

EXPLORING THE EFFECTS OF KEYBOARD PREDICTION TOOL ON THE KURDISH UNIVERSITY EFL LEARNERS' SPELLING COMPETENCE

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ABSTRACT

The rapid integration of online platforms into learners' academic lives has impacted their skills and competence, to which writing is highly connected. Spelling is among the most affected aspects. The current study explores and examines the indirect effects of digital tools, namely keyboard prediction, on EFL learners' spelling competency, where mobile phones are the most commonly used device among learners. Learners who depend too much on online platforms must use various digital devices. For this purpose, forty students from the English Department at Soran University, ranging from Stage One to Four, were randomly chosen to participate in the study. The study designed a special sheet containing questions and a writing area, which were then offered to participants. After answering some questions, the participants had to write eight sentences on paper from dictation. The sentences included at least one common challenging word in terms of spelling. Furthermore, using Cook's (1999) spelling error analysis framework, university students' performances were evaluated in spelling errors. The results showed the shockingly negative effect of using keyboard prediction tools on EFL learners' spelling performance. Learners had an average of 23 misspelt words. The effect was mainly due to learners improperly using keyboard prediction and spell correctors on smartphones.

KEYWORDS: Writing; spelling; keyboard prediction; spell-checker; spelling error

INTRODUCTION

Humans have always communicated in many different ways. Since the early beginnings of human history, language has been the main and most powerful communication tool. We cannot communicate and interact without knowing language, and it is necessary to know more than one language. We live in a multilingual and increasingly globalised world, which makes us more communicative. English is the most widely used language in the world. When learning any language, we acquire four essential skills: listening, speaking, writing, and reading. Writing is one of the most important yet challenging skills to acquire. Learners must develop writing abilities while learning a new language. However, writing is a complex process, and learners often experience difficulties such as misspelling, poor grammar, and problems with sentence structure (Brians, 2003). Spelling, a linguistic aspect of language, refers to the skill of writing.

It involves forming words correctly from individual letters and following specific rules to ensure proper word formation and meaningfulness (Rao, 2018).

Over the past decade, the adoption of new technologies and their applications has significantly increased in various aspects of life due to the rapid growth of digital tool usage. Consequently, numerous programs, platforms, and applications are created daily. This abundance of digital tools allows us to interact easily and quickly with any language we wish to learn. Second language learners commonly utilise digital tools to enhance their language skills, including writing. Writing and typing in a foreign language are essential communication skills, particularly in the age of emailing and texting. In the digital era, people tend to spend more time typing on keyboards than writing with pen and paper. Keyboarding techniques simplify text editing and storage while also providing features like translation, spell-checking, auto-correction, and grammar-checking. These digital tools are available on smartphones, laptops, tablets, and computers. Furthermore, EFL learners can benefit from software platforms and applications to improve their writing skills automatically. However, learners should not depend on these applications and platforms blindly. Various types of assistive technology can support aspects of writing, e.g., word prediction (Mezei & Heller, 2012). Word prediction is particularly useful for individuals who struggle with spelling. It predicts complete words based on the first few letters typed by the user. A list of choices is presented, and the user only needs to select the intended word from that list. Another feature is the ability to correct spelling mistakes. If the user is a phonetic speller, the program recognises this and identifies the appropriate word. For example, when a user types "jiraf", the word "giraffe" will be automatically suggested from the list. Despite their importance, these digital tools also have disadvantages, especially in relation to learners' writing ability.

The Problem and Hypothesis

After conducting a pilot test, this research puts forward the hypothesis that despite the benefits of keyboard prediction for language learners, it also negatively impacts their writing competence, particularly with spelling. However, despite being aware of these potential drawbacks, most users still choose to utilise it. The pilot test conducted prior to this research has provided valuable insights. Building upon those findings, it is hypothesised that keyboard prediction, while assisting language learners, can adversely affect their overall writing proficiency. Specifically, it is anticipated that learners may become overly reliant on the predictive feature, leading to a decline in their spelling abilities. Despite acknowledging this potential disadvantage, most learners continue to employ keyboard prediction in their writing tasks. In addition to its impact on writing competence, the prevalence of keyboard prediction and digital tools has also had noticeable effects on handwriting skills. With the widespread use of keyboards and digital devices, people tend to spend less time practising and honing their handwriting abilities.

The primary objective of this research is to address the following questions:

- What is the impact of smartphone keyboard word prediction on the spelling performance of EFL learners?

- To what degree does the dependence on digital word prediction influence the writing abilities of EFL learners?
- What strategies can EFL learners employ to moderate these effects?

Importance of the Study

This study works to conduct a comprehensive and valuable investigation into the effects of keyboard prediction among second language learners. The outcomes of this research are expected to serve as a crucial resource for university settings, particularly those focusing on online learning strategies. In addition, this study holds significant potential to contribute to teachers, language learners, and scholars by employing insights into the overreliance on digital and AI assistance. The results could enhance awareness of using digital tools both directly and indirectly, especially among students. The findings of this study might also inspire other researchers to explore new hypotheses and generate innovative ideas for future investigations. Therefore, this study serves as an essential point of reference for researchers intending to undertake related studies or formulate hypotheses, thus guiding them in initiating their work effectively.

THEORETICAL BACKGROUND

In the current digital era, it is common for many EFL learners to use mobile devices instead of laptops or other digital devices for their university assignments and projects. With rapid advancements in technology, mobile devices offer various features that can facilitate students' writing processes and enhance the quality of their work. One such feature is word prediction, which is frequently available on mobile keyboards and can be beneficial for several reasons. The primary advantage of using these features is that they can help students type more quickly and accurately. They save time and effort by predicting the correct spelling of words as students type, thereby assisting in error avoidance. Grammar and spelling checkers also help students identify language errors and improve the clarity of their writing. By utilising these mobile features, learners can enhance the productivity and effectiveness of their writing process, ultimately leading to better overall writing quality (Bećirović, Čeljo & Delić, 2021).

However, the importance of being aware of the potential disadvantages of relying too heavily on these features must be noted. Learners might become overly dependent on such features to the point where they find it challenging to write without them. This can pose a problem when completing assignments that require handwriting instead of mobile devices.

Spelling mistakes are common among language learners, particularly those new to a language or unfamiliar with its spelling rules. Learners who use improper words often make spelling mistakes, significantly impacting their written language skills. These errors can manifest in various aspects of their writing, such as paragraphing, punctuation, article usage, spelling, and conjunctions (Sari, 2015).

Writing

Voltaire states that 'Writing is the painting of the voice'. After speaking, writing is another form of communication known as written communication. It plays a crucial role in our daily

lives, allowing us to express ideas and thoughts and convey messages. Words serve as the tools of writing. Writing has been employed to preserve past events, safeguard human identity, and share information. It remains one of humanity's most significant inventions, serving the betterment of society. Ultimately, writing helps us understand our own identities (Lefevre, 2018).

Writing is one of the four primary skills in language learning. It is often considered more challenging than other skills due to its productive and intricate nature. When you write, you must possess a broad vocabulary, accurate spelling, knowledge of grammar rules, and proficiency in constructing varied sentence structures. While pen and paper were traditionally used for writing, nowadays, digital writing has become increasingly prevalent. With the advent of digital applications and software programs, people write using computers, smartphones, or similar digital devices. This includes activities such as texting, tweeting, messaging, emailing, and engaging on social media platforms (Shin, Kwon & Lee, 2021).

Digital writing holds more influence in modern writing and communication compared to traditional writing. It allows users to incorporate different media, such as images and videos and offers easy text editing capabilities. However, there is an ongoing debate among researchers regarding the merits of handwriting versus digital writing. Some argue that handwriting is a complex process requiring multiple writing skills, which may be time-consuming for learners seeking to improve their writing abilities. On the other hand, proponents of pen and paper believe it allows learners to refine essential writing skills, such as grammar, sentence structure, spelling, and vocabulary. By honing these skills, learners can identify errors during the writing process and become proficient spellers. In digital writing, the situation is somewhat reversed. The applications learners use often possess automatic features such as spell-checking, grammar checking, and text correction, which correct errors automatically (Gayed et al., 2022). Thus, the question arises: is the pen mightier than the keyboard?

Spelling and Spell-Checkers

Spelling is considered a fundamental aspect of written language. It involves arranging letters and sounds to form words, phrases, and sentences, utilising rules and sound systems.

Spelling poses challenges for both EFL learners and native speakers. There are several reasons for these difficulties. First, the relationship between the English language's written and spoken forms of words is highly intricate. Some words have spellings that differ from their phonetic representations. In addition, English has evolved from various languages and has borrowed numerous words from sources such as Greek, Latin, French, German, and more. Moreover, the English spelling system diverges from that of many other languages (Lint, 2017).

Despite these challenges, people continue to invest effort into learning correct spelling and employ various tools and methods to aid them. However, while possessing good spelling knowledge is crucial for reading and effective writing, its importance in today's world has diminished with the advent of computers, smartphones, and tablets. These devices offer features such as auto-complete, auto-correct, and spell-checking, which diminishes the significance of strong spelling skills (Rimbar, 2017).

A spell-checker is a program or application that helps review and correct misspellings on devices while typing. It is available on smartphones, tablets, laptops, email programs, word processing programs, and other applications. Spell-checkers offer many benefits and features. When you turn on spell-checkers on your devices, they automatically identify words spelt incorrectly and suggest the correct spelling based on the language used. They are also useful for checking grammar. Spell-checkers underline errors and use different colours to analyse them, such as red for spelling errors and green for grammar errors (Ali et al., 2022).

Predictive Text in Writing

Predictive text is another technological feature used in the typing process on a device. It recommends words and phrases based on the first letter and context or your past typing history. A user receives suggestions for words and phrases that might follow as they type. Many people use this feature because it enables quick and easy text composition, which is particularly beneficial for those who struggle with word memorisation, spelling or improving their writing skills. This feature is accessible on smart devices such as laptops, smartphones, and computers while typing, messaging, emailing, and tweeting (Mezei & Heller, 2012).

English Language and Digital Tools

Digital tools are programs and applications on smartphones, laptops, computers, and tablets that enhance communication, collaboration, educational systems, and various business processes. These tools simplify tasks and play an increasingly important role in the current digitalised world. Contemporary technology has made significant advancements in the teaching and learning of English. These tools serve various purposes in language education, allowing users to improve their listening, speaking, reading, and writing skills, particularly in creative writing. Learners can access a wide range of online resources to enhance their writing abilities, including platforms that foster creativity and others that provide assistance and feedback.

Digital tools such as spell-checkers, grammar checkers, Microsoft software, and writing enhancement software significantly enhance writing skills. These tools are particularly helpful in identifying and correcting grammar mistakes, misspellings, and vocabulary issues, as many devices have built-in features that automatically detect errors. Despite numerous advantages, users should be aware of their potential disadvantages and utilise these tools only when necessary (Purcell, Buchanan & Friedrich, 2013).

Previous Studies

In the past four decades, there has been a growing interest in the field of second language acquisition (Qosayere, 2015). With English being the *lingua franca*, many individuals worldwide are required to learn it as a foreign language, particularly EFL learners (Kim & Kim, 2021). Generally, when acquiring a new language, learners need to master four skills simultaneously: listening, writing, reading, and speaking (Asma & Saka, 2022). Writing is crucial to communication and language development, making it an essential language skill (Valizade, 2022). As success in college and academic careers often hinges on writing, students must be able to write independently without relying on assistance or technological aids (Alhusban, 2016).

According to Van Staden (2010), written language spelling requires various linguistic skills, knowledge, and experience. Poor spelling can negatively impact writing and reading skills, as well as overall academic achievement. Spelling errors can result from omissions, insertions, substitutions, grapheme substitution or misplacing letters when writing specific words (Ali et al., 2022). Recent developments in technology and the internet have introduced new and diverse opportunities for teaching and learning. Smartphones have become one of the most widely used devices, seamlessly integrating into our daily lives (Khan, Khalid & Iqbal, 2019). Digital technology has become a crucial factor in language learning processes (Senad, Amna & Edda, 2021), shifting teaching methods from teacher-centred to learner-centred approaches (Almuhailib & Al-Ahdal, 2021).

Digital tools offer learners effective opportunities to collaborate with peers and instructors, enhancing their writing skills (Lint, 2017). However, it is worth noting that digital technologies, if not used appropriately, can have a significant negative impact on writing and verbal skills (Purcell, Buchanan & Friedrich, 2013). Many languages, including English, have complex pronunciation and spelling rules, thus making it easy to commit spelling mistakes (Hládek, Staš & Pleva, 2020). Fortunately, language learners now have access to a wide range of resources and language-support tools that facilitate the writing process (Shin, Kwon & Lee, 2021). Typing skills have become essential in the digital information society, and keyboarding is a crucial mode of written communication (Hasegawa & Hatakenaka, 2019; Wai & Liu, 2018). To accommodate this growth, text entry methods have been improved to allow users to type faster and correct typing errors (Alharbi, Stuerzlinger & Putze, 2020).

One notable feature of mobile keyboards is auto-correction, which automatically corrects spelling errors. While auto-correction can improve accuracy and correctness, reduce the number of mistakes and improve readability, it is important to acknowledge that it might not always provide the correct suggestions (Quratulain, Ghazanfar & Sattar, 2023). Predictive word processing systems, developed since the 1980s for individuals with motor disabilities, generate word predictions based on the user's typed words and a language model (Magnuson & Hunnicutt, 2002; Trnka & McCoy, 2008). Traditional prediction systems rely on word frequency lists to complete partially typed words (Leshner et al., 2002). Research has shown that using predictive text can result in fewer grammatical violations when texting (Waldron, Wood & Kemp 2016). Furthermore, predictive text systems benefit individuals with dyslexia and those struggling with spelling (Hamarashid, Saeed & Rashid, 2021).

However, some challenges exist with word prediction programs. They may struggle with words of which the spelling differs from their sound, and their usage can demand significant attention and accurate initial letter spelling (MacArthur, 1999). Some individuals find word prediction distracting and unhelpful, as they believe it prevents them from focusing on their writing abilities and spelling mistakes. Instead, they prefer to write each word letter by letter to be more aware of their spelling errors and improve as writers.

METHODOLOGY

This study used both quantitative and qualitative research methods, particularly the quantitative approach. Using mixed methods helped provide stronger evidence and more confidence in the findings. Moreover, by utilising several quantitative techniques, the researchers created a credible numerical representation of the mistakes reflected in the gathered data.

Piloting and Scope of the Study

Identifying deficiencies is an important component of scientific research. One approach to achieving this is by conducting a pilot test. Therefore, a pilot test was conducted prior to the main experimental process. Its purpose was to evaluate the initial research assumptions, assess the study's validity, and determine the feasibility of the planned strategy for the main study. In addition, the pilot test assisted in evaluating the preparation of questions for data collection. In total, six samples were used in the pilot test. Upon comparison, the results collected during the main study aligned closely with the data obtained from the pilot test, confirming the consistency of the findings.

This study explored and identified the indirect effects of using online platforms for spelling, which mainly includes digital typing. The current research mainly investigated the typical impacts of smartphone keyboard prediction used by Kurdish EFL learners at Soran University on their spelling competence when writing by hand. It also evaluated and examined the outcomes for EFL learners who rely on such tools in writing.

Ethical Considerations

When inviting students to participate in the study, we provided sufficient information about the research and made it explicitly clear that there would be no negative consequences or repercussions for refusing to participate. Participants were informed that their responses would be used solely for academic purposes. Therefore, all participants volunteered without any pressure and retained the right to withdraw from the research if it did not align with their interests. In addition, all data were handled with complete confidentiality, ensuring that no identities were recorded or disclosed in any manner.

Data Selection and Participants

The study focused on EFL learners since they deal more with the English language and are supposed to have better English writing skills. Accordingly, the study sample was taken from students in the English Department, Faculty of Arts at Soran University. The study sample comprised 40 randomly chosen EFL learners from all grades, including 20 males and 20 females. All the participants were EFL language learners, not native speakers. They had been studying English as a foreign language since the early stages of school. This choice of participants seemed compatible with the objectives of the study.

Data Collection

After selecting the study sample, a questionnaire consisting of closed-ended questions was designed on a sheet for extracting insights for data analysis; in addition, an open space was provided for participants to write down eight dictated sentences. The same sheet was given to

the students at each stage for answering the questions. Subsequently, the students were asked to write down the dictated eight sentences on the answer sheets. Each sentence was repeated multiple times to ensure the students had heard the words accurately, and the students were allowed to review their answers before submitting the sheet to the researchers.

Once all the sheets had been collected from the students, the researchers began to identify the spelling errors made in their papers during the test. This procedure involved referring to English standards in dictionaries and books. Each word the participants had written was carefully examined for spelling errors. This

Framework and Procedure of Analysing Spelling Errors

The analysis of spelling errors was conducted in two steps. First, spelling errors were categorised according to Cook's (1999) methodology for analysis. The identified errors were carefully reviewed and classified into four types. Second, spelling errors were detected based on these categorisations, and various insights were created to analyse the results in more detail. This approach allowed for a systematic understanding of the types of errors present in the data. The categories helped provide a clear framework for analysing the spelling errors and identifying patterns within them.

Moving onto the second step, the categorised spelling errors were further analysed and detected based on the established categories. This involved examining each error individually and determining its classification. The resulting data were then used to create visual representations, such as figures or charts, to facilitate a more comprehensive analysis and insights into the spelling errors and their distribution.

This two-step process provided valuable insights into the nature and prevalence of spelling errors within the collected data. These findings contributed to a deeper understanding of the participants' spelling proficiency and competence and could inform future interventions or instructional approaches to improving spelling skills.

Types of Spelling Errors

Spelling errors can have different causes and various forms. Mastering English spelling rules is very difficult because of the discrepancies between the pronunciations of many words and the spelling system. Moreover, the origins of English words are a cause of students' failure to spell them correctly (Miressa & Dumessa, 2011). There are several language approaches for analysing spelling errors, but Cook's (2004) method of identifying and analysing errors in language output is the most widely used and the best approach for identifying underlying spelling mistakes in writing. According to Cook (2004), spelling mistakes occur because many non-native speakers may not know or understand the actual writing system of the English language. The author divided spelling errors into four types: omission, insertion, substitution, and transposition.

1. Omission error: A spelling error whereby a writer excludes or omits one or more letters, syllables or words from a word or sentence. For example, 'frend' for 'friend', 'to' for 'too', 'moning' for 'morning' and 'se' for 'see'.

2. Inserting error: When a writer adds one or more letters or words not required to a word or sentence. Examples include ‘taike’ for ‘take’, ‘halfe’ for ‘half’, ‘knowe’ for ‘now’, ‘watche’ for ‘watch’ and ‘remeimber’ for ‘remember’.

3. Substitution error: Whenever a writer exchanges one or more letters or words for another that is not supposed to be there, it's known as a substitution error in spelling. For example, ‘out’ to ‘aut’, ‘change’ to ‘chenge’, ‘saw’ to ‘sow’ and ‘he’ to ‘hi’.

4. Transposition error: When two or more letters are switched around or transposed in a word, it is called a transposition error. Example can be ‘instead’ changed to ‘instaed’, ‘swear’ changed to ‘swaer’, ‘ticket’ changed to ‘tikcet’ and ‘married’ changed to ‘marreid’.

RESULTS

All types of errors were categorised based on their specific nature, including transposition, substitution, omission, and insertion, as outlined by Cook (1999). This classification allowed for a systematic examination of the mistakes made by the participants, providing a clearer understanding of the specific areas where errors occurred. Based on the responses, 28 students indicated that they had activated the keyboard prediction feature on their devices and were using it as an assistive tool. Therefore, the spelling error analysis was conducted exclusively on their samples.

The study obtained additional information from the students to enhance the data collection process. This supplementary information provided valuable insights that complemented the main dataset, enriching the overall analysis. Figure 1 illustrates the students' perceptions regarding the usefulness of smartphones for writing. This visual representation provides a clear overview of the students' perspectives on how smartphones impact their writing activities.

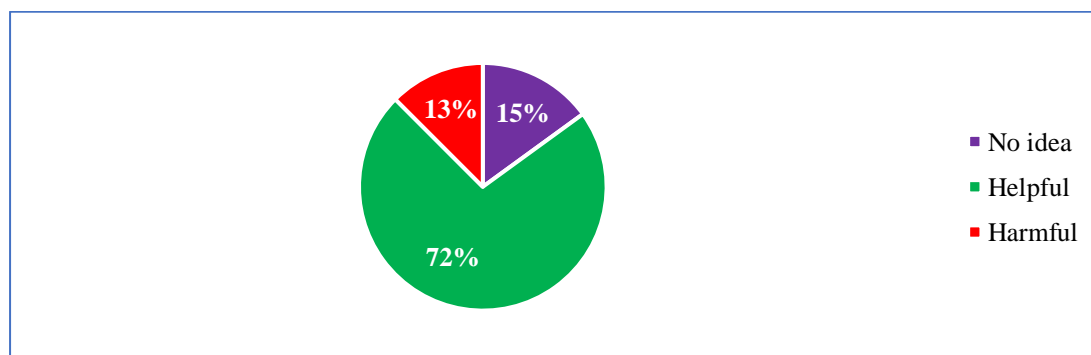


Figure 1. Students' ideas about the usefulness and harmfulness of smartphones' keyboard spell-checkers

Figure 1 reveals that 72% of the learners regarded word prediction as a helpful feature of mobile phones for EFL learners' writing skills. However, 13% of the students were uncomfortable using word prediction on writing tasks. They believed word prediction was not helpful but harmful and caused students to lose their writing creativity. The remaining 15% of the participants had no idea about the effect of using word prediction on university students.

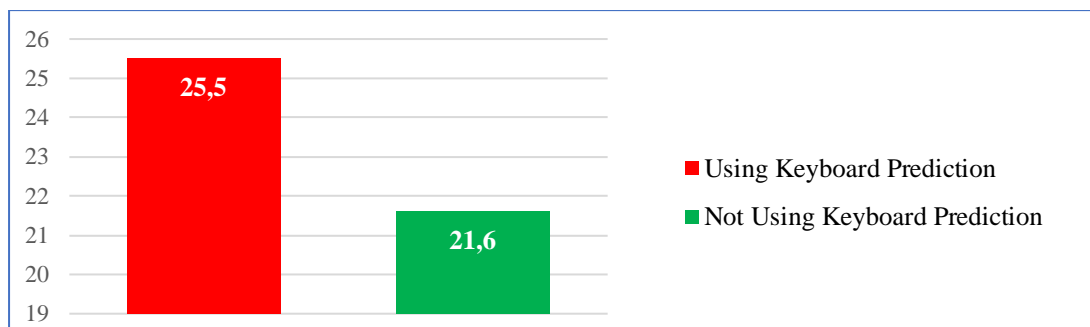


Figure 2. The average misspelt words

Based on the data presented in Figure 2, an unexpected finding emerged: students who used word prediction had a higher frequency of misspelt words, at a rate of 25.5, compared to those who did not use word prediction, at a rate of 21.6. This finding challenges the assumption that word prediction can effectively reduce spelling mistakes among EFL learners. Indeed, it suggests that word prediction may lead to an increase in spelling errors and hinder learners' ability to recognise and correct their mistakes while writing.

To obtain further insight, all the letters in the misspelt words were analysed individually. The following data reveals shocking insights in this regard.

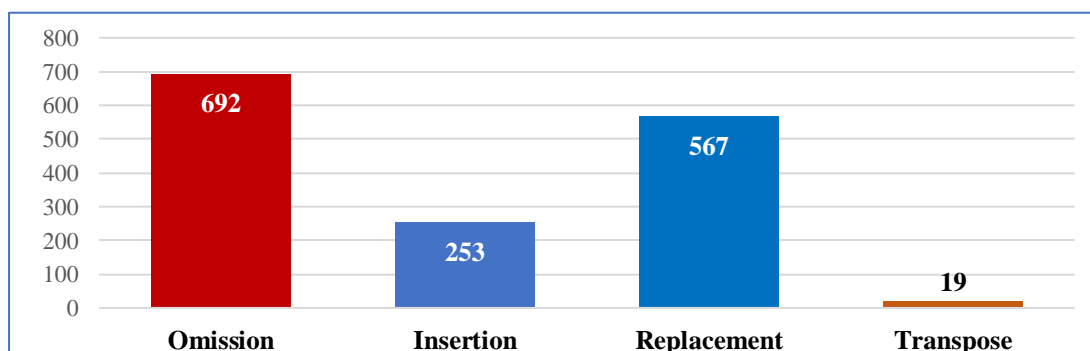


Figure 3. Total number of spelling errors based on spelling error types

Figure 3 demonstrates that **omission** was the most common type of spelling error made by Soran University EFL students, occurring 692 times, e.g., 'aditional' and 'tolration'. Second was **substitution** or **replacement**, occurring 567 times, e.g., 'section' and 'stumps' instead of 'stamps'. This was followed by **insertion** in 253 cases, e.g., 'tolleration'. The fourth most common was **transposition** in 19 cases, e.g., 'decsipline' and 'cions'.

Besides such spelling mistakes, punctuation mistakes were also common among students writing the test and occurred 218 times in various cases, as explained below.

Examples of Spelling Errors

The following examples of each error type are taken from the study data:

Omission

Incorrect: additon | Correct: additional

The example above extracted from the data shows that the student made spelling errors by omitting both vowels and consonants. The example exhibits a critical spelling difficulty. The student had omitted the letter ‘i’, which could be an effect of the digital keyboard anticipating. Keyboard prediction usually suggests longer words, and due to time or other factors, the students try to rely on them, which indirectly affects spelling competence in handwriting.

Substitution

Incorrect: section | Correct: session

As noted in the example above, substitution or replacement errors occurred in the middle of the word. The letters ‘ss’ were substituted for ‘c’ and ‘t’, so the word ‘session’ changes into another word, ‘section’. Thus, as explained before, when misspelling the first three letters of the word, the word prediction will provide differing suggestions. In this case, students became confused.

Insertion

Incorrect: tolleration | Correct: toleration

The word ‘toleration’ was added by a consonant letter ‘l’ in the middle of the word, which became ‘tolleration’. By using word prediction, these mistakes can happen when a learner is writing too quickly and not paying close attention to the correct spelling of the word.

Transposition

Incorrect: dicsipline | Correct: discipline

The word ‘dicsipline’ shows that the consonant letter ‘c’ is placed after the consonant letter ‘s’, which must be written the letter ‘s’ then followed by the letter ‘c’, which should be ‘discipline’.

Letters Involved

Categorising the letters involved in the errors provides another insight into the reasons for and effects of the errors. The following chart illustrates the different types of letters involved in errors.

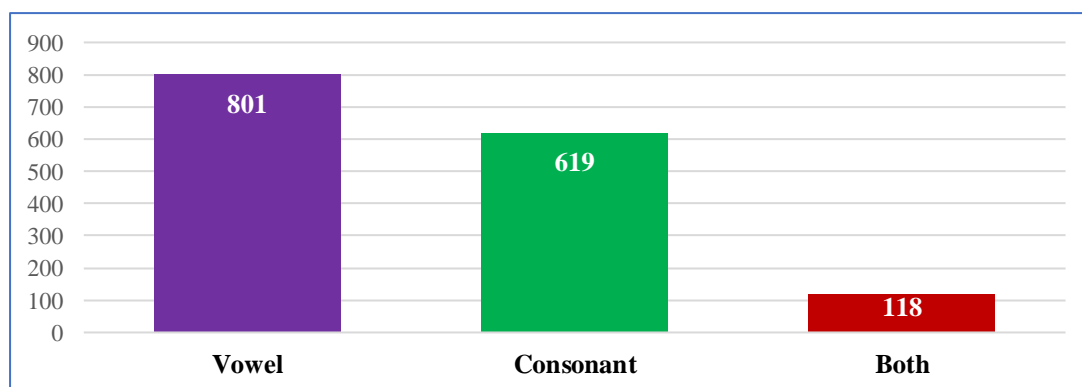


Figure 4. Division of letters involved in spelling errors

According to the findings presented in Figure 4, there is a significant disparity between vowel and consonant error letters among EFL learners when writing assignments. Vowel errors were

more prevalent, with a count of 801, and often posed a greater challenge for EFL learners. Several factors contribute to these vowel errors, such as the representation of vowel sounds in English and the presence of silent letters in English words, which can lead to confusion (Al-Sobhi et al., 2017). In addition, pronouncing vowel letters can be difficult, as they may not always be pronounced as they are written. On the other hand, consonant letters were less common and presented fewer challenges for learners, with a count of 619, as they are generally pronounced more consistently. Notably, most errors consisted of both vowel and consonant letters being misspelt, 118 instances in total.

Results of Most Commonly Misspelt Words

Different results show more analytical insights into understanding the mistakes. The common challenging words used in the study share the majority of mistakes.

Table 1. The most frequently misspelt words

No	Words	Frequency	Percentage	Misspelt samples
1	Archaeologists	28	100	arqueulogies, archiologists, archologists, archology, archelologists
2	Discipline	27	96.43	disaplane, desciplen, disaplain, disipline, dissplane
3	Bouquet	25	89.29	buket, bocket, bucket, boket, buckett
4	Sovereign	25	89.29	souverain, sovrein, soverin, sothergn
5	Allegiance	25	89.29	elegant, alegens, elegend, allegent, aligence
6	Accommodated	24	85.71	accammodated, accomodited, accomodatied, comudate, acamodaded
7	Conscious	22	78.57	consious, conscus, contions, contution, concus
8	Foreign	22	78.57	forgen, forign , afforn, forn, forigne
9	Sessions	17	60.71	sections, setion, section, sentions, sseins
10	Additional	13	46.43	aditional, addishnal, adcina, aditium, additona

Table 1 above presents the high percentage of the top ten most commonly misspelt words. These words are likely some of the first English words the students had learnt in English classes at various stages of their schooling. The first misspelt word all the students struggled with was 'archaeologists' (100%). Following that, the word 'discipline' (96.43%) ranked as the second most commonly misspelt word among the students. Other words with a similar error frequency include 'bouquet' (89.29%), 'sovereign' (89.29%), and 'allegiance' (89.29%). In addition, 'accommodated' (85.71%) and both 'conscious' and 'foreign' (78.57%), were frequently misspelt, along with 'sessions' (60.71%). Lastly, 'additional' (46.43%) had a significant error rate.

The majority of EFL learners made mistakes in writing vowels by interchanging them. Common confusions occurred between 'i' and 'e', as in 'disciplene' and 'discipline', and between /a/ and /o/, as in 'accommodated' and 'accammodated'. Furthermore, the word 'aditnal' was missing the vowel letter 'o' and the consonant letter 'd' in the middle, resulting in the incorrect spelling of 'aditnal' instead of 'additional'. Similarly, 'foregn' was missing the vowel letter 'i' between 'e' and 'g', which should be spelt 'foreign'. These errors often indicate the use of a phonological strategy when students are unsure about the spelling of a word.

Many of the words, such as 'sections', 'forgen', 'concus', 'elegiant', 'sothern', 'boket', 'displain', and 'arqueulogies', were spelt incorrectly. Furthermore, most of these words do not even appear in the English language dictionary. For instance, in the word 'soverin', the vowel letter 'e' was missing between 'r' and 'i', and the consonant letter 'g' was omitted between 'i' and 'n'. In 'aditional', the consonant letter 'd' was missing in the middle of the word, and in 'accamodated', the vowel letter 'o' was replaced with 'a' instead of 'o'. The word 'archologists' excluded the vowels 'a' and 'o', while 'consious' omitted the consonant letter 'c'. Apart from the words listed in the table, there were other examples of misspelt words related to pronunciation, such as 'alone' instead of 'loan', 'plan' instead of 'plant', 'sight' instead of 'site', 'once' instead of 'ones', 'jeans' instead of 'genes', 'bucket' instead of 'bouquet', 'for' instead of 'full', 'strange' instead of 'strength', and 'pells' instead of 'pearls'. Other misspelt words (not included in the table), such as 'wenesday', where the letter 'd' was omitted, 'supconscious', where 'b' was replaced with 'p' instead of 'subconscious', and 'resistance', where 'c' was substituted with 's' between 'n' and 'e' instead of 'resistance'. In some cases, the letter 'i' was omitted, resulting in 'resistance'. Lastly, in the word 'ordarly', the vowel letter 'e' was replaced with 'a' instead of 'orderly'. It's important to note that in long, complicated sentences, people can also lose track of whether the subject is singular or plural, leading to errors such as excluding the plural 's' in words like 'historians' and 'archaeologists', which become 'historian' and 'archaeologist'.

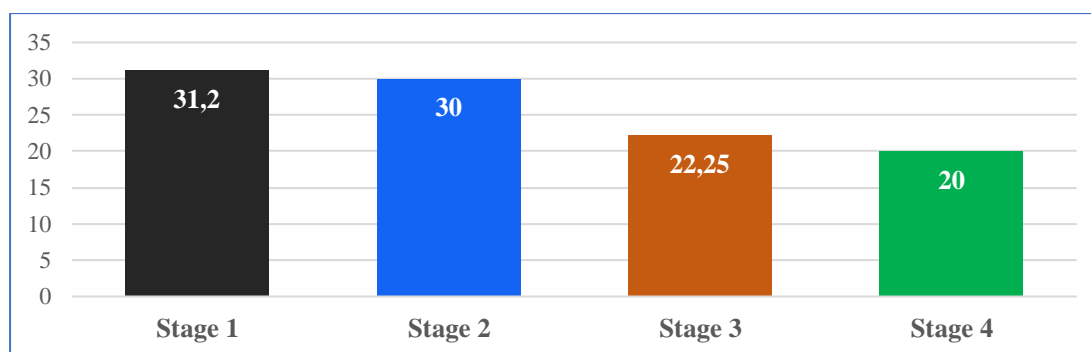


Figure 5. The average of misspelt words by students at different stages

The data in Figure 5 highlight the average number of misspelt words among students from the four stages in the English department. The data reveals a decreasing average of misspelt words as students progress through the stages. Students in Stage 1 share the highest average number of misspelt words at 31.2, followed by second-stage students, with an average of 30 misspelt words. Students in Stage 3 have a lower average of 22.25 misspelt words. The average shows the lowest rate among the fourth-stage students, with merely 20 misspelt words. This trend of decreasing average misspelling words suggests that as students progress through the stages, they become more proficient in English spelling and, thus, display the effect of keyboard predictions; however, the use of mobile keyboard prediction could potentially affect the accuracy of this data. This outcome could be due to various reasons, including more exposure to English language materials, more intensive instruction in spelling, and more practice and experience in using the English language practically.

DISCUSSION

Comparing these results with those of other researchers and seeking causes and potential solutions demonstrate that word prediction can be a helpful tool for individuals struggling with spelling. However, findings from other research differ from the statement above (Purcell, Buchanan & Friedrich, 2013; MacArthur 1999). In his study, MacArthur (1999) finds three students with severe spelling difficulties engaged in daily journal writing, using various methods, including handwriting, word processing, and word prediction with speech synthesis. Other researchers have argued that word prediction programs are not specifically designed to support spelling since users must spell the beginning of the word correctly, and such software does not allow for phonetic substitutions (Magnuson & Hunnicutt, 2002; Trnka & McCoy, 2008; Waldron, Wood & Kemp 2016; Alharbi, Stuerzlinger & Putze, 2020; Quratulain, Ghazanfar & Sattar, 2023). As a result, students with severe spelling problems did not benefit from word prediction programs since they often did not know the correct initial letters. The results of this quasi-experimental study support the notion that using word prediction can negatively affect the spelling ability of EFL learners already having spelling difficulties.

Generally, spelling mistakes arise for various reasons, such as typos, writing hastily or a lack of knowledge regarding the proper spelling of a word. Mistakes might also occur due to carelessness, poor attention to detail or a lack of emphasis on spelling skills. In addition, learners' listening skills and pronunciation can contribute to spelling errors. Difficulties in

listening skills can hinder learners' ability to discern differences in letter sounds, making it challenging to apply letter-sound associations when spelling. Moreover, EFL learners often rely on strategies like spell-checkers or word prediction instead of depending on their own spelling knowledge and understanding of correct word spelling, particularly when utilising word prediction. In other words, when writing texts or completing daily assignments, students might become overly reliant on these features and develop a habit of typing quickly without paying close attention to spelling, ultimately leading to poor spelling skills.

Overall, while the use of mobile keyboard prediction might have impacted the data accuracy, the aspect of decreasing average misspelling as students progress through the stages still suggests the need to improve spelling skills over time since the averages for such students are unsatisfactory.

CONCLUSIONS

The study results indicate that online platforms significantly impact EFL learners' writing skills. This impact extends beyond handwriting, affecting their spelling, punctuation, and ideas. Furthermore, the study suggests that excessive use of such platforms can have a long-term effect on learners' spelling ability due to daily usage and potential addiction. Conversely, learners now tend to place more trust in digital technologies than in their abilities during the writing process. They become overly dependent on internet tools and struggle to write effectively without using them. EFL learners should be aware of the impact of keyboard prediction tools on their spelling and not rely on them blindly.

The study highlights the need for EFL learners to find a balance between utilising online platforms for writing assistance and developing their spelling skills. Excessive reliance on these tools can hinder their ability to spell words correctly and independently. Moreover, the absence of handwritten assignments in university curricula diminishes opportunities for students to practise and refine their spelling proficiency. This reliance on digital platforms for writing tasks might inadvertently undermine their spelling competence in traditional settings.

Recommendations

Students should avoid blindly relying on word prediction. Overdependence on a word prediction system can result in poor spelling and diminished writing creativity. Lecturers should periodically request assignments submitted in handwritten format. In future, word prediction systems should be further developed to predict the correct spelling of words accurately and provide better suggestions for the next word. Future researchers could explore the long-term effects of word prediction on users' spelling competence.

Limitations of the Study

This study acknowledges certain limitations. First, the study sample was restricted to 40 EFL learners from Soran University, potentially affecting the validity of the study. Moreover, data collection was difficult since the students hardly provided time to participate.

REFERENCES

- Alharbi, O, Stuerzlinger, W & F Putze. 2020. The effects of predictive features of mobile keyboards on text entry speed and errors. *Proceedings of the ACM on Human-Computer Interaction*, 4(ISS): 1–16. <https://doi.org/10.1145/3427311>
- Alhusban, A. 2016. The impact of modern technological tools on students writing skills in English as a second language. *US-China Education Review*, 6(7): 438–443. <http://dx.doi.org/10.17265/2161-623X/2016.07.006>
- Ali, HF, Nakshbandi, LJ, Saadi, F & SHH Barzani. 2022. The effect of spell-checker features on spelling competence among efl learners: an empirical study. *International Journal of Social Sciences & Educational Studies*, 9(3): 101–111. <https://doi.org/10.23918/ijsses.v9i3p101>
- Almuhailib, B & Al-Ahdal, AAMH. 2021. Learner-centered teaching in Saudi context: Exploring the challenges from pre-service EFL teachers' perspective. *Journal of Positive Psychology and Wellbeing*, 5(4): 1170–1181.
- Al-Sobhi, BMS, Rashid, SM, Abdullah, AN & R Darmi. 2017. Arab ESL secondary school students' spelling errors. *International Journal of Education and Literacy Studies*, 5(3): 16–23. <http://dx.doi.org/10.7575/aiac.ijels.v.5n.3p.16>
- Asma, B & Saka, FÖ. 2022. The effect of English admission test and various variables on foreign language skills of students. *Turkish Academic Research Review*, 7(4): 937–961. <https://doi.org/10.30622/tarr.1188490>
- Bećirović, S, Brdarević-Čeljo, A & H Delić. 2021. The use of digital technology in foreign language learning. *SN Social Sciences*, 1(10): 246. <https://doi.org/10.1007/s43545-021-00254-y>
- Brians, P. 2003. *Common errors in English usage*. Oregon: Franklin, Beedle & Associates, Inc.
- Cook, VJ. 2004. *The English writing system*. New York: Routledge.
- Cook, VJ. 1999. Teaching spelling. Unpublished article.
- Gayed, JM, Carlon, MKJ, Oriola, AM & JS Cross. 2022. Exploring an AI-based writing assistant's impact on English language learners. *Computers and Education: Artificial Intelligence*, 3: 100055. <https://doi.org/10.1016/j.caeai.2022.100055>
- Hamarashid, HK, Saeed, SA & TA Rashid. 2021. Next word prediction based on the N-gram model for Kurdish Sorani and Kurmanji. *Neural Computing and Applications*, 33(9): 4547–4566. <http://dx.doi.org/10.36227/techrxiv.12725084.v1>
- Hasegawa, T & Hatakenaka, T. 2019. Touch-typing detection using eyewear: toward realizing a new interaction for typing applications. *Sensors*, 19(9): 2022. <https://doi.org/10.3390/s19092022>
- Hládek, D, Staš, J & Pleva, M. 2020. Survey of automatic spelling correction. *Electronics*, 9(10): 1–29. <https://doi.org/10.3390/electronics9101670>
- Khan, AA, Khalid, A & R Iqbal. 2019. Revealing the relationship between smartphone addiction and academic performance of students: Evidences from higher educational institutes of Pakistan. *Pakistan Administrative Review*, 3(2): 74–83.
- Kim, SL & Kim D. 2021. English learners' science-literacy practice through explicit writing instruction in invention-based learning. *International Journal of Educational Research Open*, 2: 1–11. <https://doi.org/10.1016/j.ijedro.2020.100029>
- Per Linguam* 2024 40(2):112-129
<http://dx.doi.org/10.5785/40-2-1174>

- Lefevre, RM. 2018. Using wordless picture books to develop writing skills in First Grade. *Michigan Reading Journal*, 51(1): 19–30.
- Leshner, GW, Moulton, BJ, Higginbotham, DJ & B Alsofrom. 2002. Limits of human word prediction performance. *Proceedings of the CSUN 2002*.
- Lint, K. 2017. The effects of using digital tools to support writing in the ELL classroom. *University of Northern Iowa, Graduate Research Papers*. 185.
- MacArthur, CA. 1999. Word prediction for students with severe spelling problems. *Learning Disability Quarterly*, 22(3): 158–172. <https://doi.org/10.2307/1511283>
- Magnuson, T & Hunnicutt, S. 2002. Measuring the effectiveness of word prediction: The advantage of long-term use. *Speech, Music and Hearing*, 43: 57–67.
- Mezei, PJ & Heller, KW. 2012. Effects of word prediction on writing fluency for students with physical disabilities. *Physical Disabilities: Education and Related Services*, 31(1): 3–26.
- Miressa, M & Dumessa, M. 2011. Investigating factors contributing to Grade Nine students' spelling errors at Don Bosco High and Preparatory School in Batu. *Journal of Language and Culture*, 2(6): 103–115.
- Purcell, K, Buchanan, J & L Friedrich. 2013. *The impact of digital tools on student writing and how writing is taught in schools*. Washington, DC: Pew Research Center, 16.
- Saleem, QUA, Ghazanfar, S & A Sattar. 2023. A computer-based method to improve the spelling of a learner with dyslexia. *Journal of Social Sciences Review*, 3(1): 235–243. <https://doi.org/10.54183/jssr.v3i1.135>
- Rao, VC. 2018. English spelling and pronunciation: a brief study. *Journal for Research Scholars and Professionals of English Language Teaching*, 5(2): 1–10.
- Rimbar, H. 2017. The influence of spell-checkers on students' ability to generate repairs of spelling errors. *Journal of Nusantara Studies*, 2(1): 1–12. <https://doi.org/10.24200/jonus.vol2iss1pp1-12>
- Sari, IR. 2015. Common errors in students' spelling on the required words for the seventh graders. *Educate*, 4(2): 35–43.
- Senad, B, Amna, BČ & P Edda. 2021. Exploring the relationship between language learning strategies, academic achievement, grade level, and gender. *Journal of Language and Education*, 7(2): 93–106. <https://doi.org/10.17323/jle.2021.10771>
- Shin, D, Kwon SK & Y Lee. 2021. The effect of using online language-support resources on L2 writing performance. *Language Testing in Asia*, 11(4): 1–23. <https://doi.org/10.1186/s40468-021-00119-4>
- Siok, WT & Liu, CY. 2018. Differential impacts of different keyboard inputting methods on reading and writing skills. *Scientific Reports*, 8(1): 1–13. <https://doi.org/10.1038/s41598-018-35268-9>
- Trnka, K & McCoy, KF. 2008. Evaluating word prediction: framing keystroke savings. In *Proceedings of Acl-08: Hlt, Short Papers*: 261–264.
- Valizadeh, M. 2022. Language teachers' perceptions of using Google keyboard in L2 writing. *Journal of Educational Technology and Online Learning*, 5(2): 411–421. <https://doi.org/10.31681/jetol.1060950>

- Van Staden, A. 2010. Improving the spelling ability of Grade 3 learners through visual imaging teaching strategies. *Per Linguam*, 26(1): 13–28. <https://doi.org/10.5785/26-1-11>
- Waldron, S, Wood, C & N Kemp. 2017. Use of predictive text in text messaging over the course of a year and its relationship with spelling, orthographic processing and grammar. *Journal of Research in Reading*, 40(4): 384–402. <https://doi.org/10.1111/1467-9817.12073>

BIOGRAPHICAL NOTES

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