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**Teaching Vocabulary and Letter Knowledge in Arabic Early Literacy
Programs: What Works?**

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**Teaching Vocabulary and Letter Knowledge in Arabic Early Literacy
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by

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Dedication

To my mother who taught me honesty and put my education on the top of her priorities.

To my beloved husband who supported me throughout the journey.

And to my two little sons whom I enjoy seeing the world through their curious, questioning eyes.

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Abstract

Teaching Vocabulary and Letter Knowledge in Arabic Early Literacy Programs: What Works?

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Abstract: This exploratory study compares the efficiency of two Arabic early literacy curricula that vary in the order they introduce letters and the level of emphasis placed on fostering vocabulary and comprehension skills. School-1 introduces letters in an innovative order, teaches vocabulary in context, and fosters listening comprehension while School-2 introduces letters earlier but in their alphabetic order and often introduces vocabulary in lists. The reading programs were implemented in two schools teaching Arabic as a second language in a southwestern state. Twenty-seven 1st grade students were assessed individually for 15-20 minutes at the beginning of the academic year 2014-2015 and again in mid-spring. Measures included letter naming, syllable reading, word reading, rapid naming of unique letters, rapid naming of confusing letters, listening comprehension, first-sound isolation phonological awareness, and odd-word identification phonological awareness subtasks. In addition to the assessment, two classroom observations were conducted in each school.

Results showed that School-1's students scored significantly higher than School-2's students on the comprehension subtest without compromising the coding-related skills. Students in School-1 also had a lower level of letters confusability. In addition, only students in School-1 improved significantly in the first-letter isolating task. Finally, error analysis of the letter naming and first-letter isolation task showed different patterns in each school. Results are discussed in the context of the observed differences in the two schools' Arabic instruction.

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Chapter 1: Introduction

The performance of children in early literacy skills is one of the most important predictors not only of future skill in reading acquisition but also of general academic success (Bingham & Patton-Terry, 2013; Dickinson & Newman, 2007; Aram, Korat, & Hassunah-Arafat, 2013). In order to provide children with efficient, comprehensive early literacy instruction, we need to know *what* skills to teach in early literacy programs and *how* to teach them. Paris (2005), in his conceptual essay, recommended the inclusion of both code-related and meaning-related skills in early literacy instruction. Code-related skills are constrained skills that are learned and mastered earlier such as print awareness, letter knowledge, and decoding. While meaning-related skills are unconstrained; they are skills that develop gradually such as vocabulary and reading comprehension. Specifically, letter knowledge and vocabulary are considered the most vital early literacy skills (Aram et al., 2013).

In addition, teachers are required to adopt research-based practices in teaching these skills (Clearinghouse, 2008; Marsh, 2005). Unfortunately, early literacy research in Arabic is limited and children in Arab countries are not performing well in the foundational reading skills. However, interventions that involve training Arabic teachers to use more efficient instruction and to focus on the important reading pre-requisite skills result in significant improvement in the students' performance (Boyle, Ajjawi, & Xiang, 2014; Levin, Saiegh-Haddad, Hende, & Ziv, 2008).

Arabic is the first language for at least 223 million speakers across the world and is hence considered the fifth most spoken language in the world (Lewis, Simon, & Fenning, 2013). Furthermore, 82% of Muslims worldwide are non-Arab (i.e. have diverse ethnic and linguistic backgrounds) but are eager to learn Arabic in order to read and understand the

Quran, Muslims' holy book, in its original language. Finally, increasing interest in Middle Eastern languages has led an even greater number of individuals worldwide to learn Arabic as a foreign language. Unfortunately, the Arabic script has two characteristics that confuse beginners: first, the Arabic alphabet consists of groups of adjacent orthographically-similar letter dyads or triads that share the same character and differ only in the number and/or the position of dots (for example, ح ح ح). Second, Arabic is written from right to left in a cursive mode thus all but six letters are connected within words. The cursive nature of the script has resulted in up to four different forms for each letter based on its position in the word, initial, middle, final, or isolated (for example, ح → → ح). Both features make visual similarity between different letters in the same dyad or triad often greater than the visual similarity between different forms of a letter (Elbeheri & Everatt, 2007).

Available data from some Arab countries reveals that reading is taught as a component of the language class rather than as a separate subject. Moreover, teachers do not allocate much classroom time to teach foundational skills such as letter knowledge and phonics. Consequently, students generally learn to read words orthographically through spelling rather than through sound-letter correspondences. A lack of systematic, explicit instruction may hinder students' ability to connect letter names, sounds and shapes. Letters are introduced either individually in their alphabetic order (in Egypt, for example) or in groups based on easiness and frequency. However, there is inconsistency across various curricula in defining easy and frequent letters. In addition, no comprehensive criteria for the sequence of introduction of letters nor information about the efficiency of each grouping criteria exists. Finally, there is no evidence for reading benchmarks across grades to evaluate students' progress (Boyle et al., 2014).

A final factor that can highly influence Arab students' reading performance is diglossia; Arabic is considered a highly diglossic language because at least two forms of

the same language are used for different social functions (Ferguson, 1959). Modern Standard Arabic (MSA) is used in writing and formal speech while Spoken Arabic Vernacular (SAV) is used in daily interactions and has many local dialects. SAV, the mother tongue for Arab children, deviates from MSA in all components of language such as letter names, letter sounds, vocabulary, and syntax. This imposes challenges for first grade students who begin school without experience with MSA even when they attend Pre-kindergarten and kindergarten because teachers believe that children are too young to learn and understand MSA, therefore, they do not teach it (Abu-Rabia, 2000; Boyle et al., 2014; Saiegh-Haddad, 2003, 2004).

To determine how well Arab students are learning to read in Arabic, Boyle et al. (2014) reviewed their performance on two international reading assessments, Progress in International Reading Literacy Study (PIRLS) and Early Grade Reading Assessment (EGRA). PIRLS is a measure of reading comprehension administered mainly to fourth grade students every five years since 2001. The participation of Arab countries has increased from two countries in 2001 to seven in 2011. However, their performance was consistently below the international average. The results provide a general idea of the effect of early reading instruction in Arabic but they are not helpful in pinpointing where the challenges lie.

EGRA is more helpful in this regard. EGRA was developed in 2006 to assess students' reading performance internationally in the early elementary grades. It assesses foundational reading skills such as letter naming, letter sound identification, and word identification which can inform teachers' development programs and reading standards. Four Arab countries, Egypt, Iraq, Jordan, and Yemen, had national public schools representative results. Unfortunately, the students' performance was low for all subtasks.

The letter naming subtask was conducted only in Yemen and the average performance was 16.78 correct letters names per minute for second graders. Pseudo-word decoding subtask results were also low, ranging from 2.63 words per minute for Yemenite second graders to 7 words per minute for Jordanian third graders. A possible reason for the slow rate of reading acquisition may be the confusability of letters. The current exploratory study examines the role of the sequence of letter introduction in addition to the role of fostering MSA oral skills before first grade by comparing the efficiency of two Arabic early literacy curricula that introduce letters in different sequences and have different levels of emphasis on fostering vocabulary and reading comprehension skills.

Chapter 2: Literature Review

This chapter first describes the script and orthography features of Arabic. It then rationalizes and presents a historical exploration of the Arabic alphabet order. Then, it presents an overview of the documented confusion in Arabic letter names/sounds as well as the general criteria used for introducing letters in other languages and the implications for the Arabic alphabet system. Following the introduction of these criteria is a study exploring the teaching order for the Arabic alphabet in four countries. Finally, a pilot study that explores Arabic early literacy curricula and Arabic teachers' perception in a southwestern state is reviewed to introduce the current study purpose and hypotheses.

ARABIC SCRIPT AND ORTHOGRAPHY

Arabic is a Semitic language that is written using alphabetic symbols. It has 28 letters (or 29 letters if *Hamza*, a glottal stop, is included) and 34 phonemes. All but three letters (*Alif*, *Waw*, and *Yaa'*) are consonants. *Alif* frequently represents two sounds, /a/ and /a:/ while *Waw* and *Yaa'* can be long vowels or diphthongs in a manner similar to the letter *Y* in English. The three short vowels, on the other hand, are represented using diacritics superscripted above or under the letters which makes the Arabic script syllabic and orthographically loaded (for example, the 3-letter Arabic verb جَمَّلَ, which means *has been beautified* is pronounced in English as a 3-syllable word jum/mi/la). Moreover, Arabic is written from right to left and letters within each word have to be connected to each other in a cursive mode except for six letters that can be connected only from one side, the right side (i.e. can be connected only to the previous letter). These six letters, usually referred to as naughty or mean letters, present spaces within the words which may affect the print

awareness of young children (Elbeheri & Everatt, 2007). For example, a word can be all connected together such as **كتب** or it can have internal space(s) such as **قنديل** and **وردة**.

Because of the cursive nature of the Arabic script, each letter is represented by more than one form depending on its position within the word, initial, middle, final, or isolated (see Figure 2.1). Six letters have only two forms as the initial and isolated forms are identical, and the middle and final forms are identical. For most letters, each form shares common features with the isolated form and therefore are considered recognizable (Abd El Minem, 1987). Some letters, however, such as *Haa'* and *Kaaf*, have quite different forms that may be confused by children (**ه ه ه ه ه ه** and **ك ك ك ك ك ك**). In addition, the Arabic alphabet consists of groups of adjacent orthographically-similar dyads or triads of letters that have the same character but differ only in the number and/or the position of dots (i.e. dot(s) are imposed below or above the character to distinguish letters). As a result, the visual similarity between different letters in the same dyad or triad often exceeds the visual similarity between different forms of a letter. For example, **ت** and **ث** are two different letters in the same triad differ only in the number of dots but **ت** and **ت** are two forms of the same letter.

Letter Name	Letter Sound	Isolated	Initial	Medial	Final
alif	various, including /a:/	ا	ا	ا	ا
bā'	/b/	ب	ب	ب	ب
tā'	/t/	ت	ت	ت	ت
thā'	/θ/	ث	ث	ث	ث
jīm	[dʒ] ~ [ʒ] ~ [g]	ج	ج	ج	ج
hā'	/h/	ح	ح	ح	ح
khā'	/x/	خ	خ	خ	خ
dāl	/d/	د	د	د	د
dhal	/ð/	ذ	ذ	ذ	ذ
rā'	/r/	ر	ر	ر	ر
zayn / zāy	/z/	ز	ز	ز	ز
sīn	/s/	س	س	س	س
shin	/ʃ/	ش	ش	ش	ش
ṣād	/sˤ/	ص	ص	ص	ص
ḍād	/dˤ/	ض	ض	ض	ض
ṭā'	/tˤ/	ط	ط	ط	ط
ẓā'	[ðˤ] ~ [zˤ]	ظ	ظ	ظ	ظ
'ayn	/ʕ/	ع	ع	ع	ع
ghayn	/ɣ/	غ	غ	غ	غ
fā'	/f/	ف	ف	ف	ف
qāf	/q/	ق	ق	ق	ق
kāf	/k/	ك	ك	ك	ك
lām	/l/	ل	ل	ل	ل
mīm	/m/	م	م	م	م
nūn	/n/	ن	ن	ن	ن
hā'	/h/	ه	ه	ه	ه
wāw	/w/, /u:/, /aw/	و	و	و	و
yā'	/j/, /i:/, /aj/	ي	ي	ي	ي

Figure 2.1. Arabic letters names, sounds and different forms. Adapted from “Topical Analysis of Early Grade Reading Instruction,” by H. Boyle, S. Al-Ajjawi, and W. Xiang, 2014, Learning Systems Institute, Florida State University for RTI.

In contrast, Arabic has some advantageous features that facilitate its learning. First, Arabic is considered a shallow orthography when the diacritics (i.e. short vowels) are included. That is to say there is regularity and consistency of grapheme-phoneme correspondence. Diacritics are maintained in textbooks and children's books until children are in third or fourth grade. Later, readers are expected to read fluently and accurately without the short vowels relying instead on context, syntax, and morphological information (Abu-Rabia, 1997; Touka & Coltheart, 2004). During the early literacy phase, Arabic is considered an ideal shallow orthography because the script is often vowelized (i.e. the script has the diacritics that represent short vowels) (Mohamed, Elbert, & Landerl, 2011). Children learning to read shallow orthographies tend to develop phonemic awareness and phonological decoding skills faster and read with more accuracy than their counterparts learning to read deep orthographies (Aro, 2004).

Another advantageous feature of the Arabic script is the ease of linking the letter sound to its name. Not only are all Arabic letters iconic (i.e. the letter name contains the letter sound) but they are also acrophonic, which means that the letter name starts with the letter sound (Levin et al., 2008). Share (2004) found that it is easier for children to learn letter-sound correspondence when the letter name contains the letter sound (i.e. iconic letters). Moreover, Treiman, Tincoff, Rodriguez, Mouzaki, and Francis (1998) found that having the letter name start with the letter sound (i.e. acrophonic letters) makes it easier for children to identify the letter sound. The presence of this feature suggests that more emphasis should be put on developing letter naming in Arabic as students can acquire letter sounds easily if they know the letter names and get minimal training on letter sounds.

The Arabic script initially lacked both dots distinguishing letters using the same character and diacritics indicating the short vowels. These clarifying aids were added to preserve the Quran and help non-Arabic speakers read it correctly. Abo Al-Aswad Al-Do'aly (621-688 AD), the founder of Arabic grammatical rules, first added diacritics to the words' final letters (the diacritic on the final letter in Arabic determines the syntactical role of the word in the sentence). When reading errors continued due to the confusion between different sounds that are represented using the same character, Nasr Ibn Assem El-Laythy (d. 707 AD) added the dots to distinguish the different letters that share the same character. Additionally, he grouped similar letters in the historical Phoenician/abjad sequence for a homogeneous beautiful appearance. He started with the Phoenician order, and inserted the new letters into the sequence after the current letters that were orthographically similar. All of the unique letters were added at the end of the sequence. This resulted in the current well-known Arabic alphabetic order. Other scholars such as Al-Khaleel Ibn Ahmed, Seebawayh, and Abu Ali Al-Qaly created an alphabet sequences that were based on the articulation points of the letters. This led to different sequences of the Arabic alphabet that were more common in the western Arab countries.

In summary, the dots and diacritics created the shallow orthography that the vowelized Arabic script enjoys today. However, the order of the letters had many forms historically and regionally and the current widely-used order has an aesthetic, rather than a functional or linguistic, basis.

DOCUMENTED CONFUSION IN READING AND SPELLING ARABIC LETTERS

“A student who can recognize most letters with confidence will have an easier time learning about letter sounds and word spelling than a student who still has to work at remembering what is what” (Adams, 1990). In vowelized Arabic, letter recoding speed,

rapid automatized naming (RAN), and short-term working memory tasks have a higher correlation with pseudowords reading than phonemic awareness tasks (Saiegh-Haddad, 2005). This result is similar to other shallow orthographies reviewed by Aro (2004), which emphasizes the importance of the letter knowledge skill in shallow orthographies like vowelized Arabic.

The acquisition of letter knowledge, however, is highly influenced by the visual similarity and the adjacency of the letters. Confusing visually-similar letters and adjacent letters (i.e. letters that follow each other in the alphabet) is common in many languages (Treiman, Kessler, & Pollo, 2006; Treiman, Levin, & Kessler, 2006) and may have more impact in Arabic as visually-similar letters were intentionally grouped to form visually-similar dyads or triads. The letters in each group share the same character and differ only in the number and/or the position of the dots. In addition, the majority of these visually-similar adjacent letters have phonologically-similar names that share the rime and differ only in the onset which further increases the confusability risk.

Some Arabic studies have referred to the confusability issue in the Arabic script but no suggestions for addressing the issue were proposed. Levin et al. (2008) examined an Arabic early literacy intervention among Israeli Palestinian kindergarteners with a focus on letter knowledge. The intervention involved raising teachers' awareness of the Arabic letter system and the instructional implications of its unique characteristics. The impact of the intervention was evaluated by comparing performance on pre and post assessment between an intervention and control group. The assessment consisted of three early literacy skills, letter knowledge, alphabetic awareness, and phonological awareness, where the letter knowledge task required the association between the letter orthography and the letter name (i.e. letter naming task). The researchers analyzed the errors and found three error categories in the letter knowledge task, adjacent similar (AS) errors, adjacent-dissimilar

(AD) errors, and nonadjacent-dissimilar (NAD) errors. The similarity was defined as visual similarity rather than phonological similarity. Using a three-way ANOVA, they found an effect for the error type as expected; children erred significantly more frequent in naming AS letters. At posttest, AS errors were significantly higher than NAD for the control and the intervention group. They concluded that visual similarity is the major factor in confusing letter names in Arabic.

Other studies found evidence of visually-similar letter confusion in older students and in students with dyslexia. Abu-Rabia and Taha (2004) compared the reading and spelling errors of 20 fifth graders who have dyslexia with 20 mainstream fifth graders and 20 mainstream younger students whose reading level matched the reading level of the students with dyslexia. One of the goals of this comparison was to determine the impact of Arabic orthography on the error types made by native speakers. Both reading and spelling error analysis had an error category for visually-similar letter confusion. Although not stated by the authors, after examining the examples provided in the articles, I concluded that the authors included both adjacent and nonadjacent visually-similar letters in this category. The results showed that visually-similar letter confusion is responsible for a small percentage of the total reading and spelling errors. However, the authors saw it as a reflection of the nature of the Arabic script and worthy of study as it was observed only in the dyslexia and the reading-level-matched groups. They concluded that due to the high confusability of Arabic letters, mastering the grapheme-phoneme correspondences highly correlates with reading accuracy.

The same authors (2006) analyzed the spelling errors of 228 mainstream native Arabic-speakers in grades 1 to 9 using the same error categories that were used in the previous study. Although the phonetic errors were dominant at all grade levels, visual similarity contributed to 1.91% of the errors of first graders, 16.3% of the errors of second

graders and 4.03% of the errors of third graders with an average of 2.66% across all the grade levels. The high level of confusability in grade 2 might be because of the uniqueness of this grade sample; the second grade sample was unique in that gender ratio was unbalanced with only nine males and 20 females. This could contribute to the maximum observed confusability as Mohamed et al. (2011) noticed a positive correlation between visuo-spatial ability and Arabic literacy skills and that males were superior in both skills among the first grade participants. This correlation between visuo-spatial ability and literacy skills was explained by the high visual demands of the Arabic orthography. However, this hypothesis needs further examination.

GENERAL CRITERIA FOR INTRODUCING LETTERS

Although there is no consensus on the best order for teaching the English alphabet (Hall & Moats, 1999), Honig, Diamond, and Gutthron (2012) reviewed three criteria for ordering letters in early literacy curricula: first, introduce easier letters before harder ones. This was explained in the context of the English script as teaching letters that are easy to form/handwrite first. In Arabic, there are two possibilities for “easier”. First, it could apply to phonological easier letters with sounds that are already used in the local dialect. Second, it could apply to orthographically easier letters. Orthographical ease may be reflected in the number of strokes in the letter or the number of different forms the letter has in different positions within the words. For example, the six letters that can be connected from only one side, and hence have only two forms, are easier. Other letters that have four consistent forms are easier too (for example, *Baa'* بـ بـ بـ بـ). On the other hand, the letter *Haa'* is harder since children need to learn four forms for this letter that share few visual features (هـ هـ هـ هـ).

The second criterion calls for introducing more frequent letters before less frequent letters. Madi (2010) performed an Arabic letter frequency analysis that used two sources. One was the Quran and the second was three famous traditional Arabic books. The results yielded almost similar letter frequencies from both sources. Figure 2.2 reveals that when Arabic letters are taught in alphabetic order, most of the less frequent letters will be taught earlier in the learning process and will not be useful in forming words. By considering the frequency of the letters, students can start blending simple, high-frequency words.

This concept of teaching more frequent letters first is related to the task-based teaching that was discussed by Scardamalia, Bransford, Kozma and Quellmalz (2010). Task-based teaching involves working backward from goals to teaching objectives even if it interrupts the traditional sequence of topics. In the context of early literacy, this approach results in a change in the order of teaching letters. More frequent letters, regardless of their alphabetic order, should be taught first to give students the opportunity to form and read basic words before mastering the whole alphabet. That is to say that forming and reading words should be seen as an important goal of reading instruction. Thus, introducing letters in a sequence that contributes to that goal should be part of the early literacy instruction.

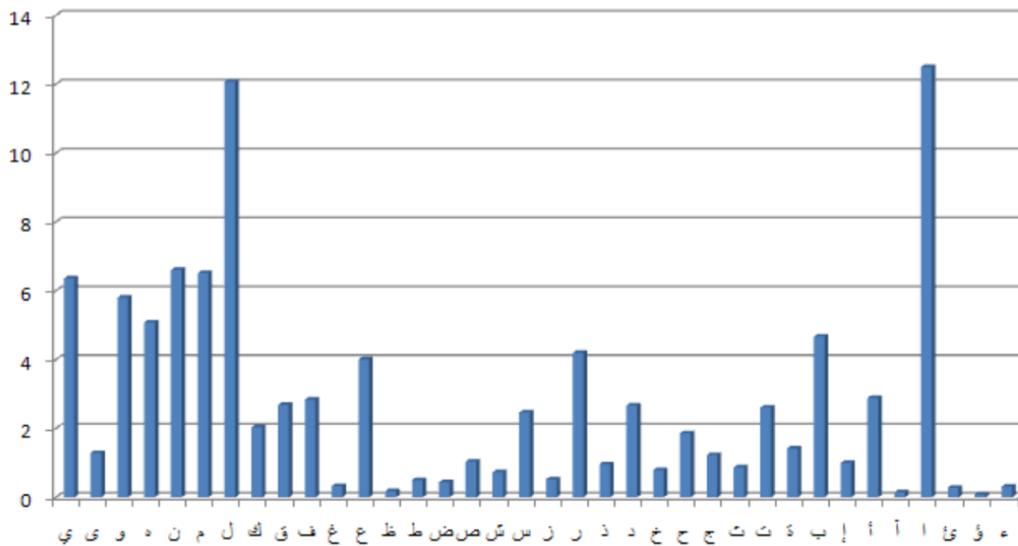


Figure 2.2. The percentages of the frequency of the Arabic letters using 3 famous Arabic sources that added up to 3,378 pages and generated 1,297,259 words. Letters are written from right to left and ordered in the alphabetic order. They include the primary 28 letters plus some modified letters. Adapted from “A Study of Arabic Letter Frequency Analysis,” by M. Madi, 2010, retrieved from <http://www.intellaren.com/articles/en/a-study-of-arabic-letter-frequency-analysis>

The third and final criterion calls for separating visually and/or phonologically similar letters to avoid confusion. The authors argued that both visual and phonological characteristics affect the learning process. Accordingly, English letters were divided into three groups of pairs: a group that has visually similar pairs such as B-R, U-V, and g-q; a group that has phonologically similar letters (i.e. shared phonemes between two letter names) such as b-c and F-L; and a group that has both visually and phonologically similar letters such as B-D, B-P, and m-n. In the context of Arabic, this criterion essentially means separating the letters in each of the dyads and triads of visually, and often phonologically, similar letters for instruction. This, in turn, will allow mastery of one letter of a dyad/triad before introducing another one from the same dyad/triad. It also implies distinguishing

between visually similar adjacent letters such as ح and ح on the one hand and visually *and* phonologically similar adjacent letters such as ح and خ on the other hand. Using this criterion, one would expect beginners to confuse the second pair more than the first one. In addition to the dyads and triads, some non-adjacent letters are still visually-similar such as ب and ن. These letters should remain separated to avoid further confusion.

Finally, Honig et al. (2012) recommended giving more time to the harder letters and refraining, if possible, from the one-letter-per-week approach that gives equal time to teach all letters. In the context of Arabic, this might mean giving more time to letters that have quite different forms, letters that have visually and phonologically-similar siblings, or letters that do not exist in the local colloquial speech for Arabic speakers or the mother tongue for non-Arabic speakers.

PRESENT ORDER OF TEACHING ARABIC LETTERS IN SOME ARAB COUNTRIES

Recently, Boyle et al. (2014) reported the order of teaching Arabic letters in a few Arab countries. In Egypt, teachers introduce letters in their alphabetic order. However, in Yemen, teachers teach letters in groups. The first group consists of the three long vowels and the most frequent letters that are also easy to pronounce (ا و ي س د ر). Then, the rest of the letters are introduced in groups of five with increasing difficulty. Similarly, in Saudi Arabia, the letters are divided into five groups based on the difficulty. Although the sequences in the two countries show some overlap, they show no consistency in how they define frequency or in how they decide which letters are easy. Fortunately, by dividing letters into groups based on frequency and/or difficulty, most of the dyads and triads were broken. However, some visually-similar letters still remain within groups such as د, ن, ب, ذ, ز.

Furthermore, the Lebanese Ministry of education developed general principles for introducing letters: frequency of the letter, ease of pronunciation and transcription, and the utility in combining the letters into meaningful words. Although these principles sound similar to the ones reviewed in the last section, they ignored the visual and phonological similarity in the letters. Moreover, their website suggests three different letter groupings for teachers to choose from. All of the proposed groups contained visually and phonologically similar letters and one grouping actually combines dyads and triads which violate the frequency and easiness criteria listed by the Ministry. This calls into question their understanding of the listed criteria and their proper application to Arabic. In general, little is known about how teachers should teach the suggested groupings of letters in Lebanon, Yemen, and Saudi Arabia or the efficiency of each grouping compared to the traditional alphabetic order used in Egypt and Palestine (Levin et al., 2008). Hence, the impact of the letter sequence on the letter knowledge, level of confusability, and the ability to blend and read words need further study.

PILOT STUDY

A qualitative research study (Zayan, 2014) investigated the Arabic early literacy curricula used in five private schools teaching Arabic as a second language in a Southwestern state in the United States. In addition to examining the implemented curricula for Kindergarten to second grade, Zayan interviewed the school principals and Arabic teachers to determine how the cultural perception of the Arabic unusual features influenced the curricula choice and teaching practices. Results indicated that two curricula sequences are used. The first is the traditional introduction of letters in their alphabetic order; in these schools, teachers complained of letter confusability but claimed that they overcame this challenge by grouping similar letters on a poster to help children see the subtle differences

between letters. When asked about changing the order of teaching the letters, one teacher said “If it is beneficial to students and it is easy for them, I can adopt it. If I try it . . . because sometimes theoretical things do not work. . .”. In addition, principals in these schools were not open enough to benefit from the research work done for teaching other languages. When asked about adopting teaching strategies from other languages, one principal replied “The ways of teaching are different and there are many educational philosophies”.

The second sequence introduced letters purposefully and not in their alphabetic order. When asked about the alphabetic order, one teacher said, “Even if the curriculum [I was given] introduced letters in order, I would not follow it.” This quotation reflects high awareness of the special features of the Arabic script. In addition, one principal emphasized more than once that they “. . . use the same types of techniques that are used for teaching any [other] language”.

CURRENT STUDY DESIGN

Of the five schools that participated in the pilot study, two schools were chosen to participate in the current study, one that used each sequence. Both schools implemented the chosen curricula well and did not have plans to change their curricula in the near future. Each school adopted a different approach to teaching Arabic in the early grades and the principals and Arabic teachers at each school had different perceptions about how to teach Arabic. In addition, both schools had similar demographics (SES and percentage of Arabic-speaking students) and both expected similar numbers of students in first grade during the 2014/2015 academic year. However, they differed on their early literacy curricula in two key ways: a) the level of emphasis on the vocabulary and comprehension skills in the years

prior to the first grade, and b) the sequence of introducing and reviewing letters in the first grade.

School-1

School-1 adopts a curriculum that focuses on building Arabic vocabulary and comprehension prior to the first grade through oral activities. However, by the end of kindergarten, the teacher starts introducing the letters in their isolated forms. When asked about the curriculum, the kindergarten Arabic teacher said “We teach vocabulary in Fus-Ha [MSA rather than colloquial]. It is hard because even Arabic speakers do not use this vocabulary [in MSA] . . . the mission is hard, to teach students the [correct] pronunciation . . . they start to speak after listening [to me] for a while.” When asked about the difference between Arabic and other languages, she said “Arabic is tough! That is why we do not teach letters [in the beginning] . . . I prepare them for the first grade by the conversation and the vocabulary. The students will get bored if they do not know the meaning of the words they will read later.” Finally, regarding phonological awareness she explained “They [the students] listen and differentiate sounds. Articulation points are very important . . . I also ask them to say words that start with a certain letter.”

In first grade, School-1 adopts an Arabic curriculum that introduces one letter per week. The order of the letters is as shown in Table 2.2 as well as the characteristics of some letters to explain the criteria used for ordering. In addition, the activity books include activities that require the students to circle each letter with its different forms within words and other activities where children have to fill blanks within words using the previously taught letters.

Table 2.2

The Letters Teaching Order and Criteria in School-1

Order	The Letter	Freq. %	Characteristics
1	م	6.52	In one of the first Arabic words: <i>mama</i> ماما means mother
2	ب	4.67	In one of the first Arabic words <i>baba</i> بابا means father
3	ل	12.07	Highly frequent because it is in the definite article ال means the
4	ر	4.2	only 2 forms, easy to pronounce
5	د	2.67	Only 2 forms, easy to pronounce
6	ن	6.61	---
7	ك	2.04	Frequent in first words such as كتاب means book and كلب means dog, quite different forms
8	ف	2.84	---
9	س	2.47	Easy to pronounce
10	ق	2.69	---
11	أ	2.89	---
12	ت	2.61	Easy to pronounce
13	ح	1.86	---
14	و	5.8	Could be long vowels or diphthong
15	ط	0.5	Easy to pronounce
16	ز	0.52	---
17	ج	1.23	---
18	ص	1.04	---
19	ش	0.73	frequent in first words like شجرة means tree, and شمس means sun
20	خ	0.79	Hard to pronounce
21	ع	4.01	Hard to pronounce, quite different forms
22	ض	0.44	--
23	ي	6.36	Could be long vowels or diphthong
24	ذ	0.96	--
25	ث	0.87	--
26	هـ	5.08	Quite confusing forms
27	غ	0.33	--
28	ظ	0.18	--

Note. The frequency percentages are driven from “A Study of Arabic Letter Frequency Analysis,” by M. Madi, 2010, retrieved from <http://www.intellaren.com/articles/en/a-study-of-arabic-letter-frequency-analysis>

School-2

School-2, on the other hand, adopts a curriculum that starts introducing letters prior to first grade. Letters are introduced in the alphabetic order with different forms of each letter, one letter per week in pre-kindergarten and again in kindergarten. The diacritics are added to words starting in kindergarten. Two words are taught with each letter in addition to songs, calendar, and numbers. When asked if they can learn more vocabulary, the Arabic teacher said “Our process is harder [than the process in Arabic-speaking countries] because we teach non-Arabic speakers and I cannot introduce words they do not understand.” About phonological awareness, she said “If the teacher is an Arab, the pronunciation will be right and we help students differentiate sounds. We also sing the alphabet song.” In first grade, School-2 adopts a curriculum that introduces simple sentences and grammar rules after reviewing the letters in their alphabetic order again in the beginning of the fall and with continuous revision of the letters in their alphabetic order throughout the year.

The purpose of the current study is to compare the efficiency of those two curricula sequences in teaching Arabic early literacy skills by comparing the performance of the first grade students in both schools. This study seeks answers to the following research questions:

- What is the effect of teaching beginning reading using each of the two sequences on students’ reading outcomes?
- What is the effect of teaching beginning reading using each of the two sequences on students’ level of confusability between visually and/or phonologically similar letters?

- What is the effect of exposure to oral Arabic instruction in pre-kindergarten and kindergarten on the listening comprehension and phonological awareness skills of first grade children?

I hypothesized that students in School-1 would start with lower phonological decoding skills and higher listening comprehension and phonological awareness skills than student in School-2 because of the emphasis on vocabulary building activities and the lack of emphasis on letters and decoding prior to the first grade. However, they might be expected to show more improvement in the phonological decoding skills by the end of the school year. I also hypothesized that students in School-1 would be less confused by similar letters than students in School-2 as they do not learn them in proximity.

Chapter 3: Method

This study compares students' progress in Arabic literacy in the first grade. First grade was chosen because it is a critical period for reading development in shallow orthographies (Aro, 2004). Two intact first grade classrooms in two different schools that implement different curricular approaches were compared. Measures included letter naming, syllable reading (individual letters with diacritics), word reading, rapid naming of unique letters, rapid naming of confusing letters, listening comprehension, first-sound isolation phonological awareness, and odd-word identification phonological awareness subtasks. These oral subtasks took approximately 15-20 minutes for each student. This study compared the already existing curricula in the two schools and did not control for confounding variables, making it an ex post facto/ correlational study.

PARTICIPANTS

Schools

The two schools chosen for this study are full-time accredited private schools in a southwestern state. Since they are private schools, the socioeconomic status of the students is high. However, both schools offer financial aid for up to 20% of the students. School-1 has a Montessori program for children 3 to 6, and an elementary program for grades 1 to 5. School-2, on the other hand, has four pre-school classes accepting children 18 months to 5 years old, elementary, middle, and high school. Both schools set a limit of 18-20 students per class.

In terms of the culture of the school, School-1 is more acculturated to the American culture, demonstrated by the smaller power distance between the principal on one side and

the teachers and administrative staff on the other side. The principal also had greater English fluency and more familiarity with research procedures than the principal at School-2.

Teachers

The first grade teacher at each school agreed to participate in the study and was assigned a pseudonym. Their role involved recruiting parents of the first grade students and facilitating the parental permission distribution and collection. They also consented to allowing classroom observations and they communicated with classroom teachers to schedule the assessment.

Both teachers are native Arabic-speakers who were born in an Arab country but neither taught in her home country. Noor (the first grade teacher in School-1) received an undergraduate degree in Media and Communication in her home country and worked for 7 years in her major. She has three years of experience teaching Arabic as a second language in the United States. Maryam (the first grade teacher in School-2) received an undergraduate degree in Modern Languages in her home country. She has 14 years of experience teaching Arabic as a second language in the United States and she is also enrolled in a bachelor of psychology degree program in the United States.

Students

All students whose parents permitted their participation and who assented to participate in the study were included. In School-1, 16 out of 16 students in the first grade class participated (11 girls, 5 boys; $M_{age} = 6y, 2m$; age range: 5y, 8m - 6y, 11m), 15 families chose to allow recording of their children's oral response in the assessments. All students in School-1 were assessed at pre- and post-test. In School-2, 13 out of 19 students in the first grade class participated (6 girls, 7 boys). However, two of the students who took the

pretest left the school and were not assessed at posttest. Thus, only 11 students from School-2 are included in the data analysis (4 girls; 7 boys; $M_{\text{age}} = 6\text{y}, 7\text{m}$; age range: 6y, 1m – 6y, 11m). Ten of them allowed audio recording during assessment. In addition, participating students differed in their native language. The majority of students, in both schools, spoke a language other than English or Arabic at home. Home languages included Urdu, Farsi, Spanish, Pashto, Indonesian, and African dialects. Table 3.1 shows a summary of the participating students’ demographics.

Table 3.1

The Participants’ Demographics

	School-1	School-2
<i>N</i>	16 (11 girls, 5 boys)	11(4 girls, 7 boys)
Mean Age *	6y, 2m	6y, 7m
Home Language		
English	7	2
Arabic	1	1
Other	8	8

Note. * Age is calculated on September 1st, 2014.

TIMELINES

School recruitment began in the fall of 2014 and the first assessment took place in September, immediately after obtaining the teachers’ consents and parents’ permission forms, while the second assessment took place in March of 2015. The investigator assessed students in both schools within one week of each other at pretest and at posttest to ensure

equal exposure to the instruction by all students. Students were assessed individually in a quiet room in each school and the assessment took about 15-20 minutes per student. In the period between the two assessments, the investigator observed each classroom twice, once in fall and again in spring. Classroom observations involved staying in the back of the classroom during the first grade Arabic period and observing classroom activities and instruction.

MEASURES

Participating students were assessed individually on eight oral subtests. Since about 90% of the participating students were non-Arabic speakers, the two Arabic phonological awareness subtasks were taken from the Chad and Mali EGRA assessment, two countries in which Arabic is taught as a second/foreign language, to better fit the participants' linguistic backgrounds.

The subtests were as follows:

- Letter naming subtest (Arabic EGRA-Egypt, 2008): this is a timed 1-minute test that requires the student to read from right to left from an array of 50 Arabic letters in the isolated forms. The administration includes three examples with corrective feedback to ensure the student understands the task. Correct letter names and self-corrections within 3 seconds are considered correct answers. The subtest is terminated if the student cannot name any of the first 10 letters correctly. Finally, the administrator calculates the number of correct letter names per minute (CLPM) by subtracting the number of errors from the total number of letters read in 1 minute.
- Syllable reading subtest (Arabic EGRA-Egypt, 2008): this is a timed 1-minute test that requires the student to read from right to left from an array of 50 Arabic letters in different forms with diacritics (i.e. vowelized letters). The administration

includes three examples with corrective feedback to ensure the student understands the task. Correct syllables and self-corrections within 3 seconds are considered correct items. The subtest is terminated if the student cannot read any of the first 10 syllables correctly. Finally, the administrator calculates the number of correct syllables read per minute (CSPM) by subtracting the number of errors from the total number of syllables read.

- Word reading subtest (Arabic EGRA-Yemen, 2011): this is a timed 1-minute test that requires the student to read from right to left from an array of 50 vowelized Arabic words. The administration includes three examples with corrective feedback to ensure the student understands the task. For a word to be correct, all the letters and the vowels have to be correct. Correct words and self-corrections within 3 seconds are considered correct answers. The subtest is terminated if the student cannot read any of the first 10 words correctly. Finally, the administrator calculates the number of correct words per minute (CWPM) by subtracting the number of errors from the total number of words read.
- First-sound-isolation phonological awareness subtest (Arabic EGRA-Mali, 2009): this untimed subtest requires the student to isolate the first sound in 10 spoken Arabic words after listening to each word twice. The administration includes three examples with corrective feedback to ensure the student understands the task. Each correct answer is worth one point for a total of ten. The administrator calculates the number of correctly isolated sounds (PA-1).
- Oddity task phonological awareness subtest (Arabic EGRA-Chad, 2013): this untimed subtest has 10 items; each item has three words which are spoken by the administrator. The student must identify the odd word out; the one that starts with a sound that is different from the other two. The administration includes three

examples with corrective feedback to ensure the student understands the task. The item is considered correct if the student provides the odd word or the initial syllable or sound of it. Each correct answer is worth one point for a total of ten. The administrator calculates the number of correctly identified odd words (PA-2).

- Unique letters rapid naming (RAN) subtest (Assad & Eviatar, 2014): This subtest consists of five Arabic unique letters (letters that do not have visual or phonological similarity with other letters) arranged randomly to form an array of 50 letters. Students are required to name all the letters as fast as they can. Before the test, the administrator practices the five letters with the student using flash cards to make sure the student knows the letters. If the student cannot identify at least 4 out of the 5 letters, the subtest is terminated. Otherwise, the administrator calculates the time required to name the whole list (t1) in seconds. In addition to the latency, the accuracy is calculated as the percentage of the correctly named letters (Acc1). This test was chosen to get a baseline for letter name retrieval in the case of zero confusability.
- Confusing letters rapid naming (RAN) subtest (Assad & Eviatar, 2014): this subtest is composed of five Arabic confusing letters (letters that have both visually and phonological-similar neighbors) arranged randomly to form an array of 50 letters. The students are required to name all the letters as fast as they can. Similar to the other RAN subtest, this subtest is terminated if the student cannot identify at least 4 out of the 5 letters prior to the subtest administration. Otherwise, the administrator calculates the time required to name the whole list (t2) in seconds. Additionally, the accuracy is calculated as the percentage of correctly named letters (Acc2). This test was chosen to get an index of confusability that is reflected in a delay in the retrieved letter names when compared to the unique RAN subtest. Cronbach's alpha

of both RAN subtests was .92 for the first grade participants in Assad and Eviatar's study (2014).

- Listening comprehension subtest: this subtest was created by the investigator. This untimed subtest has 10 items. Each item consists of three images with a letter underneath from which the student chooses one after listening to a simple Arabic sentence/phrase describing one of the pictures. The administrator repeats each sentence twice before prompting the student to choose one of the pictures. The answer is considered correct if the student clearly points to the correct picture or says the letter under the correct picture. Each correct answer is worth one point for a total of ten. The administrator calculates the number of correct items (LC).

Observation protocol: An observation form was constructed for this study to capture the teachers' instruction in each of the literacy components (phonological awareness, phonics, vocabulary, comprehension, writing, and speaking). These observations were expected to enrich the study by providing explanations of the findings.

PROCEDURES

Participating students were assessed individually in a quiet, yet familiar, room inside their schools during regular school hours. The assessment days were arranged with the classroom teachers to minimize the risk of interrupting important instruction. Before the pretest, a simplified assent form was read to each student; if the student agreed to participate, the investigator administered all the subtests in a 15-20 minute session. In addition, instructions were provided in English since the school language and the language in which most if not all of the students received at least their kindergarten instruction was English. Providing the instructions in Arabic or in students' home languages was not

possible since about 90% of the participating students are non-Arabic speakers and have different linguistic backgrounds.

The assessment sessions of 15 out of the 16 participants in School-1 and 10 out of the 11 participants in School-2 were audio recorded as their parents permitted. Three of the recordings from the first assessment were lost due to technical problems. However, the investigator found 100% agreement between the manual scoring using the administrator forms and auditory scoring using the audio recordings for students who had audio recordings. This high agreement increases the scores' reliability for students who do not have audio recordings.

The grading criteria for the PA oddity task were made flexible; the item was considered correct if the student provided the odd word or the initial syllable or sound. This change was made because most of the participants are non-Arabic speakers and it may be hard to phonologically record the three words and then repeat the whole odd word if the words are not in the students' vocabulary bank.

DATA ANALYSIS

The eight oral subtests used for the pre- and post- tests were divided into three categories, reading measures (letter naming, syllable reading, and word reading tasks), confusability measures (the two RAN tasks), and oral skills measures (the listening comprehension and two PA tasks). These three categories were used to answer the three research questions in order.

SPSS was used in data analysis and the significance level was set to .05. To answer the first and third research questions, descriptive statistics (means and standard deviations) by school and time were calculated for each of the reading measures and oral skills subtests. Then, individual independent-samples t-tests were conducted to examine the significance

of the differences between the two schools at pretest. Next, a 2x2 Split Plot ANOVA was conducted for each subtest to examine the time by school interaction effects. Finally, two independent-samples t-tests were needed to further examine the significance of improvement over time in each school on the PA-1 subtest.

To answer the second research question, means and standard deviations of the latencies t1 and t2 associated with each RAN task were calculated. Then, confusability indices were calculated by subtracting the time on the RAN-unique measure, t1, from the time on the RAN-confusing measure, t2 and dividing that by t1. Finally, percentages of accurately-named letters on both RANs, Acc1 and Acc2, were reported by school and time.

Finally, an error analysis was conducted for two of the subtests that needed more explanation, letter naming and first-sound isolation PA subtests. The error analysis results are reported at the end of the results chapter.

Regarding the classroom observations, all teachers' verbal and gesture instruction and interaction with the students as well as students' responses and their observed level of interest in the classroom activities were captured during the observation and recorded immediately. After translating the script into English, classroom activities were classified according to the literacy component they foster. Literacy components included speaking, letter knowledge, vocabulary, phonological awareness, comprehension, writing and phonics. Finally, in the results section, the two classrooms are contrasted by listing the strategies used in each classroom to foster each literacy skill.

Chapter 4: Results

This study aimed to answer three questions regarding the efficiency of two Arabic early literacy curricula in teaching basic reading skills to first grade students. The three categories of measures, reading outcomes, confusability, and oral skills were used to answer the following three research questions.

- What is the effect of teaching beginning reading using each of the two letter sequences on the students' reading outcomes?
- What is the effect of teaching beginning reading using each of the two letter sequences on students' level of confusability between visually and/or phonologically similar letters?
- What is the effect of exposure to oral Arabic instruction in pre-kindergarten and kindergarten on the listening comprehension and phonological awareness skills of first grade children?

Before reporting the assessment results and analyzing them, qualitative data describing each of the classrooms is presented. This qualitative data was collected during classroom observations in order to set the context for the interpretation of the results.

CLASSROOM DESCRIPTION

In School-1, Noor is more persistent in speaking in Arabic in the classroom and encouraging students to speak in Arabic even during side chats with friends. When she hears one of the students speaks in English, she pauses and says in Arabic "I am hearing English, who is speaking in English?" without directly addressing the student. In addition, vocabulary is taught using evidence-based practices such as drawing on the black board,

showing photos and real objects to watch and touch, and hearing them in the context of Arabic sentences and stories (Beck, McKeown,& Kucan, 2002; National Reading Panel, 2000; Stahl, 2005). For each newly introduced letter, the teacher asks for words that have the letter in the beginning, middle and end to foster phonological awareness. In addition, each letter is introduced with the three short vowels as well as without any vowels (i.e. the letter sound).

Moreover, Noor demonstrates more awareness of Arabic orthography as she emphasizes the letter characteristics by asking students questions during writing activities such as “is the letter *Seen* written above, on, or under the line?”, “Does *Seen* have more than one form for different positions?”, and “Does *Seen* connect to the next letter?”. Finally, Noor introduces a new story weekly that is written purposefully to include many words with the letter of the week. During story time, Noor fosters print awareness, activates the students’ background knowledge about the story topic, relates events to their lives, acts or draws new vocabulary, raises phonological awareness, and asks comprehension questions.

In School-2, Maryam starts her Arabic class with rote revision of previously memorized Arabic songs and vocabulary lists. Songs include body parts, senses, numbers, and days of the week while vocabulary lists are written on posters with a picture for each word. Each poster/list includes 12 related words for categories such as fruits, sea livings, jobs, school supplies, transportations, and insects. Maryam points to each picture in order and the children name each one. Some of the songs and some of the vocabulary lists have very rare Arabic words. Similarly, this routine includes saying the Arabic alphabet in order while Maryam points at displayed cards that have the letter and a picture of an object that starts with this letter. After saying the letters in order, she asks them to repeat the letters

but with the words this time, for example, *Alif arnab* (rabbit), *Baa' battah* (duck), and so on.

The classroom in School-2 was unique in having a calendar activity during which Maryam asks about the date, weather, and current season in Arabic. Also, a projector is used to display pages from the book for the whole class during reading and writing activities. During the reading activity, Maryam frequently gives hints for the first sound in the words but rarely gives hints for blending sounds. When a student confuses a letter for another visually-similar one, she corrects without emphasizing the orthographical differences. During writing activities, Maryam writes on the blackboards without providing instruction on how the letters are written or are connected to each other. During phonological awareness activities, Maryam asks students to give her words with a specific letter without specifying a position for the letter. Students called out words with the intended letter in different positions and the teacher accepted all of them without providing feedback about the letter position in each word that may make the task unclear and confusing for the students. Finally, the class usually ends with a computer activity where the students watch an Arabic educational video or interactive software on the projector.

RESEARCH QUESTION 1

Three timed reading measures were administered: letter naming, syllable reading and word reading. They were used to answer the first research question regarding the effect of teaching beginning reading using each of the two letter sequences. Hypotheses were that students in School-1 would score lower on these three measures at the beginning of the year since they do not receive instruction that develops phonological decoding skills prior to first grade but students in School-2 do. However, greater improvement was expected for

students in School-1 due to the nature of first grade instruction. Results of these measures are reported as the numbers of correct items per minute (i.e. CLPM, CSPM, and CWPM). Table 4.1 shows the means and standard deviations for the reading outcome measures by school and time.

Table 4.1

The Means and Standard Deviations of the Reading Outcome Measures

School	Pre		Post	
	M	SD	M	SD
CLPM				
1	23.06	15.1	34.13	12.63
2	22.82	15.57	32.72	18.52
CSPM				
1	9.38	9.98	26.19	14.47
2	11.82	10.51	25.45	18.93
CWPM				
1	2.5	4.5	7.69	6.38
2	2.45	2.8	7.09	6.12

Participants in School-1 started at a slightly higher but not significant level on the letter naming and word reading subtests while students in School-2 had a higher rate of

syllable reading at pretest. To test for statistical significance, three independent-samples *t*-tests were conducted to examine whether the two groups differed significantly on pretest scores on each of the three reading outcome measures. The results revealed non-significant differences between the two groups' performance at pretest CLPM, $t(21.205)=0.041$, $p = .968$; for CSPM, $t(20.881) = -0.606$, $p = .551$; and for CWPM, $t(24.843) = 0.032$, $p = .975$.

A 2x2 Split-Plot ANOVA was conducted for each reading outcome measure, with Time (pre, post) and School (School-1, School-2) as the within-subjects factor and between-subjects factor respectively. Results yielded statistically significant main effect for Time: For CLPM, $F(1,25) = 25.345$, $p < .001$; for CSPM, $F(1,25) = 54.018$, $p < .001$; and for CWPM, $F(1,25) = 37.358$, $p < .001$. Thus, students improved over time regardless of the school they attended. However, the main effect for school was not statistically significant for CLPM, $F(1,25) = 0.021$, $p = .885$; CSPM, $F(1,25) = 0.03$, $p = .864$; or CWPM, $F(1,25) = 0.029$, $p = .866$. Finally School X Time interaction was not statistically significant for CLPM, $F(1,25) = 0.077$, $p = .784$; CSPM, $F(1,25) = 0.588$, $p = .45$; or CWPM, $F(1,25) = 0.118$, $p = .735$. That is to say that there was no significant difference between the two groups either in students' performance or students' improvement on the reading outcome measures.

RESEARCH QUESTION 2

Confusability was measured with two RAN subtests, one with five Arabic letters that are visually unique (م ل و ي هـ) and one with five Arabic letters that have visually and phonologically similar sibling(s) (ك ضدت س ز). Latencies t_1 and t_2 were calculated for each student as well as the percentage of accurately-named letters, Acc1 and Acc2. All students were included except those who had at least one terminated RAN subtest at either time.

Therefore, analysis was conducted for 14 participants in School-1 and nine participants in School-2. Together, these two subtests were used to answer the second research question concerning the confusability level of letters. Thus, a confusability index (Con-I) was calculated by school and assessment time as the difference between both RANs latencies divided by the unique RAN latency, t_1 (See Equation 1).

$$\text{Con-I} = (t_2 - t_1) / t_1. \quad (1)$$

Since latency for unique letters (t_1) was expected to be lower than the latency for confusing letters (t_2), the confusability index was expected to be greater than 0 with higher values indicating a higher level of confusability. Table 4.2 shows the means and standard deviations of latencies and the confusability indices for both schools at pretest and posttest.

Although students' scores on level of confusability did not differ at pretest, the confusability index decreased at posttest for students at School-1 but did not for students at School-2. Results for students' accuracy naming letters were similar; Table 4.3 shows the accuracy percentages for each RAN task by school and time. Not only did students in School-1 start with higher accuracy rates, but they also made greater gains on accuracy on both RAN tasks over time. Furthermore, their accuracy scores on both RAN measures was closer to each other than those of students in School-2.

Table 4.2

The Means and Standard Deviations of Latencies in Seconds for the RAN Subtests and the Confusability Indices per School per Time

School	t1		t2		Con-I*
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Pre					
1	51	13.04	64.83	20.35	0.2711
2	55.46	24.93	71.45	24.52	0.2883
Post					
1	42.2	8.5	50.5	9.9	0.1967
2	40.4	11.45	51.3	17.38	0.27

*Con-I are calculated by inserting latency means in Equation 1.

Table 4.3

Accuracy Percentages for Unique and Confusing RAN subtests

School	Acc1%		Acc2%	
	Pre	Post	Pre	Post
1	93	98	91	95
2	89	91	85	87

RESEARCH QUESTION 3

Oral skills were measured with a listening comprehension subtest, a first-sound-isolation PA subtest, and an oddity task PA subtest. The hypothesis was that students in School-1 would score at a higher level on listening comprehension and phonological awareness on the first assessment because they received more instruction in these areas prior to the first grade. Furthermore, it was hypothesized that they would maintain this advantage on the second assessment. Table 4.4 provides the means and the standard deviations of the three subtests scores by school and time.

Table 4.4

The Means and Standard Deviations of the Listening Comprehension and the 2 PA subtasks

School	Pre		Post	
	M	SD	M	SD
	LC			
1	7.94	2.26	8.63	1.75
2	4.55	2.3	5.91	1.97
	PA-1			
1	5.25	4.58	7.88	2.09
2	7.27	2.57	7.55	2.58
	PA-2			
1	6.38	2.0	7.75	2.11
2	5.09	2.81	6.91	1.92

To test for statistical significance, three independent-samples t-tests were conducted to examine whether the two groups' performance differed significantly at pretest. The results revealed a significant difference between the two groups' performance only on the LC subtest, $t(21.452) = 3.793, p = .001$. However, the differences between the groups on PA-1, $t(24.258) = -1.462, p = .157$ and PA-2, $t(16.797) = 1.306, p = .209$ were not statistically significant.

A 2x2 Split-Plot ANOVA was conducted on each of the oral skills measures, with Time (pre, post) and School (School-1, School-2) as the within-subjects factor and between-subjects factor respectively. Results yielded a statistically significant main effect for Time in the LC and PA-2 subtests but not in the PA-1 subtest: for LC, $F(1,25) = 15.588, p = .001$; for PA-1, $F(1,25) = 3.956, p = .058$; and for PA-2, $F(1,25) = 14.918, p = .001$. Thus, students' improvement over time was statistically significant on LC and PA-2 subtests. On the other hand, the main effect for School was statistically significant for the LC subtest: for LC, $F(1,25) = 15.805, p = .00$ but not for PA-1, $F(1,25) = 0.686, p = .415$; or PA-2, $F(1,25) = 1.969, p = .173$. That is to say that the students in School-1, performed better than those in School-2 on the LC subtest. Finally School X Time interaction was not statistically significant for any of the subtests: LC, $F(1,25) = 1.694, p = .205$; PA-1, $F(1,25) = 2.607, p = .119$; or PA-2, $F(1,25) = 0.287, p = .597$.

To further examine students' progress on PA-1 subtest, two individual independent-samples t-tests were conducted to examine whether students in either school improved significantly over time. The results yielded a significant difference between PA-1 pretest and posttest scores in School-1 only. For School-1, $t(15) = -2.514, p = .023$, but for School-2, $t(10) = -0.312, p = .76$.

ERROR ANALYSIS

Letter naming

Since students at both schools had similar outcomes on CLPM, it is useful to examine the speed and the accuracy as well as the percentage of visually-similar letters that were incorrect. Three terms were created, *Speed*, *Errors*, and *Visual*. Speed is defined as the number of letters read per minute; Errors is the percentage of all incorrect letters; and Visual is the percentage of incorrect visually-confusing letters. Table 4.5 shows the values for the three variables by school and assessment time.

Table 4.5

Speed, Errors Percentage, and Visually-Similar Error Percentage by School and Time

School	Pre			Post		
	Speed	Errors %	Visual %	Speed	Errors %	Visual %
1	28.75	19	5	39.56	14	5
2	31.09	28	7	42.55	23	8

PA-1 subtest

Since the PA-1 subtest requires isolating the initial sound of a spoken word, errors were divided into three categories, *Wrong*, *Name*, and *Syllable*. The Wrong category involves providing a wrong letter sound that usually has a similar sound, while the Name and Syllable categories involve saying the first letter name and syllable respectively rather than the first letter sound. Table 4.6 shows the percentage of each error category by school and time.

Table 4.6

Percentage of Each Error Category in PA-I Subtest by School and Time

School	Pre			Post		
	Wrong	Name	Syllable	Wrong	Name	Syllable
1	21	54	25	18	6	76
2	7	13	80	15	4	81

Chapter 5: Discussion

Children in Arabic-speaking countries perform below the international average on comprehension assessments and perform below the expected level on foundational reading skills. These results are explained by the challenging features of Arabic script and the diglossia phenomena as well as limited research on early literacy to guide instruction (Boyle et al., 2014; Levin et al., 2008). Since letter knowledge and vocabulary are considered the most important early literacy skills (Aram et al., 2013), it is important to examine how they are taught in the early literacy Arabic context. Boyle et al. (2014) reported a lack of systematic instruction in letter knowledge in the examined Arab countries. In addition, letters were introduced either in the alphabetic sequence or in groups based on ease and frequency. However, there was a lack of consistency in how easiness and frequency of letters were defined, a lack of comprehensive grouping criteria, and improper implications of the listed criteria to the Arabic script context. On the other hand, diglossia challenges students entering first grade who have not had prior exposure to MSA vocabulary. Kindergarten teachers often do not provide MSA instruction because they believe that young children cannot learn MSA (Abu-Rabia, 2000; Boyle et al., 2014; Saiegh-Haddad, 2003, 2004).

The Arabic script has features that are believed to increase letter confusability risk for children (Elbeheri & Everatt, 2007). Thus, children's difficulty in learning visually-similar Arabic letters has been documented in some studies (Levin et al., 2008; Abu-Rabia & Taha, 2004, 2006). However, no suggestions were proposed to mitigate this issue.

Introducing letters in a purposeful order that decreases confusability is used as criterion for letter introduction in other languages (Honig et al., 2012). Thus, the need to discuss the implications of these criteria in the Arabic context and examine the efficiency of different sequences in teaching Arabic letters is urgent. Finally, it is also important to examine how the early literacy Arabic curricula and oral activities as well as the Arabic teachers' beliefs influence students' oral skills.

This study compares the efficiency of two Arabic early literacy curricula used in two private schools teaching Arabic as a second language in a Southwestern state. School-1 introduces the letters in first grade in an innovative order while School-2 introduces letters earlier in pre-kindergarten and kindergarten in their alphabetic order. Moreover, School-1 puts more emphasis on the vocabulary and comprehension skills in the years prior to first grade through a variety of oral activities. Twenty-seven 1st graders participated in this study and were assessed in September and again in March in an effort to get insight into the impact of both curricula on the decoding skills, the similar-letters-confusability level, and the oral skills. The assessment results are discussed in the context of the teachers' beliefs and awareness, the observed classrooms' instruction, the students' demographics, and the chosen Arabic curricula in each school.

DECODING SKILLS

Students in School-1 started at almost equal level with students in School-2 in both letter naming and word reading. That was not expected as their first formal exposure to letters began at the end of kindergarten while students in School-2 received explicit instruction that focused on letters throughout their kindergarten year. On the other hand,

students at School-1's read fewer syllables than School-2 students at pretest. That was expected since students at School-2 were exposed to the vowelized letters in their different forms prior to first grade while students at School-1's were briefly introduced to the isolated unvowelized forms of the letters at the end of their kindergarten year. Although students in School-1 scored lower than students on School-2 on the syllable reading pretest, their word reading mean rate was almost the same as School-2's students. This is unexpected too as syllable reading involved reading letters in their connected forms along with short vowels which are considered the building blocks for Arabic words. This unexpected performance by students in School-1 on the word reading subtest may be attributed to their familiarity with the words.

In addition, students in School-1 made greater gains on all three decoding subtests and ended at a higher level than students in School-2 however, the School X Time interaction effect in ANOVA tests was not statistically significant for any of these subtests, perhaps, because of the small sample size. This higher improvement by students in School-1 on decoding skills, even if not statistically significant, may reflect the efficiency of their curriculum. Although letters are introduced later, they are introduced in a purposeful order that takes into consideration the easiness and the frequency of the letters and, most importantly, breaks the dyads and triads of visually and phonologically-similar letters. That is reflected also in the error analysis of the letter naming subtask where School-1's students were more accurate and had a lower percentage of errors for visual confusability than School-2's students in both assessment times. Beside the statistically significant improvement of all students over time, students' scores did not differ significantly on any of the phonological decoding skills. Thus, School-1 emphasizes meaning-related skills in years prior to the first grade without compromising the students' performance on code-related skills in first grade.

SIMILAR LETTERS CONFUSABILITY

As expected, students regardless of the school or the assessment time found the confusing letters harder to name than the unique letters. That is reflected in Con-I values that always exceed 0 and in the mean accuracy percentages that are always higher for naming unique letters. To answer the research question regarding the difference of confusability levels between the two schools, the Con-Is were compared as well as qualitative data from the RANs accuracies and the error analysis of the letter naming subtest. First, both groups started at almost the same level of confusability (0.27 and 0.28 in School-1 and School-2 respectively). Confusability of School-1's students is understandable given the short exposure to letters at the beginning of first grade while confusability of School-2's students can be explained by the persistence in repeating letters in order in a daily routine. At posttest, School-1's students had lower confusability index (0.19) while School-2's students maintained almost the same level of confusability (0.27). The decrease in the Con-I of School-1's students can be explained by the innovative order of letter teaching since they do not learn confusing letters in proximity.

In addition to the Con-I calculated using the RAN latencies, the RAN accuracy results were similar; School-1's students were more accurate at pretest and increased their accuracy rate on both RAN tasks. Most importantly, the accuracy percentages on both RAN tasks were closer to each other in School-1 which indicates less confusability since they could name unique and confusing letters with equal ease. Finally, the error analysis of the letter naming task revealed higher confusability of visually-similar letters in School-2; School-1's students confused 5% of the read letters with visually-similar siblings on both pretest and posttest while School-2's students confused 7% and 8% in the pretest and posttest respectively.

Interestingly, the two groups' demographic information reveals that School-1's participants were younger and dominated by females (11 girls, 5 boys; $M_{age} = 6y, 2m$) while School-2's participants were dominated by males (4 girls; 7 boys; $M_{age} = 6y, 7m$). This characteristic usually favors School-2 on the phonological decoding skills and confusability issue as Mohamed et al. (2011) noticed that males scored higher in both visuo-spatial ability and Arabic literacy skills during the first grade.

COMPREHENSION

Both Time and School main effects were statistically significant on the listening comprehension subtest which means that students in both schools improved significantly across time and that students in School-1 scored significantly higher than students in School-2 regardless of the assessment time. However, the School X Time interaction was not statistically significant, perhaps because of the ceiling effect for School-1's students that decreased the test's ability to capture students' improvement on comprehension skills; the mean score for School-1's students was 7.94 out of 10 at pretest with 69% of the participants scoring 8 or higher while School-2's students had a mean of 4.55 at pretest with only 10% of the participants scoring 8 or higher.

The superiority of School-1 on the comprehension subtask was expected as students in School-1 spent most of their pre-kindergarten and kindergarten Arabic periods on activities meant to develop their oral MSA skills and build comprehension and vocabulary. Also, vocabulary words are usually introduced in context such as stories and conversations and are explained using drawings and/or acting. Moreover, Noor was more persistent in speaking in Arabic during her class. On the other hand, Maryam introduced the majority of the vocabulary words during the daily alphabet recitation (i.e. a word for each letter) and

in lists (out of context) that children memorized and repeated in order at the beginning of each class. In addition, the story time in School-1 was more engaging, age-appropriate, and tailored than the educational software used in School-2.

Noor's vocabulary and comprehension instruction was more scientific-based; it was found that encountering vocabulary in rich context rather than isolated vocabulary lists provides deeper understanding (National Reading Panel, 2000) and that students need to see the same word more than once to record it in their long-term memory and that does not mean mere repetition of the word but seeing it in different contexts (Stahl, 2005). Moreover, Beck et al. (2002) found that when words are contextualized in stories, students gain deep and rich knowledge of the words and they recommended student-friendly explanation and teacher-created context in addition to the text-based context.

Moreover, one of the instructional strategies for English language learners is to teach basic words that English-only peers already know (August, Carlo, Dressler, & Snow, 2005). Similarly, Arabic language learners need to focus first on basic words that their Arabic-speaking peers know. Unfortunately, students in School-2 was exposed to some rare vocabulary in the songs and the vocabulary lists instead of focusing on the common, age-appropriate conversational vocabulary. Finally, it was noticed that when vocabulary instruction does not result in gains in comprehension, as the case in School-2's vocabulary instruction, it is usually because of the lack of depth in word knowledge (Nagy, 1988).

Interestingly, the Arabic teachers' experience in teaching Arabic as a foreign language favors School-2; Noor has only three years of experience while Maryam has 14 years of experience. This can be explained by the principals' perceptions explored in the pilot study. School-2's principal was not satisfied by the students' long-term performance in Arabic but has never questioned the curricula, instruction, or teacher's performance in the classroom. When asked whether he is satisfied with the student's performance, he

answered “There is a goal to read, write and speak by the fifth grade. Kids do not talk [Arabic] fluently here by the fifth grade. Last year we started changing at the kindergarten and 1st grade levels and we will then continue. . . . We decided to follow the same Arabic standards as for native speakers. We [also] increased the number of hours [allocated for Arabic] to four hours weekly”. Moreover, when he was asked about the ways used to evaluate the Arabic curricula, he emphasized “The curricula are good but we increased the standards and increased the time [allocated for Arabic]”. On the other hand, School-1’s principal seemed to pay more attention to teachers’ professional development. When she was asked about her satisfaction with the program and the way she evaluate the curricula, she answered “We are very satisfied with the [Arabic] program right now. We are always making, hmmm, the [Arabic] teachers are getting training, [and] sometimes online training . . . We have teachers that make teaching fun and engaging so that they really develop the students’ language. A lot of the techniques came from training our staff. We [also] did training for other teachers in other schools. They might use the same [Arabic] curriculum but I have noticed that there is a difference in the way the teachers teach it” (Zayan, 2014).

PHONOLOGICAL AWARENESS

For the PA-1 subtask, only School-1’s students achieved significant gain over time. This task requires phonemic awareness which is believed to develop better when taught using letters (National Reading Panel, 2000). This may explain the significant gain students in School-1 made after the systematic exposure to letters in the first grade. Or perhaps phonological awareness is a result rather than a pre-requisite or a predictor for reading in shallow orthographies (Aro, 2004). The error analysis of this subtest yielded an interesting pattern of two error types: Name and Syllable. This pattern shows that students, before

formal exposure to the written language, tend to name the first letter instead of sounding it (i.e. in School-1's pretest). However, after exposure, isolating the first syllable dominates the errors (i.e. in School-2's pretest, and both schools' posttest). The syllabic nature of Arabic and/or the lack of emphasis on letter sounds in Arabic reading instruction might explain this (Boyle et al., 2014).

Although Noor introduces the vowelless form (i.e. the letter's sound) of the weekly letter in addition to the voweled forms, sounds were not used in PA instruction. Both teachers ask for words that start with or have the target letter (i.e. they name the letter and asks for words that have this letter). Given that Arabic letters are acrophonic, this can be seen as asking for words that start with the same sound as the letter name. In addition, sounds were not used in reading activities as students are trained to blend syllables rather than sounds during reading.

However, students' performance on the PA-1 subtest was quiet high at the posttest; School-1's students scored 7.88 mean correct isolated sounds and School-2's students scored 7.55 mean correct isolated sounds. This can be explained by the transferability of PA skills across languages. This study's participants receive formal instruction in English and training students to isolate the first sound is a common practice in teaching English PA. Also, the subtest administration started with three examples with corrective feedback, which may have helped students in transferring these PA skills to Arabic. However, this ability to transfer this PA skill was seen only after formal exposure to the Arabic written script. Another explanation may be the acrophonic nature of the Arabic alphabet. Thus, students are expected to learn to isolate the first sound without direct training if they already know how to name the first letter and have been exposed to the Arabic written script.

For the PA-2 subtest, students experienced significant gains over time, regardless of the type of instruction they received. However, School-1's students started and ended at higher levels that were not significant, perhaps, because of the small sample size.

The oddity task requires children to listen to three words and identify the one that begins with a different sound. Thus, School-1's students might have an advantage as they were more familiar with Arabic words and may have been able to phonologically store the words in their short-term memory to compare them. Another possibility is that School-1's students are better able to differentiate letter sounds because they have experienced more exposure to oral conversation in Arabic.

To summarize, students in School-1 performed significantly higher on the listening comprehension subtest without compromising the development of their code-related skills. In addition, results of this study suggest that they experienced a lower level of confusability of phonologically and visually-similar letters. Students in School-1 also showed statistically significant improvement in the PA-1 subtest and a higher, but not statistically significant, performance in PA-2 subtask.

In general, the participants in this study, regardless of the quality and type of instruction, outperformed their counterparts in public schools in the Arab countries who participated in EGRA international assessment (Egypt, Iraq, Jordan, and Yemen). While second graders in Yemen had a CLPM of 16.78, this study's first grade participants had a mean score of 33, and 43 CLPM at pretest and posttest respectively. Similarly, Arab students had a pseudo-word decoding rate that ranged from 2.63 CWPM for second grade Yemenites to 7 CWPM for third grade Jordanian students while this sample's mean for word reading was 7.39 CWPM at posttest (i.e. at the end of the first grade). This discrepancy suggests that the low performance of Arab students in public schools cannot be explained by the Arabic script itself or its unique orthography. Low SES and the

depressed learning environment are important factors in students' ability to learn alongside the quality of the instruction and teachers' preparation programs.

IMPLICATIONS

Teachers

Arabic teachers, even prior to school grades, should be encouraged to interact with students in MSA and create meaningful contexts for newly-introduced vocabulary. This evidence-based practices resulted in significantly higher listening comprehension level in this study's sample despite the small sample size, short time allocated for Arabic, and the diverse linguistic backgrounds of the participants. Having a daily story time with before, during, and after activities engaged the students and increased their understanding of the target vocabulary and Arabic syntax. In addition, teachers' perception of the Arabic alphabetic order should change and be more flexible in trying new teaching sequences based on criteria that decrease confusability and increase letter naming, reading, and spelling accuracy. Finally, all teachers' professional development programs should emphasize the Arabic script and orthography strengths and weaknesses and reveal the negative effect of diglossia on students' reading performance in Arabic.

Schools' principals

Principal interviews conducted by Zayan (2014) showed that principals' perceptions have a great impact on the choice and evaluation of the Arabic curricula and the extent of teachers' professional development. First, principals should dare to question the efficiency of the Arabic curricula, the instruction, and the Arabic teachers' skills and strategies repertoire. Second, increasing the allocated time and heightening the standards per se will not help if the teachers do not practice research-based instruction and know how

to use the allocated time efficiently to meet the standards. Finally, principals should be open to apply strategies proven to be effective in teaching other languages as long as they understand the proper implications in the Arabic context given its unique features.

Future research

The interesting pattern of errors in the first-sound isolation PA task raised many questions about the role and weight of PA in reading Arabic words. Future research should examine whether PA is a pre-requisite for Arabic reading or a result of exposure to literacy. In addition, it will be interesting to know which level of PA is more relevant, the phonemic or syllabic level, given the syllabic nature of the Arabic script. Finally, if phonemic awareness is crucial, when and how should it be fostered?

Although most of the evidence in answering the second research question was qualitative, the evidence favors School-1's innovative order of introducing letters rather than the traditional alphabetic order. However, further examination of this topic with larger sample sizes and more controlled experiments are required to reach a reliable conclusion. Suggested topics to better understand the confusability issue could be examining gender differences in confusability level, comparing mainstream students with students having a reading learning disability or attention deficits disorder (ADD), and comparing different strategies to overcome confusability such as reordering the letters versus using mnemonics.

Moreover, future researchers should examine the efficiency of other recommended practices in introducing letters such as allocating unequal time for letters depending on their difficulty. It will also be useful to establish benchmarks for Arabic fundamental reading skills in the early grades to monitor the students' progress and to evaluate teaching programs. Finally, creating word lists for each grade/age level will prevent teaching rare words to young students. These lists will also guide those who are interested in writing

leveled children's books in Arabic, which are sorely needed, as Boyle et al. (2014) stated and Zayan (2014) has also noted.

LIMITATIONS

This present exploratory study examines a new topic. Further research is required to reach a reliable conclusion on the efficiency of different letter introduction sequences. Hence, its many limitations include small sample size, unique participants' characteristics, and non-experimental design. First, the sample size of 27 students was small and limited the ability to generalize the results for a larger population. It also limited the ability to obtain a statistically significant difference between the two groups except for the comprehension subtest that had a large group difference.

Second, participants were first graders in two private schools teaching Arabic as a second language and the majority of the students speak a language other than Arabic or English at home. This potentially limits the generalization of the results to native Arabic-speaking children in Arab countries. However, knowing that Arabic is a highly diglossic language and that Arab children are rarely exposed to MSA before the first grade, may mitigate this limitation; Arab first graders can be seen as learning MSA as a second language alongside the local colloquial (Levin et al., 2008). Hence, exposure to MSA oral activities prior to the first grade is applicable and would benefit them in a similar way. Another unique characteristic of this study's participants is that they get systematic instruction in English as the school's official language and it is possible that some literacy skills had transferred from English to Arabic.

Finally, this study examined the already existing Arabic curricula and did not control for any confounding variables. So, it has all the limitations of non-experimental

studies. However, the pilot study that took place before this study and involved interviewing Arabic teachers and principals (Zayan, 2014) as well as the classroom observations conducted between pre and post assessments provided complementary information that facilitated the interpretation of the results.

FINAL THOUGHTS AND RECOMMENDATIONS

First, it was shown in this study that cultural barriers, even in the United States' diverse context, can hinder the use of the research-based practices that showed efficacy in other languages. Given the limited research body in Arabic early literacy and the gap in the reading performance of students, it is important to develop strategies to transfer research-based practices to the Arabic teaching programs. These strategies should involve introducing evidence-based practices to teachers in relevant contextual means, rather than mere translation, to overcome the cultural barriers. Second, the understanding of the special features of the Arabic script and orthography was crucial in deciding the implications in the Arabic context. This understanding should be present in all efforts aiming to improve the teachers' preparation programs. Finally, emphasizing the advantageous features of the Arabic language, such as having acrophonic letters and enjoying a shallow orthography, and building on these strengths are two important factors to set higher expectations for children learning Arabic and to balance the often discussed challenging features.

References

- Abd El-Minem, I. M. (1987). *Morphology*. Jerusalem: Al-Taufik. [In Arabic].
- Abu-Rabia, S. (1997). Reading in Arabic orthography: The effect of vowels and context on reading accuracy of poor and skilled Arabic readers. *Reading and Writing: An Interdisciplinary Journal*, 9(1), 65-78.
- Abu-Rabia, S. (2000). Effects of exposure to literary Arabic on reading comprehension in a diglossic situation. *Reading and writing: An interdisciplinary Journal*, 13, 147-157.
- Abu-Rabia, S., & Taha, H. (2004). Reading and spelling error analysis of native Arabic dyslexic readers. *Reading and Writing: An interdisciplinary Journal*, 17(7-8), 651-689.
- Abu-Rabia, S., & Taha, H. (2006). Phonological errors predominate in Arabic spelling across grades 1–9. *Journal of Psycholinguistic Research*, 35(2), 167-188.
- Adams, M. J. 1990. *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.
- Al-Khateeb, A. (1994). *Al-mu'jamul Arabi bayn al-mady w al-hader* [The Arabic lexicon between the past and the present]. Beirut: Librairie du Liban Publishers.
- Arabic EGRA project in Chad (2013). Retrieved from <https://www.eddataglobal.org/documents/index.cfm?fuseaction=pubDetail&ID=440>
- Arabic EGRA project in Egypt (2008). Retrieved from <https://www.eddataglobal.org/documents/index.cfm?fuseaction=pubDetail&ID=147>
- Arabic EGRA project in Mali (2009). Retrieved from <https://www.eddataglobal.org/documents/index.cfm?fuseaction=pubDetail&ID=313>
- Arabic EGRA project in Yemen (2011). Retrieved from <https://www.eddataglobal.org/countries/index.cfm?fuseaction=pubDetail&ID=427>
- Aro, M. (2004). *Learning to read: The effect of orthography*. Jyväskylä yliopisto.
- Asaad, H. & Eviatar, Z. (2014). Learning to read in Arabic: the long and winding road. *Read Writ*, 27, 649–664. doi: 10.1007/s11145-013-9469-9
- August, D., Carlo, M., Dressler, C., and Snow, C. (2005). The critical role of vocabulary development for English language learners. *Learning Disabilities: Research and Practice*, 20(1), 50-57.

- Beck, I. L., McKeown, M. G. & Kucan, L. (2002). *Bringing words to life: Robust vocabulary instruction*. New York: Guilford.
- Bingham, G. E., & Patton-Terry, N. (2013). Early Language and Literacy Achievement of Early Reading First Students in Kindergarten and 1st Grade in the United States. *Journal of Research in Childhood Education*, 27(4), 440-453.
- Boyle, H., Al Ajjawi, S., & Xiang, Y. (2014). Topical analysis of early grade reading instruction. *Learning Systems Institute, Florida State University for RTI International*. Retrieved from <http://www.giz.de/expertise/downloads/usaid2014-en-topical-analysis-early-grade-reading-instruction.pdf>
- Clearinghouse, W. W. (2008). WWC procedures and standards handbook. Washington, DC: Retrieved January, 1, 2009.
- Dickinson, D. K., & Newman, S. B. (Eds.). (2007). *Handbook of early literacy research* (Vol. 2). Guilford Press.
- Elbeheri, G., & Everatt, J. (2007). Literacy ability and phonological processing skills amongst dyslexic and non-dyslexic speakers of Arabic. *Reading and writing*, 20(3), 273-294.
- Ferguson, C. A. (1959). Diglossia. *Word*, 14, 47-56.
- Fuchs, L. S., Fuchs, D., & Compton, D. L. (2010). Rethinking response to intervention at middle and high school. *School Psychology Review*, 39(1), 22-28.
- Hall, S. L. & Moats, L. C. (1999). *Straight talk about reading: how parents can make a difference during the early years*. Lincolnwood, IL: NTC/Contemporary Publishing Group.
- Honig, B., Diamond, L. & Gutlohn, L. (2012). *Teaching reading sourcebook*. Arena Press.
- Levin, I., Saiegh-Haddad, E., Hende, N., & Ziv, M. (2008). Early literacy in Arabic: An intervention study among Israeli Palestinian kindergartners. *Applied Psycholinguistics*, 29(03), 413-436.
- Lewis, M. P., Simons, G.F. & Fennig, C. D. (Eds.). (2013). *Ethnologue: Languages of the world* (17th ed.). Dallas, Texas: SIL International. Online version: <http://www.ethnologue.com>
- Madi, M. (2010). A study of Arabic letter frequency analysis. Retrieved from <http://www.intellaren.com/articles/en/a-study-of-arabic-letter-frequency-analysis>
- Marsh, R. (2005). Evidence-based practice for Education? *Educational Psychology*, 25(6), 701-704. doi: 10.1080/01443410500344738
- Mohamed, W., Elbert, T., & Landerl, K. (2011). The development of reading and spelling abilities in the first 3 years of learning Arabic. *Reading and Writing*, 24(9), 1043-1060.

- Nagy, W. E. 1988. *Teaching vocabulary to improve reading comprehension*. Newark, DE: International Reading Association.
- National Reading Panel (2000). *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction*. Washington, DC: National Institute of Child Health and Human Development.
- Paris, S. G. (2005). Reinterpreting the development of reading skills. *Reading Research Quarterly*, 40(2), 184-202
- Saiegh-Haddad, E. (2003). Linguistic distance and initial reading acquisition: The case of Arabic diglossia. *Applied Psychometrics*, 24, 431-451.
- Saiegh-Haddad, E. (2004). The impact of phonemic and lexical distance on the phonological analysis of words and pseudowords in a diglossic context. *Applied psycholinguistic*, 25, 495-512.
- Saiegh-Haddad, E. (2005). Correlates of reading fluency in Arabic: Diglossic and orthographic factors. *Reading and Writing*, 18(6), 559-582.
- Saiegh-Haddad, E., & Geva, E. (2008). Morphological awareness, phonological awareness, and reading in English–Arabic bilingual children. *Reading and Writing*, 21(5), 481-504.
- Sayed, F. H. (2006). *Transforming education in Egypt: Western influence and domestic policy reform*. American Univ in Cairo Press.
- Scardamalia, M., Bransford, J., Kozma, B., and Quellmalz, E. (2010). New assessment and environment for knowledge building. Will be edited and published on <http://atc21s.org/>
- Share, D. L. (2004). Knowing letter names and learning letter sounds: A causal connection. *Journal of Experimental Child Psychology* 88, 213-233.
- Stahl, S. A. (2005). Four problems with teaching word meanings (and what to do to make vocabulary an integral part of instruction). In E. H. Hiebert and M. L. Kamil (eds.), *Teaching and learning vocabulary: Bringing research to practice*. Mahwah, NJ: Erlbaum.
- Taouka, M., & Coltheart, M. (2004). The cognitive processes involved in learning to read in Arabic. *Reading and Writing: An interdisciplinary Journal*, 17 (1-2), 27-57.
- Treiman, R., Kessler, B., & Pollo, T. C. (2006). Learning about the letter name subset of the vocabulary: Evidence from US and Brazilian preschoolers. *Applied Psycholinguistics*, 27(02), 211-227
- Treiman, R., Levin, I., & Kessler, B. (2006). Learning of letter names follows similar principles across languages: Evidence from Hebrew. *Journal of Experimental Child Psychology*, 96(2), 87-106.

- Treiman, R. Tincoff, R., Rodriguez, K., Mouzaki, A. & Francis, D.J. (1998). The foundations of literacy: Learning the sounds of letters. *Child Development*, 69(6), 1524-1540.
- Zayan, S. (2014). Investigation of Arabic early literacy curricula and teachers' perception. Unpublished manuscript, Department of Special Education, University of Texas at Austin, Texas, United States.

Vita

Shaimaa Zayan was born in Cairo, Egypt. She received her Bachelors of Science in Electronics and Communication Engineering Department, Cairo University in May 2005. She worked as a research assistant and lab instructor in her department after graduation and before traveling to the United States in 2007. She had several informal experiences in the United States in teaching Arabic to non-Arabic speakers, counseling, and volunteering in organizations with cultural and linguistic diversity. Thus, she decided to change her major and join University of Texas at Austin to pursue a Masters of Art in the Mild/Moderate Disabilities and Diversity (MDD) area in 2013. Beside the Arabic literacy, Shaimaa is interested in challenges that face culturally and linguistic diverse students and families in both general and special education. She has a particular interest in the Middle Eastern and North African (MENA) population. Finally, she believes in changes that start in the minds and when a friend asks her “You are smart, why did you change your major to Education?” she replies “To change this mindset, we definitely need smarter educators”.

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This thesis was typed by the author.