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Spelling in the Digital Age: Spell- checkers' Impact on Writing

A quantitative study on the effects of spell-
checkers on English grammar

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Student: Naba Hussein

Supervisor: Dr. Francesco Romano

Examiner: Dr. Mette Hildeman Sjölin



HÖGSKOLAN
I HALMSTAD

Abstract

Due to the increased usage of technology and its indicated aid in writing acquisition, it is important to investigate the effects of spell-checkers on the English language. Thus, this essay has conducted a quantitative study to ascertain if there has been an improvement or regression in English spelling with the aim of gathering an indication of if and how spelling has evolved and changed with the development of spell-checkers. This study intended to answer two main questions: “Has spelling improved after spell-checkers were invented?” and “Can spell-checkers be seen as an aid in helping people learn how to spell better?”. Texts from before the development of spell-checkers and texts from after were utilized and searched for possible misspellings, to identify whether spelling has improved or not. The main finding was that there was a numerical difference between the two groups of texts, with the older texts containing an average of 43% misspellings as opposed to the newer texts which comprised an average of 7% misspellings. Thus, it was concluded that with the emergence of spell-checkers, spelling has improved. In relation to the second question, this research detected that although spelling mistakes have decreased, certain misspellings and errors are occurring, such as errors in transposition and omission, indicating that spell-checkers might not in fact be an aid in improving spelling competence. However, more data is required with regard to the second question, thus the answer remains inconclusive, with the need for further data to reach an assertive answer.

Keywords: Language acquisition, spell-checkers, technology, spelling, misspelling, transposition, substitution, omission, insertion

Table of contents

ABSTRACT	2
1. INTRODUCTION	4
2. BACKGROUND	5
2.1 Categories of spelling errors	5
2.2 History of spell-checkers	5
2.3 Previous studies in this field	6
3. PRESENT STUDY	9
3.1 Purpose and research questions	9
3.2 Method	9
4. RESULTS	10
5. DISCUSSION	15
6. CONCLUSION	18
7. REFERENCES	19
8. APPENDIX	23

1. Introduction

English spelling has long been seen as an obstacle for both L1 and L2 language speakers, due to the multitude of rules, exceptions and homophonic words. This has caused difficulty in learning various grammatical and spelling rules in the English language; however, a solution has been provided by technology in the form of spell-checkers. With the growing usage of technical devices, the growing number of autocorrect programs, software and programs such as spell-checks has also increased. There has been an increase in the usage of mobile devices amongst children below the age of eight, which has likewise increased texting and writing amongst the youth, and has thus caused an increase in using autocorrection and spell-checking programs (Arif et al., 2016). Originally, autocorrect was used in the program Microsoft Word which was able to alter words when they were typed incorrectly. Spell-checks were also developed but differed from autocorrect, with underlining the word to notify the writer that the word was incorrect. With autocorrect's development, it is now in the 21st century able to suggest corrections for errors in grammar and spelling, or even automatically make changes to typed words (Tyson, 2014).

Due to the increasing usage of technology and its reported aid in writing acquisition, the question arises regarding what the impacts of spell-checkers are on the English language. Certain studies have been conducted regarding this field with differences in opinion concerning the effects of spell-checkers on English spelling. Considering that this subject is essential due to the growing significance and relevance of spell-checkers and their effects on spelling, this thesis aims to investigate the effects of spell-checkers on English spelling by examining the following research questions:

- Has spelling improved after spell-checkers were invented?
- Can spell-checkers be seen as an aid in helping people learn how to spell better?

To answer these questions, this thesis will conduct a quantitative study where certain texts will be analyzed to gather an indication of how and if spelling has evolved and changed with the emergence of spell-checkers. This thesis will consist of a background that will briefly summarize the main categories of spelling errors, the origin and development of spell-checkers, as well as certain studies in regard to spell-checkers and spelling. Additionally, the

method section will be stated, in which how this quantitative study has been conducted will be explained in further detail, with what texts have been used. The texts will thereafter be examined in the results section and presented with an analysis. Furthermore, this thesis will comprise a conclusion and will lastly in the end, discuss the limitations of this study as well as suggestions for future studies.

2. Background

2.1 Categories of spelling errors

According to Cook (1997), certain common errors can be detected when spelling:

A) Substitution: Replacement of a single letter by another single letter. For example, *separeted* instead of *separated*.

B) Omission: Omission of a single letter. For example, *of* when implying *off*.

C) Insertion: Insertion of a single letter. For example, *off* when meaning *of*.

D) Transposition: The mis-arrangement of two nearby letters. For example, *percieve* instead of *perceive*

2.2 History of spell-checkers

Peterson (1980) mentions that Earnest, who led the research on spell-checks in the year 1961, deemed it necessary to include the first spell-checkers that accessed a list of 10,000 acceptable words. The first spell-checker program that was written as an application program for general English texts was later on created and was named SPELL. However, the first spell-checkers that were available for personal computers emerged in 1980 and by 1985, most computers were equipped with varied spell-checking programs and packages. In 1993, when smartphones were not common, Microsoft introduced a new feature in their program, autocorrect. This was a program that corrected mistakes by suggesting similar or more intended words. Years later, programmers began working on the program T-9, a predictive software that was originally used on phones with a simple numeric keyboard. Initially the aim of the programmers was something else as they wanted to aid people with disabilities and give them a tool to communicate easily (Pogue, 2009).

2.3 Previous studies in this field

Connors & Lunsford (1988) conducted a study with the aim of identifying the common errors that were made in college students' papers. In the study conducted, the participants were asked to submit a set of marked papers, which yielded over 20,000 papers from 300 teachers around the United States. Ultimately, 3,000 student papers were chosen for the research. As the results demonstrated, Connors & Lunsford ascertained that some of the most important mistakes that were made were spelling errors, vague pronoun references, missing commas in a compound sentence, wrong words and missing comma(s) with a nonrestrictive element. 20 years later, Lunsford & Lunsford (2008) conducted another study to detect if any differences or improvements had been made. During the two decades that had followed, certain studies had researched the errors made in student papers (see Sloan 1990). With this review of studies as well as the ongoing debate on what constituted good college writing, they aimed to replicate the study conducted in year 1988 to see if any changes had been made. The results of the study demonstrated that the usage of the wrong word had become the most common fault in students' papers, having jumped three spots whilst misspelling had gone from being the most common error to becoming the fifth common writing error. The authors reasoned that spelling was improved due to the fact that the students transitioned from handwriting to writing texts on computers where spell-checkers were commonly used.

In 2017, Lin et al. researched the positive effects of using spelling aids. The objective of the research was to assess whether incidental spelling learning would be achievable after using spelling aids or not, and if spelling efficiency would persist if the tools were not used. It also examined how technological convenience affected proofreading performance and incidental spelling and whether different types of spelling aids led to different learning or not. The study was conducted by comparing the results of L2 students of English in regard to four fields: control, red underline, spell-check (drop-down list) and dictionary. Additionally, learning transferability and durability were also studied. The results indicated that all spelling aids caused error-detection learning, even when the errors were displayed in a different context or a delayed posttest (transferability and durability). The findings displayed that both the spell-checker (drop-down list) and the dictionary aided the students in learning the spelling accidentally.

Rimbar (2017) performed a study that investigated if students who utilized spell-checkers were able to detect and improve their spelling errors. A quasi-experimental design was used on two groups, where one was the experimental group whilst the other was the control group. The experimental group was given three dictations whilst the control group was given two dictations. Both groups were given dictations from Oxford University Press which included words that were commonly misspelled. The two groups were thereafter given time to re-read the dictations and correct and re-write the spelling errors accordingly. The study suggested that the most frequent errors that were made by the participants were omission alongside substitution. It was also suggested that where the participants were eager to spell a word but were not certain about the spelling, they reverted to using their native language or L1 phonics. This was also concluded to be one of the frequent errors that was committed. Overall, by analyzing the results it was considered that spell-checkers did not affect the participants' abilities to detect and repair spelling errors. This is due to the fact that the results produced demonstrated that there were no substantial differences between the pre-test and post-test results in the experimental group. Likewise, the results showed that there were no significant differences in the post-test results when examining both the experimental group and the control group. However, it was reported that some minor improvements were detected in the results of the experimental group after the treatment. As a conclusion, Rimbar's research concluded that spell-checkers had an insignificant effect on the participants' spelling errors on the cognitive level, as it did not help the participants repair their errors and aid them in learning how not to repeat the same error. The spell-checkers aided the students in reducing surface-level spelling errors whilst it likewise made them over-reliant on spell-checking tools to correct the errors that were made, resulting in them not learning from their spelling mistakes.

Ali et al. (2022) published a study whose primary purpose was to address the potential association between spell-checkers and the participants' spelling competence. Notably, the aim of the study was to find the influence of autocorrect and spell-checkers on the spelling of EFL learners. The research was conducted by giving the participants pre- and post-tests where the participants were asked to write 100 words about a certain topic. Comprising two groups, Group A was the control group whilst B was the experimental group. Group A were participants that were assigned to accomplish the task by handwriting whilst Group B were participants that used a program with spell-checkers to write the task. The study concluded

that students who utilized programs with spell-checkers did not have the same improvement in their spelling abilities as opposed to students who depended on their handwriting proficiencies. The research deduced that participants who depended on handwriting had better spelling proficiencies, due to the fact that more effort was involved, thus making their learning more sustained.

In 2012, Oxford University Press, which is the university press of the University of Oxford and the primary university press worldwide, released an analysis of research that was conducted amongst children in primary and secondary school, which displayed their inability to spell common words despite their usage of spell-checkers. In the research, the negative effects such as having difficulties recognizing the differences between words such as *there* and *their* and *clothes* and *cloths* were discovered. In addition to these difficulties, the students were likewise unable to spell common words while most often failing to pick out silent letters or failing to recognize the difference between a single or double letter in words such as *tomorrow* or *disappeared*. They were, however, able to spell more intricate words correctly, terms such as *pterodactyl* and *archeologist*, according to an analysis. The students were likewise incited to search for intricate words and utilize dictionaries and spell-checkers and autocorrect (Oxford University Press, 2012).

In conclusion, previous research on the topic of spelling and spell-checkers displays that there are certain disagreements in regard to what the effects of spell-checkers are. Whilst some research such as Rimbar (2017) and Ali et al. (2022) demonstrates that spell-checkers hinder participants from fully learning from their mistakes, mostly due to the fact that no cognitive learning is happening, other research such as Lin et al. (2017) describes that spell-checkers do in fact aid in the learning process. Likewise, Lunsford & Lunsford (2008) conclude that writing improves with spell-checkers, after examining research results that have compared computer-written texts and handwritten texts. Due to the difference in opinion in regard to this matter, it seems advisable to examine whether spell-checkers are truly an aid or a hindrance in the learning process and whether or not they aid or hinder spelling proficiencies. Due to this fact, this essay will examine the influence of spell-checkers, by examining certain words that have been utilized in previous research (see appendix). Additionally, due to the fact that words from the Oxford Dictionary have been utilized in previous research (such as Rimbar) and due to their research in common misspellings, words from their dictionary will

be utilized to ascertain if similar misspellings are occurring in the texts that have been chosen for analysis.

3. Present study

3.1 Purpose and research questions

This essay will examine what the effects of spell-checkers have been on modern English. Thus, the purpose of this research will be to describe how one technology, spell-checkers, has affected spelling in modern English since it has been widely available on mainstream computers. Therefore, the questions that this essay will examine will be:

- Has spelling improved after spell-checkers were invented?
- Can spell-checkers be seen as an aid in helping people learn how to spell better?

3.2 Method

A) Materials

This essay is a quantitative study where texts were selected based on specific criteria and compared to determine the number of spelling errors. The texts chosen were written before and after the invention of spell-checkers and were extracted from the UNT database (University of North Texas). The UNT database serves as an online library that comprises different UNT research as well as scholarly activities: a database that functions as an archive for UNT's and its affiliated partner's libraries, colleges, schools and departments. Ten texts were selected from the database, five being from before 1985 when spell-checkers were generally available in mainstream computers, with five texts being from after. The objective was to detect and gather potential spelling mistakes in these texts and analyze them against each other to gather if there had been an increase or decrease of spelling mistakes during the years. In terms of content, the attempt was to select texts that were on a similar level regarding word count and content with the preponderance of texts being studies and theses.

This study utilized computerized texts instead of handwritten texts, which might have affected the reliability of this study, considering that handwritten texts might have been able to distinguish the spelling competence more accurately. However, this essay was still conducted with computerized texts as they were believed to be able to attain answers regarding the research questions.

B) Word selection, search and analysis

Within the texts chosen, the aim was to localize the number of misspelled words whilst analyzing them in the older and newer texts to determine if there has been an increase or decrease in misspelled words. Words that were reviewed were selected from previous research (see Rimbar 2017), as well as selected from a dictionary by Oxford University Press, which has researched common misspellings (see Appendix). The misspelled words that were searched were 222 words.

With regard to evaluating the misspellings, all the words that were used in previous research as well as the dictionary were studied using the search function (ctrl+F). The words were searched in their correct and incorrect form to see if they appeared in the text material. The words were likewise searched to see the number of times they had been correctly and incorrectly spelled.

4. Results

In this section the results will be displayed in four different tables. Tables 1 and 2 will exhibit texts from before the year 1985 and after, whilst containing important information such as what words were found from the designated list, as well as the number of times they were spelled correctly and incorrectly. Tables 3 and 4 will describe the different spelling error groups that were discovered, as well as which group each misspelled word belonged to.

Table 1*Texts from before 1985*

	Words found	Correctly spelled	Misspelled
Text 1	Apparent and separated	3/11 (27%)	8/11 (73%)
Text 2	Achieve and threshold	2/5 (40%)	3/5 (60%)
Text 3	Receive, occur, aggressive, necessary and supersede	11/18 (61%)	7/18 (39%)
Text 4	Receive	8/9 (89%)	1/9 (11%)
Text 5	Occurrence	3/4 (75%)	1/4 (25%)

Total average: 43% misspelled

As can be observed in the first table, the second column commences by stating the misspelled words that could be found in the texts. This column does not display other misspellings, rather it merely exhibits the searched words that were found from the designated list. Thereafter, the third and fourth columns state the number of times the words were correctly and incorrectly spelled, as well as the percentage of correct and incorrect words. The table then concludes with stating the combined number of misspellings, concluding that texts from before 1985 had an average of 43% misspellings found.

As illustrated in the table, texts 1 and 2 have the highest number of misspellings, with 73% and 60% misspelled words found. With regard to text 1, when observing the type of spelling mistakes the author has made, it can be seen that the mistakes made are substitution mistakes, where one letter has replaced another (*apparant* instead of *apparent* etc). Due to this fact, text

1 has higher misspellings, even though the overall number of misspelled words detected is fewer than for example text 3 (with five misspelled words found).

A higher number of misspellings can likewise be detected in text 2, with the errors in this text being transposition and insertion mistakes (with *achieve* being spelled *acheive* and *threshold* being spelled *threshhold*). The reason for the number of misspellings in this text could be that text 2 was the longest text out of all the texts presented. Due to this fact, text 2 had more probability of mistakes than the other texts. Another observation of interest is that text 3 contains the most words found from the designated lists, but is the third text with the most misspellings, with 39% misspellings. This demonstrates that the writer had numerically more words from the designated list, but spelled those words more correctly than incorrectly, as opposed to text 1 which had fewer words from the lists, but a higher number of misspellings of those words.

Table 2

Texts from after 1985

	Words found	Correctly spelled	Misspelled
Text 1	Receive and publicly	68/71 (96%)	3/71 (4%)
Text 2	Apparent	1/3 33%	2/3 (67%)
Text 3	Acquire	0/1 0%	1/1 (100%)
Text 4	Receive and perceive	252/254 (99%)	2/254 (1%)
Text 5	Receive and perceive	123/134 (92%)	12/134 (8%)

Total average misspelled: 7%

Similarly, Table 2 commences with stating the words that can be found from the list, as well as the number of correctly and incorrectly spelled words and their percentage. The table concludes with the total percentage of words that could be found, displaying that Table 2 has an average of 7% misspellings. Texts 2 and 3 are the texts that have the most misspelled words percentage-wise and the high number in these texts is due to the limited words found and the number of times they are misspelled. As asserted earlier, this percentage does not indicate that a text is misspelled to a certain extent (percentage-wise), rather it solely implies what percentage of the words from the designated list were incorrectly spelled.

As exhibited in the table, texts 1, 4 and 5 are the texts with the most found words from the lists, and as can be observed, *receive* is the word that is dominant in the findings, comprising 50% of the words found. Additionally, *perceive* is likewise a word that is found in 2/5 of the texts, consisting of 40% of the findings, displaying a prevalence in transposition errors, with *receive* being spelled *recieve* and *perceive* being spelled *percieve*. As can be seen by the results, transposition errors are dominant.

Comparing the two tables, it can be observed that there is a higher pattern of spelling mistakes in Table 1, in comparison with Table 2. As can be seen from Table 1, 60% of the texts (texts 1, 2 and 3) have more than 25% misspellings, with texts 1 and 2 having a higher percentage such as 73% and 60% misspellings. In comparison, it can be seen that 40% of the texts in Table 2 have higher than 25% misspellings. In addition, Table 1 has numerically more words found from the designated list, with 10 words found in contrast to five words found from the list in Table 2. Thus, the results display that the newer texts have an average of 7% misspellings, in contrast to the older texts which have an average of 43%, exhibiting a higher number of misspellings in the older texts and a decline of spelling mistakes after the emergence of spell-checkers.

Table 3*Spelling error groups*

	Old texts	New texts
Transposition	2 times	15 times
Substitution	10 times	2 times
Omission	3 times	3 times
Insertion	1 time	0 times

Table 4*Words found*

	Old texts	New texts
Transposition	Achieve and receive	Perceive and receive
Substitution	Apparent, separated, supersede and necessary	Apparent
Omission	Aggressive, occur and occurrence	Acquire and publicly
Insertion	Threshold	0 words

Tables 3 and 4 display the different error patterns that can be detected in the texts, with different spelling error groups and their words. Table 3 displays the three groups that are seen in the texts and the number of times they are mentioned. Table 4 demonstrates the words that have appeared in all the texts and the spelling error group they consist of. As can be seen in Table 3, transposition is the group that is over-represented in the newer texts, with substitution being in higher proportions in the older texts. Omission is the second group that has the most errors in both groups of texts.

The most frequent words that can be seen in the older texts and can be detected in 60% of the texts are *receive*, *perceive* and *occur*. As stated earlier, *receive* and *perceive* are the words

that were misspelled more frequently than other words, showing a substantial inclination towards transposition in the newer texts in comparison with the older texts.

Furthermore, in the older texts the most frequent mistakes are substitution and omission, as reflected from the literature and previous research (see Rimbar). Examples of substitution are for instance seen in the word *apparent*, which was spelled as *apparant*, *necessary* which was spelled as *nesecarry*, and *supersede* which was spelled as *supercede*. Examples of omission are seen in the word *aggressive* which was spelled as *agressive* and occurrence which was spelled as *occurence*. An example of insertion is seen in the word *threshold*, which was spelled as *threshhold*. In the newer texts, the prominent category is transposition, where the word *receive* was spelled as *recieve* and the word *perceive* was spelled as *percieve*. The second category that has the most misspellings is omission, where the word *acquire* was spelled *aquire*, and *publicly* spelled *pubicly*, showing omission of letter to be an error pattern amongst both the older and newer texts.

5. Discussion

This thesis aimed to ascertain how spelling has evolved since spell-checkers were invented and made available to the general public and if spell-checkers aided in spelling competence. The first question that this study attempted to answer was whether spelling had improved or worsened with the emergence of spell-checkers. Five texts from before 1985 were analyzed and compared with texts from after to see if a difference could be detected in spelling competence.

The main finding that was demonstrated was fewer mistakes in the new texts in comparison with the older texts, indicating an improvement in spelling. The results displayed a numerical difference in mistakes, where the older texts had more and higher percentage of mistakes than the newer texts. This is observable when noticing the numerical differences amongst the older texts, and the moderately higher number of spelling mistakes that can be detected in the older texts in comparison with the new. From the misspelled words that were detected in the older texts, more than 25% of those selected words were misspelled in all of the texts, besides text 4 which merely had 11% misspellings. The remainder of the texts had 25% or more mistakes. Additionally, the number of words found in the older texts was also higher, with the older text having 10 misspelled words, in contrast to the newer texts that had five misspelled words

in total. This was, however, an issue that was undoubtedly presumed, due to the fact that spell-checkers are used more commonly and generally in modern computers. Nevertheless, this thesis aimed to gather an indication of whether spelling errors were occurring more or less after spell-checkers were used and to see if the same mistakes were occurring. Thus, with the newer texts displaying a lower count of mistakes than the older texts, it is suggested that spelling has improved.

Concerning the second question if spell-checkers have aided people in spelling better, it can be argued based on the data reviewed that there is nonetheless uncertainty regarding whether spell-checkers can be seen as an aid for learning spelling or not. From the results that have emerged, it can be deduced that although spelling has improved, similar spelling mistakes are occurring in texts, which leaves the answer to this question unresolved. Examples of this can be seen in certain texts from Table 2, where a word has been correctly spelled at certain times, and afterward misspelled. Texts 3 and 4 are examples of texts where certain words have been spelled correctly at certain times, whilst likewise being incorrectly spelled. As an example, text 5 can be exhibited where the words *perceive* and *receive* have been utilized 134 times in the texts, with 123 times being correctly spelled and 12 times incorrectly spelled. Another example is text 3 where the words have been misspelled 2 times, but correctly spelled 252 times. This raises the question of whether spell-checkers are aiding people in writing better, or if they are merely aiding people to correct their mistakes, rather than teaching people how to spell correctly.

Whilst analyzing these spelling errors, an interesting discussion would be why this phenomenon is occurring. If this question is examined from the texts, it can be deduced that although fewer spelling mistakes are seen in the newer texts (due to spell-checkers being used), spelling errors can still be detected, and certain words are being spelled correctly at certain times, and being misspelled at certain times. As stated earlier, text 5 displayed that the words *receive* and *perceive* had been utilized 134 times in the text, with 12 times misspelled and 123 times correctly spelled. Regardless of the fact that those words have been correctly spelled 92% of the time, the question is still raised: if spell-checkers were to aid people in writing, why are these misspellings still occurring in these newer texts? As an additional example, text 2 can be observed where, although the overall number of misspelled words is limited, the words are misspelled more than they are correctly spelled. *Apparent* is a word

that has been used 3 times in the text, with it being misspelled 67% of the time. One reason that these spelling errors are occurring even though spell-checkers are used might be due to over-reliance. When the author could be over-reliant on technology, without assessing their writing before submitting, spelling mistakes can occur. Ali et al. (2022) mention this in their study, where they mention that students who utilize spelling programs are not as competent in spelling as students who depend on their handwriting proficiencies, due to the fact that the learning is more effective and proficient while writing by hand. This is due to the effort and reflection that is required whilst writing by hand as opposed to utilizing spellcheckers. They further mention in their study that spell-checkers might not aid spelling competence, a matter that is likewise stated by Rimbar (2017).

The answer to the second question remains further inconclusive when detecting the different spelling error categories that emerged, and the pattern between them and previous research. Omission was the category that was displayed in both groups of texts, which further aids in raising the question of whether spell-checkers have aided in spelling competence or not. A question that can be discussed is, if spell-checkers were to be seen as an aid in improving spelling, would the same type of spelling mistakes be occurring? Further findings from the result section display that the spelling mistakes in the older texts were omission and substitution, a subject that adds to an interesting debate, as this reflects the findings of Rimbar (2017), who likewise concluded that the most frequent spelling errors that were made in her study were omission and substitution of letters. In addition, Rimbar believed that spell-checks were not a considerable aid in improving spelling. These error patterns are of importance due to the fact that they can lead to improvement in spelling. As an example, since omission of letters was the error group that was prominent in both the older and newer texts, and likewise prominent in previous research, it aids in a probable understanding of where people have difficulties spelling. If there is a difficulty in inserting letters when spelling correctly and letters are omitted, thus resulting in misspelled words, this can aid in future research as well as aid schools and institutes to improve spelling in these fields. It can likewise help people understand how to spell correctly.

Thus, when examining this information, it can be seen that in regard to the first question, an enhancement in spelling has been made. While comparing the results from the older texts (an average of 43% misspellings) as compared to the newer texts (an average of 7% misspellings)

it can be ascertained that misspellings have reduced since spell-checkers have been invented. Nevertheless, in regard to the second question, this thesis derives the conclusion that more research is required. Even though it can be seen from the results that fewer spelling mistakes are occurring, the same type of spelling errors are still emerging. It is not evident if spell-checkers have aided in spelling competence, or if other factors are aiding in spelling proficiency. Additionally, when assessing the correctly spelled words, one cannot say with certainty that it is due to spelling competence or due to spell-checkers being utilized. Thus, to reach a definitive answer, more research is needed.

6. Conclusion

Due to the fact of the growing usage of technical devices and various spell-checking programs and their relation to the English language and its grammatical rules, this essay deemed it essential to examine the effects spell-checkers have had on language and whether it has aided spelling or not.

In this study, two findings were detected. After analyzing the texts, the results exhibited a decrease in spelling mistakes after the development of spell-checkers. Despite mistakes in the newer texts that had used spell-checks, the overall mistakes were lower in number compared to the older texts, indicating an improvement in spelling. With regard to the second question, this study was indecisive regarding the answer. From the results that emerged, it was deduced that even though spelling developed, similar spelling mistakes were nevertheless occurring in the texts. Examples of that could be seen in certain texts where one word could be misspelled as well as correctly spelled certain times. Likewise, the results displayed different categories of misspellings and detected that the most common mistakes within the older texts were substitution and omission of words whilst the newer texts had transposition and omission errors.

To conclude, this thesis derived the conclusion that a decline in spelling mistakes could be seen in the newer texts, suggesting an improvement in spelling competence. With regard to the second question, the conclusive answer was that more research is needed to reach a definite answer.

Limitations and Further Studies

As a conclusion, certain limitations and alternative approaches are in need of mention. With regard to materials and methodology, rather than using computerized texts, handwritten texts where the spelling had not been verified, could have been elected for a more nuanced view in this matter. Handwritten texts might have been able to more appropriately distinguish spelling proficiency, as no help in form of spell-checkers would have been used. This would have eliminated the possibility that spell-checkers would have aided the writers to correctly write words they did not know how to spell beforehand, which would have increased the validity of this project. It would have further aided in understanding the second research question, as the difference would have been more noticeable. However, that would have been an alternative project with an alternative methodology and analysis to this project. Furthermore, the texts that were utilized in this study were selected from one database, which further limited the results. Had other databases or texts been used, the conclusions of this research might have differed.

In regard to the results, the data of this research ought to be considered with caution. With the data being limited in terms of the amount of text and time, it is not sufficient to extract adequate and applicable deductions. Had additional texts been utilized or more time been designated to the project, the results might have potentially differed. Different aspects need to be considered as to why misspellings occurred in the newer texts, as stated in the discussion section. Certain misspellings could have occurred due to laziness or inattentiveness, and not due to the writer's inability to correctly spell. As mentioned in earlier research (see Ali et.al., 2022) spelling errors could have likewise occurred due to over-reliance on spell-checkers, with the author being too dependent on the spell-checker to evaluate the writing. This is another risk that needs to be taken into consideration when determining the writer's spelling competence.

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8. Appendix

abscess
abseil
accommodate, accommodation, etc.
accumulate, accumulation, etc.
achieve
acquaint, acquire, acquit, etc.
address
aggressive, aggression, etc.
all right
a lot
amateur
anaesthetic
Antarctic
apartment
apparent
aqueduct
archaeology
Arctic
argument
artefact

asterisk
attach
beautiful, beauty, etc.
belief, believe
benighted
besiege
biased
bigoted
blatant
brief
broccoli
buoy, buoyant
cappuccino
Caribbean
ceiling
cemetery
civilian
coconut
commemorate
commitment
committee
comparative
compatible
competent
conceive
consensus

contemporary
correspondence
cursor
deceive
definite
descendant
despair
desperate
detach
diarrhoea
disappear
disappoint
disastrous
discipline
dissect
ecstasy
eighth
embarrass, embarrassment, etc.
environment
espresso
estuary
exaggerate, exaggeration
except
exhilarate
existence
extraordinary

extrovert
familiar
fascinate, fascination
February
fierce
fluorescent
foreign
forty
friend
fulfil, fulfilment
gauge
glamorous, glamorize
government
graffiti
grammar
grateful
grief, grieve
guarantee
guard, guardian, etc.
hamster
handkerchief
harass, harassment, etc.
hers
hierarchy
hindrance
homogeneous

honorary
humorous, humorist
hygiene, hygienic
idiosyncrasy
imaginary
immediately
inadvertent
independent
inoculate
insistent
instalment
interrupt, interruption
introvert
irrelevant
itinerary
jocular
judgement
kernel
knowledge
language
liaise, liaison
library
lightning
liquefy
maintenance
manoeuvre

medicine
Mediterranean
millennium
millionaire
miniature
minuscule
mischievous
misspell
moreover
necessary, necessity, etc.
negotiate
niece
noticeable
occasion
occur
occurrence
omission, omit
opportunity
ours
parallel
parliament
pejorative
perceive
permanent
persistent
pharaoh

pigeon
Portuguese
possess, possession, etc.
potato
privilege
pronunciation
propaganda
protein
publicly
pursue, pursuit
questionnaire
rarefied
receive
recommend, recommendation, etc.
refrigerator
relevant
relief, relieve
religious
restaurateur
resuscitate
rhythm
rigorous
risotto
sacrilege
Scandinavian
seize

separate
siege
sieve
skilful
success, successful, etc.
supersede
suppress
surprise
tariff
temperature
theirs
thief
threshold
tomato
tomorrow
truly
underrate
unforeseen
until
unwieldy
usage
vaccinate
vegetable
veterinary
vulnerable
Wednesday

weird

wield

wilful

withhold

yield

yours
