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Effect of an Arabic Program of Direct Instruction for Phonological Awareness on Phonological Awareness Abilities

Dr. Hala Elhoweris

College of Education - UAE University, halae@uaeu.ac.ae

Negmeldin Alsheikh

Abdurrahman Al Mekhlafi

Najwa Alhosani

Mohammed Alzyoudi

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Reading in Arabic is a vital skill for academic success and progress in the United Arab Emirates (UAE) elementary schools and beyond. However, there is substantial evidence to suggest that a significant number of UAE children in lower elementary grades experience difficulties in reading school-related materials. Research in reading has clearly documented that the lack of phonological awareness skills is a major contributor to reading difficulties. The aims of the present study were to (a) identify phonological awareness deficits among UAE's struggling first-grade readers, (b) provide intervention in the area of phonological awareness deficits through direct training, (c) determine whether phonological awareness direct training significantly increases

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**Hala Elhoweris, Negmeldin Alsheikh, Abdurrahman Al Mekhlafi,
Najwa Alhosani, and Mohammed Alzyoudi**
United Arab Emirates University

Abstract

Reading in Arabic is a vital skill for academic success and progress in the United Arab Emirates (UAE) elementary schools and beyond. However, there is substantial evidence to suggest that a significant number of UAE children in lower elementary grades experience difficulties in reading school-related materials. Research in reading has clearly documented that the lack of phonological awareness skills is a major contributor to reading difficulties. The aims of the present study were to (a) identify phonological awareness deficits among UAE's struggling first-grade readers, (b) provide intervention in the area of phonological awareness deficits through direct training, (c) determine whether phonological awareness direct training significantly increases phonological awareness abilities, and (d) determine the effect of gender on the reading intervention. The results of this study indicate that a direct training intervention program in the UAE positively impacted struggling first-grade readers' phonological awareness abilities.

Reading and writing are complex cognitive skills that are predictors of school success. Children who struggle to read and write are at risk of academic failure, behaviour problems, and dropping out of school. Phonological awareness seems to be a panacea for readers who experience reading difficulties, and its efficacy on reading in young learners with reading difficulties is statistically confirmed (Bus & Van IJzendoorn, 1999; Catts & Kamhi, 1999; Goswami, 2010; Stanovich & Siegel, 1994; Swan & Goswami, 1997; Wagner & Torgesen, 1987). In a very important sense, the ability of the brain to develop “phonological representations in response to spoken language exposure and learning to speak, and the quality of these phonological representations, determines literacy

acquisition” (Goswami, 2010, p. 103). Reading is a complex cognitive skill that requires the reader to recognize words and comprehend the text. Beginner readers often struggle to learn how to read because of their inability to recognize and manipulate the sounds of their native language (Stuart, 2005). The lack of phonological awareness skills hinders beginning readers from learning how to decode and spell words effectively (Ryder, Tunmer, & Greaney, 2008). Leafstedt, Richards, and Gerber (2004) indicated that students with phonological deficits have difficulties understanding words that can be broken into individual phonemes and therefore cannot capitalize on that knowledge.

Phonological Awareness Research

The significant impact of phonological awareness on the reading ability of young children has been investigated since the 1990s in several countries around the world (e.g., Adams, 1990; Fuchs & Fuchs, 2006; Torgesen, 1999). Previous studies have documented that there is a strong association between phonological awareness skills and reading and spelling achievement (Center, 2005). Research in the last 20 years strongly supports phonological awareness skills as the predictor of reading success among beginning readers as well as those in later grades (Bernstein & Ellis, 2000; Goswami, 2002; Goswami, 2010). Indeed, research has demonstrated that phonological awareness is a predictor of reading and spelling success in the early school years (Hogan, Catts, & Little, 2005). Recently, Abou Elsaad and Abd Elhamed’s (2016) study revealed a strong relationship between phonological awareness skills and the proficiency in word reading abilities among Arabic school-aged children. Students identified with reading and/or writing difficulties have a lifetime struggle, and more likely, their academic achievements will be impeded. Therefore, it is imperative to recognize their special needs (Salend, 2008).

Phonological awareness, defined as the awareness of the sound structure of the language, is a critical skill for reading development. It involves identifying and manipulating parts of spoken language such as whole words, syllables, words chunks referred to as onsets and rimes; and phonemic awareness (Virginia Department of Education, 1998). Phonics is the knowledge of the relationship between letters and sounds (Morrow, 2012), so phonemic awareness and phonological awareness are considered precursor to phonics. The Virginia Department of Education (1998, pp. 3–4) suggested five major components for phonological awareness including listening (alertness, sequencing, discrimination, figure-ground, memory, and sound-symbol), rhyme (exposure, judgment, and production), word awareness (pointing and counting), syllable awareness (counting, segmenting, blending, and deletion), and phonemic awareness (initial sound identification and comparison, sound–symbol correspondence, final sound identification, phoneme counting, phoneme segmentation, phoneme blending, phoneme deletion, and phoneme substitution).

In a study that compared phonological awareness abilities between typical Arab-speaking children and Arab children with learning disabilities, Barakah et al. (2015) found that children with learning disabilities scored significantly poorer than typical children in most phonological awareness skills. Indeed, several researchers (e.g., Ammar & Ridha, 2013) reported that poor readers lack phonemic awareness abilities. According to these researchers, phonemic awareness does not develop spontaneously,

but only in the specific context of learning to read an alphabetic script at school. Gillon (2000) found that the children with spoken language impairment who received phonological awareness intervention made significantly more gains in their phonological awareness ability and reading development than children receiving other types of interventions. Recently, many researchers reported that integrated phonological awareness intervention programs significantly improved the phonological awareness abilities of students with varying degrees of disabilities (e.g., Gillon & Macfarlane, 2017; van Bysterveldt, Gillon, & Foster-Cohen, 2010; van Bysterveldt, Gillon, & Foster-Cohen, 2014).

According to Rupley, Blair, and Nichols (2009), for students who lack phonological awareness, teachers should use explicit instruction in phonological awareness abilities. Explicit instruction in phonological awareness should be an integral part of learning phonemic awareness, phonics, fluency, vocabulary, and comprehension. Letter-sound relations assist children to read and spell words correctly, whether the words are within or outside of the text (Smith, 2003). Previous researchers indicated that phonological awareness instruction is most effective when provided in small groups of three to five students (e.g., Foorman & Torgesen, 2001) and whole-class instruction (Center, Freeman, & Robertson, 2001). Earlier, Griffith (1992) found that children who were taught phonological awareness using whole-language and basal reading approaches outperformed children who were not taught phonological awareness in their reading programs. Torgesen (1999) found reading programs that emphasized even a minimal amount of explicit instruction in phonological awareness succeeded in increasing the proficiency rate of poor readers by 37%.

Research in special education emphasizes the use of small group interventions and one-to-one tutoring in remediating reading difficulties (see Fuchs & Fuchs, 2006; Salend, 2008). Ryder et al. (2008) found that children in a reading intervention program that emphasized phonological awareness improved their ability to recognize words accurately and to comprehend the reading text. Children who developed phonological awareness skills also learned how to read fluently and accurately at a faster rate (Ehri, 2003). The inclusion of phonological awareness training in discriminating rhyme, alliteration, and phonemic sounds increases reading rate for children with reading difficulties (Smith, 2003). Other studies of phonological awareness programs have shown that they are effective in improving beginning readers' phonological awareness skills (see Aisa, 2007; Al Otaiba et al., 2008; Cardoso-Martins, Mesquita, & Ehri, 2011). In a review of effective programs for struggling readers, Slavin, Lake, Davis, and Madder (2009) concluded that one-to-one tutoring that focuses on phonics is very effective in improving reading performance.

To summarize, phonological awareness ability is a critical predictor of early reading ability and crucial for subsequent academic success in later stages. Evidence from research overwhelmingly supports phonological awareness training as a precursor for beginning readers to be skillful and fluent readers.

Studies that have examined the use of phonological awareness programs with struggling readers in the Arab world are rare, most having been carried out in Western countries. However, the findings of these studies provide additional evidence of the need for phonological awareness instruction in overcoming reading difficulties among struggling readers. For example, in a study that investigated the role of phonological awareness in diagnosing developmental dyslexia among Arabic children, Ashor (2010) concluded that phonics training is essential to remediate children with dyslexia. Another study was conducted by Abedlah (2006) to assess the impact of using an intervention program in improving phonological awareness among Arabic beginning readers. The results of this study indicated that the program was effective in facilitating significant improvement in speech production, early reading, and achievement in Arabic language. Layes, Lalonde, and Rebai (2015) examined the effects of a phonological awareness training program on word reading and pseudo-word decoding in children with dyslexia reading Arabic. They found that in comparison to typical readers in Grades 4 and 5, the students with dyslexia performed significantly better in all post-training measurements in reading, phonological processing, and metalinguistic-related skills

UAE Context

Literacy has been and remains a cornerstone for UAE citizens. In 2015, on the directive of the UAE President, His Highness Sheikh Khalifa bin Zayed Al Nahyan, the UAE cabinet approved the declaration designating 2016 as the UAE Year of Reading. (“UAE Declares,” 2015). Although every student in the UAE needs a solid foundation in literacy to be able to enter college, a number of parents and educators have questioned students’ reading and writing achievements in English and Arabic languages. There was a virtual national panic about reading and writing achievements in the UAE elementary, secondary, and post-secondary education. Indeed, the consensus is that literacy levels are unsatisfactory at the national level in the UAE. Most children who start off their time in school struggling to learn to read are more likely to be at risk of serious difficulties throughout their time in school. Reading and writing problems can be overcome by early diagnosis and effective instructional strategies that motivates children (Salend, 2008). Therefore, it is imperative to address the literacy problems in the early school years, to avoid negative consequences in subsequent years.

Arabic orthography includes 28 letters, all consonants except for three long vowels: *أ* [/a:/], *و* [/u:/], and *ي* [/i:/]; short vowels are represented by diacritical dots, making a total of 6 vowels in Arabic. Most Arabic consonants have more than one written form (e.g., /f/ = *ف*, *ف*) depending on whether they occur in the beginning, middle, or end of a word (Ammar & Ridha, 2013). The Arabic orthographic system is considered phonologically transparent with a high consistent set of phoneme-grapheme correspondences (Abu Rabia, 1999).

Currently, there is scant data on children’s phonological awareness skills and the teachers’ use of phonological awareness for reading instruction in the UAE. A study by Tibi (2005) indicated that both special and general education teachers in the UAE have limited knowledge of phonological awareness and its application in teaching reading. Additionally, there is substantial evidence to suggest that a significant number of UAE

children in lower elementary grades experience reading difficulty when approaching school academic materials.

Research Questions

At the elementary level, success in school is virtually synonymous with success in reading. Because Grade 1 is a critical period for establishing a solid foundation in reading abilities, this study focused on first-grade students with reading difficulties. The intention of this study was to implement a highly effective phonological awareness program based on best practices that could be incorporated into the emergent reading program in lower primary schools in the UAE. Specifically, the research questions of this study are as follows:

1. What phonological awareness skills do UAE's struggling first-grade readers lack?
2. Does an Arabic-language program using direct instruction for phonological awareness significantly improve the phonological awareness abilities of UAE's struggling first-grade readers?
3. Is there any significant gender-based difference in phonological awareness skills among UAE's struggling first-grade readers?

Method

Participants

The participants all attended UAE government schools and consisted of 50 struggling first-grade readers: 25 girls and 25 boys ranging in age from five to seven years. For all the participants, Arabic was the mother tongue and the first language. In these schools, Arabic language is assigned for five periods per week. Participants were included in the study using stratified sampling technique and did not differ significantly with respect to pre-test measure in their phonological awareness abilities. They were randomly assigned to either the control or experimental group in their first semester.

These students had been nominated by their teachers as having reading difficulties in Arabic language and as experiencing difficulties in phonological awareness. To verify the source of the participants' difficulty in reading, the participating teachers were asked to use an error analysis sheet (prepared by the researchers) to identify the participants' errors in the reading diagnostic test. Error analysis revealed that all participants had difficulties related to phonological awareness skills.

The two teachers were chosen from two UAE elementary government schools. Both teachers were general education teachers who teach first-grade students. The two Arabic teachers had bachelor's degrees in Arabic teaching and learning, and they were native Arabic speakers.

Instrument

A quasi-experimental design (pre and post test) was used to answer the research questions of this study. The instrument was developed based on a comprehensive review

of relevant literature pertaining to phonological awareness assessment and instruction (e.g., Bernstein & Ellis, 2000; Goswami, 2002; Virginia Department of Education, 1998). The Phonological Abilities Measure (PAM) was used to determine the effects of this study's instruction program (intervention) in improving struggling readers' phonological awareness skills. The PAM consists of 12 phonological awareness skills including the following: sentence segmentation, rhyme recognition, rhyme production, syllable blending, syllable segmentation, syllable deletion, phoneme isolation of initial sounds, phoneme isolation of final sounds, phoneme deletion of initial sounds, phoneme deletion of final sounds, phoneme deletion of first sound in consonant blend, and phoneme substitution. Each skill is assessed by six items, making 72 items in total. The pre-test and post-test measures were not identical, but they both assess the same phonological awareness skills and have the same length.

Validity. To establish content validity of the PAM, four university professors from the field of reading education and special education reviewed each item in the instruments (pre-test and post-test measures). All reviewers indicated that the items of the instruments are appropriate, suitable, and related to phonological awareness skills.

Reliability. Internal consistency was used to measure the reliability of the parallel version of the PAM. More specifically, two versions of the test were developed, a pre-test measure and a post-test measure. The instrument was found to have an alpha coefficient reliability index of .88 for the pre-test measure and of .79 for the post-test measure, which were found to be appropriate for this study.

Intervention. The phonological awareness intervention (direct instruction) program used in this study was supplementary to existing Arabic language and reading instruction, which used indirect or implicit phonological awareness program. The two schools used the Ministry of Education curriculum, which does not include activities that directly or explicitly teach phonological awareness skills. In contrast, our intervention program used best practices for directly or explicitly teaching phonological awareness skills, including teaching strategies such as a multi-sensory approach, flexible grouping, and differentiated instruction (Tomlinson, 2001). The two teachers had received several workshops by the Ministry of Education in using multi-sensory approach and differentiated instruction strategies.

As noted above (see Introduction) Arabic orthography has a consistent letter-sound alphabetical system. Short vowel patterns are rule-governed depending on the meaning of the word, inflections, and the word function in a sentence. In this study all the words used are in voweled form to make it easier for beginner readers to read words or texts.

Intervention Framework

In this study, a general five-step framework for intervention developed by Gillon (2004) and Gillon and McNeill (2007) was adopted. However, some changes were made to the assessment framework to fit the purpose of the current study. The current study used four-steps including assessment, planning, implementation (intervention), and evaluation. The following paragraphs give a general overview of this four-step framework and the function for each step pertinent to our study.

1. **Assessment:** (a) Data on all participants' phonological skills was collected using the pre-intervention measure (PAM), and (b) areas of phonological awareness deficit were identified for the participants.
2. **Planning:** (a) Participating teachers were trained by the researchers on how to use direct instruction to teach phonological awareness by using flexible grouping, a multi-sensory approach, and differentiated instruction; and (b) participating teachers were asked to prepare lesson plans (see Appendix) to ensure that they would use similar activities and strategies.
3. **Implementation (intervention):** (a) Participating teachers were asked to implement the lesson plan as it is, using its activities and strategies within the specified time (similar in length to a typical single class period in the UAE government schools, i.e., 45 minutes); and (b) the two instructions were ensured to be comparable in terms of learning time, teaching strategies, vocabulary, and the targeted phonological awareness skills by reviewing the two teachers' lesson plans, student work samples, and the checklists that the two teachers completed on their own performance.
4. **Evaluation:** (a) The post-intervention measure (PAM) was administered individually to all participants; and (b) the research team re-evaluated the students' phonological awareness skills.

Procedures

In spring 2016 the researchers contacted school principals and teachers and requested their participation in this study. Parents of the experimental group of students were contacted, and their agreement was obtained before conducting this study.

Planning. We trained the UAE elementary school teachers who agreed to participate in this study in the special methods of direct instruction for phonological awareness. Upon successful training, the UAE participating teachers carried out the phonological awareness intervention program in autumn 2016.

To control for threats to internal validity, the two groups (experimental and control) of both genders were exposed to the same pre-test measures. Additionally, to avoid design contamination, the two groups (experimental and control) of male and female students were equivalent in terms of age range, phonological awareness ability (both groups scored below average on the pre test), and gender. To minimize cross-contamination of conditions, the participating teachers received instruction related to design contamination and were asked to note anything significant in this regard.

Assessment. To identify phonological awareness deficits, all student participants were individually administered pre-tests of the 12 phonological awareness skills. Each assessment was conducted in a one-on-one (teacher–student) assessment. The teacher communicated directions orally..

Implementation. After identifying the phonological awareness deficits that needed to be taught directly for UAE's struggling beginning readers, we assigned the participants randomly to two groups (A and B) for each gender type, since all government schools in the UAE are same-gender schools. Group A boys (experimental group, n = 12) and

Group A girls (experimental group, $n = 13$) were taught using a program of direct instruction for phonological awareness. Group B boys (control group, $n = 13$) and Group B girls (control group, $n = 12$) were taught using a program of indirect instruction for phonological awareness.

During the 16-week intervention period, the experimental groups were taught by their teachers in a series of special 40-minute classes after school using intensive small-group and individualized instruction that included differentiated instruction and a multi-sensory approach. The class comprised 10 minutes of whole-group instruction, 20 minutes of small-group instruction, and 10 minutes of individualized instruction. It is noteworthy that the phonological awareness training program was designed based on students' needs, providing explicit instruction on the skills that the students were lacking or on their difficulties including segmenting, rhyming, sound blending, and phonemic awareness. Instruction addressed sentence segmenting, rhyming production, syllable segmenting, and phoneme manipulation (e.g., phoneme deletion of initial sounds, phoneme deletion of final sounds, and phoneme substitution). Each lesson introduced, demonstrated, and provided practice sessions in a single phonological awareness skill using drill and practice with multi-sensory and differentiated instruction strategies (see a lesson plan example in the Appendix).

The control groups were taught phonological awareness abilities using implicit or indirect instruction—typical teaching methods in the UAE schools including whole-group and small-group instruction and a multi-sensory approach.

Evaluation. Following the intervention, all children were given the post-test of phonological awareness. The total score for each skill is six points: Each skill was assessed by six items and each item was worth one point. To determine the mastery level of phonological awareness skills for the whole class, a mean score of 5.4 (90%) was taken to indicate that the participants mastered the phonological awareness skill. A mean score of 4.8 (80%) or higher meant that participants had partially mastered the skill. A mean score of less than 4.8 meant that participants had not mastered the skill. Thus, the skill was considered as an area of deficit or difficulty if the mean scores fell below 4.8 or $\leq 79\%$.

Data Analysis

Descriptive statistics such as frequencies and percentages were used to analyze quantitative data such as students' scores in phonological awareness skills. To measure the impact of the instruction program on the phonological awareness skills of UAE's struggling first-grade readers, an independent sample *t*-test was used.

Results

To answer research question 1, "What phonological awareness skills do UAE's struggling first-grade readers lack?", all the participants (experimental and control groups) were given pre-assessments to identify their common areas of phonological awareness deficits. The results of the pre-test measurement revealed that there are no statistically significant differences between Group A and Group B in phonological

awareness abilities ($p \geq .05$), indicating that the two groups lacked the phonological awareness skills that have been assessed in this study.

Based on the pre-test scores, the participants had difficulties in segmenting, rhyming, sound blending, and phonemic awareness. The participating teachers provided direct and explicit instruction in six phonological awareness skills as shown in Table 1.

The results of the pre test indicated that prior to the intervention, participants had mastered only two phonological awareness skills, namely phoneme isolation of initial sounds and phoneme isolation of final sounds (see Table 1); that is, the isolation of a phoneme was an easy task for the participants of this study. Therefore, the intervention training program did not target these two skills. To ensure that all participants mastered these skills, participating teachers reviewed the pre-test assessment for each individual student, and they reviewed samples of the students' work and students' previous performances at these phonological awareness skills.

Table 1
***Pre-test Phonological Awareness Skills Assessment Results
for First-grade Struggling Readers***

Category	Mean	%
Concept of Spoken Word (Sentence Segmentation)	3.2	53.3
Rhyme Recognition	3.6	60.0
Rhyme Production	1.9	31.7
Syllable Blending	4.1	68.3
Syllable Segmentation	2.4	40.0
Syllable Deletion	4.6	76.7
Phoneme Isolation of Initial Sounds	5.9	98.3
Phoneme Isolation of Final Sounds	5.4	90.0
Phoneme Deletion of Initial Sounds	3.0	50.0
Phoneme Deletion of Final Sounds	3.6	60.0
Phoneme Deletion of First Sound in Consonant Blend	3.5	58.3
Phoneme Substitution	2.9	48.3

Question 2 asks, “Does an Arabic-language program using direct instruction for phonological awareness significantly improve the phonological awareness abilities of UAE’s struggling first-grade readers?” The results the post test as reported in Table 2 reveal significant differences between Group A (experimental) and Group B (control). Students in Group A experienced greater improvements than students in Group B.

To answer question 3, “Is there any significant gender-based difference in phonological awareness skills among UAE’s struggling first-grade readers?”, boys’ and girls’ post-test scores were compared using the *t*-test. Results of the analysis indicated that there were no statistically significant differences in the PAM overall scores of boys and girls at $p .05$ level, $t = 1.33$. So, there is no statistically significant effect of gender on phonological awareness skills.

Table 2
Differences in Post-test Mean Scores of Phonological Awareness
Between Group A and Group B

Category	Group A Mean	Group B Mean	<i>t</i>
Concept of Spoken Word (Sentence Segmentation)	5.2	2.6	2.2*
Rhyme Recognition	5.0	3.3	2.4*
Rhyme Production	2.7	1.7	0.9
Syllable Blending	6.0	2.9	4.9**
Syllable Segmentation	4.7	1.1	4.4**
Syllable Deletion	6.0	4.0	3.3*
Phoneme Isolation of Initial Sounds	5.8	1.9	4.2**
Phoneme Isolation of Final Sounds	6.0	3.5	3.1*
Phoneme Deletion of Initial Sounds	4.8	2.6	2.0
Phoneme Deletion of Final Sounds	4.3	3.1	1.0
Phoneme Deletion of First Sound in Consonant Blend	4.7	2.6	1.7
Phoneme Substitution	4.2	2.9	1.3
Total	4.9	2.7	5.4**

Note. * p-value significant at .05 and **p-value significant at .01.

Discussion

Results of this study indicate that the program of direct instruction for phonological awareness did produce slight improvements in UAE's struggling first-grade learners' ability in word segmentation. This result supports previous studies that indicated that phonological awareness direct instruction training program leads to improvements in students' reading abilities and phonological awareness abilities (e.g., Abou Elsaad & Abd Elhamed, 2016; Laves, Lalonde, & Rebai, 2015; Smith, 2003).

Results of this study further indicate that the direct and explicit instruction in phonological awareness using flexible grouping format (e.g., whole class, small groups, and one-to-one tutoring) positively impacted UAE first graders with reading difficulties. This confirms findings of previous researchers who indicated that phonological awareness instruction is most effective when provided directly through one-to-one tutoring (2009), small groups (Foorman & Torgensen, 2010), and whole classes (Center et al., 2001). Our findings support previous recommendations that teachers should use explicit instruction in phonological awareness in teaching students who lack phonological awareness (e.g., Algozzine, 2008) and that teachers should target and train students in the phonological awareness skills directly and explicitly. The importance of direct instruction is highlighted by our finding that the improvements among UAE's struggling first-grade readers vary from one skill to another.

In our UAE-based study of struggling first-grade readers, we found no statistically significant effect of gender in the effects of direct instruction on phonological awareness

skills. This finding is consistent with Musa and Balami's (2016) study, which investigated the impact of sex on reading performance in children with dyslexia. Using phonological awareness skill training, they found no significant effect of sex on the effectiveness of the intervention.

Implications

This research provides a solid framework for phonological awareness instruction based on scientific research that can substantially improve the reading skills of UAE beginning readers. Teaching Arabic in many UAE elementary schools is currently based on the whole-word approach, which uses a program of indirect or implicit phonological awareness instruction. However, given that in the current study direct phonological awareness instruction outperformed an indirect approach in addressing the reading difficulties of UAE first graders with poor phonological awareness, it might be more effective if teachers' education programs prepared pre-service teachers to teach phonological awareness explicitly to beginner readers.

Certainly, since phonological awareness is a precursor for reading acquisition and has consequences for reading proficiency in later years, the Ministry of Education in the UAE and the Abu Dhabi Education Council should train in-service teachers to identify children who have difficulties in phonological awareness. Further, they should (a) ensure that elementary school teachers are aware of the positive impact of direct instruction program as a viable means for improving phonological awareness skills among students with reading difficulties in first grade, and (b) teach them how to provide direct phonological awareness instruction using flexible grouping, multi-sensory approach, and differentiated instruction.

Within their classrooms, UAE elementary school teachers need to consider using a direct phonics approach with beginner readers. We encourage those teaching Arabic language to be cognizant of phonological awareness and to employ a balanced approach between whole language and phonics, in which phonics can be taught directly and in a meaningful context.

Regarding implications for future research, it will be important to examine the long-term effect of this or similar intervention programs on phonological awareness, and to measure the impact on reading performance and comprehension skills.

Limitations

Since the age range (5–7 years old) of the participants appears quite small, future researchers may need to consider the use of ANCOVA and including age as a covariate.

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Authors' Note

Correspondence concerning this article should be addressed to Dr. Hala Elhoweris, Faculty of Education, Special Education Department, UAE University, P.O. Box 17551, United Arab Emirates. Email: halae@uaeu.ac.ae

Appendix

Example of Lesson Plan

Learning Outcomes

- Students will be able to identify Arabic rhyming words

Introduction (5 minutes)

1. The teacher introduces the concept of *rhyming words* to students in Arabic. Explain that *rhyming words are words that have the same ending sounds*. For example, "مات" [mæt] and "فات" [fæt] are Arabic rhyming words.
2. The teacher reads aloud a rhyming poem, emphasize the rhyming words, and ask students to listen for rhymes in the poem.
3. After each rhyme, ask students to clap and then tell what rhyming words they noticed.

Explicit Instruction/Teacher Modeling (20 minutes)

1. Read aloud a rhyming *story* and emphasize rhyming words.
2. Pause occasionally and ask students in pairs to point out which words rhyme and discuss why they rhyme and then share their response with the teacher.
3. Explain directly to students how some Arabic words sound the same at the end (-at) (ات) [-æt]

Guided Practice (10 minutes)

1. Divide the class into groups (3–4 students per group).
2. Hand each group mixed flashcard sets of rhyming words.
3. Ask students to look through the cards and pairing up rhyming words.
4. Distribute different worksheets to each group according to the students' abilities (differentiation). For example, high achievers can be asked to go over a story book and identify rhyming words as much as they can. And low achievers can go over different pairs of rhyming words using one-on-one approach.

Assessment (10 minutes)

1. Ask each student to write down three pairs of rhyming words on the given sheet.
2. High achievers can be given an extra assignment to create a "who am I" poem including rhyming words.