Spelling Difficulties among EFL Students: An Error Analysis Framework Using-Computer Software- the Spelling Sensitivity Score (SSS)

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Abstract

This study explores the prevalent spelling errors among Saudi students of English, by investigating two proficiency levels of English employing the Spelling Sensitivity Score (SSS) software for nuanced analysis. The software in question dissects words into elements, assigning scores to elements and words, offering a detailed perspective on spelling errors. The results show that lower-level English learners exhibit significantly higher percentages of incorrect words and lower percentages of correct words than their high-level counterparts. The analysis also indicates that low-level learners struggle with identifying phonemic elements, often omitting or misrepresenting them. In conclusion, this research underscores that low-level English learners grapple with more spelling errors and inferior performance compared to high-level peers, across all examined categories. The insights gained provide a foundation for tailored teaching strategies, addressing the unique needs of EFL Arabic learners at varying proficiency levels and potentially informing the development of targeted intervention programs.

Keywords: EFL Arabic learners, SSS software analysis, phonemic elements, error analysis, second language acquisition

1. Introduction

Mastering spelling for English as a Foreign Language (EFL) learners poses a unique challenge due to the language's complex orthographic rules. This is particularly true for Saudi Arabian students whose first language, Arabic, is structurally and orthographically different from English. There have been few successful cases concerning spelling learning among EFL students. In fact, spelling error levels have remained the same recently, despite, many different teaching approaches to eradicate them. Moreover, experts seem to have understood spelling, grammar, and pronunciation as secondary skills and therefore have decided to provide limited time and emphasis on teaching those (Brown, 2007).

On the other hand, several researchers suggest that spelling proficiency in a second language can significantly influence overall language competency, as it affects both written communication and reading comprehension. For instance, Ehri and Rosenthal (2007) link spelling proficiency with vocabulary learning and overall language competency. McNeill et al. (2023) argue that early spelling ability is a unique predictor of later reading comprehension, beyond other key foundational literacy skills such as phoneme awareness and letter-sound knowledge. A previous study on a child with spelling problems by Kelman and Apel (2004) further highlighted the importance of orthographic knowledge and phonemic awareness skills for reading abilities. In addition, a meta-analysis by Graham and Santangelo (2014) points out how formal spelling instructions positively correlate with spelling improvements, reading comprehension, and text composition. Other studies show that spelling is not only related to reading comprehension and writing, but is also connected to pronunciation (Edwards et al., 2023; Respita et al., 2022).

As previously noted, native Arabic speakers are especially prone to problems with English spelling as foreign language students. Unlike Arabic, which is phonetically consistent, English spelling is riddled with silent sounds and multi-syllabic words (Al-Jarf, 2008; Hameed, 2016). Moreover, the Arabic language lacks certain features present in English, such as capitalization, double letters, silent letters, and specific phoneme-grapheme correspondences. This orthographic disparity causes Arab students to apply Arabic spelling conventions to English words, leading to errors (Al-Jarf, 2008).

Furthermore, some authors also point out that there is a systemic problem within Saudi education as the current syllabus and education system were found to be lacking and often sidelining the importance of spelling rules and techniques (Al-Jarf, 2010; Altamimi & Rashid, 2019).

This study, methodologically similar to Werfel and Krimm's study (2015), uses the Spelling Sensitivity Score (SSS) software and compares the percentage of correct words in a spelling test of 60 words among Saudi EFL students. The study uses two methods to compare the spelling skills of low and high-language-level college students to see if there are differences between these two groups in terms of spelling level and type of spelling errors. The "traditional method" only looks into the percentage of correct answers, while SSS is a linguistic-based spelling scoring system that can offer a better understanding of the type of errors and can point out single elements within a word. This is an

important difference as the traditional approach can sometimes overlook the complexity of spelling errors, which, if understood, can significantly inform and refine instructional methods.

2. Literature Review

2.1 Importance of Spelling

Spelling proficiency has been identified as an important factor for overall language competency. Several studies uncovered spelling and reading comprehension connection. Recently, McNeill, Gillon, and Gath (2023) in their study on 5-year-old children, show that early spelling ability is a unique predictor of later reading comprehension, beyond other key foundational literacy skills such as phoneme awareness and letter-sound knowledge. The study recommends the systematic instruction of phoneme-grapheme relationships and their utilization in decoding and encoding tasks. This approach is, according to the authors, more effective than sequentially introducing new graphemes only after the mastery of prior ones has been achieved. The simultaneous introduction and reinforcement of multiple graphemes acknowledge the complex interplay between reading and spelling and the influence of sequence on decoding and encoding accuracy. A previous intervention study, by Ouellette and Sénéchal (2008), also implies that spelling instructions are important for learning to read. Namely, in their study kindergarten children were introduced to invented spelling – an attempt of the child to spell the word without prior knowledge of spelling, and it was shown that it had benefits in terms of children's orthographic and phonological awareness. Especially children's understanding of the importance of vowels in the structure of words was enhanced. Furthermore, while the phonological awareness group in the study showed improvement in phonological awareness post-intervention, the invented spelling group's performance was comparable, indicating that invented spelling might also implicitly bolster phonological awareness.

Geva and Siegel (2000) explored how orthographic complexity intertwines with cognitive processes in bilingual reading development. They found that simpler orthographies, like Hebrew and Arabic, facilitate quicker development of word recognition skills, while more complex ones like English require a broader range of cognitive and linguistic abilities.

The significance of spelling in enhancing reading skills is further evidenced by Kelman and Apel's (2004) case study. This study focused on an 11-year-old English-speaking girl with notable spelling difficulties, further emphasizing the crucial role of orthographic knowledge and phonemic awareness in reading abilities. Kelman and Apel used the Comprehensive Test of Phonological Processing (CTOPP) to identify specific areas of challenge. Their intervention, tailored to her needs, stressed the importance of understanding orthographic rules, such as differentiating long and short vowels, and the complexities of 'r-controlled' vowels. The significant improvement in her spelling abilities post-intervention underlined the effectiveness of targeted orthographic training, demonstrating that focused spelling instructions can also significantly enhance word-level reading skills.

Studies have also shown that spelling is not only related to reading proficiency but also to writing. In research by Graham et al.(2002) that examined the effects of spelling instruction on second-grade children grappling with spelling challenges, the post-intervention findings show that not only did the students exhibit marked improvements in standardized spelling measures, but they also showcased enhanced writing fluency and reading word-attack skills. However, a follow-up six months later revealed that while the spelling gains remained intact, the advancements in writing and reading had waned. Harrison et al. (2016) argue that syntactic awareness is a common predictor for writing for both ESL and EL1 (English as the first language) children, but that this was more significant in the second case. Interestingly, despite having underdeveloped oral vocabulary and syntactic skills, ESL children's writing skills were comparable to those of EL1 children in the study. This is surprising given the theoretical importance of oral language skills in writing. The study concludes that ESL children, despite their lower levels of syntactic awareness, are drawing on grammatical knowledge when writing. They also seem to rely more on rapid access to word-specific knowledge (like rapid naming and transcription), which may serve to compensate for their weaker L2 oral skills. This suggests that while spelling and writing are interconnected, the relationship is influenced by various cognitive and linguistic factors that can differ between ESL and EL1 children.

Spelling has also been related to pronunciation. Respita et al. (2022) demonstrated that pronunciation can be improved via spelling word strategy. By employing spelling as a tool, the study found that students were better able to articulate words correctly, thus suggesting that spelling exercises can serve as an effective method for teaching pronunciation. The authors conclude that spelling is not just a written exercise but can also be crucial in mastering oral language skills. Edwards et al. (2023) explore the complex relationship between spelling and pronunciation, particularly in the context of English orthography, which they understand as quasi-regular and often inconsistent. The researchers introduce the concept of "spelling-to-pronunciation transparency ratings," a measure for determining how easily a decoded spelling can be matched to its correct pronunciation. The ratings were found to be predictive of both adult word naming time and child reading accuracy, underscoring their utility in various reading tasks and potentially in spelling as well. Overall, the study contributes to our understanding of how spelling and pronunciation are linked, and how this relationship can influence reading proficiency.

2.2 EFL Arabic Learners and Spelling Mistakes

When we look into the types of common spelling errors in English they are usually grouped into one of four groups: omission, substitution, insertion (addition), and transposition (misordering) errors (Brosh, 2015; Hameed, 2016). Omissions, referring to instances where morphemes in English words are left out, often stem from poor sound perception. As the name suggests, the substitution errors happen when the speller substitutes two letters in a word. This often occurs, because of the inconsistent pronunciation of vowels in English. Moreover, as Sénéchal et al.(2016) claim both omission and substitution errors are almost always a result of "silent letters", which is an inconsistency in pronunciation depending on the context. Insertions or additions, when an extra letter is added, are also very common among Saudi EFL

students, according to Alhaisoni et al.(2015).As well as misordering which was found to be common among participant Saudi students, who often error in regards to diphthongs and vowels spelling, for example with “thier” instead of “their”, “quite” instead of “quiet” or “freind" instead of “friend”.

A study focusing on Arab ESL secondary school students by Al-Sobhi et al. (2017) sought to understand the depth and nature of these challenges. Using a standardized fifty-word spelling test with seventy participants, a total of 2,873 spelling errors were unearthed. The most prevalent errors were in the categories of substitution, accounting for 43.2% of mistakes, and omission, making up 39.8%. A deeper dive into the data revealed that many of these errors could be attributed to the inherent complexities of the English language, especially the inconsistencies between phonemes and graphemes. Additionally, silent letters and double consonants in English words further exacerbated the students' spelling challenges. Another significant factor was the students' unfamiliarity with specific English spelling rules, particularly concerning inflectional suffixes like -s, -ed, and -ing. Furthermore, the influence of the students' native Arabic language, or L1 interference, was evident. This interference manifested in various ways, such as substituting certain Arabic phonetic characteristics when attempting to spell English words.

Hameed (2016) also examines the problem with spelling among Saudi EFL learners. According to this study, the main problem for Saudi students lies in the stark differences between English and Arabic spelling systems. This difference often leads to mispronunciation mistakes, especially when educators cannot rationalize the spelling rules to the students, or when foundational courses on spelling and pronunciation are absent. The study identified specific challenges faced by Arab students, such as differences in vowel and consonant systems, unfamiliarity with capitalization, and the unique diacritic system of Arabic. When probed about their perceptions, students attributed their spelling challenges to various factors, including the presence of silent letters in English words, differences in sentence structures between the two languages, and a lack of modern teaching tools. Furthermore, students expressed that the primary aim of their English education seemed to be exam-oriented rather than fostering genuine language proficiency.

Al-Jarf (2008) reports that the most frequent sources of whole-word spelling errors were communication breakdowns, interference from other English words, and partial failures. Regarding faulty graphemes, the predominant causes were ignorance of English spelling rules, the transfer of the Arabic spelling system to English, students' mispronunciations, and overgeneralization. The study also highlighted the influence of other English words and the overgeneralization of certain English spelling features as significant contributors to spelling errors. Such errors often resulted in invented words or words that only partially resembled the target word. This overgeneralization and interference might stem from inadequate exposure to the English spelling system and insufficient practice.

Altamimi and Rashid (2019) conducted a study at Tabuk University, employing structured interviews with 15 students and 15 English language lecturers to uncover the root causes of spelling errors. A significant finding was the interference between the English and Arabic languages, with students often drawing from their native Arabic linguistic structures when attempting English spelling. The research also highlighted systemic issues in the Saudi education landscape. The current syllabus and education system were found to be lacking, often sidelining the importance of spelling rules and techniques. This deficiency was exacerbated by administrative constraints and a prevalent attitude among students that downplayed the significance of mastering spelling.

2.3 The Use of SSS Software to Analyze Spelling Errors

In terms of using two levels of language learners to compare their spelling skills Harrison (2021) is one of the few studies which introduced a series of cognitive, linguistic, and spelling measures that were administered to third-grade English L1 and L2 learners.

The study's objective was to explore how children develop their mental graphemic representations (MGRs) by examining spelling errors using three criteria: Phonological Constrained, Visual-Orthographic, and Correct Letter Sequences. The findings revealed no significant differences between L1 and L2 learners in terms of cognitive or spelling accuracy measures, and that L1 learners scored higher than L2 learners in linguistic measures, specifically vocabulary and syntactic knowledge. Both L1 and L2 learners relied heavily on their understanding of graphophonemic rules and positional constraints in pronunciation for spelling. The influence of underlying cognitive and linguistic resources on spelling varied based on the scoring system and language group. Linguistic predictors, such as vocabulary and syntactic knowledge, accounted for more variance in L1 than in L2 learners. In the end, the article emphasizes the intricate relationship between oral and written language in literacy development, suggesting that spelling serves as a crucial bridge between the two.

Werfel and Krimm (2015) introduced SSS in contrast to the conventional percentage correct scoring method, analyzing the spelling patterns of children with specific language impairment (SLI). In many English-speaking nations, spelling is often approached as a task of memorization. This traditional approach can sometimes overlook the nuances of spelling errors, which, if understood, can significantly inform and refine instructional methods. The findings of the study reveal that children with SLI consistently score lower on spelling measures than compared to their typically developing peers. Moreover, the nature of their spelling errors in English seems to differ qualitatively from those of children without SLI. For instance, in the context of British English spelling, children with SLI were found to produce more phonologically inaccurate and orthographically illegal errors than their counterparts. Similarly, when assessed with the Phonological, Orthographic, and Morphological Assessment of Spelling (POMAS) for American English spelling, the errors of children with SLI were qualitatively distinct from those of age-matched controls. These findings underscore the potential of the SSS software as a tool. Unlike traditional methods, the SSS offers a more detailed insight into the spelling errors of children with SLI, paving the way for more tailored and effective instructional strategies.

3. Research Questions

1. What type of spelling words, one or more syllable words (cvc, cvc cvc, cvc v cvc, ccvc or ccvcc or cvcc, challenge words from TWS-5 standardized spelling test), do EFL Arabic learners commit the most?
2. Are there differences between high and low-level EFL Arabic learners' spelling errors using two methods (number of incorrect words and number of invalid elements?
3. Do low-level learners omit elements and represent elements with an illegal grapheme more than the higher level?
4. Do both methods (percentage of correct words and the number of valid elements) show a statistical difference between low and high-level English learners?

4. Methodology

The participants with low and high English proficiency levels were chosen from different classes at the same university. The classes are first-level courses and fourth-level courses. The participants were given an empty sheet with 60 cells numbered. The researcher administered the test by first telling them that this was a spelling test and they needed to try their best to get 80% or above to get a bonus grade in their classes. Then they told them that they would say the word first, put the word in a sentence, and then say the word a second time. The test starts with easy words and leaves challenging words at the end.

The words that are used in the test are selected from:

1- TWS-5 standardized test used in the US. The researcher used 10 challenging words based on the test criteria and these words have different letters length

2- One and multi-syllabic words. (cvc, cvc cvc, cvc v cvc, cThe choice of words was based on:

   a- All words have a one-to-one phoneme to grapheme

   b- Use the most challenging phonemes Arabic speakers face e.i(/i/,/e/,/p/,/b/,/f/,/v/, /g/, /j/.

   c- Ten words are consonant clusters and ten words are long vowel ones.

met	fabric	slash	trail
let	picnic	rash	gown
fin	ransom	thin	town
tan	public	whip	haul
wet	sinful	brush	coin
bed	medical	rock	agriculture (WTS-5)
jam	comical	sunk	ambiguous (WTS-5)
get	nominal	kick	retaliate (WTS-5)
bet	politic	pick	visualize (WTS-5)
mud	capital	drill	variance (WTS-5)
sandal	cabinet	deed	awful (WTS-5)
zigzag	minimum	boil	fountain (WTS-5)
napkin	radical	real	continuity (WTS-5)
kidnap	lanolin	meal	enough (WTS-5)
candid	Vatican	deal	institution (WTS-5)

4.1 Spelling Sensitivity Score (SSS) Software

In order to compute scores through this method, for starters, words will be entered into the SSS respective software (Masterson & Hrbec, 2011). Afterward, the software will divide words into elements and assign scores to both these elements and words as a whole. Consequently, the SSS will give a score of the number of invalid elements for each word misspelled.

Consequently, all examined words will be categorized into three different groups: 1. regular – irregular sound-based words; 2. one syllable – two syllables – several syllables words; 3. CVC (consonant-vowel-consonant)— e.g. ‘’bed’’— CVC CVC (consonant-vowel-consonant – consonant-vowel-consonant)— e.g. ‘’tictoc’’— and multi-syllabic words— e.g. ‘’hospital’’ (hos-pi-tal).

Taking into account the importance of spelling proficiency and the prevalence of spelling errors among Arabic EFL students this study offers a novel approach. First, it investigates spelling errors between different levels of EFL Arabic students which has not been done in past research. Second, it uses SSS as a tool which allows a better understanding of the errors in question. The study's exploration of the differences in spelling errors using two methods (number of incorrect words and number of invalid elements) among high and low-level EFL Arabic learners could shed light on the most effective measurement of spelling proficiency. This knowledge could lead to more accurate assessments and, consequently, more tailored and effective interventions for learners.

The examination of whether low-level learners tend to omit elements or represent elements with an illegal grapheme more than higher-level learners could reveal specific problem areas for beginning learners. Such findings can inform instruction and intervention strategies targeted at these particular issues, helping beginner learners overcome these initial hurdles more quickly and effectively.

Lastly, by investigating whether the two methods (percentage of correct words and the number of valid elements) show a statistical

difference between low and high-level English learners, this study could provide valuable insights into the efficiency of these methods in distinguishing between different proficiency levels. This could further lead to improvements in the assessment methods used to determine students' proficiency levels, enhancing the accuracy of placement decisions, and the effectiveness of subsequent instruction.

4.2 Participants

The study population is Saudi students of first and fourth level English from a Saudi Arabian university. It was divided into two groups: a) low English level students, and b) high English level students. The level of English was determined such that students who had more than 3 years of previous English learning were considered to have high-level English proficiency, and those with less experience low-level English proficiency. The sample was randomly selected from different classes of the same university to which we had access to: 42 low-level students and 45 high-level students.

4.3 Data Collection and Analysis

Table 1 presents the study variables that will allow us to analyze the types of spelling errors of Saudi EFL students.

Table 1. Learners' language leve and type spelling words variables

Study Variables	
Variables	Categories
Level	1. Low level learners
	2. High level learners
Type spelling words	1. cvc
	2. cvc cvc
	3. cvc v cvc
	4. ccvc or ccvcc or cvcc
	5. Long vowels
	6. Wt5 test word
Total of student's valid element	
Total of student's invalid element	
Total of student's incorrect words answer	
Percentage of student's correct words answer	

Descriptive statistics were used for the statistical analysis, with central tendency and dispersion measures. Inferential statistics were used to analyze the differences between the study variables, for which the assumption of normality was tested using the Kolmogorov-Smirnov Test (case $n > 50$) and the Shapiro-Wilk Test (case $n \leq 50$) and homoscedasticity with the Levene Test; based on these results, the following tests were applied to compare the variables depending if the distribution is normal or not: t-test or Mann Whitney U test. IBM SPSS version 25 and Microsoft Excel 2021 were used for the statistical analyses. A significance level of $\alpha = 0.05$ was established. All the results are presented in detail in the next section.

5. Results

- *What type of spelling word, of one or more syllables (cvs, cvc cvc, cvc v cvc, ccvc or ccvcc or cvcc, long vowels, high school wt5 test words) do Arabic EFL learners commit most errors?*

Figure 1 shows that the type of word high school wt5 test words presents the highest percentage of errors in both groups, however, low-level students make more errors (75%) compared to high-level students (45%). This could indicate that this type of word is the most difficult for students at both levels.

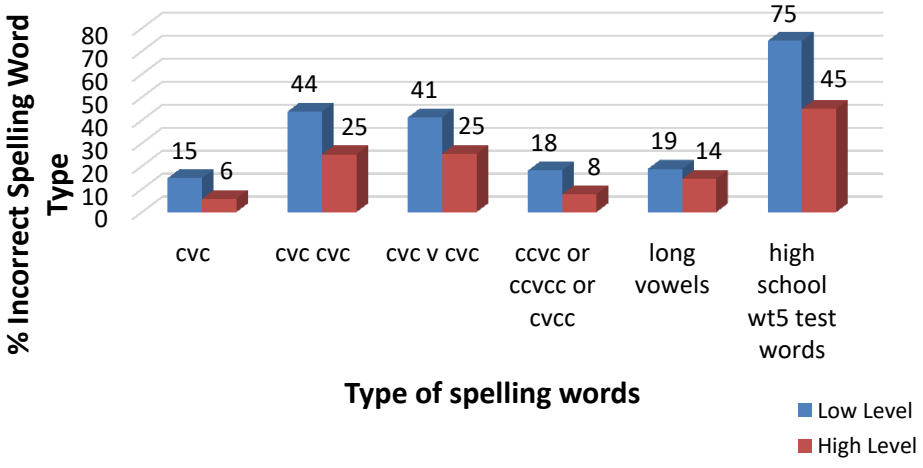

Figure 1. Percentage of incorrect word by spelling words type

In this spelling word type high school wt5 test words, Figure 2 shows that the most frequent error made by both groups is in the ambiguous. The low-level students (95%) make more errors than the high-level students (73%); this indicates that the structure of this word is the one that presents the greatest difficulty for students in both groups.

Also, it is observed that the errors made by low-level students in the words agriculture, visualize, and continuity exceed 80%, while in words retaliate, variance, fountain, and institution exceed 70%; this could indicate that the structure of these words is the one that presents the greatest difficulty in low-level students.

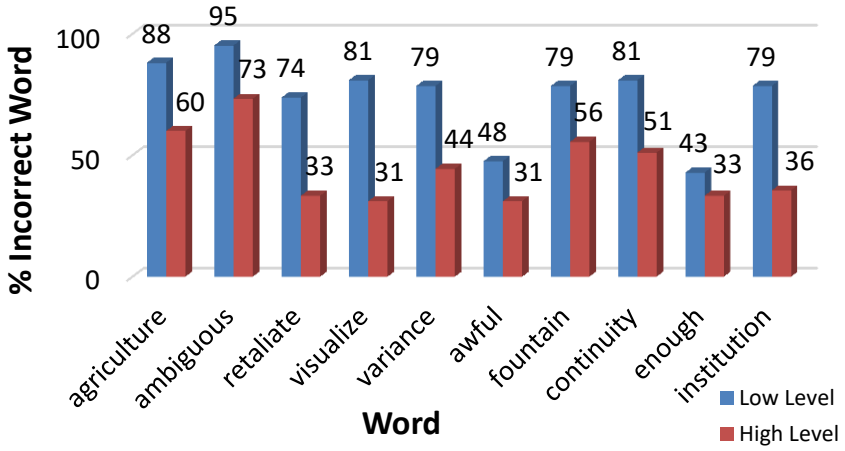

Figure 2. Percentage of incorrect words according to spelling words type "high school wt5 test words"

- *Are there statistically significant differences between low and high-level EFL Arabic learners' spelling errors using the number of incorrect words methods?*

Since the variable errors follow a normal distribution, the assumption of the equality of variances was tested for compliance through Levene's test ($p = 0.784 > 0.05$) (Table 5), accepting the equal variances hypothesis.

Table 2 shows that there are statistically significant differences in the means of spelling errors of low and high-level EFL Arabic learners in terms of the method number of incorrect words ($p = 0.000 < 0.05$), where the difference in means (8.190) indicates that low-level learners present a higher mean than high-level learners. This is reflected in the statistics in Table 3, where the mean of spelling errors using the method number of incorrect words of low-level students (Mean = 20.52) is higher than that of high-level students (Mean = 12.33). Therefore, it is inferred that low-level students present a lower spelling competence than high-level students.

Table 2. Independent sample test of spelling errors using the number of incorrect words methods

Variable	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	p	t	df	p	Mean difference
Number of incorrect words	0.075	0.784	4.155	85	0.000*	8.190

Nota: * statistically significant ($p < 0.05$)

Table 3. Statistics descriptive of spelling errors using the number of incorrect words methods

Variable	Level	Statistics		
		n	Mean	Standard Deviation
Number of incorrect words	Low	42	20.52	9.361
	High	45	12.33	9.025

- *Are there statistically significant differences between low and high-level EFL Arabic learners' spelling errors using the number of invalid elements methods?*

Table 4 shows the Mann-Whitney U Test results for the spelling errors of low and high-level EFL Arabic learners using the number of incorrect methods. There are statistically significant differences in the spelling errors using the number of incorrect methods made by low and high-level EFL Arabic learners ($p= 0.000 < 0.05$). It can be observed that the scores of the errors made by the low-level learners (Median = 49, Range = 112) exceeded that of the high-level learners (Median = 23, Range = 87). Therefore, it is inferred that low-level students present greater difficulty in identifying the phonemic elements of each word than high-level students.

Table 4. Mann-Whitney U test of spelling errors using the number of invalid elements methods

Variable	Level	Statistics			Mann-Whitney U Test	
		n	Median	Range	U	Sig. (p-value)
Number of invalid elements	Low	42	49	112	384.50	0.000*
	High	45	23	84		

Nota: * statistically significant ($p < 0.05$)

- *Do low-level EFL Arabic learners omit elements and represent elements with an illegal grapheme more than high level?*

As shown in Table 5 low-level EFL Arabic learners omit elements and represent elements with an illegal grapheme (Mean = 52.14) more than high-level ones (Mean = 26.62). It can be inferred that the omission of elements and representing elements with an illegal grapheme, by low-level learners, is due to: distraction, low importance to spelling, problems with spelling, handwriting, or both types simultaneously, among other things.

Table 5. Statistics descriptive of spelling errors using the number of invalid elements methods

Variable	Level	Statistics		
		n	Mean	Standard Deviation
Number of invalid elements	Low	42	52.14	25.41
	High	45	26.62	20.12

Analysis of the methods: percentage of correct words and number of valid elements

The Kolmogorov-Smirnov Test was used to verify compliance with the normality assumption for the two variables. Table 6 shows that the variable percentage of correct words follows a normal distribution ($p = 0.200 > 0.05$), so the T-test for independent samples was applied to analyze whether there are significant differences between the two groups of students. On the other hand, the Mann-Whitney U-test was used for the variable number of valid elements since the assumption of normality was not met ($p = 0.005 < 0.05$).

Table 6. Test of Normality of spelling errors using two methods: Percentage of correct words and number of valid elements.

Variables	Kolmogorov-Smirnov		
	Statistics	df	Significance (p-value)
Percentage of correct words	0.073	87	0.200
Number of valid elements	0.117	87	0.005*

Nota: * statistically significant ($p < 0.05$)

- *Are there statistically significant differences between low and high-level English learners using the Percentage of correct words method?*

Since the variable percentage of correct words follows a normal distribution, the assumption of the equality of variances was tested for compliance through Levene's test ($p = 0.772 > 0.05$) (Table 10).

Table 7 shows that there are statistically significant differences in the means of spelling errors of low and high-level EFL Arabic learners in terms of the percentage of correct words method ($p = 0.000 < 0.05$), where the difference in means (-13.683) indicates that low-level learners present a lower mean than high-level learners. This is reflected in the statistics in Table 8, where the mean of spelling errors using the percentage of correct words method of the low-level students (Mean = 65.76) is lower than that of the high-level students (Mean = 79.44), therefore, it is inferred that the percentage of correct words method is more efficient in the high-level students.

Table 7. Independent sample test of spelling errors using percentage of correct words methods

Variable	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	p	t	df	p	Mean difference
Percentage of correct words	0.084	0.772	-4.161	85	0.000*	-13.683

Nota: * statistically significant ($p < 0.05$)

Table 8. Statistics descriptive of spelling errors using the percentage of correct words methods

Variable	Level	Statistics		
		n	Mean	Standard Deviation
Percentage of correct words	Low	42	65.76	15.628
	High	45	79.44	15.042

- *Are there statistically significant differences between low and high-level English learners using the number of valid elements method?*

Table 9 shows the Mann-Whitney U Test results for the spelling errors of low and high-level EFL Arabic learners using the number of valid elements method. There are statistically significant differences in the spelling errors made by low and high-level EFL Arabic learners ($p= 0.000 < 0.05$. It can be observed that the scores of the errors made by the low-level learners (Median = 285, Range = 112) are lower than those of the high-level learners (Median = 310, Range = 87). Therefore, it can be inferred that the method number of valid elements is more efficient in the group of high-level students.

Table 9. Mann-Whitney U test of spelling errors using the number of valid elements methods

Variable	Level	Statistics			Mann-Whitney U Test	
		n	Median	Range	U	Sig. (p-value)
Number of valid elements	Low	42	285	112	384.50	0.000*
	High	45	310	87		

Nota: * statistically significant ($p < 0.05$)

6. Discussion

The results show that most mistakes are made with high school wt5 test words at both levels. More importantly, low-level English learners have a significantly lower mean percentage of correct words compared to high-level learners, as well as a significantly higher mean percentage of incorrect words. Taking into account the invalid elements methods low-level English learners have a significantly lower mean number of valid elements compared to high-level learners, indicating that low-level learners have more problems identifying the phonemic elements of each word. Furthermore, low-level learners more often omit elements and represent them in illegal graphemes. Results also show that both invalid and valid elements do not follow a normal distribution for both low and high-level English learners, compared to the normal distribution when the percentage method is used. The results highlight the difference in spelling skills between low- and high-level English university learners from Saudi Arabia. This disparity highlights significant challenges for low-level learners, as they face difficulties in grasping English's phonemic structure. It also indicates a fundamental difference in linguistic competencies across skill levels.

These results confirm that phonological awareness is important for language acquisition, similarly to Harrison et al. (2016). The interaction between orthographic knowledge and phonemic awareness, suggests that effective spelling instructions need to take into account the learners' native language orthography. The findings provide more evidence to support the conclusion of researchers like Al-Jarf (2008) and Hameed (2016). They also emphasized the importance of the difference between Arabic and English spelling. Identifying the specific areas of difficulty helps interventions more effectively address the root causes of spelling errors. This can lead to the development of evidence-based practices and comprehensive spelling curricula. In conclusion, our results suggest the need for educators to devise targeted spelling instruction strategies, focusing on phonemic structure understanding, which is consistent with previous recommendations such as that of Ehri and Rosenthal (2007) and McNeill et al. (2023).

The key limitation of the study is thatthe sample size and demographic were restricted to Saudi students in only one University. Therefore, the outcomes might reflect the unique characteristics of these environments, such as specific teaching methods, curriculum design, and educational policies. This may affect the generalizability of the findings to other Arabic-speaking EFL contexts.

The dependence on the Spelling Sensitivity Score (SSS) software poses another potential limitation.

While it offers an in-depth examination of spelling errors, it cannot capture other essential aspects of language proficiency. Because the study is quantitative, the qualitative exploration of learner experiences, attitudes, and cognitive processes is omitted.

The study focuses only on spelling and it does not consider grammar, syntax, or oral proficiency. On the other hand, spelling s just one aspect of language learning and a more comprehensive approach might yield a fuller understanding of the language acquisition process among EFL learners.

Lastly, the absence of an intervention phase or a longitudinal component in the study does not allow for tracking changes over time, or the possibility assess the effectiveness of specific instructional strategies on improving spelling proficiency.

Nevertheless, our results have implications for teaching. They show that we should provide spelling instructions that are tailored to the needs of low-level learners. This could include a greater emphasis on phoneme-grapheme correspondences. And teaching strategies could address common error patterns identified in the study. Educators should consider using multi-sensory and interactive methods, as this could enhance phonemic awareness and orthographic knowledge. The study especially stresses the importance of integrating phonemic awareness training into the EFL curriculum. This could include phonemic segmentation exercises and , also, include blending activities and explicit instruction on the English phonetic system.

The use of the SSS software highlights the potential of technology in aiding language instruction. Educational technologies that offer detailed tracking of learners' progress and provide immediate feedback can be invaluable tools in the classroom. Teachers might consider incorporating similar digital resources to support their spelling instruction.

In addition, the research conducted opens several avenues for further studies. Future studies could include a more diverse participation base, including students from different Arabic-speaking countries and regions, thus providing a broader perspective and help in generalizing the current findings. On the other hand, this approach would be able to discover any dialectical variations in spelling challenges.

Subsequent research would benefit from the inclusion of qualitative methods as well. Interviews, case studies, and observational research would offer deeper insights into students' spelling strategies, cognitive processes, and the challenges they face. This mixed-method approach could provide a more comprehensive understanding of the factors influencing EFL spelling proficiency.

There is also a need for longitudinal research to track the progression of spelling skills over time. Such studies would be instrumental in understanding how spelling proficiency develops in EFL learners and the long-term impact of different teaching methodologies and interventions. This would lead to a better evaluation of various spelling instruction strategies.

7. Conclusion

The present study explored common spelling errors among Saudi students of English in one university in Saudi Arabia, specifically focusing on two levels of proficiency. The study for the first time in literature introduced the Spelling Sensitivity Score (SSS) software to foreign students of English who are Arabic-speaking, enabling a more fine-grained understanding of their spelling errors. This software allows for the division of words into elements and assigns scores to both elements and complete words, providing a comprehensive analysis of spelling proficiency. The findings revealed several key insights into the spelling skills of EFL Arabic learners, who participated in the study, and the differences between low and high proficiency levels.

The results of the study suggest that low-level English learners make more spelling errors and have lower performance in both correct words and valid elements compared to high-level learners. Additionally, low-level learners perform worse in all categories of spelling words compared to high-level learners. The findings provide valuable insights into the spelling skills of EFL Arabic learners and the differences between low and high proficiency levels. By identifying the specific spelling challenges experienced at different proficiency levels, this research could lead to the development of more tailored teaching strategies to address these unique needs. Future studies should explore a more robust participation base to determine if these results can be replicated for other EFL students whose first language is Arabic.

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No additional data are available.

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