

Direct Phonemic Awareness Instruction as a Means of Improving Academic Text Comprehension for Adult Language Learners

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ABSTRACT: At an international branch campus of a Canadian university located in Qatar, difficulty comprehending academic English text has been an institutionally acknowledged barrier to student success. A team of teacher-researchers in the English for Academic Purposes program conducted a quasi-experimental investigation into the efficacy of phonemic awareness instruction as a means of addressing this competency gap. This project was conducted in an attempt to achieve better alignment between teaching strategies, classroom activities, and student learning outcomes. Sixty-seven students, enrolled in three program levels, were given one hour per week of standardised direct phonemic awareness instruction over a 10-week period. Two tests were used to measure pre-/post-instruction differences: a missing vowel identification test and a C-test. Learners in the treatment group improved significantly more in both measures than those in the control group. The results suggest that direct phonemic awareness instruction can promote the development of both vowel recognition and ability to comprehend academic English text among tertiary-level EAP learners in a predominantly native Arabic language environment.

Keywords: English for Academic Purposes, phonemic awareness, phonics, English as foreign language, academic reading

RESUMÉ: Dans un campus international délocalisé d'une université canadienne située au Qatar, les étudiants éprouvent des difficultés à comprendre les textes anglais universitaires. C'est une barrière institutionnellement reconnue avant qu'ils ne puissent réussir. Une équipe d'enseignants-chercheurs du programme de l'Anglais académique a mené une recherche quasi-expérimentale sur l'efficacité qu'aurait un enseignement spécialisé sur l'aspect phonémique (lecture) afin que les étudiants puissent pallier ce manque. Le but de cette étude présente est d'essayer de mieux mettre en adéquation l'enseignement des stratégies, des activités en classe et des résultats universitaires des étudiants. Soixante-sept étudiants inscrits dans trois niveaux de programmes ont suivi, pendant une heure par semaine, un enseignement standardisé sur les phonèmes et ce, pendant une période de dix semaines. On a procédé à deux analyses pour évaluer les différences notées avant et après l'enseignement:

- 1) une analyse pour repérer l'absence de voyelles
- 2) une analyse du C

Les apprenants du groupe évalué ont fait beaucoup plus de progrès dans ces deux aspects que ceux du groupe témoin. D'après les résultats, l'enseignement direct des phonèmes peut aider à développer à la fois, la reconnaissance des voyelles et la faculté à comprendre les textes académiques anglais chez les apprenants de niveau supérieur (EAP : English for Academic Purposes) issus d'un milieu principalement de langue arabe natale.

Mots-clés: Anglais académique (EAP), sensibilisation phonémique, phonétique, anglais langue étrangère, lecture académique.

Introduction

This study intends to address the role of phonemic awareness in the development of English language learners' vowel recognition and ability to comprehend academic English text within an English for Academic Purposes (EAP) Program at a tertiary-level nursing institute in Qatar. This research draws upon and extends from previous literature and research conducted in orthographic and phonological areas of English language learning within the wider Arab Gulf region. The project took place amidst a rapidly changing educational environment within the Gulf Cooperation Council (GCC) nations. This is an environment which has been utilizing partnerships with Western tertiary institutions to advance educational development (Tetreault, 2010).

The setting for this research is situated within a Canadian university's international branch campus (IBC) in Qatar, established to educate prospective, as well as currently diploma certified nurses, with a Canadian Bachelor of Nursing degree. Students presenting an International English Language Testing System (IELTS) Academic overall score of 6.0, or a Test of English as a Foreign Language (TOEFL) Internet-based Test (iBT) of 80, enter the nursing degree program directly. Students who do not meet this requirement are streamed into one of the EAP program's four levels depending on the results of a standardized placement test (Accuplacer® OnLine) and a writing sample elicited through an in-house designed question item. At the time of the study, approximately 89% of all incoming students were required to complete at least one level of the EAP program.

The level of learner proficiency in English, in particular reading, has been identified as an ongoing obstacle to student success in the four-year nursing program. Through a needs analysis conducted at the institution, nursing program instructors reported reading difficulties as a primary obstacle to student learning. Introductory nursing course textbooks used at the campus assume readers already possess academic reading comprehension skills, proficiency in academic vocabulary and knowledge of the rhetorical functions and discourse grammar typical of academic writing (Alexander, Argent, & Spencer, 2008). However, as reflected in the institutional needs analysis, students in the nursing program who have been identified as English Language Learners (ELLs), struggle with the

reading material assigned in their respective nursing courses. Furthermore, these students are challenged by the high level vocabulary presented throughout course materials. The following extract, from a textbook that is widely used in a number of first-year Bachelor of Nursing courses, highlights some of the challenges faced by learners in this study's context:

Critical thinking is an intentional higher level reasoning process that is intellectually delineated by one's worldview, knowledge, and experience with skills, attitudes, and standards as a guide for rational judgement and action. (Berman & Snyder, 2012, p. 163)

Navigating through uncommon collocations (e.g. intellectually delineated), and infrequent lexical items (e.g. worldview) not appearing on either the General Service (West, 1953) or Academic Word Lists (Coxhead, 2000) embedded within a complex sentence construction may discourage ELLs. Such discord between student reading ability and academic text level is likely to be a considerable barrier to student learning. With regard to this, it has been noted that ELLs, in particular, require additional scaffolding when negotiating specialized language and concepts found in academic discourse due to its informational density and differentiation from recognizable spoken English (Fillmore & Fillmore, 2012). Thus, the need to assist students in navigating and comprehending academic text is a high priority at the institution and the impetus for this study.

The Literature Review

Arab English Language Learners' Approach to Reading

A first step in approaching strategies to improve Arabic L1 English Language Learners' (ELLs) reading skills is to identify common trends that may provide obstacles in understanding English text. Although the literature reviewed appears limited in terms of studies conducted in Qatar, a considerable amount of research has focused on the difficulties Arab ELLs face in approaching English vocabulary. Hayes-Harb (2006) observed that most "existing work in this area has looked to higher level aspects of reading such as, familiarity with discourse structure and cultural knowledge to explain native Arabic speakers' ESL reading difficulties" (p. 321). However, as Hayes-Harb indicates, problems in lower level processing, including letter recognition and word identification, can also undermine the ability to understand text. In relation to this present study, it is thought that a focus on the lower level influences, specifically phonemic awareness, may be a root cause of students' difficulties in understanding academic text.

Research on word error trends has developed significantly over the past twenty years in relation to the identification of consonant combination structural patterns inherent in morphologic and semantic groupings in the Arabic language (Abu-Rabia & Awwad, 2004; Al-Sulaimani, 1990; Hayes-Harb, 2006; Ryan & Meara, 1991). Studies in the area of isolated word recognition in skilled readers

of Arabic has identified that the absence of short vowels results in a reliance on morphological understanding (Abu-Rabia, 1998, 2001, cited in Abu-Rabia & Awwad, 2004). Ryan and Meara (1991) provide strong evidence that Arab ELLs' reading is obscured by vowel errors made as a result of the dependence on consonant construction. The absence of short vowels in the L1 results in Arab ELLs relying heavily upon consonant structures when approaching English texts.

The implications of the potential negative transfer that lower level reading skills had on Arab ELLs' reading difficulties was further explored by Hayes-Harb (2006). Building upon and revealing limitations from the earlier Ryan and Meara (1991) study, Hayes-Harb (2006) found that "native Arabic speakers exhibit exceptional treatment of vowel letters in English texts compared to both native English speakers and non-Arabic ESL learners" (p. 335). This finding was attributed to the minor presence of vowels in the Arabic letter system which placed importance on the possible role of transfer in Arabic speakers' approach to the English alphabet.

Phonemic Awareness and Phonological Awareness

The metalinguistic category known as phonological awareness refers to cognizance of speech sounds and therefore subsumes phonemic awareness. Phonemic awareness (PA) describes the capability to recognize, identify and deploy speech sounds. The focus of phonological awareness on larger components of speech, such as onset and rime, can be distinguished from PA's particular emphasis on phonemes, which are the smallest components of speech (Cunningham, Cunningham, Hoffman & Yopp, 1998). The National Reading Panel's definition of phonemic awareness is "the ability to focus on and manipulate phonemes in spoken words" (National Institute of Child Health and Human Development, 2000, p. 823). Indeed, capability for grapheme-phoneme manipulation is a key indicator of PA (Ehri et al., 2001). However, for the purposes of surveying the literature, this study follows Dellicarpini (2011) in fusing phonological awareness and PA, given the overlap of the two in the literature.

Phonemic Awareness and Reading

Studies have shown PA to be a significant predictor of reading ability in children (Burgess, 2006; Ehri, 2004; Goldstein, Fabiano & Washington, 2005; Lonigan, 2006; Troia, 2004; Yeung, Siegel & Chan, 2013) and a contributor in numerous ways to learning to read (Ehri, 1994; Ehri et al., 2001; Morris, Bloodgood, Lomax & Perney, 2003). Literature regarding the benefits of PA are not limited to studies of early reading in English, but also include studies of children learning to read Arabic (Abu-Rabia, Share, & Mansour, 2003), Korean (Kim & Davis, 2004), Latvian (Sprugevica & Torleiv, 2003), and Spanish (Carrillo, 1994). Further, evidence points toward positive cross-linguistic transfer from first language PA to second language reading (Gottardo, Yan, Siegel, & Wade-Woolley, 2001; Gottardo, 2002; Yeung & Chan, 2013), and to strengthen learning outcomes in contexts where English is being learned as a

second or foreign language (Cheung et al, 2010, Johnson & Tweedie, 2010; Keung & Ho, 2009; Lesaux & Siegel, 2003; Stuart, 1999; Takeda, 2002; Yeung, Siegel & Chan, 2013).

Adult Readers and Phonemic Awareness

While the causal association between reading and PA has been strengthened over time (Dellicarpini, 2011), as Taylor (2008) observed, most of the literature available in the general area of phonological awareness has focused on children and adolescents, and this appears to be the case even more so with PA. Some contributions in this regard include Dellicarpini's (2011) study of adult ESL learners in the USA, and Durgunoglu and Oney's (2002) investigation of adult learners in Turkey. In both studies, positive effects of PA instruction for adult learners were demonstrated.

As illustrated by the studies above, the benefits of PA in reading acquisition appear well-established for children, in English and in other languages, and further research shows similar findings with adult learners. However, concerns have been expressed about the nature of controlled-vocabulary texts and how they tend to appear childish to beginning adult readers (McShane, 2005). In this regard, improving phonemic awareness skills may appear irrelevant to learners in the process of pursuing a university degree since they are interacting with academic text. Nonetheless, the researchers' decision to proceed was guided by the conviction that extending the focus of PA research to adult learners may have an advantage. An adult learner demographic may be able to utilize and learn from shorter periods of research treatment due to their more developed metacognitive skills (Taylor, 2008).

Conceptual Framework

The effective alignment between an IBC and its host nation depends heavily on the ability of the IBC to align its own programs to the needs of its surrounding region. In Qatar, for example, numerous IBCs have been established throughout the past decade to facilitate moving the nation towards "a knowledge based economy" (Pillars of Qatar's National Vision 2030). However, the long-term success and sustainability of an IBC, and any meaningful contributions it might make to its host nation, depends upon the alignment of the abilities of the local pre-tertiary education system's graduates, and the expectations of the foreign institution's branch campus. In Qatar, despite efforts to improve K-12 learning outcomes, published reports and literature question whether graduates' skills are sufficient for success within their state funded and regionally located IBCs (Stasz, Eide, & Martorell, 2007; Telafici, Martinez, & Telafici, 2014).

Where such educational misalignments exist, it is essential that IBCs are able to identify and effectively address them, as they are potential threats to both student and institutional success. Currently, every IBC in Qatar has its own academic skills preparation program, a large component of which is language focused. This indicates that gaps exist between local K-12 graduates' language

competencies and those required by the IBCs. It is the responsibility of the IBCs to identify and address these language competency gaps which impede student success in their programs.

Constructive Alignment Theory

Constructive alignment theory (Biggs, 1996; Biggs & Tang, 2011) provides an effective pedagogical framework for developing and implementing educational efforts at IBCs intended to bridge student competency gaps. Biggs and Tang (2011) conceptualized a reiterative cycle of identifying intended learning outcomes (LOs), developing teaching and learning activities to achieve these outcomes, and evaluating evidence as to whether the outcomes have been attained.

The EAP program at the institution of the current study has articulated the following reading LO: students who complete the EAP program have the ability to identify, understand, and utilize key concepts and information in the reading materials in their initial nursing program courses. Ongoing efforts in developing and implementing effective learning activities for students, via both curricular and extra-curricular means, is intended to improve skills relevant to the LO. Evidence of students' reading ability is gathered, whether through EAP course assessments (e.g., assignments or exam results) or other means (e.g., focus groups with nursing instructors). Periodic review of this evidence informs future revisions of not only the teaching and learning aspect of the model, but potentially also changes to the learning outcomes, or how they are assessed. Greater alignment between the intended outcomes of the program, teaching and learning activities, and assessment methods can be achieved through each iteration of the model.

While this framework is typically discussed with regard to identifying and ensuring course, program, and institutional LOs are met, it can also be used to guide alignment efforts at a smaller scale, such as piloting alternative pedagogical techniques. Table 1 presents how this study utilizes this framework.

Table 1. Alignment Model for the Current Study

Pilot Learning Outcomes	Teaching and Learning Activities	Assessment
Improved vowel recognition in academic English text	Direct phonemic awareness instruction (online instructional reading program)	MVI pre- and post-test results
Improved ability to understand academic English text		C-test pre- and post-test results

Should assessment outcomes from the missing vowel identification (MVI) test and the C-test (a type of cloze test) pre-/post scores indicate direct PA

instruction contributed to significant improvements in the intended learning outcomes (improved vowel recognition and ability to understand academic text), this may warrant incorporating the technique in a larger scale, such as in EAP courses and/or through extra-curricular opportunities. As such, the technique would be incorporated into the teaching and learning component of the program-level version of the model (Table 1). Subsequent assessment efforts could further inform ongoing evaluation of the technique and its contribution to reducing the misalignment between the reading skills students come to the institution with, and those they need to be successful in the nursing program.

Purpose of the Research

The main purpose behind undertaking this study is to evaluate the effectiveness of employing direct phonemic awareness (PA) instructional methods and techniques to improve student vowel recognition and ability to comprehend academic English text. Improvements in this area may increase Arabic ELLs' understanding of academic text thus better preparing them for meeting the overall objectives of the nursing program. Previous research has indicated that the impact of direct PA instruction on the acquisition of children's phonemic awareness is large and significant (Ehri, Nunes, Stahl & Willows, 2001; Johnson & Tweedie, 2010; Scarborough, Ehri, Olson & Fowler, 1998; Stuart, 1999). There has also been evidence of improved student performance in overall reading ability with a concerted focus being placed upon direct PA instruction (Chiappe, Siegel & Gottardo, 2002; Takeda, 2002). If slight improvements can be realized in reading skills amongst a more mature learner demographic, the teacher-researchers of this study feel that alignment with regard to reading outcomes in the EAP program could be strengthened.

The Research Question

The research question for this investigation follows and extends from the rationale based in a previous study conducted by Taylor (2008). Whereas the Taylor (2008) study focused on orthographic and phonological awareness among native (L1) Arabic English as second language (ESL) learners, this present study focuses on the impact PA has on the ability to comprehend academic text amongst a similar linguistic target group of learners. This study's research question is as follows: Does direct phonemic awareness instruction assist primarily Arabic L1, adult EAP students preparing for studies in an English-medium nursing baccalaureate program in achieving a statistically significant gain in vowel recognition, and consequently the ability to comprehend academic English text?

Methods

This is a quantitative, quasi-experimental study of direct phonemic awareness instruction. Research ethics clearance for data collection was obtained through the institution's Research Ethics Board.

Participants

All 67 study participants involved in this study were students in the EAP program of a Canadian university's IBC in Doha, Qatar. Participants reflected a variety of demographic characteristics: 96% female; 21% between the ages of 17-24 years old, 69% 25-35, 6% 36-45, and 1% over 46 (3% did not provide an age range); all had been in the program 1 year or less. Participants' self-identified their first language as: Arabic (88%), Persian (4%), Somali (3%), and others (4%). Participants were evenly divided across the EAP program, with 29, 25, and 24 in Levels 1, 2, and 3, respectively. In total, 31 participants were in classes receiving treatment, and 36 in classes designated as control groups.

Measures

The teacher-researchers' choice of the two measures used for this study was influenced by previous studies. The first instrument (appendix A) was the MVI test (Ryan & Meara, 1991), conceived to evaluate the hypothesis that Arab ELLs rely heavily on consonant strings in reading English texts. Following the original study, the researchers randomly selected 100 General Service List (GSL) words (West, 1953), and deleted vowels from the 2nd, 4th, 6th and 8th positions of 15 words each. 40 words were presented without vowel deletions. Study participants were shown PowerPoint slides at 1-second intervals with the correct spelling, followed either by the same word with a deleted vowel, or the word again in its correct form (see Table 2, below). Participants were asked to indicate whether the second word presented was the same (S) or different (D) than the first word.³³

Table 2. Missing Vowels Identification (MVI) Test – Examples of Presented Stimuli

Word (1st presented stimulus)	GSL Number	Vowel deletion	2 nd presented stimulus
determine	355	2 nd position	dtermine
dependent	835	4 th position	depndent
marriage	855	6 th position	marrige
possible	175	8 th position	possibl
attention	613	n/a	attention

The second instrument (appendix B) was a C-test developed with texts from the four levels of the EAP program. C-tests have demonstrated validity as instruments measuring global language ability (Babaii & Ansary,

2001; Connelly, 1997; Dornyei & Katon, 1992; Eckes & Grotjahn, 2006; Klein-Braley, 1997). Adhering to the principle of reduced redundancy (Babaii & Ansary, 2001; Klein-Braley, 1997; Spolsky, 1973), C-tests typically delete the second half of every second word in 4-6 authentic texts. Beginning with word two in the second sentence, test-takers are asked to supply the missing information, calling upon both previous linguistic knowledge and contextual clues, whether grammatical, phonological, collocational or others (Klein-Braley, 1997). The researchers followed Klein-Braley's (1997) suggested procedures for C-tests; extracts from the texts used are shown in Table 3.

Table 3. Example Extracts from C-tests

EAP program level	C-test extract
1	We are the children of Korphe. We live in a village in the mountains of Pakistan. Our fami__ grow a__ gather t__ food w__ eat. Our moth__ weave a__ sew t__ clothes w__ wear.
2	There is a constant need for new drugs. This i__ because th__ is __ lot w__ don't kn__ about hu__ biology, th__ are st__ many illn__ we can__ cure, a__ new illn__ appear a__ the ti__ while exis__ medicines lo__ their effect__.
3	Nurses have a moral and ethical obligation to advocate for health and well-being on behalf of individual clients and for social justice on a broader level. In th__ role a__ advocates, nur__ must add__ systemic iss__ that opp__ marginalized gro__, which incl__ those liv__ in pove__, the elde__, people wi__ mental illn__, the home__, visible minor__, children, a__ people wi__ disabilities. ⁱ
4	Most scientists agree that the main safety issues of genetically engineered crops involve not people but the environment. Allison Snow i__ a plant ecol__ at t__ Ohio State University kn__ for h__ research o__ "gene flow," t__ natural move__ of pl__ genes fr__ one popul__ of plants t__ another.

The C-test method was selected for a number of reasons. Numerous studies have found agreement between C-test results and various assessments of ELL listening, speaking, writing, and reading macro skills (for example, Connelly, 1997; Dornyei & Katona, 1992; Eckes & Grotjahn, 2006). Beyond those four macro-skills, research also indicates C-tests access competencies in: lexis (Babaii & Ansary, 2001; Eckes & Grotjahn, 2006); grammar (Babaii & Ansary, 2001); and language processing above, at, and below the sentence level (i.e., macro- and micro-processing) (Babaii & Ansary, 2001; Dornyei & Katona, 1992).

While the instrument does not give a differentiated estimate for any particular subskill involved in recreating the original texts, it does provide a composite index for text-related skills working in unison, including lower- and upper-level language processing. As understanding the passages of the instrument is necessary to reconstruct the altered texts, improvements in post-test results would be evidence of gains in participants' ability to comprehend English text. The intention was to use the MVI procedure as a more direct indicator of PA instruction's impact on vowel recognition abilities, while the C-test provided insights as to whether or not PA instruction led to gains in overall text understanding.

Treatment

At the beginning of the semester, both treatment and control groups received pre-tests of both measures. Both groups received regular curriculum instruction associated with their level of the EAP program. Additionally, treatment group students completed designated sections of Reading Horizons™, a commercially-available, online, direct phonemic awareness instruction program (Reading Horizons, 2014). Biggs (2003) observed the importance of selecting learning strategies that maximize student engagement. The Reading Horizons™ program was considered appropriate because of its "multisensory delivery method" (n.p.) that fosters an engaged and interactive learning experience.

At the end of a 10-week period, participants repeated the MVI and C-test measures. Pre- and post-test results were used to compare gains made by control and treatment groups, and thereby estimate whether the use of PA instruction led to significantly greater improvement on vowel recognition and ability to comprehend academic English text.

Data Analysis

For both the MVI and C-test procedures, analysis of covariance (ANCOVA) was used to test for a significant group effect on post-test results. ANCOVA is useful in situations involving pre- and post-test outcomes, particularly when random assignment to treatment and control groups is not possible, as it limits the influence of any pre-existing group differences (as indicated by pre-test scores, the covariate of the ANCOVA). The result is an estimate of group effect, while controlling for the influence of any pre-treatment group difference. Where a significant group effect was found, follow-up post-hoc analysis investigated the statistical significance of the group mean differences. Finally, partial eta squared (η_p^2) was used to assist interpretation regarding the size of any effect found to be statistically significant.

Results

Observed pre- and post-test means for treatment and control groups are reported for both instruments in Table 3. From the pre-test scores of both instruments we see a pre-existing group difference – mean results of the treatment group were higher than the control group before the treatment began.

This highlights the importance of the ANCOVA method in testing for a significant group effect, as it provides estimates of effect size while controlling for such pre-treatment differences.

Table 4. Means and Means Differences for Treatment and Control Groups on Both Instruments

	<i>n</i>	MVI			C-test		
		Pre-test	Post-test	Mean Difference	Pre-test	Post-test	Mean Difference
Treatment	31	87.90	90.97	3.07	44.54	54.61	10.07
Control	36	81.36	80.08	-1.28	38.86	46.53	7.67

Effect of direct Phonemic Awareness instruction on MVI results

Observed mean scores for the MVI post-test, as well as post-test means adjusted for pre-treatment differences between groups, are reported in Table 4. From the adjusted means, we see that participants who received direct phonemic instruction scored higher on the MVI post-test ($M = 88.96$) than those in the control group ($M = 81.76$).

Table 5. Observed and Adjusted Means for MVI Post-test Results, by Group

Group	<i>n</i>	Unadjusted		Adjusted	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SE</i>
Treatment	30	90.967	6.133	88.956	1.498
Control	36	80.083	11.520	81.759	1.360
Difference		10.884		7.197	

A visual inspection of the scatterplot of pre- and post-test MVI results indicated a linear relationship between the two variables, a necessary precondition for analysis of covariance. An initial ANCOVA was conducted which included testing for a potential interaction between the dependent variable (group) and the covariate (MVI pre-test scores). The interaction term was not statistically significant, $F(1, 62) = .420$, $p = .936$. As such, this term was removed from the subsequent ANCOVA, results of which are reported in Table 6.

Table 6. ANCOVA and Post-hoc analysis for Group Effect on MVI Post-test

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η_p^2
MVI Pre-test (covariate)	1766.604	1	1852.414	28.041	.000	.308
Group (treatment/control)	752.896	1	1121.403	11.950	.001	.159
Error	3969.112	63	1766.604			
Total	484864.000	66	752.896			
Corrected Total	7673.939	65	63.002			
Post-hoc analysis	Mean difference	<i>SE</i>	<i>p</i> ^a			
(Treatment-Control)	7.197	2.082	.001			

Note. a. adjustment for multiple comparisons: Bonferroni

Results of the ANCOVA suggest that, after adjusting for pre-intervention differences, a statistically significant group effect was found between MVI post-test results of participants in the treatment and control group, $F(1, 63) = 11.950$, $p < .001$. This indicates that students receiving direct PA instruction made significantly greater gains in vowel recognition skills (as measured by the MVI) than control group peers. Further, partial eta squared estimates for group effect ($\eta_p^2 = .159$) fall within the range Cohen (1988; Ellis, 2010) describes as indicating a large effect. As the analysis involves a single factor, η_p^2 values are essentially the same as eta squared (Richardson, 2011), and therefore, can be interpreted as the amount of variance in the dependent variable accounted for by variance in the predicting variable. As such, outcomes indicate that whether or not students received direct PA instruction accounted for approximately 16% of the variance observed in MVI post-test scores.

Effect of Direct Phonemic Awareness Instruction on C-test Results

Observed and adjusted post-test means for the C-test, for both treatment and control groups, are reported in Table 6. From the adjusted means, we see that participants who received direct phonemic instruction scored higher on the C-test post-test ($M = 52.57$) than those in the control group ($M = 48.29$).

Table 7. Observed and Adjusted Means for C-test Post-test Results, by Group

Group	n	Unadjusted		Adjusted	
		M	SD	M	SE
Treatment	36	54.61	11.26	52.57	1.55
Control	31	46.53	13.37	48.29	1.44
Difference		8.08		4.28	

A scatterplot of results confirmed a linear relationship between pre- and post-test scores for both the treatment and control groups, a pre-requisite for analysis of covariance. An initial ANCOVA, conducted to test for a possible interaction between group and C-test post-scores, found the interaction term was not significant, $F(1, 63) = .045, p = .832$. This term was subsequently removed and the ANCOVA rerun, results of which are reported in Table 7.

Table 8. ANCOVA and Post-hoc Analysis for Group Effect on C-test Post-test

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η_p^2
MVI Pre-test (covariate)	5415.979	1	5415.979	74.569	.000	.538
Group (treatment/control)	291.464	1	291.464	4.013	.049	.059
Error	4648.348	64	72.630			
Total	180458.000	67				
Corrected Total	11153.164	66				

Post-hoc analysis	Mean difference	<i>SE</i>	<i>p</i> ^a
(Treatment-Control)	4.28	2.13	.05

Note. a. adjustment for multiple comparisons: Bonferroni

Results of the ANCOVA suggest that, after adjusting for pre-intervention differences, a statistically significant difference existed between the C-test post-test results of participants in the treatment and control groups $F(1, 64) = 4.01, p < .05$. This indicates that students receiving direct PA instruction made significantly greater gains in skills that allowed them to understand and reconstruct the altered texts of the C-tests. Partial eta squared estimates for group effect ($\eta_p^2 = .059$) are at the lower end of the range Cohen (1988; Ellis, 2010) describes as suggesting a moderate effect. As the model only involves a single predictor, this η_p^2 value suggests that whether students received direct PA instruction or not accounted for approximately 6% of the variance observed in C-test post-test outcomes.

Results suggest direct phonemic instruction lead not only to substantial gains in vowel recognition skills, but also to moderate gains in skills allowing ELLs to navigate and reconstruct the altered and predominantly academic texts of the C-test. Both outcomes would seem to support the position that direct PA instruction may help improve the institution's EAP students' abilities in navigating and comprehending academic English text. The implications of these findings appear to support the use of constructive alignment theory as a guide for examining the effectiveness of piloting alternative pedagogical techniques that enhance students' learning outcomes in this context.

Discussion and Conclusion

While this study is not without its limitations, discussed at relevant points throughout this section, the findings bear potentially important implications for a number of stakeholders. These include the EAP program at the host institution, institutions in a similar context and/or working with students from Arabic

language backgrounds, and for (applied) linguists interested in orthographic and phonological issues, particularly amongst Arabic L1 ELLs.

Results of the pilot indicate ten hours of direct PA instruction, over a ten-week period, led to substantial gains in vowel recognition and moderate gains in ability to comprehend academic English text. This is evidence that PA instruction may be a valuable tool in addressing the top language-related competency gap identified in a recent needs analysis at the institution – difficulties ELL students demonstrate in understanding academic nursing text. However, as with any pilot study, there are important caveats to consider as well.

A common concern in educational research, including this investigation, is the difficulties faced in isolating variables and, as a result, interpreting causality. Was it the phonemic awareness instruction that led to the increased effect size in global language skills, or could this be accounted for by the fact that treatment participants spent one more hour per week practicing English in general through the Reading Horizons™ program?

In addition, factors related to the nature of the institutional program under study need to be considered: the single faculty subject area (EAP students preparing for a Nursing program) from which participants were drawn may limit generalizations to students in other programs; and participant gender distribution (96% female). Future research might attempt to validate these findings across a wider range of post-secondary majors, and more balanced gender sampling.

Furthermore, the researchers acknowledge the potential conflict inherent in their dual roles as observers and participants as the research team served as instructors either of treatment or control group classes. However, post-positivist critiques of the interrelationship between research and researcher informed the study. Such an approach values the fact that the researcher is part of the environment being researched (Cohen, Manion, & Morrison, 2007).

Another issue, not addressed in the current study, is whether or not the concern regarding potential frustration or resentment adult learners might feel towards direct PA tuition, perhaps perceiving it as ‘childish’, for example. This is something future research should address, as it potentially impacts both the perception of the method by students and its usefulness.

While important, these limitations must be viewed within the larger context of the institution. Students being able to read, understand, and utilize information in the course readings encountered in the nursing program is an identified learning outcome of the EAP program. However, a recent needs analysis clearly establishes there is an ongoing competency gap in this skill area amongst EAP graduates. In reference to developing constructive alignment in a nursing skills curriculum, Joseph and Juwah (2012) observed the value of working “backwards” in determining that an appropriate “end point” has been achieved (p. 53). In this context, student difficulty in navigating and comprehending course academic texts was identified as the main language-related barrier to student success. As such, innovative teaching and learning methods that could help reduce this competency gap were very much in need.

Should fellow EAP instructors at the institution find the outcomes of the pilot compelling, the next step in the program's curriculum development model would be to incorporate direct PA tuition (whether through Reading Horizons™ or through some other form) as part of the curricula of one or more courses, or throughout the entire program. This would mean future and ongoing assessment efforts could provide more data and insights into the effectiveness of the method, with larger participant numbers and modified methodology intended to address the caveats above.

Future outcomes related to improved text understanding due to direct PA instruction, would certainly be of interest to any institutions or educators serving a group of predominantly Arabic L1 ELLs. Considering the number of IBCs in the Middle East, and academic institutions in other nations which accept and serve students with Arabic language backgrounds, there is clearly a need for methods that can help address the issues encountered by these learners when navigating through English academic text. There may also be implications for assisting those from language backgrounds other than Arabic, but whose L1 writing method similarly leads to the 'skipping' of vowels or other aspects of written English.

Outcomes from the current study contribute to the literature focusing on lower-level aspects of reading (such as vowel recognition, and as opposed to higher-level factors, such as cultural knowledge) in attempting to account for Arabic L1 students' difficulties reading in English. Results would seem to support Hayes-Harb's (2006) contention that lower level processing issues, particularly 'skipping' vowels (Hayes-Harb, 2006; Ryan & Meara, 1991) is a root impediment to understanding academic English text. Not only did direct PA instruction appear to significantly, and substantially, improve students' vowel recognition in English text, it also resulted in improved outcomes on C-tests, an instrument requiring the ability to both understand and reconstruct academic English text. Additionally, this research contributes to a very limited number of studies investigating the effectiveness of PA instruction with adult learners. Results would seem to support findings from previous research that adult ELLs' reading skills are enhanced by direct PA instruction (DelliCarpini, 2011; Durgunoglu & Orney, 2002).

The findings of this investigation indicate that direct instruction in phonemic awareness lead to substantial gains in vowel recognition and a moderate increase in ability to comprehend academic text amongst a sample of predominantly Arabic L1, adult English Language Learners (ELLs). Overall, results of this study suggest that direct instruction in phonemic awareness may be a helpful strategy in initiating a better understanding of university-level texts for learners of English.

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APPENDICES

APPENDIX A: The Invisible Vowel Test

The following screen shots offer proposed student instructions and examples from the invisible vowel test PowerPoint slides:

1) medicine © 2010 John & Mary LLC	1) medcine © 2010 John & Mary LLC	Question 1): Are the 2 words the same? Circle: S = SAME (the 2nd word is the same as the 1st) D = DIFFERENT (the 2nd word is different from the 1st) © 2010 John & Mary LLC
2) mother © 2010 John & Mary LLC	2) mothor © 2010 John & Mary LLC	Question 2): Are the 2 words the same? Circle: S = SAME (the 2nd word is the same as the 1st) D = DIFFERENT (the 2nd word is different from the 1st) © 2010 John & Mary LLC

APPENDIX B: The Standardized C-test

Circle the information that is relevant for you in the box below:

In each reading section of the test, some letters are missing from some of the words. Use the information in the text to help you fill in the missing letters and complete the words. For example:

Male / Female
45 46 and over

Age range: 17-24 25-35 36-

EAP LEVEL: 1 2 3 4 First language: _____

Your program: BNRT PDBN Other: _____

Number of years in the EAP Program: less than one / one / two / three

There a__ many tr__ in t__ forest.

There are many trees in the forest.

If there is only a blank space (___), the word is one letter long.

If the word is more than one letter long, about half of the letters will be missing. So, the number of letters you add should be about the same as the number of letters you can see.

For example, if you see lit___, there are three letters before the blank. Therefore, your answer should be 3 or 4 letters long as well. So:

lit___ could be little, or litter, or litters

but not lite (too short) or literature (too long).

If you have any questions, ask the instructor.

You have **20 minutes** to complete the test. Make sure you **complete all 4 texts**.

You have **20 minutes** to complete the test. Make sure you **complete all 4 texts**.

Text 1

We are the children of Korphe. We live in a village in the mountains of Pakistan. Our fami___ grow a__ gather t__ food w__ eat. Our moth___ weave a__ sew t__ clothes w__ wear. W__ make o__ own gam__ and to__. We re__ books, a__ we wri__ with o__ pencils. W__

study i_ the sch__ that w_ helped t_ build. Bef__ our sch__ was
bu__, we h__ to study outside.

Text 2

There is a constant need for new drugs. This i_ because
th__ is _ lot w_ don't kn__ about hu__ biology, th__ are st__
many illn__ we can__ cure, a__ new illn__ appear a__ the
ti__ while exis__ medicines lo__ their effect__. New dr__
are tes__ on ani__, but bec__ animals' bod__ work
differ__ from ou__, if _ drug wo__ on a caged rat, it does not
mean that it will do the same for a human being.

Text 3

Nurses have a moral and ethical obligation to advocate for
health and well-being on behalf of individual clients and for
social justice on a broader level. In th__ role a_ advocates,
nur__ must add__ systemic iss__ that opp__ marginalized
gro__, which incl__ those liv__ in pove__, the elde__,

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