Learning Disabilities: A Contemporary Journal 21(2), 177-193, 2023

Do Reading Teachers Have Sufficient Phonological and Morphological Knowledge of Arabic?

Rashed Binfehaid Alqahtani*
Prince Sattam Bin Abdul-Aziz University

Alan G. Kamhi
The University of North Carolina at Greensboro

This study examined knowledge of the Arabic language in special and general education teachers, using a knowledge survey, Knowledge of Arabic Morphology and Phonology (KAMP). The KAMP was administered to 180 teachers teaching students with reading disabilities to examine their knowledge and determine whether it was influenced by differences in their specialization, teaching years, and highest educational level. The findings indicated that special and general education teachers have poor phonological and morphological knowledge. Also, there were no significant mean differences between teachers on their knowledge attributed to the differences in their specialization, teaching experiences, or highest education. The study concluded by discussing the findings and suggestions for researchers and policymakers.

Keywords: **teacher knowledge, phonology knowledge, morphology knowledge, language knowledge, survey research**

Introduction

Reading is a language-based activity; thus, acquiring sufficient language knowledge is central to becoming a proficient reader. Phonological, morphological, and orthographic knowledge are vital for fluent decoding (Sanchez et al., 2012; Spencer et al., 2015), whereas vocabulary and syntactic knowledge are important for sentence and text-level comprehension (Brimo et al., 2017; Martino & Hoffman, 2002). The linguistic features of a language influence the reading acquisition process experienced by young readers. Some languages are described as having orthography shallower than others, which means a one-to-one correspondence between its grapheme and phoneme systems, allowing for a smoother experience in acquiring decoding skills (Share & Daniels, 2016). However, although a shallow orthography characterizes Arabic, it might be difficult to acquire due to diglossia (Saiegh-Haddad, 2012), and its complex morphological system (Frost et al., 2005). Therefore, teachers, responsible for designing and delivering reading instruction, should be aware of these basic linguistic elements.

Numerous studies (e.g., Lane et al., 2008; Piasta et al., 2009; Podhajski et al., 2009) have shown the importance of providing students with explicit reading instruction. To provide this instruction, reading teachers should have sufficient knowledge of the various aspects of language (e.g., Cunningham et al., 2004; McCutchen et al., 2002; Moats, 1994). Numerous studies have shown that teacher knowledge strongly predicts student reading performance (e.g., McCombes-Tolis & Feinn, 2008) and that improving reading teachers' language knowledge often leads to significant

*Please send correspondence to: Rashed Binfehaid Alqahtani, Department of Special Education, Prince Sattam Bin Abdul-Aziz University, King Abdullah Rd., PSAU, Office # 20M3, Al Kharj 16278, Saudi Arabia, Email: rf.alqahtani@psau.edu.sa.

reading gains in students' reading performance (Piasta et al., 2009). The next section briefly summarizes some of Arabic's phonological, morphological, and orthographic characteristics.

The Arabic Language

Arabic is one of the most spoken languages worldwide, and its speakers are spread across two continents within more than 20 countries (Beeston, 1970). Arabic has a complex writing system that includes consonants and diacritic marks to indicate vowel sounds, which can change words' meaning and function. In addition, many letters have contextual variations in their shapes, depending on their position in a word or proximity to other letters. Arabic also has two forms: a formal form (Modern Standard Arabic, MSA) that is literary and used in public broadcasting and publishing, and a colloquial spoken form that varies geographically. Arabic letters often have different graphemic representations according to word position. For example, the letter "ب" is "بـ" at the beginning of the word, "ـبـ" at the middle of the word, and "ـب" at the end of the word. Also, ligaturing adds to the visual complexity of Arabic orthography, which is the combination of two or more letters or characters into a single grapheme. For example, while the letter "ب" connects to letters that come before or after it, the letter "ر" connects only to the letters that come before it.

Arabic has three long vowels (/aː/, /uː/, /iː/), which are represented by three graphemes (ا = /ʔ/, و = /w/, ي = /j/); three short vowels (/a/, /u/, /i/), which are represented as diacritic symbols placed above or under the letters (Fatt-ha = /ˊ/, Dhamah = /ˋ/ , Khasrah = /ˏ/); and a reduced vowel sound (schwa; /ə/; Al Ghanem & Kearns, 2015; Jensen, 1970). Diacritics in Arabic can be categorized into phonemic diacritics or morpho-syntactic diacritics, based on the function it serves (Saiegh-Haddad, 2018). On the one hand, diacritics provide semantic contrast phoneme information on any word letter. For example, diacritic variation in the word "درج" might mean stair as in "دَرَجٌ" or cabin as in "دِرْجٌ." On the other hand, diacritics convey the morpho-syntactic constraint imposed on each word based on its function in the sentence. For example, the word "كتب" might appear as "كَتَبَ" (meaning wrote) or "كُتِبَ" (meaning being written).

Arabic is a morphologically rich language (Saiegh-Haddad & Henkin-Roitfarb, 2014). It has two basic morphemic unites, roots and word patterns. Many Arabic words contain 3-letter consonant roots (range is 2-5) that convey a core semantic meaning (Khateb et al., 2022). For example, the root Kataba (كَتَبَ - he wrote) might become Yaktub (يَكْتُبْ - he is writing), Taktub (تَكتُبْ - she is writing), or Katabu (كَتَبوا - they wrote). The word patterns in Arabic come as inflectional or derivational morphemes that might transform the word's phonological structure to serve a syntactic end or convey a new meaning of a word (Abu-Rabia & Awwad, 2004). Inflectional morphology is a linear change, maintaining the word base structure while representing the morpho-syntactic information as affix or suffix additions. For example, the root Kataba (كَتَبَ - he wrote) might become Yaktub (يَكْتُبْ - he is writing), Taktub (تَكتُبْ - she is writing), or Katabu (كَتَبوا - they wrote). The derivational morphology denotes a nonlinear change, transforming the word root through specific word patterns. For example, the base Kataba can be changed into (كَتَبَ - he wrote) into Maktub (مَكْتوبْ - written), Kateb (كاتِبْ - writer), or Kut-tab (كُتَّاب - writers).

Reading in Arabic

Many Saudi dialects exist, but all Saudi children begin learning MSA when they enter the school (Al Ghanem & Kearns, 2015). MSA is used throughout their schooling and beyond for literary and religious purposes. Several studies have shown how differences between MSA and spoken Arabic negatively impact children's ability to learn to read MSA (Myhill, 2014; Schiff & Saiegh-Haddad, 2018). Some have argued that learning to read MSA is similar to learning a new language (Ibrahim & Eviatar, 2009; Saiegh-Haddad, 2005). Teachers' familiarity with the linguistic differences between spoken Arabic and MSA is thus very important in teaching young Arabic children to read.

Reading acquisition in Arabic is perceived to be slower than reading acquisition in other languages due to its complexity (Eviatar & Ibrahim, 2014). In Arabic, vowelized text is read faster and with fewer errors than unvowelized text (Abu–Rabia & Siegel, 1995; Midhwah & Alhawary, 2020). However, vowelized texts are only used during elementary grades. In middle school, Saudi and other Arabic students begin to read MSA texts without short vowel diacritics. For students who have difficulty learning to read, it may be necessary to provide vowelized texts in middle school to help them become accurate fluent readers (Abu-Rabia, 1996, 1998). Interestingly, knowledge of morphological roots and word patterns has been shown to aid in reading unvowelized texts in middle school and beyond (Abu-Rabia, 2007; Abu-Rabia & Abu-Rahmoun, 2012). Some studies showed how morphological awareness might help readers to compensate for the absence of word vowelization when they move to upper elementary grades and beyond.

Teacher Language Knowledge

Assessment of teachers' language knowledge has typically focused on English. For example, the earliest study by Moats (1994) used a questionnaire consisting of 15 questions that tapped phonological and morphological knowledge and spelling rules. The questionnaire was administered to 89 general and special education teachers. More than 50% of the teachers had difficulty identifying specific vowel patterns, whereas more than 70% struggled with spelling rules. Subsequent studies (e.g., Chapman et al., 2018; Cunningham et al., 2004; Mather et al., 2001; L. Moats & Lyon, 1996; Piasta et al., 2009; Washburn et al., 2011b) substantiated Moats' findings. For example, Mather et al. (2001) found that pre-and in-service teachers averaged 50% and 68%, respectively, in their accuracy in identifying schwa, diphthong, and voiced consonants in words, as well as in defining basic concepts such as phonemic awareness and digraphs. In a large-scale study of more than 700 general classroom teachers, Cunningham et al. (2004) found lower accuracy levels in counting phonemes in words (40.2%) and on a task measuring phonics knowledge (35.5%). Moreover, studies consistently found that teachers had better knowledge of phonology than morphology (e.g., Arrow et al., 2019; Chapman et al., 2018; Washburn et al., 2011b, 2011b, 2016). For example, Washburn and her colleagues (Washburn et al., 2011b, 2011a, 2016) found similar differences in favor of phonological tasks (20%-24% higher) in studies involving pre-and in-service teachers from the USA, Canada, UK, and New Zealand. A recent study of New Zealand teachers noted a 61.5% difference between phonology and morphology knowledge (Arrow et al., 2019).

Teachers' language knowledge has also been examined in Sweden and Finland (e.g., Alatalo, 2016; Aro & Björn, 2016). The findings from these studies were generally similar to the English language studies. For example, Aro and Björn (2016) sampled a group of 220 Finnish teachers for their knowledge of Finnish phonology and morphology. They adopted the survey format used in previous studies such as Moats (1994) and Binks-Cantrell et al. (2012). The teachers achieved an accuracy rate of 53%, indicating low language knowledge. Like their English-speaking counterparts, the Finnish teachers performed better on the phonological tasks (29%-33%) than the morphological tasks and poorer on tasks that required defining language terms.

The few studies that examined Arabic teacher knowledge only assessed familiarity with specific terms such as phonetics, phonemic awareness, and phonology (Almisfari, 2021; Alzamili & Ghareb, 2021; Jadidi & Zabdi, 2021). For example, Almisfari (2021) surveyed reading teachers at K-2 in Qatar about their knowledge of defining linguistics terms (such as phonetics and phonemic awareness) and how often they use phonics instruction. Alzamili and Ghareb (2021) examined Saudi general and special education teachers for their knowledge of phonemic awareness, and it is addressed in their diagnostics practices. Jadidi and Zabdi (2021) examined teachers' attitudes toward the role of phonemic awareness in the development of reading for early elementary students. The findings from these studies indicate various levels of knowledge of the importance of these concepts for reading development. However, these studies were limited only to teachers' conceptual understanding and never examined teachers' ability to implement these concepts. The current study is the first one to address Saudi teachers' phonological and morphological knowledge. We decided to focus on these two aspects of language because of their particular importance in learning to read Arabic.

Other Factors Influencing Teacher Knowledge

Other factors that have been shown to influence teachers' language knowledge are the education they receive to become general or special education teachers and their teaching experiences. Teachers' language knowledge is obviously influenced by the education they receive to become general or special education teachers (Fielding-Barnsley & Purdie, 2005; McCutchen et al., 2002). One would expect special education teachers to have higher levels of language knowledge than general education (GE) teachers because of their focus on students with learning disabilities (Alatalo, 2016; Clark et al., 2017; Washburn et al., 2017). This is confirmed by studies with English-speaking teachers (Fielding-Barnsley & Purdie, 2005; McCutchen et al., 2002). The expectation is that teachers with different backgrounds and training orientations would have different levels of language knowledge and skills to teach reading. In Saudi Arabia, however, the training of GE teachers tends to be focused on the phonological, morphological, and syntactic features of the Arabic language (Saudi National Center for Assessment, 2020). In contrast, the training of the SE teachers tends to focus more on how to design and implement individualized educational plans for students with learning disabilities (Alsarawi, 2020; Al-Shareef, 2017; Hussain, 2010). These differences in training would suggest differences in language knowledge, mostly in favour of the GE teachers.

The impact of teachers' teaching experience on language knowledge has typically been addressed by comparing pre-service teachers to in-service teachers (e.g., Aro & Björn, 2016; Mahar & Richdale, 2008; Mather et al., 2001; Washburn et al., 2011a). Not surprisingly, these studies find that in-service teachers have higher levels of language knowledge than pre-service teachers. In the current study, we questioned whether in-service teachers with more years of experience had more language knowledge than teachers with few years of teaching experience.

We also questioned whether level of education (undergraduate vs. graduate degree) influenced teacher's language knowledge. The research has been inconsistent. Some studies have found that teachers' level of education and number of literacy courses only had a minimal impact on their language knowledge (e.g., Alatalo, 2016; Clark et al., 2017; Mather et al., 2001; Intyre & Hellsten, 2008; Spear-Swerling et al., 2005; Spear-Swerling & Brucker, 2003). For example, Mather et al. (2001) and Clark et al. (2017) found that the number of completed literacy courses did not differentiate language knowledge in teachers. In contrast, Spear-Swerling & Brucker (2003) and Alatalo (2016) found that prior literary preparation had a significant impact on teachers' level of knowledge. Graduate education also improved language knowledge (McIntyre & Hellsten, 2008; Spear-Swerling et al., 2005).

In summary, this study examined Saudi reading teachers' Arabic phonology and morphology knowledge. We questioned whether there were differences in knowledge based on the differences in their specialization (i.e., general education or special education), years of teaching, and highest educational level. This study was designed to answer the following research questions:

1. Do Saudi GE and SE teachers of students with reading disabilities have sufficient knowledge of the phonological and morphological aspects of Arabic?
2. Is the GE and SE teachers' phonological and morphological knowledge level influenced by their certification, teaching experience, or highest educational degree?

Method

Participants and Procedures

Participants in the study were Saudi special and general education teachers, teaching for students with learning disabilities. Following the approval of the Saudi Ministry of Education and three school districts in Riyadh, Jeddah, and The East Province, the first author contacted the Research and Innovation Sector (RIS), part of the Ministry of Education, to access their databases. The RIS manages a yearly updated database with information about Saudi teachers, students, schools, educational services and programs, and special education. Through this access, the first author obtained access to general and special education teachers who were teaching students with learning disabilities in elementary schools. Through the RIS, a link to the KAMP in Qualtrics was sent to the personal cell phones of a representative sample of 900 teachers in Riyadh, Jeddah, and The East Province. Responses were obtained from 223 teachers (24.7% response rate) of which 180 completed the entire survey.

The participants were certified to teach reading as general education teach-

ers (GE) or as special education teachers (SE) and taught students with reading disabilities (RD) for at least one year. GE teachers majored in elementary education, whereas SE teachers majored in special education for students with learning disabilities. Some of the participants obtained master's degrees in either special education, curriculum and instruction, or Arabic literature.

As shown in Table 1, slightly more than one-half of the participants (53.3%) were SE teachers, and slightly less than half (46.7%) were GE teachers. There were more male teachers (67.2%) than female teachers (32.8%). More than 80% of the participants held bachelor's degrees (83.9%); 16.1% had master's degrees. Teaching experience ranged from one year to 30 years, with an average of 13.5 years.

Table 1. ***Demographic Information on the Participants***

Characteristics	Frequency	Percentages
Specialisation		
General Education	84	47%
Special Education	96	53%
Gender		
Female	59	33%
Male	121	67%
Highest Educational Level		
Bachelor	151	84%
Master	29	16%

The Instrument

A survey of Arabic morphology and phonology was developed in Alqahtani (2020). The process for developing the survey (Knowledge of Arabic Morphology and Phonology – KAMP) included item pooling, content validation, pilot testing, and items analysis. This process resulted in a survey with 34 items organized into four tasks, general language knowledge (5 items), phoneme segmentation (10 items), syllabic counting (11 items), and morphological awareness (8 items).

The content of the KAMP was presented in vowelized MSA. The general language items addressed the participants' knowledge of basic terminologies, including phonemic awareness, phonemes, morphemes, and speech sound knowledge. The phonemic segmentation task required the participants to identify the number of phonemes in words or identify the word with a specified number of phonemes. To succeed in this task, teachers had to have knowledge of phonemes and how they are combined into meaningful words. For example, when given the word "Kataba" (wrote), they should indicate that it has six phonemes. This is especially important because when this word is presented unvowelized it appears as "Ktb" giving the impression that it has only three phonemes. Teachers' knowledge of how short vowels are considered phonemes, even when not present in unvowelized text, will presumably influence their reading instruction.

The syllable counting task required participants to identify the number of syllables in a word and the words with a specific number of syllables. For example, when given the word "Kataba" (wrote), they should indicate that it has three syllables. The knowledge of syllable structures in MSA is necessary for reading teachers because there are syllabic-related differences between the SA and MSA (Asadi, 2019; Saiegh–Haddad, 2003). Arabic is characterized by different syllable structures that range between simple (e.g., CV, CVC) and complex (e.g., CCVCC). Teachers' knowledge of these different structures and how they are represented in Arabic words is vital for their ability to devise effective reading instruction.

The morphological awareness task required the participants to identify the morphemic units in words and to use a prime word to identify words with a similar pattern of morphemic structure. For example, a word such as "Maktabah" (a library) can be analyzed into a root morpheme – "maktab" (office), and a feminine suffix – "h". Reading teachers should possess knowledge of morphology because morphological awareness has been reported as a strong contributor to reading performance in the MSA (Khateb et al., 2022; Saiegh-Haddad & Taha, 2017; Schiff & Saiegh-Haddad, 2018).

The test specifications, the layout of the question, and the scoring techniques were similar to those adopted by Binks-Cantrell et al. (2012) and Moats (1994). All questions were multiple choice, with four possible answers. One point was given for each correct answer; the maximum score on the test was 34. The appendix presents the KAMP, written using the International Phonetic Alphabetic.

Results

Descriptive statistics, internal consistency reliability estimates, and test characteristics are all shown in Table 2. The overall reliability estimate for the KAMP is considered good. The reliability estimates of the KAMP scale indicate that the scale has an overall consistency of .76, as measured by Cronbach's alpha. Also, the KAMP had a difficulty index of .39 (ranging between .08 and .83), a discrimination index of .69 (ranging between .14 and .71), and a distractor efficacy above 96%.

Table 2. ***Descriptive Statistics of the KAMP***

Measure (number of items)	*M*	*SD*	*Df*	*Di*	*DE*	*α*
KAMP (34)	13.4	5.2	0.39	0.69	0.96	.76

Note. N = 180. M = mean; SD = standard deviation; Df = difficulty index; Di = discrimination index; DE = distractor efficacy.

The first research question was addressed using descriptive statistics, and Table 4 shows each test's means and standard deviations in relation to the study variables. Overall, the teachers correctly answered only 39 % of the 34 items on the KAMP. They performed best on the basic language terminologies (42%), followed by phonological knowledge (40%), and morphological knowledge (34%).

Table 3. ***Means, Standard Deviations, Categorised by Type of Certification, Educational Level, and Gender***

	Certification		Educational Level		Items answered correctly
Sections	SE (n = 96)	GE (n = 84)	BA (n = 151)	GR (n = 29)	
BLT	2.4 (1.1)	2.3 (1.6)	2.3 (1.3)	2.8 (1.2)	42%
PK	8.3 (3.8)	8.5 (4)	8.2 (3.8)	9.1 (4.3)	40%
MK	2.6 (1.4)	2.8 (1.7)	2.6 (1.5)	3 (1.8)	34%
KAMP	13.3 (4.9)	13.6 (5.5)	13.1 (5)	14.9 (6.1)	39%

Note. SE = special education teacher; GE = general education teacher; BA = Bachelor; GR = Graduate; BLT = basic language terminologies; PK = phonological knowledge; MK = morphological knowledge; KAMP = knowledge of Arabic morphology and phonology.

The second research question examined whether there was a significant difference in teachers' phonological and morphological knowledge based on their specialization, years of teaching experience, and highest educational level. The analysis addressed teachers' overall performance on the KAMP and in the phonological and morphological components. The overall KAMP findings indicated that the mean difference between GE and SE was not statistically significant ($t = .383$, $p = .702$). Similarly, there were no statistically significant mean differences between the SE and the GE in their knowledge of Arabic phonology ($t = .448$, $p = .655$) or morphology ($t = .502$, $p = .617$). Further, the correlation between teachers' KAMP knowledge and their years of teaching experience was examined at the general and specific levels. The Pearson correlation coefficient between the teachers' KAMP knowledge and their teaching experiences variables was negative but not statistically significant ($r = -.029$, $p = .701$). Further, this outcome was also similar to their specific knowledge of phonology ($r = -.025$, $p = .742$) and morphology ($r = .088$, $p = .240$). Finally, the comparison between the BA teachers and the GR teachers on their overall the KAMP knowledge yielded no significant mean differences ($t = 1.7$, $p = .092$). Furthermore, there were also no significant mean differences between the two groups in their specific knowledge of Arabic phonology ($t = 1.15$, $p = .250$) or morphology ($t = 1.2$, $p = .232$).

Discussion

Main Findings

This study examined Saudi reading teachers' knowledge of Arabic phonology and morphology. We questioned whether there were differences in knowledge based on the differences in their specialization (i.e., general education or special education), years of teaching, and highest educational level. Concerning teacher knowledge, the findings from this study were generally consistent with those from the earlier studies of teacher knowledge in English and other European languages (e.g., Alatalo, 2016; Aro & Björn, 2016; Chapman et al., 2018; McCutchen et al., 2002; Moats,

1994; Spear-Swerling & Brucker, 2003; Washburn et al., 2011, 2016). Teachers had relatively poor knowledge of these basic linguistic elements and tended to perform better on phonological tasks than morphological tasks. These findings might indicate the absence of this type of knowledge during teachers' preparation and professional development programs. Some studies noted the influence of teachers' instructional orientation on their language knowledge, suggesting that teachers who adopted a code-based instruction approach tended to have significantly better language knowledge (McCutchen et al., 2002) and better influence on students' reading (Podhajski et al., 2009). Subsequent studies should take a closer look into teacher preparation and professional development programs throughout the Kingdom.

Concerning teacher specialization, previous studies in English-speaking countries have found that SE teachers tended to have significantly higher levels of language knowledge than GE teachers (e.g., Fielding-Barnsley & Purdie, 2005; McCutchen et al., 2002). As noted in the introduction, in Saudi Arabia, GE teachers are given more opportunities than SE teachers to learn about Arabic's phonological, morphological, and syntactic features. The two groups are held to different certification requirements, focusing on knowledge of Arabic language for the GE teachers, and knowledge of individuals with learning disabilities for the SE teachers. These differences suggest that GE teachers might have better language knowledge than SE teachers. However, the findings showed no significant differences between the two groups, as GE and SE teachers exhibited comparable levels of poor language knowledge. As noted in the previous section, this reflects limitations in the teacher training and professional development that all Saudi teachers receive.

Previous studies examined the impact of teachers' teaching experience on their language knowledge through a comparison between pre-and in-service teachers. These studies repeatedly found in-service teachers significantly outperformed pre-service teachers. This imperfect way of defining teacher experience suggests that teachers gain increasingly more language knowledge when allowed to teach in real situations. However, this study examined the impact of teaching experience differently, accounting for the number of years of teaching. The findings showed that teachers' teaching experience did not impact their language knowledge. This is a clear manifestation of the Mathew Effect principle, that the quality of teachers' language knowledge depends on the quality of preparation and training rather than their years of teaching. For Saudi teachers to have better language knowledge, they need high-quality training that counts for the role of language knowledge in reading and how to design effective and explicit code-based instruction, especially in the early elementary grades.

Years of teaching experience and level of education also had no influence on teacher knowledge. Previous studies (e.g., Aro & Björn, 2016; Mahar & Richdale, 2008; Washburn et al., 2011a) have found differences in teacher knowledge between pre- and in-service teachers. It is unclear whether no differences in teacher knowledge would be found in other countries if years of experience were considered. The finding that the level of education had no impact on teacher knowledge was consistent with previous studies (e.g., Horn & Jang, 2017; Kane et al., 2008; Leigh, 2010) showing that teachers' level of education had, at most, a minimal impact on their language knowledge. These findings confirm that changes need to be made in the training teachers receive in their education programs and in the professional development experiences

teachers attend once they begin teaching. Professional development that specifically targets language knowledge, has been shown to improve the reading instruction provided (e.g., Gormley & Ruhl, 2007; Podhajski et al., 2009). Simply taking more classes or getting an advanced degree will not improve language knowledge unless these additional classes provide explicit instruction about this knowledge.

Implications

Given the importance of phonological and morphological knowledge for reading (Perfetti & Stafura, 2014) and teachers' essential role in developing children's awareness of these metalinguistic elements (e.g., Cohen et al., 2017; Moats & Foorman, 2003; Podhajski et al., 2009; Spear-Swerling & Brucker, 2003), especially for Arabic (Saiegh-Haddad, 2018), it is vital for early elementary reading teachers to possess sufficient language knowledge. This knowledge would allow them to devise effective explicit reading instruction targeting phonemic and morphemic awareness, building fluency, and creating strategic readers. Teachers need explicit education that provides information about Arabic's phonological, morphological, and orthographic features. Pre-service education and in-service training programs need to be modified to include this crucial language knowledge. Information about how to design and provide effective reading instruction should be provided (Kalinowski et al., 2019).

Limitations

The present study had some limitations. The KAMP only focused on phonological and morphological knowledge because it was developed considering the literature relevant to teacher language knowledge, which was mostly related to European languages. However, orthographic knowledge also plays an important role in learning to read Arabic (Elbeheri et al., 2011). Future language surveys must be developed following the framework suggested in Saiegh-Haddad (2018), emphasizing the essential roles of phonological awareness, morphological awareness, and orthographic knowledge. Also, the survey did not examine instructional practices. Having appropriate language knowledge does not necessarily translate to instructional practices. Future studies should also include items that address instructional practices.

Conclusion

Reading is essential for ensuring success and prosperity (Fuchs et al., 2002). For many children, learning to read depends on effective instruction from knowledgeable and skilled reading teachers. For students with reading disabilities, it is even more important for teachers to know Arabic's phonological, morphological, and orthographic characteristics and be familiar with the most effective instructional practices. Teachers who do not have this knowledge or skill may provide less than optimal reading instruction, which could result in their students struggling to acquire basic reading skills at an early stage. The Saudi teachers in the current study were found to have insufficient knowledge of Arabic phonology and morphology. These findings were not influenced by certification, years of experience, or education level. For teachers to build such important knowledge, they must be provided with training and ample opportunities to practice designing and delivering code-based instruction during teacher preparation and professional development programs.

References

Abu-Rabia, S. (1996). The role of vowels and context in the reading of highly skilled native Arabic readers. *Journal of Psycholinguistic Research*, *25*(6), 629–641. https://doi.org/10.1007/BF01712413

Abu-Rabia, S. (1998). Reading Arabic texts: Effects of text type, reader type and vowelization. *Reading and Writing: An Interdisciplinary Journal*, *10*(1), 105–119.

Abu-Rabia, S. (2007). The role of morphology and short vowelization in reading Arabic among normal and dyslexic readers in grades 3, 6, 9, and 12. *Journal of Psycholinguistic Research*, *36*(2), 89–106.

Abu-Rabia, S., & Abu-Rahmoun, N. (2012). The role of phonology and morphology in the development of basic reading skills of dyslexic and normal native Arabic readers. *Creative Education*, *03*(07), Article 07. https://doi.org/10.4236/ce.2012.37185

Abu-Rabia, S., & Awwad, J. (Shalhoub). (2004). Morphological structures in visual word recognition: The case of Arabic. *Journal of Research in Reading*, *27*(3), 321–336. https://doi.org/10.1111/j.1467-9817.2004.00235.x

Abu–Rabia, S., & Siegel, L. S. (1995). Different orthographies different context effects: The effects of Arabic sentence context in skilled and poor readers. *Reading Psychology*, *16*(1), 1–19. https://doi.org/10.1080/0270271950160101

Al Ghanem, R., & Kearns, D. M. (2015). Orthographic, phonological, and morphological skills and children's word reading in Arabic: A literature review. *Reading Research Quarterly*, *50*(1), 83–109.

Alatalo, T. (2016). Professional content knowledge of grades one—three teachers in Sweden for reading and writing instruction: Language structures, code concepts, and spelling rules. *Scandinavian Journal of Educational Research*, *60*(5), 477–499. https://doi.org/10.1080/00313831.2015.1024734

Almisfari, L. (2021). *The extent to which early childhood teachers in Qatar have the skills to give children the phonological awareness skills* [Master Thesis, Qatar University]. https://qspace.qu.edu.qa/handle/10576/21323

Alqahtani, R. F. (2020). *Arabic Language Knowledge among Early Elementary Saudi Teachers of Students with Reading Disabilities: A Mixed Method Study* [Dissertation, The University of North Carolina at Greensboro]. https://www.proquest.com/docview/2431017050/abstract/E58ADD79FE344C2CPQ/1

Alsarawi, A. (2020). Inclusive playgrounds: Concerted efforts for children with disabilities in Saudi Arabia. *International Journal of Play*, *9*(4), 382–399. https://doi.org/10.1080/21594937.2020.1843802

Al-Shareef, L. (2017). *A study of provision for specific learning difficulties (dyslexia) in primary education in the Kingdom of Saudi Arabia* [University of Birmingham]. https://etheses.bham.ac.uk/id/eprint/7279/9/Al-Shareef17PhD_Redacted_rev_2.pdf

Alzamili, F., & Ghareb, R. (2021). Early primary grades and resource room teachers' knowledge level of phonemic awareness skills as an indicator to identify students with learning disabilities. *Journal of Special Education and Rehabilitation*, *12*(1), 173–215. https://doi.org/10.21608/sero.2021.206260

Aro, M., & Björn, P. (2016). Preservice and inservice teachers' knowledge of language constructs in Finland. *Annals of Dyslexia*, *66*(1), 111–126. https://doi.org/10.1007/s11881-015-0118-7

Arrow, A. W., Braid, C., & Chapman, J. W. (2019). Explicit linguistic knowledge is necessary, but not sufficient, for the provision of explicit early literacy instruction. *Annals of Dyslexia*, *69*(1), 99–113. https://doi.org/10.1007/s11881-018-00168-0

Asadi, I. A. (2019). How the characteristics of phonemes and syllabic structures can impact the phonological awareness of kindergarten and first-grade Arabic-speaking children. *Reading Psychology*, *40*(8), 768–781. https://doi.org/10.1080/02702711.2019.1674431

Beeston, A. F. L. (1970). *The Arabic Language Today* (1st Ed.). Routledge. https://doi.org/10.4324/9781315512815

Binks-Cantrell, E., Joshi, R. M., & Washburn, E. K. (2012). Validation of an instrument for assessing teacher knowledge of basic language constructs of literacy. *Annals of Dyslexia*, *62*(1), 153–171. https://doi.org/10.1007/s11881-012-0070-8

Brimo, D., Apel, K., & Fountain, T. (2017). Examining the contributions of syntactic awareness and syntactic knowledge to reading comprehension. *Journal of Research in Reading*, *40*(1), 57–74. https://doi.org/10.1111/1467-9817.12050

Chapman, J. W., Greaney, K. T., Arrow, A. W., & Tunmer, W. E. (2018). Teachers' use of phonics, knowledge of language constructs, and preferred word identification prompts in relation to beginning readers. *Australian Journal of Learning Difficulties, 23*(1), 87–104. https://doi.org/10.1080/19404158.2018.1467937

Clark, S. K., Helfrich, S. R., & Hatch, L. (2017). Examining preservice teacher content and pedagogical content knowledge needed to teach reading in elementary school. *Journal of Research in Reading, 40*(3), 219–232. https://doi.org/10.1111/1467-9817.12057

Cohen, R. A., Mather, N., Schneider, D. A., & White, J. M. (2017). A comparison of schools: Teacher knowledge of explicit code-based reading instruction. *Reading and Writing*, *30*(4), 653–690. https://doi.org/10.1007/s11145-016-9694-0

Cunningham, A. E., Perry, K. E., Stanovich, K. E., & Stanovich, P. I. (2004). Disciplinary knowledge of K-3 teachers and their knowledge calibration in the domain of early literacy. *Annals of Dyslexia*, *54*(1), 139–167.

Elbeheri, G., Everatt, J., Mahfoudhi, A., Al-Diyar, M. A., & Taibah, N. (2011). Orthographic processing and reading comprehension among Arabic speaking mainstream and LD children. *Dyslexia (10769242)*, *17*(2), 123–142. https://doi.org/10.1002/dys.430

Eviatar, Z., & Ibrahim, R. (2014). Why is it hard to read Arabic. In E. Saiegh-Haddad & M. Joshi (Eds.), *Handbook of Arabic Literacy* (1–9). Springer.

Fielding-Barnsley, R., & Purdie, N. (2005). Teachers' attitude to and knowledge of metalinguistics in the process of learning to read. *Asia-Pacific Journal of Teacher Education*, *33*(1), 65–76. https://doi.org/10.1080/1359866052000341133

Frost, R., Kugler, T., Deutsch, A., & Forster, K. I. (2005). Orthographic structure versus morphological structure: Principles of lexical organization in a given language. *Journal of Experimental Psychology. Learning, Memory & Cognition*, *31*(6), 1293–1326. https://doi.org/10.1037/0278-7393.31.6.1293

Fuchs, D., Fuchs, L. S., Thompson, A., Otaiba, S. A., Yen, L., Yang, N. J., Braun, M., & O'Connor, R. E. (2002). Exploring the importance of reading programs for kindergartners with disabilities in mainstream classrooms. *Exceptional Children*, *68*(3), 295–311. https://doi.org/10.1177/001440290206800301

Gormley, S., & Ruhl, K. L. (2007). Language structure knowledge of preservice teachers: Connecting speech to print. *Teacher Education & Special Education*, *30*(2), 83–92. https://doi.org/10.1177/088840640703000203

Horn, A. S., & Jang, S. T. (2017). *The impact of graduate education on teacher effectiveness: Does a master's degree matter?* MHEC Research Brief. https://files.eric.ed.gov/fulltext/ED587432.pdf

Hussain, O. (2010). *Evaluation of preparation program for teachers specializing in learning disabilities in Saudi Arabia* [The University of New Mexico]. https://digitalrepository.unm.edu/educ_spcd_etds/2/?sequence=1

Ibrahim, R., & Eviatar, Z. (2009). Language status and hemispheric involvement in reading: Evidence from trilingual Arabic speakers tested in Arabic, Hebrew, and English. *Neuropsychology*, *23*(2), 240–254. https://doi.org/10.1037/a0014193

Jadidi, A., & Zabdi, N. (2021). Teachers 'attitudes towards the impact of phonemic awareness skills on Reading Instruction A field study in town of El-Oued. *Journal of Educational and Psychological Sciences*, *7*(1), 230–250.

Jensen, H. (1970). *Sign, symbol and script: An account of man's efforts to write* (3rd revised and enlarged ed.; edition). Allen & Unwin.

Kalinowski, E., Gronostaj, A., & Vock, M. (2019). Effective professional development for teachers to foster students' academic language proficiency across the curriculum: A systematic review. *AERA Open*, *5*(1), 2332858419828691. https://doi.org/10.1177/2332858419828691

Kane, T. J., Rockoff, J. E., & Staiger, D. O. (2008). What does certification tell us about teacher effectiveness? Evidence from New York city. *Economics of Education Review*, *27*(6), 615–631. https://doi.org/10.3386/w12155

Khateb, A., Asadi, I. A., Habashi, S., & Korinth, S. P. (2022). Role of morphology in visual word recognition: A parafoveal preview study in Arabic using eye-tracking. *Theory and Practice in Language Studies*, *12*(6), 1030–1038. https://doi.org/10.17507/tpls.1206.02

Lane, H. B., Hudson, R. F., Leite, W. L., Kosanovich, M. L., Strout, M. T., Fenty, N. S., & Wright, T. L. (2008). Teacher knowledge about reading fluency and indicators of students' fluency growth in reading first schools. *Reading & Writing Quarterly*, *25*(1), 57–86. https://doi.org/10.1080/10573560802491232

Leigh, A. (2010). Estimating teacher effectiveness from two-year changes in students' test scores. *Economics of Education Review*, *29*(3), 480–488. https://doi.org/10.1016/j.econedurev.2009.10.010

Mahar, N. E., & Richdale, A. L. (2008). Primary teachers' linguistic knowledge and perceptions of early literacy instruction. *Australian Journal of Learning Difficulties*, *13*(1), 17–37. https://doi.org/10.1080/19404150802093703

Martino, N. L., & Hoffman, P. R. (2002). An investigation of reading and language abilities of college freshmen. *Journal of Research in Reading*, *25*(3), 310–318. https://doi.org/10.1111/1467-9817.00178

Mather, N., Bos, C., & Babur, N. (2001). Perceptions and knowledge of preservice and inservice teachers about early literacy instruction. *Journal of Learning Disabilities*, *34*(5), 472–482. https://doi.org/10.1177/002221940103400508

McCombes-Tolis, J., & Feinn, R. (2008). Comparing teachers' literacy-related knowledge to their state's standards for reading. *Reading Psychology*, *29*(2), 236–265.

McCutchen, D., Harry, D., Cunningham, A. E., Cox, S., Sidman, S., & Covill, A. (2002). Reading teachers' knowledge of children's literature and English phonology. *Annals of Dyslexia*, *528*(2), 207–228.

McIntyre, L. J., & Hellsten, L. M. (2008). Differences in teachers' knowledge of language. *Exceptionality Education International*, *18*(1), 24–37. https://doi.org/10.5206/eei.v18i2.7622

Midhwah, A. A., & Alhawary, M. T. (2020). Arabic diacritics and their role in facilitating reading speed, accuracy, and comprehension by English l2 learners of Arabic. *The Modern Language Journal*, *104*(2), 418–438. https://doi.org/10.1111/modl.12642

Moats, L. (1994). The missing foundation in teacher education: Knowledge of the structure of spoken and written language. *Annals of Dyslexia*, *44*(1), 81–102. https://doi.org/10.1007/BF02648156

Moats, L. C., & Foorman, B. R. (2003). Measuring teachers' content knowledge of language and reading. *Annals of Dyslexia*, *53*(1), 23–45. https://doi.org/10.1007/s11881-003-0003-7

Moats, L., & Lyon, G. R. (1996). Wanted: Teachers with knowledge of language. *Topics in Language Disorders*, *16*(2), 73–86.

Myhill, J. (2014). The effect of diglossia on literacy in Arabic and other languages. In E. Saiegh-Haddad & M. Joshi (Eds.), *Handbook of Arabic Literacy* (pp. 197–223). Springer.

Perfetti, C., & Stafura, J. (2014). Word knowledge in a theory of reading comprehension. *Scientific Studies of Reading*, *18*(1), 22–37. https://doi.org/10.1080/10888438.2013.827687

Piasta, S. B., Connor, C. M., Fishman, B. J., & Morrison, F. J. (2009). Teachers' knowledge of literacy concepts, classroom practices, and student reading growth. *Scientific Studies of Reading*, *13*(3), 224–248. https://doi.org/10.1080/10888430902851364

Podhajski, B., Mather, N., Nathan, J., & Sammons, J. (2009). Professional development in scientifically based reading instruction: Teacher knowledge and reading outcomes. *Journal of Learning Disabilities*, *42*(5), 403–417. https://doi.org/10.1177/0022219409338737

Saiegh–Haddad, E. (2003). Linguistic distance and initial reading acquisition: The case of Arabic diglossia. *Applied Psycholinguistics*, *24*(03), 431–451. https://doi.org/10.1017/S0142716403000225

Saiegh-Haddad, E. (2005). Correlates of reading fluency in Arabic: Diglossic and orthographic factors. *Reading and Writing*, *18*(6), 559–582. https://doi.org/10.1007/s11145-005-3180-4

Saiegh-Haddad, E. (2012). Literacy reflexes of Arabic diglossia. In M. Leikin, M. Schwartz, & Y. Tobin (Eds), *Current Issues in Bilingualism: Cognitive and Socio-linguistic Perspectives* (pp. 43–55). Springer. https://doi.org/10.1007/978-94-007-2327-6_3

Saiegh-Haddad, E. (2018). MAWRID: A model of Arabic word reading in development. *Journal of Learning Disabilities*, *51*(5), 454–462. https://doi.org/10.1177/0022219417720460

Saiegh-Haddad, E., & Henkin-Roitfarb, R. (2014). The structure of Arabic language and orthography. In E. Saiegh-Haddad & R. M. Joshi (Eds.), *Handbook of Arabic Literacy* (Vol. 9, pp. 3–28). Springer Netherlands. https://doi.org/10.1007/978-94-017-8545-7_1

Saiegh-Haddad, E., & Taha, H. (2017). The role of morphological and phonological awareness in the early development of word spelling and reading in typically developing and disabled Arabic readers. *Dyslexia*, *23*(4), 345–371. https://doi.org/10.1002/dys.1572

Sanchez, M., Magnan, A., & Ecalle, J. (2012). Knowledge about word structure in beginning readers: What specific links are there with word reading and spelling? *European Journal of Psychology of Education*, *27*(3), 299–317. https://doi.org/10.1007/s10212-011-0071-8

Saudi National Center for Assessment. (2020). *Certification standards for teachers of Arabic language*. Saudi Education & Training Commission. https://etec.gov.sa/ar/productsandservices/Qiyas/profession/TeachersLicensure/Pages/default.aspx

Schiff, R., & Saiegh-Haddad, E. (2018). Development and relationships between phonological awareness, morphological awareness and word reading in spoken and standard Arabic. *Frontiers in Psychology*, *9*(1), 1–13. https://doi.org/10.3389/fpsyg.2018.00356

Share, D. L., & Daniels, P. T. (2016). Aksharas, alphasyllabaries, abugidas, alphabets and orthographic depth: Reflections on Rimzhim, Katz and Fowler (2014). *Writing Systems Research*, *8*(1), 17–31. https://doi.org/10.1080/17586801.2015.1016395

Spear-Swerling, L., & Brucker, P. O. (2003). Teachers' acquisition of knowledge about English word structure. *Annals of Dyslexia*, *53*(1), 72–103.

Spear-Swerling, L., Brucker, P. O., & Alfano, M. P. (2005). Teachers' literacy-related knowledge and self-perceptions in relation to preparation and experience. *Annals of Dyslexia*, *55*(2), 266–296. https://doi.org/10.1007/s11881-005-0014-7

Spencer, M., Muse, A., Wagner, R. K., Foorman, B., Petscher, Y., Schatschneider, C., Tighe, E. L., & Bishop, M. D. (2015). Examining the underlying dimensions of morphological awareness and vocabulary knowledge. *Reading and Writing*, *28*(7), 959–988. https://doi.org/10.1007/s11145-015-9557-0

Washburn, E., Binks-Cantrell, E., Joshi, R. M., Martin-Chang, S., Arrow, A., Washburn, E. K., Binks-Cantrell, E. S., & Joshi, R. M. (2016). Preservice teacher knowledge of basic language constructs in Canada, England, New Zealand, and the USA. *Annals of Dyslexia*, *66*(1), 7–26. https://doi.org/10.1007/s11881-015-0115-x

Washburn, E., Joshi, R. M., & Binks-Cantrell, E. (2011a). Are preservice teachers prepared to teach struggling readers? *Annals of Dyslexia*, *61*(1), 21–43. https://doi.org/10.1007/s11881-010-0040-y

Washburn, E., Joshi, R. M., & Binks-Cantrell, E. (2011b). Teacher knowledge of basic language concepts and dyslexia. *Dyslexia*, *17*(2), 165–183.

Washburn, E., Mulcahy, C., Musante, G., & Joshi, R. M. (2017). Novice teachers' knowledge of reading-related disabilities and dyslexia. *Learning Disabilities -- A Contemporary Journal*, *15*(2), 169–191.

Appendix

Teacher Knowledge of Arabic Morphology and Phonology (KAMP)

Directions

This survey contains items related to knowledge of Arabic Phonology and Morphology (KAMP). This survey is designed to have eight sections. All the items in this survey are multiple-choice. Please read through the survey items carefully and complete all the items to the best of your knowledge.

Background and Personal Information (BPI)

Select the appropriate options that best describe you for each of the following items.

1. Specialization: General Classroom Teacher, Special Education Teacher.
2. Gender: Male, Female
3. Highest Educational Degree: Bachelor, Master, Doctorate

The KAMP Scale

Defining General Language Terminologies

1. Phonemic awareness is: the ability to derive meaning from a word, the ability to recognize and manipulate the individual sounds in spoken language, the ability to use sound-symbol (phoneme-grapheme) correspondences to read and spell new words, or both options b and c
2. A phoneme is: a single letter, a single speech of sound, a single unit of meaning, a single word
3. A morpheme is: a single letter, a single speech of sound, the smallest unit of meaning, or a word that has several different meanings
4. All the following are voiceless sounds except: t, θ, s, dʒ
5. All the following are voiced sounds except: b, t, l, m

Phoneme Segmentation Task 1

For each of the following words, identify the number of phonemes. Hint: words are made up of sounds. (The options are: 3, 4, 5, or 6 sounds).

6. sir, 7. Kataba, 8. Bajtu, 9. Masdʒid, 10. Naaːr

Phoneme Segmentation Task 2

For each of the following items, identify the word that has the specified number of phonemes (sounds). Hint: words are made up of sounds.

11. A word with six phonemes is: qird, ʃaraba, Salb, Sajf
12. A word with four phonemes is: Laqiiːtʕ, Nubl, Nahrun, ʃaːriʕ
13. A word with five phonemes is: Kutub, tʕaaːwilah, Luqmah, Rumħuk
14. A word with three phonemes is: ʃurtʕah, qalam, Bur, zaʕiiːm
15. A word with three phonemes is: Sum, Hind, Burdʒ, tʕarada

Syllabic Counting Task 1

For each of the following words, identify the correct number of syllables. Hint: the syllable is made of multiple phonemes. (The options are: 1, 2, 3, or 4 syllables).

16. Fiiː, 17. Kataba, 18. Baaːbun, 19. Naaːfurah, 20. Hindun

Syllabic Counting Task 2

For each of the following items, identify the word that has the specified number of syllables. Hint: the syllable is made of multiple phonemes.

21. A word with two syllables is: Sir, Darb, ʕaaːbaˉ, Sulamun
22. A word with one syllable is: Hind, qirdun, nabʕun, Harab.
23. A word with four syllables is: ʕitʕlah, Rihlatun, maqbarah, Maɣsalatun.
24. A word with three syllables is: dʒaras, Hindam, Lahiiːb, Jawaaːlun.
25. A word with five syllables is: Arimaaːjatu, Samaaːʕh, Taʃriiːf, Nihaaːjah
26. A word with one syllable is: ʕilm, ʕalamun, ʃarun, qasʕrun

Morpheme Counting Task

For each of the following words, identify the number of morphemes. Hint: the morpheme unite could come as a letter or as a whole word. (The options are: 1, 2, 3, or 4 morphemes).

27. Kataba, 28. Maktab, 29. Alnaaːfiðah, 30. Almuhandisah

Morpheme-based Matching Task

For each of the following words, identify the word/s with the same number of morphemes from the word options available: Hint: the morpheme unite could come as a letter or a whole word.

31. The number of the morphemes in (Harab) is equal to the number of morphemes in: alqalam, Kitaaːb, almuʕalim.
32. The number of the morphemes in (albajtu) is equal to the number of morphemes in: muʕalimah, rajul, tʕaaːlib.
33. The number of the morphemes in (almuʕalimah) is equal to the number of morphemes in: jaktub, ʕinwaaːnuk, tasˁaaːlahu
34. The number of the morphemes in (taaːlībaˉh) is equal to the number of morphemes in: alfataaːtaaːn, alfariiːgaaːn, aldʒahlu

The End