a robust correlation with standardized reading tests (Reschly et al., 2009). It contains a set of reading tests designed to assess various aspects of student reading abilities, including phoneme segmentation skills, letter and name recognition, word-reading fluency, passage-reading fluency, and reading comprehension.

Reading fluency is an essential reading skill, considered a good indicator of reading failure (Fuchs et al., 2001; O'Connor, 2018). Fluency refers to individuals reading at an appropriate speed compared to peers, accurately (minimal reading errors), and with prosody ("National Reading Panel," 2000). Furthermore, good reading implies automatic processing and the accurate decoding of words (Hosp & Suchey, 2014). Reading fluency is strongly correlated with reading comprehension (Denckla et al., 2013; Gersten et al., 2001). Students who struggle with fluency are unable to read successfully because they tend to put more effort into word decoding, leaving insufficient cognitive effort for comprehension (Mastropieri et al., 1999; Oakhill & Cain, 2004). Therefore, reading fluency, which indicates an individual's performance in decoding and reading comprehension, is widely used to assess reading skills (Kim et al., 2010; Landi & Oakhill, 2005).

The curriculum-based measurement of oral reading fluency (CBM-ORF), based on measuring the number of correct words per minute (CWPM), is widely used to assess fluency (Baker et al., 2015). This measure is based on reading rates and accuracy (Hasbrouck & Tindal, 2006) and has adequate reliability and validity. The CBM-ORF was strongly correlated (weighted average r = .67) with standardized reading achievement tests (Reschly et al., 2009) and reading comprehension measures (r =.69–.49) (Hintze & Silberglitt, 2005). Among the CBM measures, the CBM-ORF was utilized with the Response to Intervention (RTI) model to make important decisions about students with special education needs (Reschly et al., 2009). Although the value of this measure has been proven, it has not yet been utilized or studied in the Arabic language.

Arabic has 28 letters, including three vowels. However, each letter can be read using more than six sounds, and each sound changes the word's meaning (Habash, 2022). Each letter has three short and three long vowels. Short vowels are presented in signs above or below the letters, whereas long vowels are presented as extra letters. Readers must identify the letter first and then the sign to pronounce that letter correctly. However, signs are generally not presented along with letters because readers can typically identify meaning from a context without signs (Saiegh-Haddad & Henkin-Roitfarb, 2014). This complicates both teaching and learning. Consequently, the unique linguistic and graphical constructions of Arabic require the development and validation of a CBM-ORF.

Research on the validity of CBM procedures for assessing Oral Reading Fluency (ORF) in Arabic remains limited, highlighting the need for greater attention in this critical area. In contrast to English-speaking regions, where the CBM ORF is a well-established practice, Arab educational systems often grapple with a significant gap, namely the absence of validated assessment tools tailored to identify students at risk of reading difficulties. The complexity of Arabic orthography further compounds this challenge (Habash, 2022), reinforcing the urgency of validating tools, such as the CBM ORF test, to predict early reading skills accurately.

Previous attempts to validate Arabic reading skills (Abou El-Ella et al., 2004; Abou-Elsaad et al., 2016; Tibi et al., 2019) and CBM measures (Mahfouz and Mohamed, 2023) have been relatively limited. For instance, Abo Hamor (2014) conducted the only known study on CBM-ORFs in Arabic. He designed an Arabic version of the CBM-ORF,

collected data from 200 elementary-school students from the first to third grades in Jordan, and compared their CBM-ORF scores with their school GPAs. His findings indicate that the CBM-ORF is a reliable and valid measure of grade-point averages and can effectively identify students experiencing reading difficulties. However, while Abo Hamor's (2014) study included lower-elementary-age students, the current study attempted to validate the applicability of the CBM in evaluating Arabic reading performance for all grades of elementary school. This underscores the critical importance of standardizing and expanding research efforts in this domain, ultimately bridging the existing gap and ensuring that valuable tools for early intervention become readily available and accessible in Arabic-speaking countries.

Therefore, this study aimed to investigate the applicability and validity of the CBM-ORF as a standardized reading assessment tool for Arabic speakers for multiple evaluation purposes such as screening, progress monitoring, and identifying at-risk students (Hosp et al., 2007). This study aimed to answer the following questions: R1: Can the CBM-ORF effectively evaluate Arabic reading fluency performance? R2: Is the CBM-ORF a reliable measurement tool? R3: Does the CBM-ORF distinguish between different student grade levels? R4: Can CBM-ORF effectively discriminate between varying levels of student reading performance?

METHOD

Participants of this research in public elementary schools located in the province's central region were recruited for this study. Data was collected online during the COVID-19 pandemic when all students attended school remotely. Randomly, multiple elementary public schools were selected from the Riyadh Province region. After obtaining approval from an Institutional Review Board (IRB), a link was provided to the chosen school administrations, who then forwarded it to the parents of the students. Five hundred thirty responses were received at the beginning of spring 2021, encompassing second-sixth-year students. However, a total of 414 students' recordings were analyzed. Recordings were excluded when parents did not follow the instructions or assess the students and if the students needed to read three passages.

CBM-ORF Passages

Three narrative passages suitable for elementary-school students were selected from children's literature and used in this study. The passages were selected based on three criteria: they should be narrative in nature, have a complete story structure including a beginning and ending, include characters and events, and specify time and place. Additionally, they should not be based on or similar to the students' curriculum. The passages and instructions were written in formal Arabic language without any dialect, as is customary in Arabic countries where formal language is taught in schools. An Arabic language specialist with a master's degree reviewed the passages for clarity, sentence construction, grammar, and suitability, specifically for elementary school students. To control for variability among the three passages, their difficulty was rated using an Arabic formula (Al-Heeti, 1985) that considers the average word length in letters. The reading difficulty of the passages ranged from six to eight, which is considered a medium difficulty level for elementary students. The number of words was 69, 93, and 145 for the three passages, respectively, and the correlations between them are presented in Table 1.

Table 1 Correlations Between The Forms On CWPM

Grade	Form1 vs. Form2	Form1 vs. Form3	Form2 vs. Form3	Students' scores and Tacher rating
2	.929**	.786**	.858**	.48*
3	.887**	.809**	.861**	.40*
4	.752**	.778**	.842**	.55**
5	.774**	.701**	.836**	.30**
6	.828**	.531**	.749**	.16
All	.893**	.795**	.873**	

** Correlation is significant at the 0.01 level

Procedure

A form was developed using an online platform (https://www.jotform.com). This website provides various tools for data collection, including video, audio, text, and file collection. However, only text and audio data were utilized in this study. The form comprised several sections. Initially, instructions were provided to parents, followed by a consent agreement. Upon agreeing to the consent terms, parents proceeded to input demographic information, including the students' age, grade, sex, and school attended. Subsequently, the parents were instructed to hand the device to their child (the student) and ensure that they read the three passages in full. Clear guidelines were provided, indicating that parents should refrain from offering assistance unless the student stopped reading for a minimum of three seconds. The form began recording once the passages were switched on. Each passage was presented on a separate page, and the students were instructed to read the text aloud before proceeding to the next page. The instructions, procedures, and wording were adapted and translated from the CBM-ORF Manual Book (Hosp et al., 2007).

Scoring

After collecting the data, the teacher listened to all the recordings and entered the data into an Excel file. The teacher used a stopwatch as the students began reading until the last word in the passage was read. While listening, the teacher counted the number of decoding errors made by the students, including reading or skipping different words. The CWPM was then calculated by converting the reading times into seconds, multiplying by 60, and then dividing the resulting number by the passage's total word count minus the number of decoding errors. This process was applied independently to all three passages. The median score was selected for analysis.

Teacher Rating

To compare the CBM-ORF with an independent measure, students' readings were rated by eight elementary school teachers who held degrees in elementary education and were currently teaching elementary students. The teachers were trained to evaluate students' readings based on accuracy, fluency, and reading expression and to rate their readings on a scale from 1 to 5. The median of the three readings was selected for this process. The recordings were separated and categorized by grade level and sent to each teacher based on the grade in which they worked. However, the two teachers rated the grades to ensure reliability. Teachers were unaware of their actual CWPM scores.

Reliability and Procedural Integrity

To ensure the reliability of the scoring process, a teacher not involved in the scoring or rating process was asked to review 15% of the collected data randomly. The teacher listened to three recordings for each of the 15% selected students and calculated

the CWPM. The reliability between the primary and the second scorers was Cronbach's alpha = .998, .992, and .987 for the first, second, and third scores, respectively. In addition, the ratings of the same reading grades were calculated to ensure the reliability of the rating process, and the correlation was .79 for teachers who rated the same grade. To ensure procedural integrity, the researcher randomly selected 15% of the collected data and used a procedural integrity checklist to evaluate the assessment implementation process. The average score was 95% (range = 92–100%), indicating that students and parents followed the assessment instructions precisely.

RESULTS AND DISCUSSION

Following standardized procedures for developing CBM-ORF passages and initiating ORF norms (Deno, 2003; Hasbrouck & Tindal, 2017), the CBM-ORF median scores of the participants were analyzed and subsequently converted into percentile ranks for each grade level. For each grade level the 10th, 25th, 50th, 75th, and 90th percentiles were computed. (Table 2). Students whose performance fell at or below the 25th percentile were identified as individuals with reading disabilities or at risk (Hosp et al., 2007). In contrast, students who achieved scores above the 75th and 90th percentiles were categorized as good or outstanding readers.

Skewness and kurtosis were employed to assess the non-normality of the data. Table 1 indicated that the values were within the accepted range (skewness ± 2.0 and kurtosis ± 7.0) (Finney & Distefano, 2013), which indicate the normality of the data. No statistically significant differences were found regarding gender (boys = 60.58, girls = 67.35; t (1.841), p = .066), indicating that students responded to the test similarly regardless of their gender. However, the results revealed statistically significant differences based on grade level, as illustrated in Table 3 (*F* (61.160), p = .001), indicating that students from different grades responded significantly differently to the test.

Table 2 Percentiles of CWPM

Grade	10^{th}	25^{th}	50^{th}	75^{th}	90^{th}
2	16	20	35	50	72
3	25	36	51	65	79
4	35	52	66	79	94
5	56	67	80	95	112
6	60	70	90	101	114

Reliability and Validity

The reliability assessment of the Arabic CBM-ORF passages exhibited a strong correlation coefficient, as shown in Table 1. Each student was tasked with reading three different forms of the CBM-ORF passages, and their responses exhibited remarkable consistency across these forms, indicating a high level of reliability. Only the median scores were used to construct the ORF norm. The correlation was statistically significant at the 0.01 level.

Table 3 show the mean scores for each grade, indicating an increased difference as the students moved to the upper grades. The consistency of the students' CWPM performance within each grade demonstrated the differentiation efficacy of the CBM-ORF and the correlation between the CBM-ORF and grade levels. As shown in Table 2, the percentile for each grade at different forms of performance (percentile) also increased as the students' grade level increased. Second, there was a strong relationship between teachers' ratings and the CBM-ORF. The teachers rated the students on a scale of 1–5.

DOI: 10.18860 /ijazarabi. V7i2.26356
ISSN(print): 2620-5912 | ISSN(online):2620-5947
ejournal.uin-malang.ac.id/index.php/ijazarabi/index

The correlation coefficient between teacher ratings and student scores, as shown in Table 1, ranges from moderate for grades 2 and 4 to weak for the other grades, suggesting a degree of validity.

Table 3 Descriptive Statistics

Grade	N	Mean	Std. Deviation	Range	Skewness	Kurtosis
2	57	39.93	24.69	105-00	1.22	1.15
3	102	52.79	22.60	125-00	0.92	2.01
4	83	65.48	21.89	88-00	0.08	-0.49
5	75	82.66	22.42	100-00	0.39	-0.15
6	83	88.15	21.67	105-00	-0.17	-0.25

This study aimed to examine the applicability and validity of the CBM-ORF as a standardized reading assessment tool for Arabic-speaking individuals, serving various evaluation purposes, such as screening, progress monitoring, and identifying at-risk students (Hosp et al., 2007). Additionally, this study aimed to establish primary reading fluency benchmarks for elementary-level Arabic-speaking students. The Arabic CBM-ORF emerged as a valid measure of reading fluency as evidenced by the study results. These findings distinctly demonstrate the performance benchmarks that differentiate student grades, rendering the tool valuable for screening and progress monitoring purposes. This supports the evidence that the Arabic CBM-ORF effectively evaluates reading fluency performance, similar to the English versions and other languages.

The reliability and validity of this study are supported by several indicators. First, the CBM-ORF Arabic passages showed a strong and statistically significant correlation. Students reading the different forms exhibited consistent responses, reflecting the high reliability of the assessment ($p < 0.01$). Criterion validity was the second source of validity. There was a moderate relationship between the CBM-ORF and teacher ratings, which indicates the tool's precision in the Arabic context. Third, the percentile scores clearly delineated between grade levels and between proficient readers and those at risk or experiencing reading difficulties.

This result is consistent with the only existing study investigating the applicability of the Arabic CBM-ORF (Abu-Hamour, 2014). Nevertheless, this study extends its coverage to encompass the second to sixth grades, whereas Abu-Hamour's (2014) study focused solely on the first, second, and third grades. However, the percentile scores in the current study were lower than in Abu-Hamour's (2014). The difference could be attributed to the variation in passages.

Divergences were evident when comparing the ORF scores to Hasbrouck and Tindal's (2017) scores, which were higher for the English versions of the norms. This difference may be a result of the inherent complexity of Arabic (Eviatar & Ibrahim, 2014). Remarkably, despite these disparities, the differences between the grade percentiles were similar to those presented in Hasbrouck and Tindal's (2017) norms for the Arabic and English versions. The differences between the 90th percentiles from each grade to the next, beginning in the second grade, were 17%, 12%, 15%, and 3%, respectively, according to Hasbrouck and Tindal's (2017) norms; in this study, the differences were 20%, 18%, 14%, and 3%.

Although this study showed promising results, further studies with larger sample sizes are required. For instance, Tendel (2017) utilized data from over 7,000 students, underscoring the need for more extensive research. In addition, validation of other aspects

of the CBM for the Arabic language is necessary. For instance, many CBM assessments have been used to assess different types of reading skills, such as letter names, letter sounds, phoneme segmenting, word reading fluency, passage reading fluency, vocabulary, basic reading, and professional reading (EasyCBM, 2023); however, none of these tests have been validated in Arabic.

Despite these limitations, the present study has significant implications for educators. This study underscores a critical gap in Arab educational systems: the absence of a standardized, empirically based tool for assessing reading performance. The proposed methodology, characterized by its ease of development and administration, low cost, and short administration time, addresses this gap. This study offers valuable resources for elementary school teachers. In addition, the developed benchmark can be used to compare student performances and make data-driven decisions for these students, especially those with learning disabilities.

REFERENCES

Abou El-Ella, M. Y., Sayed, E. M., Farghaly, W. M., Abdel-Haleem, E. K., & Hussein, E. S. (2004). Construction of an Arabic reading test for assessment of dyslexic children. *Neurosciences Journal*, *9*(3), 199-206. Tamer Abou-Elsaad, Rawhia Ali & Haidy Abd El-Hamid (2016) Assessment of Arabic phonological awareness and its relation to word reading ability, Logopedics Phoniatrics Vocology, 41:4, 174-180, DOI: 10.3109/14015439.2015.1088062

Abu-Hamour, B. (2014). A Pilot Study for Standardizing Curriculum-Based Measurement Oral Reading Fluency (CBM ORF) in Arabic. *Journal of the International Association of Special Education*, *15*(1).

Baker, D.L., Biancarosa, G., Park, B.J. *et al.* Validity of CBM measures of oral reading fluency and reading comprehension on high-stakes reading assessments in Grades 7 and 8. *Read Writ* 28, 57–104 (2015). https://doi.org/10.1007/s11145-014-9505-4

Christ, T. J., & Silberglitt, B. (2007). Estimates of the standard error of measurement for curriculum-based measures of oral reading fluency. *School Psychology Review*, *36*(1), 130-146.

Denckla, M. B., Barouero, L. A., Linosrrom, E. R., Benedict, S. l., Wilson, L. M., & Cutting, L. E. (2013). Attention- deficit/hyperactivity disorder, executive function, and reading comprehension. In H. L. Swanson, H. K. R., & S. Graham (Eds.), *Handbook of Learning Disabilities* (pp. 155-168). New York, NY: Guilford Press.

Deno, S. L. (1985). Curriculum-Based Measurement: The Emerging Alternative. Exceptional Children, 52, 219-232. https://doi.org/10.1177/001440298505200303

Deno, S. L. (1992). The nature and development of curriculum-based measurement. Preventing School Failure, 36, 5−10.

Deno, S., Reschly, A. L., Lembke, E., Magnussen, D., Callender, S., Windram, H., et al. (2009). A school-wide

Eviatar, Z., & Ibrahim, R. (2014). Why is it hard to read Arabic?. *Handbook of Arabic literacy: Insights and perspectives*, 77-96.

Eviatar, Z., & Ibrahim, R. (2014). Why is it hard to read Arabic?. *Handbook of Arabic literacy: Insights and perspectives*, 77-96.

Finney, S.J. & DiStefano, C. (2006). Non-normal and Categorical data in structural equation modeling. In G. r. Hancock & R. O. Mueller (Hrsg.). Structural equation modeling: a second course (S. 269–314). Greenwich, Connecticut: Information Age Publishing

Fletcher, J. M., Lyon, G. R., Fuchs, L. S., & Barnes, M. A. (2019). *Learning disabilities: From identification to intervention* (2nd ed.). The Guilford Press.

Fuchs, L. S., Fuchs, D., Hosp, M. K., & Jenkins, J. R. (2001). Oral reading fluency as an indicator of reading competence: A theoretical, empirical, and historical analysis. *Scientific studies of reading*, *5*(3), 239-256. DOI: 10.1207/S1532799XSSR0503_3

Gersten, R., Fuchs, L. S., Williams, J. P., & Baker, S. (2001). Teaching Reading Comprehension Strategies to Students with Learning Disabilities: A Review of Research. *Review of Educational Research*, 71(2), 279-320.

Grigorenko, E. L., Compton, D. L., Fuchs, L. S., Wagner, R. K., Willcutt, E. G., & Fletcher, J. M. (2020). Understanding, educating, and supporting children with specific learning disabilities: 50 years of science and practice. *The American psychologist*, *75*(1), 37–51. https://doi.org/10.1037/amp0000452

Habash, N. Y. (2022). *Introduction to Arabic natural language processing*. Springer Nature.

Hart, S. A., Logan, J. A., Soden-Hensler, B., Kershaw, S., Taylor, J., & Schatschneider, C. (2013). Exploring how nature and nurture affect the development of reading: an analysis of the Florida Twin Project on reading. *Developmental psychology*, *49*(10), 1971–1981. https://doi.org/10.1037/a0031348

Hasbrouck, J. & Tindal, G. (2017). An update to compiled ORF norms (Technical Report No. 1702). Eugene, OR, Behavioral Research and Teaching, University of Oregon

Hasbrouck, J. and Tindal, G.A. (2006), Oral Reading Fluency Norms: A Valuable Assessment Tool for Reading Teachers. The Reading Teacher, 59: 636-644. https://doi.org/10.1598/RT.59.7.3

Hintze, J. M., & Silberglitt, B. (2005). A longitudinal examination of the diagnostic accuracy and predictive validity of R-CBM and high-stakes testing. *School Psychology Review*, *34*(3), 372-386. DOI: 10.1080/02796015.2005.12086292

Hosp, J. L., & Suchey, N. (2014). Reading assessment: Reading fluency, reading fluently, and comprehension: Commentary on the special topic. *School Psychology Review*, *43*(1), 59–68.

Hosp, M. K., Hosp, 1. L., & Howell, K. W. (2007). The ABCs of CBM: A practical guide to Curriculum-Based Measurement. New York: Guilford.

John M. Hintze & Benjamin Silberglitt (2005) A Longitudinal Examination of the Diagnostic Accuracy and Predictive Validity of R-CBM and High-Stakes Testing, School Psychology Review, 34:3, 372-386, DOI: 10.1080/02796015.2005.12086292

Kim, Y.-S., Petscher, Y., Schatschneider, C., & Foorman, B. (2010). Does growth rate in oral reading fluency matter in predicting reading comprehension

achievement? *Journal of Educational Psychology, 102*(3), 652–667. https://doi.org/10.1037/a0019643

Mahfouz, M. A. S., & Mohamed, A. H. H. (2023). Using Word Reading Fluency Curriculum-Based Measurements to Monitor Students' Reading Progress in Grade 2. *Education Sciences, 13*(2), 217. https://doi.org/10.3390/educsci13020217

Mastropieri, M. A., Leinart, A., & Scruggs, T. E. (1999). Strategies to increase reading fluency. *Intervention in school and clinic*, 34(5), 278-283. Al-Heeti, Khalaf N. 1984. "Judgment Analysis Technique Applied to Readability Prediction of Arabic Reading Material," Unpublished PhD diss. University of Northern Colorado.

National Institute of Child Health and Human Development. (2000). *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction (NIH Publication No. 00-4769).* Washington, DC: U.S. Government Printing Office.

O'Connor, R. E. (2018). Reading Fluency and Students With Reading Disabilities: How Fast Is Fast Enough to Promote Reading Comprehension? *Journal of Learning Disabilities, 51*(2), 124–136. https://doi.org/10.1177/0022219417691835

Oakhill, J. V., & Cain, K. (2004). The development of comprehension skills. In *Handbook of children's literacy* (pp. 155-180). Dordrecht: Springer Netherlands.

Perfetti C. A., Landi N., Oakhill J. (2005). The acquisition of reading comprehension skill. In Snowling M. J., Hulme C. (Eds.), *The science of reading: A handbook* (pp. 227–247). Malden, MA: Blackwell.

Reschly, A. L., Busch, T. W., Betts, J., Deno, S. L., & Long, J. D. (2009). Curriculum-Based Measurement Oral Reading as an Indicator of Reading Achievement: A Meta-Analysis of the Correlational Evidence. *Journal of School Psychology*, 47, 427-469. https://doi.org/10.1016/j.jsp.2009.07.001

Saiegh-Haddad, E., Henkin-Roitfarb, R. (2014). The Structure of Arabic Language and Orthography. In: Saiegh-Haddad, E., Joshi, R. (eds) Handbook of Arabic Literacy. Literacy Studies, vol 9. Springer, Dordrecht. https://doi.org/10.1007/978- 94-017-8545-7_1

Stecker, P.M., Fuchs, L.S. and Fuchs, D. (2005), Using Curriculum-Based Measurement to Improve Student Achievement: Review of Research. Psychol. Schs., 42: 795-819. https://doi.org/10.1002/pits.20113

Tibi, S., Tock, J. L., & Kirby, J. R. (2019). The development of a measure of root awareness to account for reading performance in the Arabic language: A development and validation study. *Applied Psycholinguistics, 40*(2), 303-322. https://doi.org/10.1017/S0142716418000589