The Efficacy of Spell Check Packages Specifically Designed for Second Language Learners of Spanish

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ABSTRACT

Generic spelling checkers (GSCs), such as the one included in Microsoft Word, might seem appropriate for second language (L2) learners of Spanish to correct their writing. However, previous applied linguistics researchers point out that these proof-readers are designed primarily for native writers; they automatically correct some mistakes or provide alternatives, while sometimes failing to detect L2 learners' errors. This study evaluates the efficacy of spell-check packages developed for L2 learners to overcome these limitations. Thirty compositions written by learners of Spanish as a Foreign Language (SFL) were randomly chosen from a corpus. Spelling mistakes in the compositions were analysed, categorised and inputted into three specially designed spell checkers. Their efficacy in detecting and providing appropriate feedback was compared with a GSC. The results suggest that, despite detecting more than 85% of the errors, all the platforms fail to give the appropriate alternative for one third of the spelling errors. Surprisingly, the GSC provided the right alternative more frequently (67%). Additionally, the feedback provided by the specialised spell checkers is limited to a list of potential alternatives. Future iterations of spell checkers should include an expanded database of frequent L2 spelling errors for comparison and feedback that is tailored to L2 learners of Spanish and teaches them how to avoid future mistakes.

Keywords: Accuracy of spell checkers, computer assisted language learning, L2 spelling acquisition, Microsoft Word, orthography, self-correction, Spanish as a foreign language, written corrective feedback

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INTRODUCTION

Text editing software applications use grammar and spell checkers to detect and correct possible deviations from the correct usage of grammar and spelling in a written text. Spell checkers use a dictionary or a corpus as a reference to verify each word used in a given text (Mitton, 2010). They also use an algorithm to detect all possible inflections, derivations or morphological compositions of each word; such as those referring to plural, genre or verbal conjugations. If the words of the text are in the list of correct words, they are accepted. Otherwise, the software can either automatically correct errors while typing, or highlight them by proposing similar terms (Mitton, 2010; Peterson, 1980). To generate these lists of possible correct alternatives, spell checkers use what is known as "edit distance" (Damerau, 1964; Levenshtein, 1966). As explained in Navarro (2001), the edit distance is the number of deletions (*experence*), insertions (*expperience*), substitutions (*esperience*) or transpositions (*expereince*) necessary to convert the spelling of the incorrectly written word into the correct one (*experience*). These mechanisms rarely manage to detect all misspellings in a written text like in the case of homophones. They also commit false positives by pointing out errors that are neologisms, loan words, foreign words, or proper names. However, spell checkers are becoming more sophisticated by employing algorithms, which can even detect words that, although included in the reference body, are erroneous in the context used (Golding & Roth, 1999). These algorithms are widely utilised by Generic Spell checkers (GSCs) in *Microsoft Word* (*MW*) or *Google*.

Generic Spell Checkers

While second language (L2) learners of Spanish could make use of GSCs to correct their written texts, there are certain disadvantages. These proof-readers are designed for native writers and therefore assume that most errors are typographical errors caused by slips and not by a lack of knowledge of spelling. Consequently, they conclude any error is due to a minor deviation from the correct spelling. When an error is detected, it is either auto-corrected or a list of alternative words that have a similar spelling or whose sequence of letters is like the word that was misspelled is suggested (Helfrich & Music, 2000). In a study where Japanese students attempt to spell the English word *library*; out of their guesses of *libelary, *liberary, *liburally, *liburary, *liveraly, *liverary,* and *liverely,* only two cases (*liberary* and *liburary*) did the *MW* spell checker package feature the right word *library* as an alternative (Mitton & Okada, 2007).

If the correct word were among the alternatives, a native speaker would have no problem choosing the correct word from the list, but it would not be as intuitive for an L2 learner to choose the correct word (Lawley, 2015). For example, in a composition in

the CORANE corpus[1], an L2 learner of Spanish wrote *humanitaras* instead of the appropriate word in the context of his story: *humanitarias* (humanitarians). However, the first word suggested by the GSC of *Microsoft Word* was the subjunctive *humanizaras*, whereas the adjective *humanitarias* only appeared later in the list of suggestions. Heift and Rimrott (2008) demonstrated that these lists, which suggested several feasible options, often misled language learners. They found that students believed that the correct word was among the alternatives offered by the GSC even though this was not always the case. Additionally, most thought that the first word suggested from the list was always the correct one.

Another problem that language students face when using a spell checker designed for native writers is that these software tend to automatically correct some spelling mistakes. For example, if an L2 learner of Spanish writes *appropiado* - instead of *apropiado*, the word processor will remove the additional -p-, changing *appropiado* to *apropiado* automatically and so quickly that the student might not notice it. Therefore, GSCs are generally useful for those who are writing in their mother tongue, because they are not designed to teach but to facilitate and expedite the user's writing. But a Spanish language learner most likely does not write

appropiado because he has inadvertently double-tapped the -p- on the keyboard, as would happen to a majority of native writers (performance error), but because he really believes that it is written like this (competence error). Consequently, a correction like this, in which the incorrect spelling is replaced quickly by the correct one, could potentially eliminate any type of learning. As Lee (1997) suggested, "[a] student's major difficulty in error correction lies in their failure to detect errors rather than the lack of knowledge".

Other times, the GSC might not even detect the error. This is usually due to the possibility that the word written was not intended, but appears in the corpus or dictionary that the GSC uses to detect errors. For example, if an Arab[2] student of SFL writes *pilo* when he actually wanted to write *pelo* (hair), a conventional word processor would not indicate *pilo* as a misspelled word. Even though it is rarely used, *pilo* (kind of bush) is a word that exists in Spanish.

Rimrott and Heift (2005) conducted a pilot study that analysed the effectiveness of *Microsoft Word* GSC that took all potential disadvantages into consideration. They discovered that out of 374 misspellings

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1   Corpus composed of materials written by SFL students in the Spanish Language and Culture Courses for Foreigners of the University of Alcalá (Mancera & Martínez, 2009). These students had different proficiency levels of Spanish ranging from A2 to C1 of the CEFR (Common European Framework of Reference for Languages).

2   Arab students of SFL often confuse sounds /e/ and /i/. In Arabic, most of the sounds are consonant. Vowels, in many cases, function as mere syllabic supports and are not pronounced the same in all situations. In Arabic, the sound /e/ exists but is an allophone of the phoneme /i/, hence its discrimination in Spanish is difficult for Arab students of Spanish as a Foreign Language (Benyaya, 2007; Reyes, 2009)

made by 34 British students of German, the *MW* spell checker was only able to correct 52% properly. In a follow up study, Rimrott and Heift (2008) confirmed their suspicion about the partial effectiveness of *MW* GSC as a correctional tool for language learners. This study expanded the sample size to 1027 errors made by 48 British students learning German and observed that the GSC of *MW* was only able to adequately correct 62% of these errors. They therefore concluded that GSCs might not be the most adequate learning tool for L2 leaners and writers.

Spell checkers specifically designed for L2 learners of SFL

The studies and arguments mentioned above show the weaknesses GSCs have in detecting and correcting texts written by L2 learners. In response to these limitations, spell checkers specially designed for foreign language learners have been developed in recent years. They incorporate new tools to detect spelling errors that have their origin in misinterpretations of phonetics *(*jappy / happy)*, grammar *(*goed / went)* or inference of the native language *(*asociacion / association)*. This is achieved by introducing lists of common errors and algorithms adapted to the errors that foreign language students often make (Rimrott & Heift, 2008).

Designed specifically for L2 learners of Spanish are *Spanishchecker* (http://www.spanishchecker.com), *Stilus* (http://www.mystilus.com), and *LanguageTool* (https://www.languagetool.org). All of them work like a GSC, but they do not

automatically correct errors. They also generate explicit feedback that might help the student understand the reason for the error so that the student may avoid it in the future.

Like GSCs, there are few studies that analyse the effectiveness of spell checkers designed specifically for second language learners. Burston in 1998 investigated the effectiveness of the *Antidote 98* spell checker specially designed for students of French. Burston (1998) found that, although this corrector was capable of correcting most of the errors in an effective way, it sometimes did not identify "some fairly obvious spelling errors". Similarly, Holmes and Moras (1997) studied the efficacy of -*Le corrector 101*-, a spell checker designed for English L2 learners of French. They concluded that this spell checker would be more useful if "it was taught to anticipate some typical Anglophone errors" (Holmes & Moras, 1997). Based on the few studies on this subject, it seems that spell checkers designed specifically for students of a foreign language suffer from the same problems as GSCs when it comes to detecting and providing feedback. Moreover, spell checkers designed for learners of SFL are rare and their distribution in many cases is not free or universal. Consequently, most students of SFL continue to use GSCs to correct their spelling. It is therefore necessary to investigate the effectiveness of spell checkers specifically designed for SFL students and analyse their limitations to develop more precise and effective spell checkers in the future.

This Study

This study analyses the effectiveness of three different spell checkers (*SpanishChecker*, *Stilus*, and *LanguageTool*) designed specifically for SFL students and compares them with the GSC incorporated in *MW*. This study not only analyses their ability to detect spelling errors, but also the effectiveness and accuracy of the feedback the spell checkers generated in relation to the mistakes made by SFL learners. This study aims to answer the following Research Questions (RQ):

RQ1: How efficacious are the spell checkers specifically designed for SFL learners compared to a GSC in detecting spelling errors made by L2 learners of Spanish?

RQ2: How is the feedback provided by these spell checkers?

RQ2.1: Is the feedback limited to a list of potential alternatives?

RQ2.2: How accurate are the alternatives provided and in which position they appear in the list of suggestions compared with the one provided by the GSC?

MATERIALS AND METHODS

To analyse and evaluate in detail the reliability and usefulness of these spell checkers, thirty essays were chosen using blocked stratified randomisation (based on proficiency level) from the CORANE corpus (Mancera & Martinez, 2009), a corpus composed of 957 compositions written by L2 learners of Spanish (for further details see Footnote 1). Ten essays were written by L2 learners of Spanish with an A2 proficiency level according to the

CEFR and were native speakers of German, Austrian, Japanese, Korean, Portuguese, Urdu and Arabic; the next ten by students with a B1 proficiency level and were native speakers of English, German, French, Italian, Japanese and Korean; and the final ten were written by students with a B2 proficiency level and were native speakers of English, German, Swedish, Japanese, Portuguese and Italian.

These thirty essays were entered into the free versions of the following spell checkers: the GSC of *MW*, *SpanishChecker*, *Stilus*, and *LanguageTool*. The free versions were used because they are universal and, therefore, accessible to all SFL students. It was verified in a preliminary study that neither the effectiveness nor the quality of feedback improved with a subscription to the full versions.

Analysis

The compositions were analysed by highlighting and classifying the orthographic errors that were committed. As the purpose of this study was to investigate the effectiveness of spell checkers as a correctional tool for L2 learners of Spanish, a spelling error was defined based on the criteria used by spell checkers. They utilised the edit distance algorithm and then refered to a dictionary or a corpus to validate a word's spelling. Thus, a spelling error occurred if: a misspelling of any letter sequence occurred between two blank spaces, the word or sequence of letters did not appear in the dictionary of the Royal Spanish Academy (RAE, 2013), or if a word's frequency in the corpus of the Royal Spanish Academy (CREA) was very

low compared to the intended word despite its inclusion in the dictionary. Text editing software detect these errors as grammatical errors by using grammar checkers based on *n-grams*, which, unlike the tools and algorithms used in spelling filters, use the surrounding context to detect the error. For this reason, errors such as mismatch of gender and number, punctuation errors, and misspellings derived letter case were also not considered spelling errors. Common names written in the middle of a sentence with a capital letter were considered punctuation errors and, therefore, were not treated as spelling errors. However, proper names, such as names of cities or countries, written without a capital letter were considered spelling errors since they rarely appear in dictionaries or corpora not capitalised.

Once all the orthographic errors of the thirty selected texts were detected, the thirty essays were introduced to the different spell-check packages (*SpanishChecker*, *Stilus*, *LanguageTool* and *MW*). The percentage of errors that these spell checkers were able to detect was analysed, including false positives. If detected, the usefulness of the feedback that a corrector offered was evaluated based on these criteria:

• If the correct word was present or not in the drop-down list of possible alternatives

• If present, the position in which the word was found

• The quality of the feedback provided (if it was limited to offering a list of words or if it provided more information)

RESULTS AND DISCUSSION

Detection Rate of the Spell Checkers Specifically Designed for SFL Learners

The thirty compositions had a total of 4458 written words such as *supermercado* (supermarket) or *profesor* (professors), of which, 385 contained spelling errors (8.64%) like *supermerkado or *proffesor. As shown in Figure 1, the four spell checkers detected most of the spelling errors. *LanguageTool* detected the least errors (85% of the total) and *SpanishChecker* detected the most at 94%. However, the grammar checker of *SpanishChecker* classified many spelling errors as grammar errors and highlighted extensive sequences of words that included more words and errors. The GSC of *MW* had the second-best detection rate with 91.9%. *Stilus* and *LanguageTool* detected 89.6% and 87% of the spelling errors respectively. *Stilus* and *LanguageTool* detected fewer errors because they failed to detect errors in very frequent words. For example, the *Stilus* detection tool did not consider the lack of graphic accent in *despues (after) as a spelling error and *LanguageTool* did not consider the word *mas* (but) to be a spelling mistake. The few words that were not detected by the spell checkers were mostly words that were very rare, but do appear in the dictionary of the RAE. For example, *pello* (thin sheepskin coat) versus the intended *pelo* (hair). Finally, most of the spell checkers did not detect problems with incorrect letter case in proper names such as*navidad (Christmas) or *barcelona.
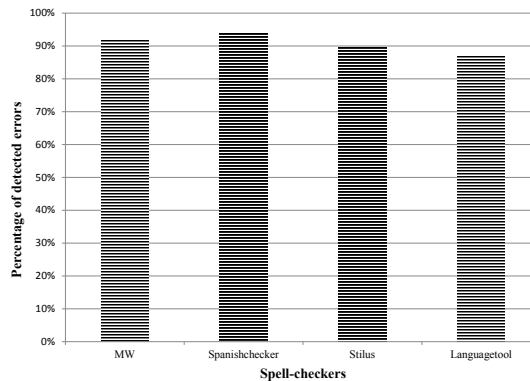
Note: Quality of the feedback of the spell checkers specifically designed for SFL learners
Figure 1. Percentage of spelling errors detected and highlighted by the spell checkers

Even though the spell checkers' error detection capacities were very high, their correction abilities were not, as the feedback given was not as effective. Unlike the GSC of *MW*, the three spell checkers specifically designed for SFL learners never auto-corrected any error and sometimes added some additional information to the list of potential alternatives. However, this information was limited to specific spelling errors and was often ambiguous.

SpanishChecker differentiates between spelling, grammatical, and punctuation errors by highlighting each differently. For each type of error, *SpanishChecker* offers different kinds of feedback. Regarding grammatical or punctuation errors, *SpanishChecker* offers explicit feedback explaining why certain *n-grams* are wrong, for instance, if words do not match gender or number. A report is displayed at the end where the user can see every written error detected with their corresponding feedback. This report includes a series of didactic resources for the SFL student to improve

their spelling, grammar or learn the rules of punctuation. However, *SpanishChecker* rarely offered an explanation for spelling errors and displayed a list of possible alternatives like the GSC of *MW*, although the list can be very broad (see Figure 2). The only case in this study in which this corrector offered some explanation in the feedback for a detected spelling error was in the case of *mas* (but). However, this feedback appeared in English, which was unhelpful for students of SFL that were not fluent (see Figure 2).

Stilus does not highlight any of the written errors while typing and but Moreover, it does not deactivate the Google proof-reader, so certain errors are auto-corrected and in other cases, it is Google's own spell checker which highlights errors and proposes alternatives. However, it displays a window with additional information in the word processor and offers a detail post-hoc report of the errors. In the report, written errors are highlighted in different colours to differentiate between spelling, grammatical
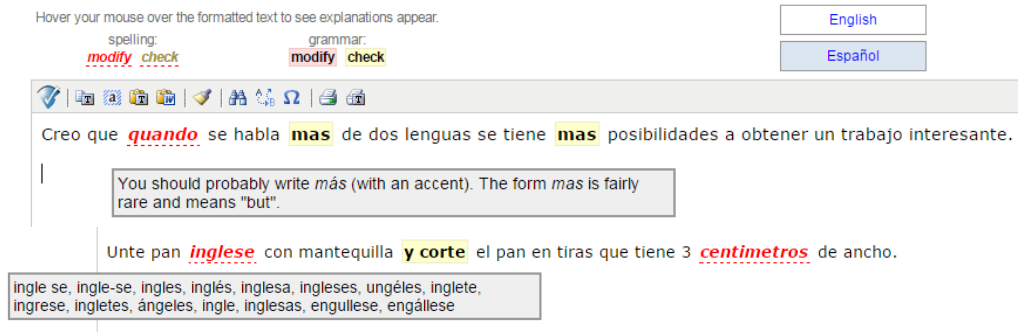
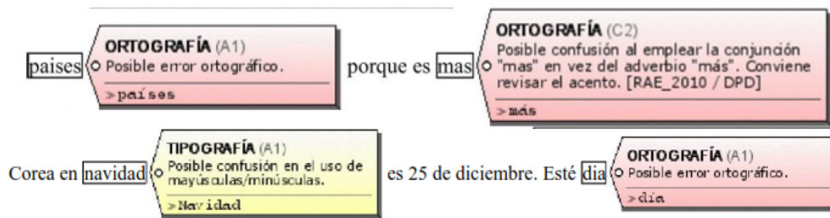*Figure 2*. Example of the feedback offered by SpanishChecker

Figure 3. Example of the feedback offered by Stilus

or punctuation errors; and it generates a list of alternatives for spelling errors and explicit feedback for some grammatical and punctuation errors. The feedback in most cases for misspellings was limited to pointing out the existence of a "possible spelling error". However, in the case of *mas* (but) and certain proper names that need the use of capital letters, these were classified as "typographical" and a more detailed explanation was offered (see Figure 3).

Finally, *LanguageTool* is an open source software that corrects spelling, grammar and style in different languages, including Spanish. When highlighting errors, it only distinguishes between spelling and grammar. In the case of spelling errors, this corrector only offers a vague "possible spelling error" message with a list of possible

alternatives like the one offered by *MW* (see Figure 4). However, grammatical errors are always accompanied by fairly accurate and concise feedback that offers an explanation with examples of the proper use of the grammatical structure in question. In some cases, a link to the *Centro Virtual Cervantes*[3] or to the *Diccionario Panhispánico de dudas* (RAE, 2005) to provide the user with more detailed information.

The accuracy of the lists of potential alternatives offered by the different spell checkers was analysed. Table 1 and Figure 5 shows the percentage of appropriate feedback that was given when the spelling error was detected, and if given, in which position does the correct version of the word appear

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[3]Centro Virtual Cervantes: https://cvc.cervantes.es/

in the alternatives list. Once a spelling error was detected the GSC of *MW* failed to offer the correct alternative only 14.7% of the time and the correct word appeared in the first position in the list at a rate of 72.9%. In contrast, *Stilus* gave the incorrect feedback 24.3% of the time. This might be because *Stilus* rarely gave more than two alternatives, which resulted in low probabilities for the third position onwards. *SpanishChecker* offered the correct word more frequently than *Stilus* or *LanguageTool*, but this spell checker gave too many alternatives (usually more than ten). *SpanishChecker* had the highest percentage (7.10%) of times in which the correct word was found in the fifth or later position. Although there was a higher chance the correct word would be on the list, it is more likely that the SFL learners will become confused after being

given more alternatives, as their knowledge about the error they committed might not be so intuitive (Lawley, 2015). Findings of Rimrott and Heift (2008) indicated that most students thought that the correct alternative was always the first one. This was demonstrated when informant nº 067 made the error **inglese*. The first word that all the correctors suggested was *ingles* (groin). The correct and most common *inglés* (English), if it appeared, it only did so later in the lists. Although *LanguageTool* was better at detecting errors than *Stilus* (Figure 1), the former could cause greater confusion for SFL learners as just 66.3% of the time did the correct word appear first in the list versus 70.7% for *Stilus*. But in this respect, *SpanishChecker* turned out to be the riskiest, as only 64.6% of the time the correct word was not in the first position.
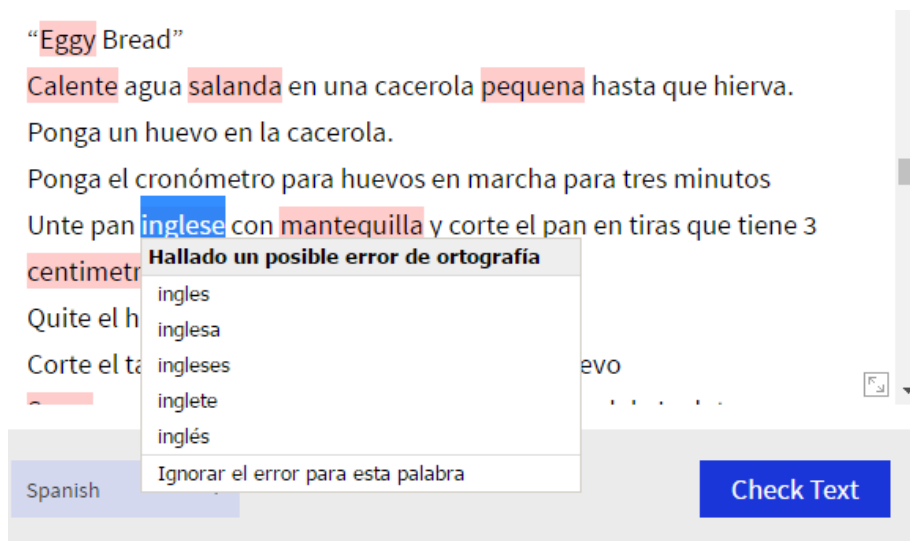
Note: Accuracy of the lists of suggestions

Figure 4. Example of the feedback offered by LanguageTool

Table 1

The Percentage that the correct word appears or not in the list of potential alternatives. And if it appears, the percentage of appearance for each position in the suggested list.

		Position of the correct spelling in the list of alternatives					
	Never	1ª	2ª	3ª	4ª	5ª o +	Σ (2ª, 3ª, 4ª y 5ª)
MW	14.7%	72.9%	5.65%	4.24%	1.69%	0.85%	12.4%
Spanishchecker	19.6%	64.6%	6.01%	1.64%	0.82%	7.10%	15.6%
Stilus	24.3%	70.7%	4.35%	0.29%	0.00%	0.29%	4.93%
LanguageTool	22.4%	66.3%	3.88%	2.09%	3.28%	2.09%	11.3%

Note: The percentages are estimated based on the number of errors detected by each spell checker and not by the total number of spelling errors of the 30 compositions
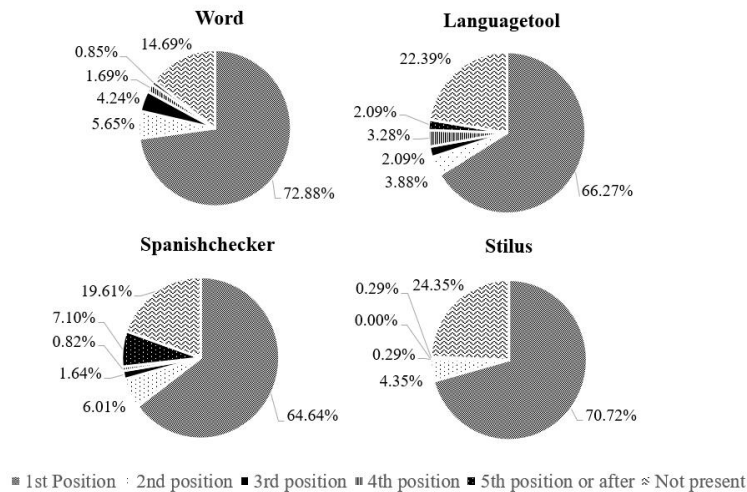

Figure 5. Performance of each spell checker-based accuracy and efficiency of feedback in terms of word position for all the spelling errors

Effectiveness of these spell checkers is defined in this study as their ability to detect spelling errors and the frequency of the correct word being present in the first position. Based on these conditions the GSC of *MW* performed the best at 67%. Among the spell checkers designed specifically for SFL students, the most effective in general terms, despite detecting the least errors, was *Stilus* at 63.4% efficiency. *SpanishChecker* was 60.8% and *LanguageTool* was 57.7% effective (see Figure 6).

However, the reliability and effectiveness of all these spell checkers were compromised when faced with essays written by students of SFL with a more limited linguistic competence. For example, in a composition written by a beginner from
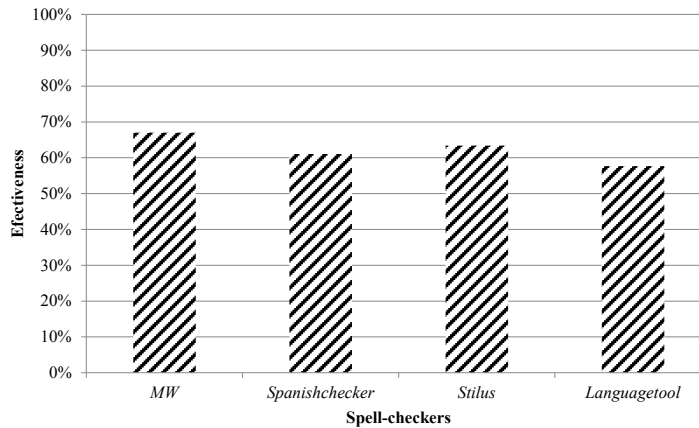
Figure 6. Overall effectiveness of the different spell checkers

Pakistan (participant 8), even though all the spell checkers (with the exception of *Stilus*) detected and highlighted all the errors committed by the student, they were unable to generate appropriate feedback for many of them: out of the 26 spelling errors found in this text, the right suggestion was only offered in first by the *MW* with nine errors (34.6%), *LanguageTool* and *Stilus* with seven errors (26.9%) and *SpanishChecker* with only five errors (19.2%).

Evaluation

This study compared the performance of the accessible and globally known GSC of *Microsoft Word* with three other spell checkers specifically designed for SFL students (*SpanishChecker*, *Stilus* and *LanguageTool*) in detecting and correcting spelling errors. It was found that they all had greater than 85% frequency of detection. The corrector that detected the most errors was *SpanishChecker* at 94%, but this high

percentage is attributed to the fact that it highlights complete sentences as the grammar-checker has priority. *MW* detected 91.9% of the total errors, which is indicative of a well-designed detection engine and corroborates the results of previous studies that suggests a detection capacity of more than 90% (Heift & Rimrott, 2005; Kukich, 1992; Rimrott & Heift, 2008). *Stilus* and *LanguageTool*, on the other hand, detected 89.6% and 87% of the errors respectively. The few spelling errors that were not detected by the four spell checkers were mostly words that, although very rare, do appear in the RAE dictionary. In addition, they sometimes did not detect misspellings related to the correct use of letter case in proper nouns of festivities, cities, and countries.

Although they detected most of the spelling errors, the ability of these spell checkers to offer the appropriate spelling was quite poor. The qualitative analysis of the feedback offered by these spell checkers

showed that the feedback was limited to a list of possible alternatives and they rarely offered an explanation as to why the mistake was made and how the student could avoid committing it in the future.

After analysing the list of alternatives, the spell checkers provided, the GSC of *MW*, contrary to expectations, turned out to be the most effective. Of all the errors it detected, it only gave incorrect feedback (the correct alternative was not among the suggested ones) 14.7% of the time. *SpanishChecker* generated incorrect feedback for 19.6% of the errors it detected, *LanguageTool* for 22.4%, and spell checker *Stilus* for 22.4%. These results, in addition to the study done by Mitton and Okada (2007), suggest that these spell checkers could mislead SFL students into thinking that the correct alternative is always among those offered (Rimrott & Heift, 2008).

Taking into account that foreign language students tend to consider the first alternative as correct and that few students spend time searching for the correct word in the list of alternatives (Rimrott & Heift, 2008), the effectiveness of all these spell checkers as a correctional tool is further compromised. If the alternative suggested in the first place on the list is incorrect, it can effortlessly mislead the student, as seen in the case of the misspelling *inglese*. Considering the spelling errors that all of these correctors did not detect, those errors for which they were not able to offer a correct alternative, and those correct alternatives that failed to appear in the first position, we can conclude that the

most efficient was the GSC of *MW* (67% overall efficiency) rather than the correctors designed specifically for learners of SFL: 63.4% (*Stilus*), 60.8% (*SpanishChecker*) and 57.7 % (*LanguageTool*). These spell checkers could misinform SFL students in one out of three misspellings they make. These results are comparable to those obtained by previous studies that also analysed the efficacy of spell checkers in other languages (Blazquez & Woore, in press; Burston, 1998; Heift & Rimrott, 2005; Holmes & Moras, 1997; Rimrott & Heift, 2008).

Limitations

Limiting the concept of a spelling error to a definition established by the researcher could be a controversial choice, especially since this definition is not strictly based on linguistic concepts but aims to understand and explain how the spell checkers work. That is why it was considered erroneous to study and classify orthographic errors for purely linguistic reasons about the origin and category of the error; because both the spell checker and the user would be unable to discern those extremes. Instead, this study tried to understand how software works when it comes to detecting errors and offering feedback in order to improve the effectiveness of future spell checkers. That is why the non-agreement of gender or number, the verbal conjugation of certain verbs or the lack of a tilde in personal or possessive pronouns, were not considered spelling errors. Other types of filters, such as the grammatical filter based on *n-grams*,

can offer more adequate solutions in these situations. Punctuation errors were also not considered.

CONCLUSION

The spell checkers tested in this study have a high frequency of error detection, detecting more than 85% of the spelling errors present in thirty essays written by SFL students. Nonetheless, their detection capacity could be expanded and improved by enriching the database of correct words (dictionary or corpus) by conducting detailed studies of the errors that SFL students usually make.

The ability to detect would also be improved if the filters used by spell checkers (orthographic, grammatical or style) were staggered and did not appear at the same time to avoid, for example, spelling errors being marked as grammatical errors. This also might make the self-correction work less complicated for the SFL learner.

It has also been observed that once the errors are detected, between 15% and 25% of the time, the feedback offered by the different spell checkers, especially those designed specifically for Spanish learners, is erroneous. Moreover, when they detect an error the correct word is only suggested in the first position in the list of alternatives between 64% and 73% of the time. A possible solution could be that once the "edit distance one" algorithm is applied, the words suggested by the algorithm are checked against a list of words frequently written by SFL learners to offer feedback more tailored to the SFL learners' needs. This would allow in the case of *inglese,* a suggestion of the alternative *ingles* (English), which appears 10070 times in CREA (corpus of the RAE) as opposed to *ingles* (groin)*,* which only appears 203 times. Another solution would be to generate feedback not based on word lists. Instead, the feedback would be based on basic rules of spelling and explain spelling patterns to help students avoid similar mistakes in the future. These rules would be accompanied by words frequently used by students of SFL that exhibited that pattern (see Figure 7) instead of by a list of words based on the similarity of their spelling.

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ingles

The correct spelling is *ingl**é**s.*

Many nationalities and languages end in -*és*:

francés

inglés

japonés

Also exists **ingles** (plural of ingle): *f.* Groin

Note: The feedback would appear in Spanish. It has been translated for informative purposes.
Figure 7. Proposed feedback for future spell checkers specifically designed for SFL learners.

No study to date has evaluated the efficacy of the spell checkers specifically designed for SFL. This article has performed a preliminary analysis of the effectiveness of spell checkers designed for SFL students in comparison to the GSC of *MW*. While the GSC has performed better than the spell checkers tailored for SFL, there are many opportunities to improve the latter to support students in mastering a foreign language.

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