

Discipline-specific reading expectation and challenges for ESL learners in US universities

K. James Hartshorn
Brigham Young University
USA

Norman W. Evans
Brigham Young University
USA

Jesse Egbert
Northern Arizona University
USA

Amy Johnson
Brigham Young University
USA

Abstract

English-medium institutions of higher education host increasing numbers of English-as-a second-language (ESL) learners in the US. English language skill is vital to their progress. Previous research examined reading challenges and expectations faculty have for their first-year students within five popular majors for international students including Biology, Business, Computer Science, Engineering, and Psychology. Analyses revealed differences across majors and identified the reading expectations and challenges these first-year learners face. Building on the research, this study examines the reading expectations of faculty for their upper-division students nearing graduation. In addition to comparing the reading expectations and challenges within the same five majors, we compared professor perceptions across the baccalaureate experience. We present these findings along with observations of participating faculty across the five majors regarding the linguistic preparation of their students for professional work or graduate study within the discipline. The implications and applications of these findings are discussed.

Keywords: ESL university students, reading purposes, reading challenges, discipline-specific reading

The number of international students enrolling in colleges and universities in the United States continues to climb. A record high of nearly 974,926 international students in the US during the 2014-2015 academic year represents a 10% increase over the previous year and a 60% increase

since 2000 (IEE, 2015). While only 18% of the English-as-a-second-language (ESL) learners in the K-12 system are admitted into 4-year colleges or universities, the proportion of these students is projected to jump from just under 5% to nearly 25% by the year 2025 (Kanno, 2015). At the same time, globally mobile university students are projected to jump from 4.5 million to 8 million by 2025 (OECD, 2015). Though the United States' share of international students has been reduced as other English-speaking countries strive to become more competitive alternatives, the US has more institutions of higher learning and hosts twice the number of international students as any other nation (International Trade Administration, 2016). Thus, these predictions suggest a substantial increase in the number of international students in US colleges and universities and will likely have a dramatic impact on every aspect of the university experience.

As students' demographics shift, it is essential for institutions of higher learning to understand the needs of their prospective student populations. One area worth careful consideration is the linguistic preparation of ESL students to succeed at the university as well as the linguistic readiness of the students to effectively transition into the workforce. In a recent study, Anderson (2015) examined the reading expectations and challenges of first-year ESL learners across five of the most popular majors for international students. While this study produced important insights regarding ESL learner preparation to study in English-medium universities, it did not examine student preparation to transition into the workforce and graduate school in an English context. In an effort to further clarify the needs of these learners and the ways in which intensive English programs (IEP) and universities might help them succeed, the present study examines the reading expectations and challenges of ESL students immediately prior to graduation. In addition to comparisons at the beginning and end of the university study within the same five majors examined in Anderson's research, the present study explores the readiness of these learners to use English in graduate school and professional work within the respective fields.

Review of Literature

While the numbers of ESL students enrolled in universities in the United States continues to rise, this phenomenon is not without precedence. We have already seen the effects of similar shifts toward greater percentages of ESL learners on English-medium universities in other nations. For example, ESL learners rose to nearly 24% of the students enrolled in English-medium universities in Australia. Unfortunately, employer frustrations over the linguistic limitations of these graduates have threatened institutional reputations and precipitated demands for higher national standards and tighter regulations (e.g., Arkoudis, Baik, & Richardson, 2012). While universities, employers, and governmental entities in Australia are working together to address these challenges, it would be prudent for universities elsewhere to begin considering the implications of these trends and to plan ahead strategically to avoid similar difficulties.

One important consideration for universities regarding the ESL learners they admit is their linguistic readiness to persist toward graduation and to successfully transition into the workforce (e.g., Arkoudis, Baik, & Richardson, 2012; Galloway & Jenkins, 2009). Scholars have indicated that reading skill is vital to academic success, particularly for ESL learners (e.g., Anderson, 2015; Anderson, Evans, & Hartshorn, 2014; Grabe 2009; Horowitz, 1986; Johns, 1981). In fact, of the four language skills—reading, writing, listening, and speaking—none is perceived to be more

important by professors of first-year university students than reading (e.g., Anderson et al., 2014; Johns, 1981).

Influences on ESL Reading

In order to contextualize this study, we first examine reading and a number of factors that may impact comprehension. Reading is a highly complex endeavor. It utilizes lower-level processes such as recognizing vocabulary, syntactic parsing, and encoding. It also requires higher-level processes such as recognizing what a text is about, determining how to allocate attentional control, making decisions about how best to interpret a text, identifying inferences that can be made, and so on (Grabe, 2009, p. 21). Among factors that impact reading comprehension, some of the most salient elements are mentioned below.

Vocabulary

A review of the literature revealed important insights about second language reading. One important finding is the essential role of vocabulary development on reading comprehension. Evidence suggests that for second language readers to comprehend a text at a basic level, the proportion of unknown words they encounter must not exceed 2 to 5% of the text (e.g., Laufer, 1989; Nation, 2006; Schmitt, Grabe, and Jiang, 2011). Thus, it should not be surprising that while limited vocabulary interferes with reading comprehension, expanding vocabulary knowledge tends to enhance it (e.g., Binder, Cote, Lee, Bessette, & Vu, 2016; Ibrahim, Sarudin, & Muhamad, 2016; Martinez & Murphy, 2011; Shany & Biemiller, 2009; Webb & Chang, 2015; Zhang, 2012).

Morphology

Closely related is the need for morphological awareness or the reader's ability to effectively parse language in order to recognize, analyze, and utilize morphemes and their concomitant rules in the creation of meaning (e.g., Carlisle, 2000; Kuo & Anderson, 2006; Zhang, 2013), especially in the lower levels of reading proficiency (e.g., Bangs & Binder, 2016; Tighe & Schatschneider, 2014, 2015). In addition to being associated with vocabulary development, morphological awareness is closely tied to improved reading comprehension (e.g., Deacon, Kieffer, & Laroche, 2014; Kieffer & Lessaux, 2012; To, Tighe, & Binder, 2014). Nevertheless, evidence suggests that while second language learners make substantial progress in their explicit knowledge of morphology as they increase in proficiency, they do not develop the same kind of unconscious automaticity in their word decomposition compared to native speakers (e.g., Kraut, 2016). This, of course, may leave second language learners disadvantaged compared to their first language counterparts.

Background knowledge

Like vocabulary development and morphological awareness, background knowledge can also impact reading comprehension. Grabe and Stoller (2011, p. 284) describe background knowledge as "prior knowledge that readers utilize in interpreting a text. This includes general, cultural, and

topic-specific knowledge.” Evidence suggests that relevant background knowledge facilitates reading comprehension (e.g., Alexander, Kulikowich, & Schulze, 1994; Alfassi, 2004; Cromley & Azevedo, 2007; Kendeou & van den Broek, 2007; Stahl, Hare, Sinatra, & Gregory, 1991; Van Den Broek & Kendeou, 2008), especially when the prior knowledge can be successfully activated by the reader (e.g., Elbro & Buch-Iversen, 2013). However, second language learners may not always have the benefit of such knowledge due to limitations associated with where they come from, their prevailing cultural influences, or a lack of exposure to certain topics (e.g., Kraut, 2016).

Strategies

Another influence on comprehension is the use of strategies. McNamara (2012, p. 6) defines a reading comprehension strategy as “a cognitive or behavioral action that is enacted under particular conditions, with the goal of improving some aspect of comprehension.” Reading comprehension does not occur without effort on the part of the reader. However, strategic approaches to reading can substantially aid comprehension (e.g., Ghahari, & Basanjideh, 2016; Jafari, 2012; Yang, 2016; Wang, 2016). Evidence suggests that in some contexts effective use of reading strategies may facilitate comprehension even more than word knowledge (Nergis, 2013). Despite the importance of strategic reading, research shows that awareness of strategies may vary across contexts (e.g., Joshua, 2016), and that specific strategies need to be well aligned with individual students needs and preferences (e.g., Jones, Conradi, & Amendum, 2016; Zarra-Nezhad, Shooshtari, & Vahdat, 2015). Moreover, the effectiveness of reading comprehension strategies may decrease as the difficulty of texts increase (e.g., De Bruyne & Valcke, 2015).

Working memory

Working memory also plays an important role in second language reading comprehension (e.g., Erçetin & Alptekin, 2013). Working memory is contrasted with long-term memory and is often described as a “limited-capacity system” since storage is limited, connections to long-term memory are limited, and simultaneous processing is limited (Grabe, 2009, p. 32). As language proficiency develops, more processes become automatized and free up more working memory to facilitate reading comprehension (e.g., Erçetin, 2015). However, since second language learners tend to process language differently compared to native speakers, they may lack the working memory needed to read effectively in the second language (e.g., Erçetin, 2015; Hopp, 2016; Park, 2016).

This discussion illustrates that, among other things, reading comprehension depends upon adequate knowledge of vocabulary and morphosyntactic patterns, ample background knowledge of text content, effective application of personalized reading strategies, and sufficient working memory. In addition, it also suggests that second language learners may struggle with each of these. Unfortunately, admission into an English-medium university does not alter these reading requirements for ESL learners, and their associated challenges may linger well after matriculation (e.g., Kanno & Grosik, 2012). The reading skills for many such learners are still being developed, and they are likely to benefit from ongoing support as their reading skills are refined.

The Previous Study

We need a much better understanding of the specific expectations and challenges ESL students face in their university experiences once they have been matriculated. Such insights could help researchers and practitioners better determine the learning needs of their L2 readers. In an effort to clarify the challenges and expectations of such learners, Anderson (2015) focused on reading within the first year of major study. He asked professors to identify the volume of reading they expected within the most popular majors for ESL students and examined whether there were differences across majors. Rather than to ask for data specific to ESL learners, Anderson simply asked professors to respond to questions about reading in their introductory courses for all enrolled students. He then examined the reading purposes across majors along with the greatest reading challenges the students faced as perceived by the professors of their first-year courses within the respective majors.

Anderson (2015) gathered data from 157 first-year professors representing 114 departments across 5 of the most popular majors for ESL learners. These included biology, business, computer science, engineering, and psychology. These data were gathered from among schools in the United States who host the greatest numbers of international students (Farrugia & Bhandari, 2013).

Anderson (2015) found statistically significant differences across majors for the volume of reading expected. On average, reading volumes per class were the greatest for business majors at nearly 85 pages per week, followed by Psychology majors at 61 pages per week. Fewer pages were expected from biology majors at 45 pages per week, engineering majors at 42 pages per week, and computer science majors at 38 pages per week. These latter three differed statistically from the volume expected of business majors but not the volume expected of psychology majors. It was not surprising that computer science majors did the most digital reading at nearly 71% compared to the other majors that differed statistically from computer science including biology at 42%, engineering at 38%, business at 32%, and psychology at 24%.

Though there were no differences across majors for the various reading purposes identified by the first-year professors, Anderson (2015) presented the following 12 expectations in order of importance based on frequency of mention: understanding course content, applying new knowledge, preparing for lectures or labs, engaging in critical thinking, synthesizing information, understanding genre-specific information, learning and using vocabulary, demonstrating knowledge through writing, understanding research, conducting research, becoming strategic readers, and using the text as a resource.

The final emphasis of his research focused on the reading challenges the students faced within the five majors. While no statistical differences were found across majors, he found 15 challenges identified by the first-year professors regardless of major. These are included in order of importance based on frequency of reference: An inability to read discipline-specific genre material, a lack of motivation, an inability to read strategically, not taking adequate time to complete the reading, not understanding key vocabulary, being an ESL learner, a lack of academic preparation, comprehension problems, inability to engage in reading to learn, difficulty

reading graphs, inability to handle the amount of reading, a lack of critical thinking skills, relying alone on lectures to get new information, difficulty following directions, and difficulty accessing the texts needed for the reading.

Based on the findings of this work, Anderson (2015) made four recommendations largely directed to IEPs that prepare students for university study. First, he recommended that students engage in larger volumes of reading, particularly more extensive reading of expository texts. Second, students need more opportunities to practice reading the kinds of discipline-specific genres they are likely to be assigned as first-year university students. Third, teachers need to identify ways to help facilitate student motivation and to help students assume responsibility for their own learning. Fourth, teachers should help students become more strategic in the way they approach reading by teaching reading strategies and helping them to practice applying those strategies.

While each of these recommendations for IEPs are quite useful and could impact learning in positive ways, many questions remain. For example, it is unclear whether the importance of specific language skills vary across majors or shift over time as students move through their undergraduate programs. With regard to reading, we do not know whether the reading volumes identified for first-year students remain constant or change as students near graduation. At the same time, it would be helpful to know whether the types of reading expectations and challenges observed by professors differ across major and over time.

In addition to the work done in IEPs to prepare learners for university study, scholars have begun questioning whether the language development that occurs after matriculation is adequate to ensure that the students can persist to graduation and successfully transition into the workforce (Andrade, Evans, & Hartshorn, 2015, 2016; Arkoudis et al., 2012). If ESL students are not being prepared with adequate language skills, both IEPs and the universities themselves may need to reexamine their current practices and consider where adjustments may be most appropriate.

Research Questions

With the intent of building on the research conducted by Anderson (2015), we articulate the following research questions:

1. How important to their major courses do professors perceive reading to be compared to writing, listening, and speaking, and do these levels of importance differ from first-year courses to upper-division courses?
2. How much reading is expected of students in their upper-division courses, and how does this reading volume compare to first-year major courses and across majors?
3. What expectations do faculty have for reading in their upper-division courses, and how do these expectations compare to those associated with the first-year courses within each major?
4. What are the greatest reading challenges upper-division students encounter within their major, and how do these compare to challenges in the first-year courses in each major?
5. How prepared are upper-division students in these five majors for professional work or graduate studies within the discipline in terms of their reading skills, and how does the level of preparation compare to that of the native English speaking students?

Method

In an effort to answer our research questions, we created a survey that shared many of the same items as those used in the first study (Anderson, 2015) along with additional items of importance to this study (see Appendix). Unlike Anderson's study, however, we asked professors to respond to the questions as they related specifically to the ESL learners in their classes. Data collection proceeded in three distinct phases. First, we worked from the same list of schools used in the first study, which were selected because they hosted the greatest number of international students according to Open Doors (Farrugia & Bhandari, 2013). We identified culminating courses within each major at each of these institutions. This was done using online degree requirements, programs of study, course descriptions, and some direct communication with relevant faculty. We then identified faculty who taught those courses, and attempted to contact each by telephone to extend a personal invitation to participate in our online survey. Second, because contacts and responses were limited, we contacted professors by either leaving phone messages or emails inviting them to participate. This yielded greater results but was still insufficient for our needs. Finally, we identified all faculty in the departments at each school and sent them email invitations to participate. This final step resulted in a satisfactory return of surveys to answer our research questions. Once data were collected, we analyzed it and compared it with Anderson's (2015) data.

Participants

Data were analyzed from 141 different professors from 80 different departments for the five majors used in the previous study (i.e., biology, business, computer science, engineering, and psychology). In some instances, multiple individuals responded from the same institution resulting in overlaps of varying sizes for each major at each institution. This information is summarized in Table 1, which combines first-year participant information from the first study (S1) with the new participant information for this second study (S2).

Table 1. *Participating professors and departments by major*

Majors	Individuals		Departments		Overlap	
	S1	S2	S1	S2	S1	S2
Biology	37	25	24	14	35%	44%
Business	35	39	24	23	31%	38%
Computer Sci	23	22	21	16	9%	27%
Engineering	34	31	24	15	29%	51%
Psychology	29	24	21	12	25%	50%
Totals	157	141	114	80		

Analyses

In order to answer our research questions, the survey was designed to allow us to identify and report descriptive statistics, analyses of variance, post-hoc tests, and effect sizes. Thus, effect sizes accompany p -values including partial eta squared (η_p^2), where small = .01-.05, medium = .06-.13, and large \geq .14; and Cohen's d , where small = .20-.49, medium = .50-.79, and large \geq .80 (Huck, 2012).

Results

Several analyses were used to help answer our research questions dealing with the relative importance of reading, the volume of reading, reading expectations and challenges, and professors' perceptions of student preparation for graduate school or work within the major field based on reading skill. Due to the many facets of the results presented below, this section will also provide some discussion along the way in an effort to help contextualize these findings.

The Importance of Language Skills across Majors and Time

The first research question addressed the importance of reading relative to writing, listening, and speaking as perceived by the students' professors across majors and over time. The scale included *not important* (1), *somewhat important* (2), *important* (3), and *very important* (4). No statistically significant differences were observed for skill importance by major and time, $F(12, 977) = .738, p = .715$. Despite statistical significance, no meaningful difference was detected for the importance of all skills combined over time, due to the negligible effect size, $F(1, 977) = 24.082, p < .001, \eta_p^2 = .024$. Though the effect size was small, statistically significant differences were observed across major, $F(4, 977) = 0.436, p < .001, \eta_p^2 = .041$, suggesting slightly different levels of importance for these combined language skills from one major to another.

Post-hoc tests show the perceived importance of the four, combined language skills was greatest for business ($M = 3.32, SD = .833$) compared to computer science ($M = 2.94, SD = .955, p < .001, d = .424$) and Engineering ($M = 2.98, SD = .992, p < .001, d = .371$). The four Language skills were also perceived to be more important in Psychology ($M = 3.29, SD = .930$) compared to Computer Science ($M = 2.94, SD = .955, p < .001, d = .371$) and Engineering ($M = 2.98, SD = .992, p = .001, d = .322$). These findings suggest that overall, language skill may be slightly more important in the disciplines of business and psychology.

Statistically significant differences were also observed across the specific language skills themselves regardless of time or major, $F(3, 977) = 152.997, p < .001$. Unlike the previous tests, however, this analysis produced a large effect size ($\eta_p^2 = .320$). The receptive skills of listening and reading were perceived as most important with no significant difference between the two ($p = .210, d = .224$). Nevertheless, statistically significant differences were observed between the receptive skills and the productive skills and between writing and speaking as illustrated in Figure 1, which presents means, standard deviations, p -values, and effect sizes. This view of the relative preeminence of receptive skills was consistent with findings from Johns (1981) based on the perceptions of university faculty as well as with findings from Christison and Krahnke (1986) based on the perceptions of university students.

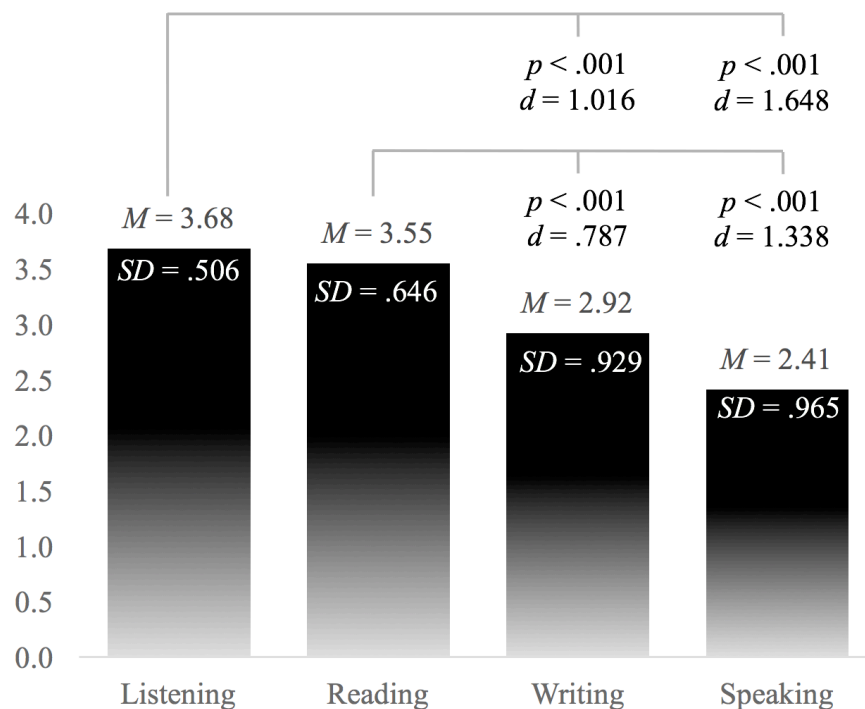
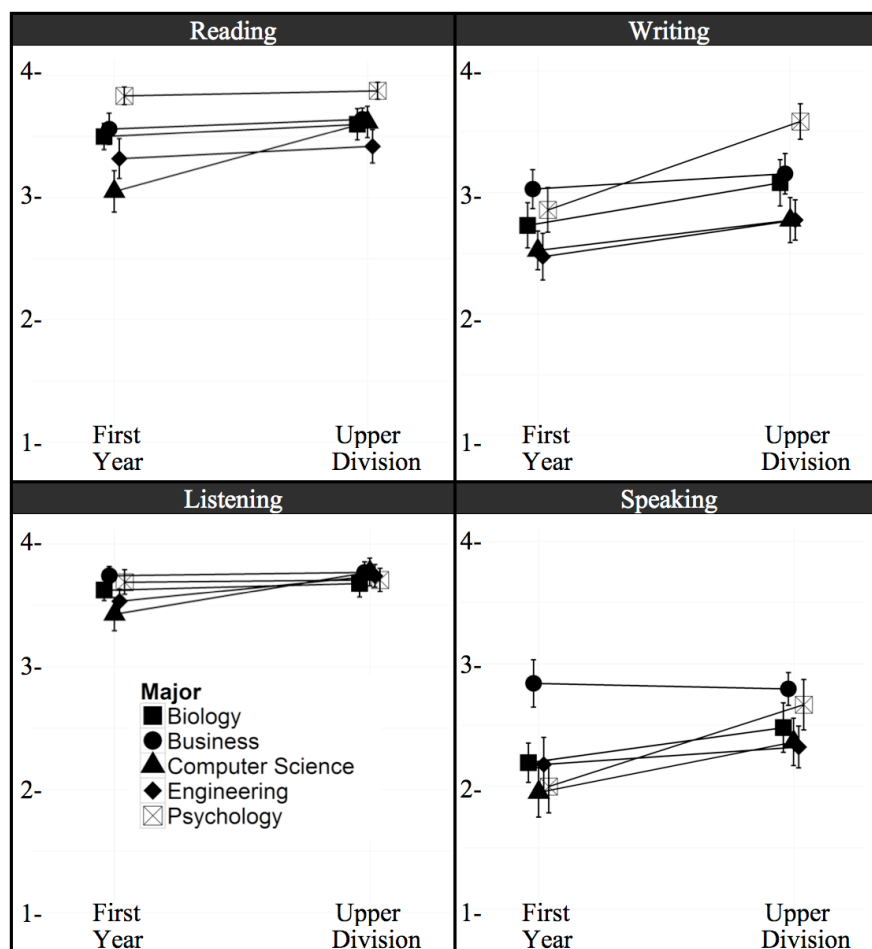


Figure 1. Relative importance of the four language skills.

Additional differences become apparent as language skills are further analyzed by major. These differences are illustrated in Figure 2 where the level of importance runs vertically (using the same 4-point scale presented previously) and time across the major program runs horizontally for reading, writing, listening, and speaking. Overall reading ranged between *important* and *very important*. While the importance of reading appears to increase as students near graduation, $F(4,243) = 5.172, p = .001$, the effect size was negligible, $\eta_p^2 = .022$. Nevertheless, reading was perceived to be much more important in psychology ($M = 3.856, SD = .331$) than in engineering ($M = 3.376, SD = .775, p = .001, d = .806$) or computer science ($M = 3.342, SD = .728, p = .001, d = .909$).

Like reading, listening was perceived to be more important than writing or speaking and had mean scores ranging between *important* and *very important* though there were no significant differences for listening across time or major. In terms of the importance of writing, there was a nearly negligible effect for time, $F(1,245) = 9.566, p = .002, \eta_p^2 = .038$, and a small but meaningful effect for major, $F(1,245) = 9.566, p = .002, \eta_p^2 = .065$. As seen with reading, writing was more important in psychology ($M = 3.244, SD = .850$) than engineering ($M = 2.642, SD = .934, p = .008, d = .674$) or computer science ($M = 2.651, SD = .806, p = .017, d = .716$). Though speaking was still rated between *somewhat important* and *important*, it was not perceived as critical compared to the other skills. Nevertheless, speaking was rated as most important for business ($M = 2.81, SD = .861$) which significantly differed from engineering ($M = 2.26, SD = .997, p = .014, d = .590$) and Computer Science ($M = 2.16, SD = .924, p = .005, d = .728$).



1 = Not important, 2 = Somewhat important, 3 = Important, 4 = Very important

Figure 2. Relative importance of the four language skills over time by major

As seen with the other language skills, the significant effect for the importance of reading over time was largely inconsequential due to the negligible effect size, $F(1,244) = 5.975$, $p = .015$, $\eta_p^2 = .024$. There also was a small but meaningful effect for major, $F(1,244) = 4.048$, $p = .003$, $\eta_p^2 = .062$, suggesting that the level of importance of reading was dependent upon which major was examined. Such findings could have important implications for linguistic preparation for university study as well as ongoing language skill development within the university.

Amount of Reading

The second research question compared the volume of reading across major and from first-year to upper-division major courses. Though differences across time and major were not statistically significant, $F(4,211) = 1.887$, $p = .114$, there was a significant decline in the overall number of pages read per week from the first year ($M = 54.67$, $SD = 39.89$) to the upper-division courses within each major ($M = 35.55$, $SD = 24.42$), $F(1,211) = 23.376$, $p < .001$. This 35% reduction in reading volume over time produced a large effect size, $\eta_p^2 = .182$. While the reasons for this decrease in reading volume are not clear from this analysis, it is possible that students may participate more in other kinds of learning activities as they near graduation. For example, they

may be involved in more writing, more group work, or more assignments that require applications of what they are learning, leaving less time for reading as the same volumes they did at the outset of their major study.

Statistically significant differences were also observed across major without regard to time, $F(4,211) = 11.718, p < .001$. These results are displayed in Figure 3, and show the highest volumes of reading in the business and psychology classes. When compared to the more than 58 pages of reading per week in business, on average the engineering and computer science students read nearly half that amount. Since these findings are based on just one of several courses in which a student might be concurrently enrolled, these differences could be compounded over a full course load to represent well over 100 pages per week. These findings suggest wide ranges in reading volumes and the need for business and psychology students to be well prepared to engage in higher volumes of reading.

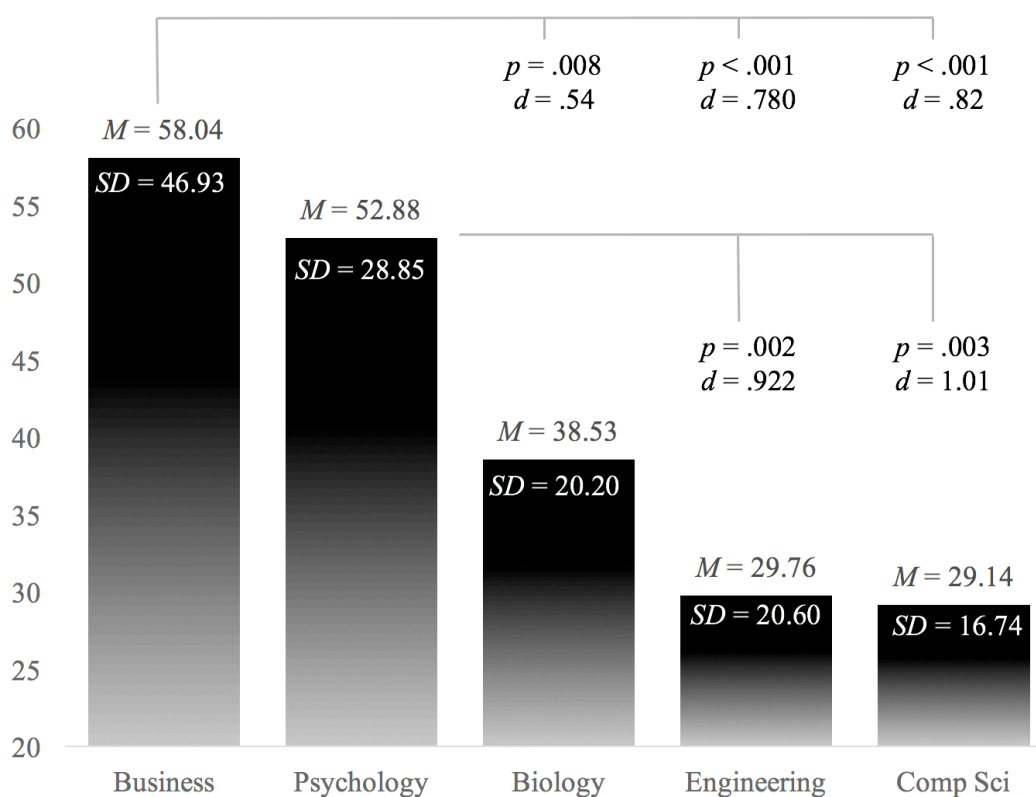


Figure 3. The number of pages read by major each week.

Percent of Digital Reading

In addition to examining the total volume of reading, we compared the percentage of reading done digitally within each major in the first year and near graduation. Though there was a significant interaction between time and major in the percentage of digital reading, the effect size was meaningful but small, $F(4,236) = 3.020, p = .019, \eta_p^2 = .049$, suggesting only minor differences between majors from the beginning of major study to the end. However, these observations displayed in Figure 4, highlight the decrease in the percentage of digital reading in

computer science from first year ($M = 70.762$, $SD = 28.261$) to upper division courses ($M = 51.727$, $SD = 29.139$). This larger amount of digital reading in computer science in the first year contributed to the statistically significant differences across majors in the first year, $F(4,105) = 10.058$, $p < .001$, $\eta_p^2 = .277$, while no significant differences were apparent for students nearing graduation, $F(4,131) = 1.386$, $p = .242$. One possibility for this phenomenon is that at the outset of their major study, students may end up completing much of their reading in the same digital environment in which they complete their programming-related homework. If computer-based learning modules are used, the reading and homework tasks may even be tied together in the same delivery mechanism.

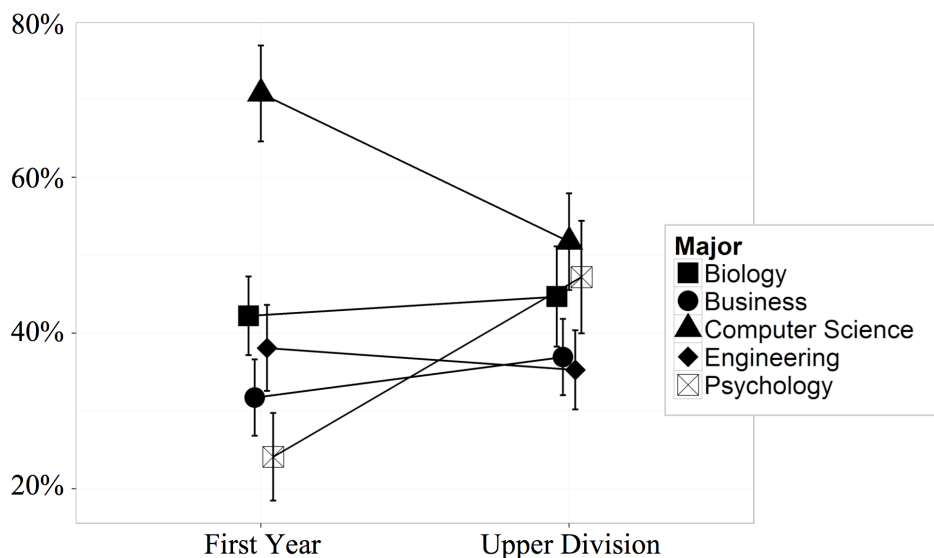


Figure 4. Percent of digital reading by major and time.

Reading Purposes

The ten reading purposes included on the survey used in this study were derived from the most frequent responses gathered from an open-ended item addressing reading purposes in the first study. Thus, a direct comparison of first-year and upper-division courses was not possible. Nevertheless, statistically significant differences were observed for analyses of major by reading purpose, $F(36,1339) = 1.738$, $p = .005$, $\eta_p^2 = .045$, as well as for major alone, $F(4,1339) = 16.122$, $p < .001$, $\eta_p^2 = .046$, though both tests produced only small effect sizes. These results suggest that overall the reading purposes identified in this study are slightly more important in psychology, biology, and business, than they are in computer science and engineering. More meaningful, however, were the differences across reading purposes without regard for major, $F(9,1339) = 39.952$, $p < .001$, which produced a large effect size, $\eta_p^2 = .212$. Table 2 presents a general ordering of reading purposes arranged from most to least important. Statistically significant differences are observed where asterisks (*) do not overlap across homogeneous subsets. The most important reading purposes include understanding course content and the discipline, synthesizing concepts, applying critical thinking and applying new knowledge.

Table 2. Reading purposes for upper-division courses

Reading Purpose	N	M	SD	Homogeneous subsets						
				1	2	3	4	5	6	
Understand course content	139	3.49	0.67	*						
Understand discipline	139	3.45	0.65	*	*					
Synthesize	139	3.37	0.76	*	*	*				
Critical thinking	139	3.31	0.81	*	*	*				
Apply new knowledge	139	3.18	0.82	*	*	*				
Learn vocabulary	139	3.13	0.86		*	*	*			
Prepare for lectures	139	3.07	0.92			*	*			
Show knowledge in writing	139	2.81	1.01				*	*		
Understand research	139	2.60	1.15					*		
Conduct research	138	1.91	1.12							*
Sig.				0.09	0.06	0.12	0.07	0.54	1.00	

1 = Not part of course, 2 = Somewhat important, 3 = Important, 4 = Very important

Additional insight may be gleaned from examining specific purposes across major. Six of these reading purposes did not differ across major including applying new knowledge, preparing for lectures or labs, engaging in critical thinking, synthesizing information, understanding discipline-specific information, and conducting research. The other four reading purposes showed one or more statistically significant differences across major. For example, understanding course content was perceived as most important in business ($M = 3.763$, $SD = .431$), which differed significantly from engineering and produced a large effect size ($M = 3.233$, $SD = .817$, $p = .010$, $d = .811$).

Similarly, learning and using vocabulary was most important in psychology ($M = 3.542$, $SD = .658$), which differed statistically from engineering and also produced a large effect size ($M = 2.900$, $SD = .923$, $p = .045$, $d = .801$). Reading for the purpose of demonstrating knowledge in writing was highest for psychology ($M = 3.293$, $SD = .955$), which significantly differed from both computer science ($M = 2.546$, $SD = .912$, $p = .050$, $d = .800$) and Engineering ($M = 2.367$, $SD = .999$, $p = .006$, $d = .948$), producing large effect sizes. Finally, reading to understand research was most important in psychology ($M = 3.458$, $SD = .833$), and differed significantly from computer science ($M = 2.091$, $SD = 1.151$, $p < .001$, $d = 1.361$) and engineering ($M = 2.000$, $SD = 1.050$, $p < .001$, $d = 1.538$), producing large effect sizes. Also, the importance of reading in order to understand research was greater for biology ($M = 3.080$, $SD = .997$) compared to computer science ($p = .011$, $d = .918$) and engineering ($p = .001$, $d = 1.055$).

Reading Challenges

The fourth research question examined the greatest reading challenges upper-division students encounter within their major, and how they compare to challenges in the first-year courses in each major. Though there were no significant differences found in reading challenges across majors, significant differences were observed across the reading challenges themselves, $F(10, 124) = 26.98$, $p < .001$. These are displayed in Table 3. The first three of these, ESL-related issues, vocabulary, and understanding discipline content, could all be associated to inadequate

language skills. Other challenges may be related to language skills or a lack of strategic approaches to reading.

Table 3. *Reading challenges*

Reading Challenge	<i>N</i>	<i>M</i>	<i>SD</i>	Homogeneous Subsets				
				1	2	3	4	5
ESL	127	2.50	.924	*				
Vocabulary	131	2.40	.882	*	*			
Understand discipline content	130	2.34	.882	*	*			
Lack strategies	128	2.09	.876		*	*		
Lack time	127	1.83	.888			*	*	
Lack critical thinking skills	128	1.78	.850			*	*	
Not reading to learn	127	1.72	.914				*	*
Lack comprehension	130	1.67	.820				*	*
Poor academic preparation	128	1.60	.806				*	*
Struggle reading graphs	128	1.44	.729					*
Lack motivation	129	1.40	.700					*

1 = Not a challenge, 2 = Somewhat challenging, 3 = Challenging, 4 = Very Challenging

Preparation for the Future

The final research question addressed how prepared upper-division students in these five majors were for professional work or graduate studies within each discipline in terms of their reading skills and how this level of preparation compared to that of the native English speaking students. No significant differences were found across major in terms of student preparation for graduate school or professional work. Professors used a 6-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (6). On average, their responses ranged between *somewhat agree* and *agree* that students have the reading skills they need for graduate school ($N = 134$, $M = 4.75$, $SD = 1.074$) and for discipline-specific employment ($N = 133$, $M = 4.78$, $SD = 1.110$).

Professors also used a 5-point Likert scale to compare their ESL students with their native-speaking counter parts in terms of their preparation for graduate school and professional work within the discipline. On average, their responses ranged between *slightly less prepared* and *equally prepared* for graduate school ($N = 133$, $M = 2.46$, $SD = .75$) and for discipline-specific employment ($N = 133$, $M = 2.50$, $SD = .84$). Nevertheless, there were no statistically significant differences across major or in comparing native and non-native readers in terms of perceived preparation for graduate school or employment within their field of study.

Discussion

This study was designed to build on the research of Anderson (2015) who examined the reading expectations and challenges of undergraduate ESL students within five common disciplines in their first year of major study. As in previous research (Anderson et al., 2014; Johns, 1981), this research underscores the prominence of reading by showing that it was perceived to be more important than writing and speaking and that it was as equally important as listening. There was no change in the relative order of importance of these skills from the learners' first year of major

study to graduation. This highlights the primacy of these receptive skills throughout the undergraduate learning experience regardless of major. One implication of this finding is the need for ESL students to have strong receptive skills before matriculating into the university. Moreover, students need to maintain and continue to develop these strong receptive skills as they progress through their major study. As texts become more difficult, students will need to leverage gains in vocabulary and new content knowledge in order to optimize the working memory needed to comprehend discipline-specific texts.

Despite the constant importance of reading throughout baccalaureate studies, this research showed a significant decline in the volume of reading from the beginning of major study to graduation. Though the reasons for this decline are not clear from these findings, it may reflect a number of changes associated with the transition to upper-division courses. For example, students may be required to spend more time demonstrating their ability to synthesize and apply their knowledge in their upper-division classes, leaving less time for additional reading. Moreover, it is possible that the additional reading in upper-division classes may include more scholarly articles and less reading from textbooks. If so, these readings may be more complex and require more processing than the readings the students experienced in their first year. This could suggest not only the need for more extensive reading skills as students prepare to matriculate into the university but also the need for more intensive reading skills as students progress through major study toward graduation. If further study confirms these preliminary interpretations, then ESL students may benefit from extra reading support throughout their university experience, particularly with the skill of intensive reading.

In addition to the notable differences in the volume of reading that occurs over time, there are also stark differences across majors. One of these differences is the much larger volume of reading required by the business and psychology students compared to the students in engineering and computer science. One possible reason for this disparity could be related to different types of course outcomes. For example, expectations could range from various levels of what students must *know* in business or psychology to what students must *do* in fields like engineering and computer science. Engineering and computer science may require much more practice and concrete application of emerging skills in the production of various products, leaving less time for reading new texts.

Another explanation is that the type of reading in which students engage may vary a great deal across majors. For example, whereas the materials in business and psychology may be more conducive for extensive reading, the materials in engineering and computer science may be more intensive and could require more time and learner engagement. Additional study could help clarify these possibilities. Regardless of the reasons for these discrepancies, however, the dramatic differences in the volume of reading across majors carry an important implications for pedagogical practice. ESL learners planning to study in disciplines such as business or psychology will need substantial reading practice prior to matriculation in order to successfully navigate heavy reading loads throughout their baccalaureate studies.

In addition to different reading loads, one of the most salient findings related to the reading purposes and how they varied widely in terms of level of importance. The most important reading purposes across majors include understanding course content and the concepts included

in the discipline. Some representative comments may help illustrate. Some professors indicated that they expect their students to “know the subject matter” and to “understand the concepts to be covered.” Nevertheless, for some professors the lecture is closely aligned with reading assignments, making the reading less critical. For example, some indicated “my lectures stay fairly close to the textbook” and “textbook reading is optional.” Others indicated, however, that the reading is much more independent from the lecture. One professor suggested, “much of the terminology and concepts cannot be covered in class, so student must read.” Another exclaimed that students need to read to “learn the course content so I don’t have to spend every class period just giving lectures that cover the same material they were supposed to have read.”

Additional reading purposes identified by the professors include synthesizing course materials, thinking critically about course content, and applying the new knowledge gained. Professors expect the assigned readings to help their students to “apply the basic principles,” “interpret tables and figures,” “independently integrate concepts,” and “synthesize materials across multiple resources.” A professor in Economics indicated that that the reading was intended to help students to “start thinking like an economist.” Other professors suggested the reading should help students “develop their own perspectives” and should “prompt them to ask questions.”

Interestingly, many of the most important reading purposes identified in this study are closely aligned with the very types of reading attributes that are the most difficult for second language learners to develop. For example, Kim (2014) identified knowledge of cohesive meaning and the strategies of summarizing and inferencing to be the most difficult. Such attributes are more complex and require higher-level processes (Grabe, 2009). In order to demonstrate these attributes, learners must be able to integrate multiple parts of a text and develop a deeper understanding of the text as a whole. As such, these attributes needed to achieve the most important reading purposes identified in this study may not be fully developed in some learners by the time a student is matriculated or even by the time they graduate. Additional instruction and practice may be needed.

The next level of importance from the survey was attached to learning vocabulary, preparing for lectures, and showing knowledge in writing. While findings about reading purposes in this study were fairly consistent with those of Anderson (2015), preparing for lectures or lab work seemed more important for first-year students than for those in this study who were nearing graduation. The least important purposes for reading in this study included understanding and conducting research. This is surprising since ongoing research is central to every discipline and the culminating learning activity in many intensive language schools is a research project. Though professors instill an understanding of the basic concepts associated with each discipline, these findings suggest that they may not expect undergraduate students to consume a great deal of research without additional support. Perhaps such reading becomes more important in graduate school.

While most of the reading purposes did not vary across major, there were a few differences that seem noteworthy. Though not all disciplines highly valued the importance of reading to understand research, it was most important in psychology as was learning new vocabulary and demonstrating knowledge through writing. Similarly, understanding course content was most

important in business. These differences may underscore key distinctions in the disciplines themselves that are reflected in what professors anticipate will occur because of the reading done in the respective courses. These findings suggest the possible benefits of focusing on certain types of reading or skill integration based on the intended major of the learner.

Since there were no statistical differences across major for the various reading challenges examined in this study, these difficulties may be equally applicable across disciplines. The most significant challenges included problems arising from the fact that English is a second language for some students along with the difficulty of learning new vocabulary. Nevertheless, the various professors held different perspectives regarding their ESL students. One observed “For native English speakers, the main challenge is usually understanding the technical content of the book, but added “For foreign students, the language is clearly the major obstacle.” Another suggested “Second language students without adequate English skills may not comprehend some of the reading material due to their language limitations.” Yet, one professor associated comprehension difficulties to sociocultural differences, indicating “Some of the material refers to experiences that are specific to life in the United States, which may be harder for foreign students to understand.” However, other professors were satisfied with their student reading and noted “Even the international students are good readers.”

These findings suggest that some learners might benefit from ongoing linguistic support and opportunities for further reading development that could help them better access the vocabulary and course content presented in their readings. They also may benefit from explicit reading strategy instruction that could help them utilize their reading texts more effectively. Since the observed challenges were the same regardless of major, universities could provide support that would likely be applicable to students across different majors.

The professors who contributed to this study perceived that, on average, their students had the reading skills they needed to move on to graduate school or professional work within the discipline. While they indicated that their ESL learners were slightly less prepared than their native-speaking counterparts for graduate school and work within the field, these differences were not statistically significant. While this is encouraging, we recommend ongoing programmatic evaluation to ensure that needs continue to be met as the percentage of ESL learners enrolled in US universities increases dramatically over the next decade.

Conclusion

English language learners are flocking to English-medium universities in record numbers. In the United States, this number is likely to increase substantially over the next decade (IIE, 2015; Kanno, 2015; OECD, 2015), and the impact on universities in the U.S. will be dramatic. Institutions who admit ESL students have an ethical obligation to understand the specific needs of these learners and to help them to succeed in their academic pursuits. This study suggests that there is no question that reading is a critical skill in preparation for and throughout undergraduate study. This needs to be well understood by IEPs that prepare students for university study as well as the universities themselves. Furthermore, this study implies that many ESL students may benefit from ongoing reading support throughout their university experience. It also suggests that

there may be a great deal of variability in reading expectations across majors and from the beginning of major study to when the student is preparing to graduate. We recommend that universities who admit ESL learners take an active role in identifying student needs and supporting ongoing reading development throughout the baccalaureate experience. The ways in which individual universities approach this challenge may need to vary according to their specific contexts and the unique needs of their students. While more research is needed, it is hoped that studies such as this will provide IEPs and universities with necessary insights that will help them to effectively meet the needs of this growing segment of their student enrollment.

References

- Alexander, P., Kulikowich, J., & Schulze, S. (1994). The influence of topic knowledge, domain knowledge, and interest on the comprehension of scientific exposition. *Learning and Individual Differences*, 6, 379–397. [https://doi.org/10.1016/1041-6080\(94\)90001-9](https://doi.org/10.1016/1041-6080(94)90001-9)
- Alfassi, M. (2004). Reading to learn: Effects of combined strategy instruction on high school students. *The Journal of Educational Research*, 97, 171–184. <https://doi.org/10.3200/JOER.97.4.171-185>
- Anderson, N. J. (2015). Academic reading expectations and challenges. In N. Evans, N. J. Anderson, W. Eggington (Eds.), *ESL Readers and Writers in Higher Education: Understanding Challenges, Providing Support* (pp. 95–109). New York: Routledge.
- Anderson, N. J., Evans, N. W., & Hartshorn, K. J. (2014, March) Reading and writing expectations of matriculated university students. *Colloquium presentation, International TESOL Convention*, Portland, Oregon.
- Andrade, M., Evans, N., & Hartshorn, K. J. (2015). Perceptions and realities of ESL students in higher education: An overview of institutional practices. In N. Evans, N. Anderson, & B. Eggington (Eds.), *ESL Readers and Writers in Higher Education: Understanding Challenges, Providing Support* (pp. 18–35). New York: Routledge.
- Andrade, M., Evans, N., & Hartshorn, K. J. (2016). Internationalizing Higher Education: English Language Policy and Practice. In K. Bista (Ed.), *International Student Mobility, Services, and Policy in Higher Education* (pp. 188–208). New York: IGI Global. <https://doi.org/10.4018/978-1-4666-9752-2.ch010>
- Arkoudis, S., Baik, C., & Richardson, S. (2012). *English language standards in higher education*. Victoria, Australia: ACER Press.
- Bangs, K. E., & Binder, K. S. (2016). Morphological awareness intervention: Improving spelling, vocabulary, and reading comprehension for adult learners. *Journal of Research and Practice for Adult Literacy, Secondary, and Basic Education*, 5, 49–56.
- Binder, K. S., Cote, N. G., Lee, C., Bessette, E., & Vu, H. (2016). Beyond breadth: the contributions of vocabulary depth to reading comprehension among skilled readers. *Journal of Research in Reading*, 1–11. <https://doi.org/10.1111/1467-9817.12069>
- Carlisle, J. F. (2000). Awareness of the structure and meaning of morphologically complex words: Impact on reading. *Reading and Writing*, 12, 169–190. <https://doi.org/10.1023/A:1008131926604>
- Christison, M. A., & Krahnke, K. J. (1986). Student perceptions of academic language

- study. *TESOL Quarterly*, 20, 61–81. <https://doi.org/10.2307/3586389>
- Cromley, J. G., & Azevedo, R. (2007). Testing and refining the direct and inferential mediation model of reading comprehension. *Journal of Educational Psychology*, 99, 311–325. <https://doi.org/10.1037/0022-0663.99.2.311>
- De Bruyne, E., & Valcke, M. (2015). The impact of reading comprehension strategy instruction and text difficulty on learning performance when academic reading in L1 or L2. *International Conference of Education, Research, and Innovation*, held in Seville, Spain.
- Deacon, S. H., Kieffer, M. J., & Laroche, A. (2014). The relation between morphological awareness and reading comprehension: Evidence from mediation and longitudinal models. *Scientific Studies of Reading*, 18, 432–451. <https://doi.org/10.1080/10888438.2014.926907>
- Elbro, C., & Buch-Iversen, I. (2013). Activation of background knowledge for inference making: Effects on reading comprehension. *Scientific Studies of Reading*, 17, 435–452. <https://doi.org/10.1080/10888438.2013.774005>
- Erçetin, G. (2015). Working memory and L2 reading: theoretical and methodological issues. *ELT Research Journal*, 4, 101–110.
- Erçetin, G., & Alptekin, C. (2013). The explicit/implicit knowledge distinction and working memory: Implications for second-language reading comprehension. *Applied Psycholinguistics*, 34, 727–753. <https://doi.org/10.1017/S0142716411000932>
- Farrugia, C. A., & Bhandari, R. (2013). *Open doors 2013 report on international educational exchange*. New York: Institute of International Education.
- Galloway, F. J., & Jenkins, J. R. (2009). The adjustment problems faced by international students in the United States: A comparison of international students and administrative perceptions at two private, religiously affiliated universities. *NASPA Journal*, 46, 661–673. <https://doi.org/10.2202/1949-6605.5038>
- Ghahari, S., & Basanjideh, M. (2016). Psycho-linguistic model of reading strategies awareness in EFL contexts. *Reading Psychology*, 1–29. Doi:10.1080/02702711.2016.1224784 <https://doi.org/10.1080/02702711.2016.1224784>
- Grabe, W. (2009). *Reading in a second language: Moving from theory to practice*. New York: Cambridge University Press.
- Grabe, W. P., & Stoller, F. L. (2011). *Teaching and researching: Reading*. London: Routledge.
- Hopp, H. (2016). Individual differences in L2 parsing and lexical representations. *Bilingualism: Language and Cognition*, 1–2. <https://doi.org/10.1017/S1366728916000821>
- Horowitz, D. M. (1986). What professors actually require: Academic tasks for the ESL classroom. *TESOL Quarterly*, 20, 445–462. <https://doi.org/10.2307/3586294>
- Huck, S. W. (2012). *Reading statistics and research* (6th ed.). Boston: Pearson.
- Ibrahim, E. H. E., Sarudin, I., & Muhamad, A. J. (2016). The Relationship between Vocabulary Size and Reading Comprehension of ESL Learners. *English Language Teaching*, 9, 116–123. <https://doi.org/10.5539/elt.v9n2p116>
- IEE. (2015). *Open Doors Report on International Educational Exchange*. Retrieved from <http://www.iie.org/opendoors>.
- International Trade Administration (2016). *Top Markets Report—Education: A market assessment tool for US exporters*. US Department of Commerce.

- Jafari, D. (2012). Metacognitive strategies and reading comprehension enhancement in Iranian intermediate EFL setting. *International Journal of Linguistics*, 4, 1–14. <https://doi.org/10.5296/ijl.v4i3.1684>
- Johns, A. M. (1981). Necessary English: A faculty survey. *TESOL Quarterly*, 15, 51–57. <https://doi.org/10.2307/3586373>
- Jones, J. S., Conradi, K., & Amendum, S. J. (2016). Matching interventions to reading needs: A case for differentiation. *The Reading Teacher*, 70, 307–316. <https://doi.org/10.1002/trtr.1513>
- Joshua, J. M. (2016). Difference in metacognitive awareness of reading strategies by sex and physical location among secondary school students in Tanzania. *International Journal of Education and Social Science*, 3, 83–91.
- Kanno, Y. (2015, April). English language learners, identity, and access to postsecondary education. *Presentation given at the AAAL conference*, Toronto, Canada.
- Kanno, Y., & Grosik, S. A. (2012). Immigrant English learners' transitions to university. In Y. Kanno & L. Harklau (Eds.), *Linguistic minority students go to college: Preparation, access, and persistence* (pp. 130–147). New York: Routledge.
- Kendeou, P., & van den Broek, P. (2007). The effects of prior knowledge and text structure on comprehension processes during reading of scientific texts. *Memory & Cognition*, 35, 1567–1577. <https://doi.org/10.3758/BF03193491>
- Kieffer, M., & Lesaux, N. (2012). Direct and indirect roles of morphological awareness in the English reading comprehension of native English, Spanish, Filipino, and Vietnamese speakers. *Language Learning*, 62, 1170–1204. <https://doi.org/10.1111/j.1467-9922.2012.00722.x>
- Kim, A. Y. A. (2014). Exploring ways to provide diagnostic feedback with an ESL placement test: Cognitive diagnostic assessment of L2 reading ability. *Language Testing*, 32, 227–258. <https://doi.org/10.1177/0265532214558457>
- Kuo, L. J., & Anderson, R. C. (2006). Morphological awareness and learning to read: A cross-language perspective. *Educational Psychologist*, 41, 161–180. https://doi.org/10.1207/s15326985ep4103_3
- Kraut, R. E. (2016). *The Development of Second Language Reading and Morphological Processing Skills*. Dissertation from the University of Arizona, Tucson, Arizona.
- Laufer, B. (1989). What percentage of text lexis is essential for comprehension? In C. Lauren & M. Nordman (Eds.), *Special language: From humans thinking to thinking machines* (pp.316–323). Clevedon, England: Multilingual Matters.
- Martinez, R., & Murphy, V. (2011). Effect of frequency and idiomaticity on second language reading comprehension. *TESOL Quarterly*, 45, 267–290. <https://doi.org/10.5054/tq.2011.247708>
- McNamara, D. S. (Ed.). (2012). *Reading comprehension strategies: Theories, interventions, and technologies*. New York: Psychology Press.
- Nation, I. S. P. (2006). How large a vocabulary is needed for reading and listening? *The Canadian Modern Language Review*, 63, 59–82. doi:10.1353/cml.2006.0049 <https://doi.org/10.1353/cml.2006.0049>
- Nergis, A. (2013). Exploring the factors that affect reading comprehension of EAP learners.

- Journal of English for Academic Purposes*, 12, 1–9.
<https://doi.org/10.1016/j.jeap.2012.09.001>
- OECD. (2014). *Education at a Glance*. Organization for Economic Co-operation and Development.
- Park, Y. (2016). *Technology-Enhanced L2 Reading: The Effects of Hierarchical Phrase Segmentation* (Doctoral dissertation, University of California, Irvine).
- Schmitt, N., Grabe, W., & Jiang, X. (2011). The percentage of words known in a text and reading comprehension. *The Modern Language Journal*, 95, 26–43. <https://doi.org/10.1111/j.1540-4781.2011.01146.x>
- Shany, M., & Biemiller, A. (2009). Individual differences in reading comprehension gains from assisted reading practice: Pre-existing conditions, vocabulary acquisition, and amounts of practice. *Reading and Writing: An Interdisciplinary Journal*, 23, 1071–1083. <https://doi.org/10.1007/s11145-009-9196-4>
- Stahl, S. A., Hare, V. C., Sinatra, R., & Gregory, J. F. (1991). Defining the role of prior knowledge and vocabulary in reading comprehension: The retiring of number 41. *Journal of Reading Behavior*, 23, 487–508. <https://doi.org/10.1080/10862969109547755>
- Tighe, E. L., & Schatschneider, C. (2014). A quantile regression approach to understanding the relations among morphological awareness, vocabulary, and reading comprehension in adult basic education students. *Journal of learning disabilities*, 49, 424–436. <https://doi.org/10.1177/0022219414556771>
- Tighe, E. L., & Schatschneider, C. (2015). Exploring the dimensionality of morphological awareness and its relations to vocabulary knowledge in adult basic education students. *Reading Research Quarterly*, 50, 293–311. <https://doi.org/10.1002/rrq.102>
- To, N. L., Tighe, E. L., & Binder, K. S. (2014). Investigating morphological awareness and the processing of transparent and opaque words in adults with low literacy skills and in skilled readers. *Journal of Research in Reading*, 39, 171–188. <https://doi.org/10.1111/1467-9817.12036>
- Van Den Broek, P., & Kendeou, P. (2008). Cognitive processes in comprehension of science texts: the role of co-activation in confronting misconceptions. *Applied Cognitive Psychology*, 22, 335–351. <https://doi.org/10.1002/acp.1418>
- Wang, Y. H. (2016). Reading strategy use and comprehension performance of more successful and less successful readers: A think-aloud study. *Educational Science: Theory & Practice*, 16, 1789–1813. <https://doi.org/10.12738/estp.2016.5.0116>
- Webb, S., & Chang, A. C. S. (2015). How does prior word knowledge affect vocabulary learning progress in an extensive reading program? *Studies in Second Language Acquisition*, 37, 651–675. <https://doi.org/10.1017/S0272263114000606>
- Yang, X. (2016). On relationship between factors and the use of reading strategies. *Theory and Practice in Language Studies*, 6, 1566–1571. <https://doi.org/10.17507/tpls.0608.06>
- Zarra-Nezhad, A., Shooshtari, Z. G., & Vahdat, S. (2015). The effects of attitude & motivation on the use of cognitive & metacognitive strategies among Iranian EFL undergraduate readers. *English Linguistics Research*, 4, 11–22. <https://doi.org/10.5430/elr.v4n4p11>
- Zhang, D. (2012). Vocabulary and grammar knowledge in second language reading comprehension: A structural equation modeling study. *The Modern Language Journal*, 96,

558–575. <https://doi.org/10.1111/j.1540-4781.2012.01398.x>

Zhang, D. (2013). Linguistic distance effect on cross-linguistic transfer of morphological awareness. *Applied Psycholinguistics*, 34, 917–942. <https://doi.org/10.1017/S0142716412000070>

Appendix

Please slide the lever for each of the following statements:



How important are the following language skills for the success of the non-native English speakers in your course?

	Reading	Writing	Listening	Speaking
Not important	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Somewhat important	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Important	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Very important	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

To what extent do you agree or disagree with the following statement: By graduation, the non-native English speakers who take my course have the following English language skills needed for

	graduate study within the discipline						professional work within the discipline					
	Strongly Disagree	Disagree	Somewhat disagree	Somewhat Agree	Agree	Strongly Agree	Strongly Disagree	Disagree	Somewhat disagree	Somewhat Agree	Agree	Strongly Agree
Reading	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Writing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Listening	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Speaking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comparing the language skills of the non-native English speakers you teach in this course with the language skills of the native English speakers, how well prepared are the non-native English speakers for

	Much less prepared	Slightly less prepared	Equally prepared	Slightly more prepared	Much more prepared
graduate study within the discipline	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
professional work within the discipline	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Indicate how important reading is in this course and the approximate number of pages read per week.

How important is reading in this course?				Approximate number of pages to read
Not part of course	Somewhat important	Important	Very important	per week
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

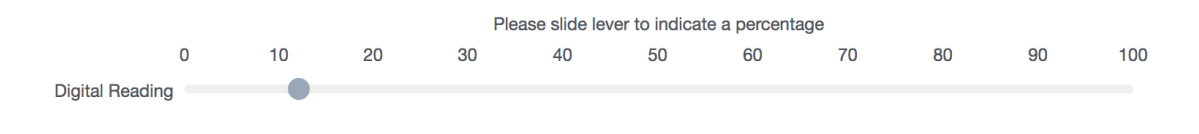
What do you expect the students to know or do because of their reading for the course?

	Not part of course	Somewhat important	Important	Very important
Understand course content	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Apply new knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prepare for Lectures/labs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Engage in critical thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Synthesize information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understand discipline-specific information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learn/use vocabulary	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Demonstrate knowledge through writing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understand research	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conduct research	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What are the greatest reading challenges for the non-native English speakers in your course?

	Not a challenge	Somewhat challenging	Challenging	Very challenging
Understand discipline-specific content	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of motivation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of strategic reading skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Struggles with vocabulary	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
English in their second language	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor academic preparation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of basic comprehension	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Not reading to learn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Struggle with reading graphs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of critical thinking skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Of all the reading your students do in your course, approximately what percent is done in a digital format? (e.g., reading from a computer screen, phone, tablet or other electronic device)



About the Authors

K. James Hartshorn has been involved in second language education in the United States and Asia for three decades. He currently serves as Program Coordinator of Brigham Young University’s English Language Center where his professional interests include teacher development and instruction-based second language acquisition. E-mail: james_hartshorn@byu.edu.

Norman Evans is a faculty member in the Linguistics and English Language Department at Brigham Young University where he is Department Chair. His research focuses on writing in a second language, language teaching methods, and curriculum development. E-mail: norman_evans@byu.edu.

Jesse Egbert is Assistant Professor in the English Department at Northern Arizona University. His primary areas of interest are corpus linguistics, register variation, and English grammar. He publishes articles in linguistics journals such as Applied Linguistics, Linguistics and Education, and Journal of English for Academic Purposes. E-mail: Jesse.Egbert@nau.edu.

Amy Johnson is a TESOL graduate student in the Linguistics and English Language Department at Brigham Young University where she also teaches in an intensive English program. Her research interests include second language writing and curriculum development. E-mail: amsjohnso@gmail.com.