

Original Article**Using Writing Assistive Technology to Improve EFL University Students Performance****Hicham Boukhechba *¹, Bachir Bouhanian ²**

1. Research Assistant, Department of English, Faculty of Letters, Languages, and Arts, University Ziane Achour Djelfa, Algeria
2. Professor, Department of English, Faculty of Letters, Languages, and Arts, Ahmed Draia University - Adrar, Algeria.

Received: 2022/06/22**Accepted:** 2023/10/22**Abstract**

Success at university depends on the possession of outstanding writing skills. Yet of all language skills, writing is the most arduous to master and the situation gets even worse in the case of second or foreign languages. The current study investigated the suitable ways to overcome the difficulties students of English face with writing especially in terms of vocabulary items and spelling mistakes by exploring the effects of adapting autocorrect and spell-checkers technologies on their writing skills. The research data comes from an experiment conducted at Adrar University, south of Algeria, in which 18 LMD (Licence-Master-Doctorat, equivalent to the BMD, Bachelor-Master-Doctorate) students utilize autocorrect and spell-checkers as assistive technology. The finding of the experiment shows that the use of assistive technology has perceptible effects regarding the quality of students' production as these technologies displace the attention from worrying about spelling mistakes to other aspects of writing. The paper also proposes some suggestions to improve writing skill at the level of Algerian Higher educational institutions (HEIs).

Keywords

Assistive technology, Auto-correct technology, EFL students, Spell-checkers, Writing skills.

Introduction

A few years ago, a dictionary was an indispensable tool for a student to check for spelling mistakes and grammatical errors, the process of flipping through pages looking for a word was ineluctable and often time-consuming. However, with today's computers and smartphones, it is no surprise when a piece of software suggests the correct spelling, autocorrects, or even advises on the word choice and formation. Such technology has advanced and it would be rather difficult to find someone who has not used it whether to chat on Facebook, write an email, an essay, or an academic paper. Despite the spread of the technology and its use, university students are prohibited to access it. Instead, they are still asked to use pens and papers to write and produce compositions in their exams and assignments. Consequently, the present research attempts to explore the adoption of assistive technology by south Algerian EFL university students.

More particularly, the paper aims at investigating the effects of such technology on writing skills solely focusing on students' productivity and possible advantages and drawbacks. The abundance of literature on writing as an integral language skill is unquestionable; however, the topic is not sufficiently dealt with when it is related to modern technology. The rapid advancement of modern machinery can render works done a few years ago obsolete, even though articles such as Owston, Murphy, & Wideman [1] 'The effects of Word Processing on Students' Writing

*Corresponding Author: hicham.boukhechba@univ-djelfa.dz

Quality and Revision' can be perceived as a similar work, the time span of twenty-four years equals decades in matter of computers and software technology. Therefore, a new insight is rather required. Although the findings of Gupta [2] align with the aims of the research, the methodology chosen in this paper might well bring new perception to the designated field of study. Another reason that would justify revisiting the topic is the idea that the younger people have grown with technology in their fingers, thus, outcomes of older methods may well have changed.

Translating these aims into a practical research, the following questions are raised:

- 1- How does the writing of Algerian University students correlate with the use of such technologies?
- 2- What are the effects of the use of assistive technology on the writing skills of Algerian university students?

The main objective behind the questions and the research, in general, is to enhance EFL university students' productivity whether in formal exams or assignments through the adaptation of assisting technologies. The presumption is that writing assistive technology boosts writing skills by providing EFL students with necessary vocabulary items which in turn enhance accuracy and style.

The context of the research can be summarized in two major points. First, the research is related to teaching English as a foreign language to university students. The latter encounter tremendous problems in communicating their ideas through writing often because of the lack of rich vocabulary items and creativity [3] (for further information on problems encountered by Arab EFL learners, see [4-18]). Second, the research is conducted in a time when almost all university students possess some sort of computer device whether a desktop computer, a laptop, or a smartphone.

Indeed, such a statement is backed by the findings of the pilot research that preceded the current article. In the latter, eighty students from different levels in the department of English at the University of Adrar were asked about whether they use pen-and-paper or computers to revise: 67 said they use computers, 10 stated that they use both, the rest did not have computers and relied on pen-and-paper. Such earlier numbers confirm the postulation that most students are abandoning writing for typing which means also that they are using assistive technology on a regular basis.

The current paper is divided into four parts: first, it starts with a review of previous works relevant to the research followed by the chosen research methodology. Then, the results will be analyzed. Finally, a conclusion is drawn with a recommendation for action and future investigations.

Literature Review

Embarking upon an investigation into the use of technology in writing requires pondering over two elements in the literature. First, the concerned technology which is the use of spell-checkers and autocorrect tools as examples of writing assistive technology are reviewed. Second, it is necessary to understand the aspects that attribute to good writing skills. Moreover, the review concentrates more on the aspect of vocabulary as it is at the center of the hypothesis of the inquiry.

Writing assistive technology

Writing assistive technology encompasses any piece of software that suggests, corrects spelling mistakes, or both. The technology has developed to cover two functions: first, it indicates and corrects a user's spelling mistakes whether caused by poor performance or simply because of typos. Second, it offers the user a range of words in an attempt to predict what is to be inputted. The latter is made possible by collecting and processing the users' input by creating huge linguistic databases. A good example of this is seen in the search engine Google.

While in the past assistive technology existed in separate applications [19], the technology now can be found almost in all textboxes where a user is asked to enter a text; this includes web browsers, word processing software, and virtual keyboards. The result of this is that everyone using the technology has at his/her disposal a powerful and rich dictionary.

The importance of vocabulary in writing

Although writing skills are acquired in the later stages of child development, they come to play a major role in one's communication whether for daily activities or for academic purposes. However, since this skill is mainly learned, not naturally acquired as speaking, it demands grueling efforts to be mastered [20]. The complexity is due to the mechanics of writing which are exhibited in the formation of letters, words, and texts as well as punctuation and handwriting [21]. The situation gets even complicated in the context of second language as it is compounded by an already existing problem which is the knowledge of language itself.

Although it is not the scope of the paper to go through what constitutes language, understanding the different components and how they correlate with the utilization of technology is valuable in the context of the research. The importance emanates from the conception that whichever form language takes whether spoken or written, knowledge of rules and principles that permit one to produce what can be deemed as grammatically correct sentences is inevitable. Language in this sense encompasses all its structure from its lexicon, morphology, syntax, semantics, phonetics, and phonology [22].

Since the inquiry is stringently circumscribed to writing skills, it would make sense to skip the sound part of language, phonetics and phonology, and focus on the aspects that are reflected in the formation of words which are lexicon, morphology, and syntax. Lexicon refers to the built-in dictionary of words in one's mind [23]. For a native adult educated speaker, it is said that the mental lexicon contains around 50,000 words [24]. But, there could be no precise number, as some words are used regularly while others are passively understood and employed (for further information on active and passive vocabulary, see Nation [25] and Mackey [26]). Moreover, such number can increase significantly when the speaker starts creating new words from combinations of roots, suffixes, and prefixes, hence morphology. Then, the knowledge of these words is expressed by coherently structured sentences, hence, syntax. (To review the literature on Arab EFL learners' types of errors and mistakes at the lexical, morphological, phonological and orthographic levels, see Sabbah [16]; Bouhania [27]).

Consequently, the importance of vocabulary for writing is evident. Krashen [28] and others (Kroll [29]; Eisterhold [30]; and Brynildssen [31]) note that given the fact of the criticalness of having a rich vocabulary as an essential element for reading, and the undisputable relation between the former and writing, it is natural to link vocabulary with writing. In relation to the research setting, in second language context, the number of words in one's mental lexicon drops drastically to around 4500 words [32]. The ramifications of such a dip can be clearly perceived in the difficulties second language learners have with writing.

Writing skills and technology

While ultimately writing is to be manifested in the form of a text, there has been a shift from solely looking at writing in the end product to the underlying stages one goes through when he/she attempts to write, i.e. shift of focus from the product to the process [33- 34]. The latter is divided into three stages: prewriting, writing and rewriting [35] (see also Tribble [36]). Such division is often at the heart of many works related to the idea of the effectiveness of technology in improving writing skills [1,37- 39]. Yet, this agreement on how to approach the matter is not necessarily reflected in conclusions as the latter are not consistent.

Salomon et al [39] came to the conclusion that many studies tackling the subject of the use of word processing and writing arrive at weak or mixed results. They also indicate that in the context

of children, it is not technology that leads to improvement in writing but instruction. The same conclusion is found in Ulusoy's closure [38], yet he adds that college students benefit more from the use of software to improve their writing. While Owston et al (1992) also arrived at mixed results, yet unlike other works, they refer explicitly to the use of spell-checkers as an important factor which needs to be investigated further. In a perfect alignment with the assumption of the current investigation, Gupta's research [2] indicates that when students use computers, their production improves in term of complexity and length; additionally, he asserts that such effects last even when students revert back to writing by hand.

Gupta [2] reached the conclusion that the use of computers helps students yield better essays. He sees that the reasons of the improvement partly have to do with the fact that students have access to correct spelling of new words and words they passively know, this means students can confidently use such words without worrying about committing spelling mistakes which would considerably affect their evaluation. In this regard, also, he adds that technology is able to liberate students from low-order skills such as spelling and punctuation to focus more on high-order skills such as content and organization.

In the case of EFL university students, writing is a crucial skill as most exams and official assignments take the form of a written document whether an essay, an article, or a thesis. The latter are evaluated under specific criteria which determine the quality of students' production. However, it is hard to think about such criteria in term of a fixed list of points but, instead, it can be subjectively related to the teacher preferences or focal points. Often the major elements are content, organization, sentence structure, and mechanics [40]. Undoubtedly, there is interplay between these rudiments and altering one will have repercussions on the others.

Methodology

The primary data in this research is provided by an experiment through the quantitative approach. However, given the nature of the subject matter, evaluating some aspects of writing can be subjective such as style and repetitive usage of words [41]. Therefore, it is rather necessary to opt for both the quantitative and the qualitative approach in the research. The latter will be used to obtain data from observing the participants during the experiment and to draw the final conclusion.

The Setting

The experiment takes place at the Department of English at Adrar University Ahmed Draia, Algeria. In Algeria, English is considered a foreign language and students study it for seven years, four at middle school and three at secondary school. Despite all these years of exposure to English, students face serious problems with writing skills which are reflected in their marks [42]. Most exams at the university (except oral expression tests) take the form of written documents in which students are asked to yield formal essays in one hour and a half. Students' production is evaluated with consideration to the criteria mentioned above which are content, organization, mechanics, and style [43]. However, one particular feature wields considerable pressure on students which is spelling mistakes as often teachers do not tolerate them, and this can result in low averages even if other aspects of writing skills are deemed acceptable [44].

The participants

The participants are a group of second-year LMD (Licence-Master-Doctorat, the equivalent of BMD, Bachelor-Master-Doctorate) students of English at Adrar University. The choice of the sample is due to the fact that one of the researchers teaches written expression to that specific group. It consists of 20 students, yet, and due to absences, the sample was reduced to eighteen students only. Even though the sample is random as there was no process of selection, it meets the two criteria needed for the research. First, the investigation is narrowed to university EFL

students. Second, given the fact that the study deals with the use of technology, participants should be familiar with spell-checker and autocorrect technologies. Indeed, students have confirmed that they use such technologies frequently. To the question of how they use them, 12 students said that they use regularly spell checker technology when they chat on Facebook on their mobile phones. The rest of the students utilize these technologies when they use Microsoft Word.

The experiment design

The experiment used the repeated measures design as it is suitable with the size of the sample and the nature of the questions asked. Moreover, the limited resources and time mobilized for the research were considered hindering factors. In this design, all the students receive the same treatment which comes as three sessions of forty-five minutes where students use autocorrect and spell-checker technologies as assistive tools in writing. However, prior to the sessions, a pretest was done in which students wrote essays using pen-and-paper without the use of assistive technologies. The pretest served two purposes. First, it helped in establishing a baseline of students writing performance from which also the researcher can determine with which aspects students were struggling the most and enabled comparison between the pretest and the posttest. For each session, students have to write an essay utilizing assisting technologies. Thus, the total of the essays at the end of the experiment was 4, a handwritten pretest (without tools), 3 essays (using assisting tools). However, for data analysis, only the pretest and the last essay in which students have employed technology in their writing were included.

An important element in the experiment was the subject of the essays students needed to write about. The choice of a neutral subject which does not require research or specific information is crucial so that all learners will have an equal opportunity to express themselves. For this reason, the subjects of the essays were confined to two topics where participants introduced themselves or someone they admired. In terms of equipment and software, the experiment took place in classrooms equipped with computers as each student had to work with one. The primary software used is Microsoft Office and electronic dictionaries. Moreover, students were allowed to use all assistive tools at their disposal from their personal smartphones and dictionaries.

Data collection

The research deployed two collection tools to obtain empirical data. The first data collection tool was informal interviews which took the form of questions asked to students at the end of each session. Second, from a merely statistical standpoint, students' production was examined in terms of a number of criteria: strikethroughs, number of words written, punctuation errors, capitalization, subject/verb agreement, spelling, wrong word form, wrong word, wrong word order, run-on sentences, prepositions, articles, adding transition, and starting a new paragraph. For each mistake, a point was deducted.

Although the primary goal of having a large number of criteria in evaluating students' essays in the experiment was to render the evaluation of style quantifiable and eliminating any subjective observations, the provided criteria were still not enough. Therefore, analyzing students' writings was crucial to determine the quality of the productions in terms of the complexity of the vocabulary chosen and repetition. These aspects, however, required the deployment of the qualitative approach.

Data analysis and discussion

Pretest (without assisting tools)

Table 1. Statistical overview on the pre-test (without assisting technologies) - Number of words

N	Range	Minimum	Maximum	Mean	Std. Deviation
18	90.00	35.00	125.00	65.7778	23.27219

The first aspect to be noticed in a piece of writing is its length. Therefore, it makes sense to be the first element to be considered in the analysis. As indicated in table 1, the mean average of words written by the students in this study is around 65 words per essay. The difference between the highest and the lowest count of words charted is 90 which is higher than the mean value. The latter gives a clear idea of how widely scores are spread. Indeed, the shortest essay comprises only 35 words while the longest reaches 125. Considering the time granted for students and the nature of the topic, these numbers remain considerably low for second-year university students. The value for variation or dispersion of the data is 23.27. However, it is difficult to state that such value is high without a baseline for comparison.

Here comes the importance of dissecting the results so as to look at the results of each student. The stacked bars shown in figure 1 stand for the number of words written in each essay. It is clear that papers A and R top the chart with scores of 125 and 101 respectively. Coming in the second place, 4 essays only passed 75 words. The numbers in table 1 and figure 1 are evidence that students had issues in writing despite the simplicity of the topic. In the light of these figures, students were asked how they are able to write more during exams. They asserted that the only solution is to memorize lessons by heart. Therefore, when they are asked a question which they are not prepared for, the result is low performance.

**Figure 1.** Pre-test (without assisting technologies) - Number of words

Nevertheless, the number of words alone does hardly tell anything about the quality of a piece of writing; therefore, it is not sufficient for evaluation. In this regard, the second graph presents a detailed look at many types of mistakes. For a start, the first aspect to be measured in the second graph is the strikethroughs made by students. Strikethroughs here mean that a student made an error and it needs to be discarded. The interest here is not on the error itself nor its correction but rather on the underlying reasons behind the correction. The number of strikethroughs alone is an indication of the hesitation students suffer from while writing. All the strikethroughs found in students' papers are limited to one word which means that they struggle to find the right spelling of words.

The total number of strikethroughs found in all papers is 48 with the average of 3 per essay. In the interviews, students expressed that they did their best to avoid strikethroughs in their essays by abandoning difficult words altogether. Yet, evaluating a paper full of mistakes even if they are corrected is for sure not pleasant and gives a good idea of student struggle to write correctly and it can result in a negative evaluation. Furthermore, the ramification of avoiding difficult words is seen in the length of the essays which are short. A good example is seen in participants I and K who produce essays containing 65 and 45 words, respectively. The essays corrected were not only short but often lacked sophisticated and hard words as students resorted to easier ones. Moreover, the simplicity that characterizes the essays makes the talk about style at this point rather difficult.

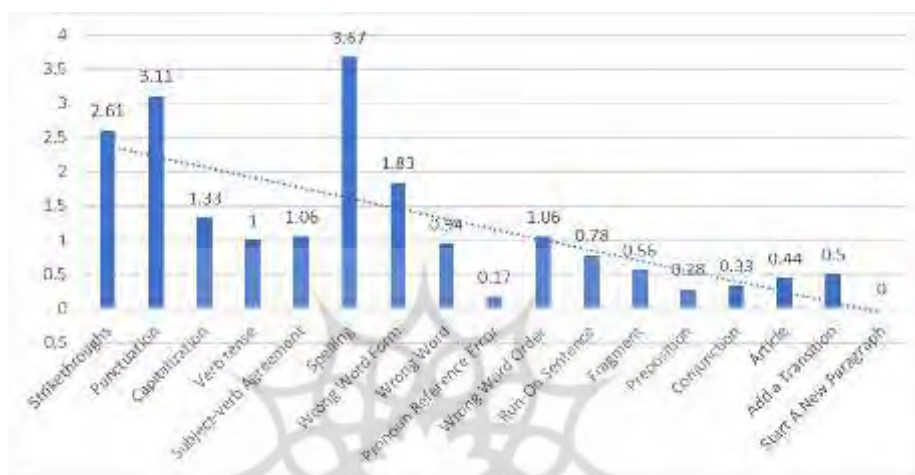


Figure 2. Pre-test (without assisting tools) - Averages of all errors

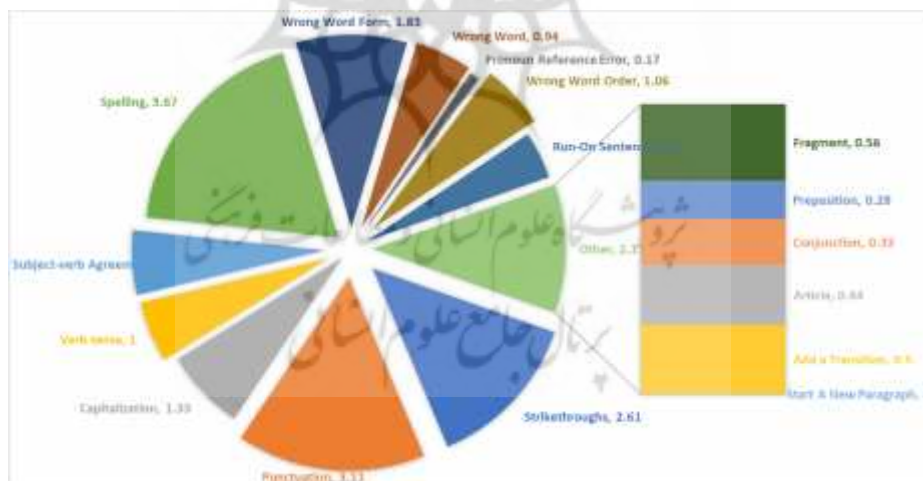


Figure 3. Pre-test (without assisting tools) - Averages of all errors

Continuing with the second figure, as discussed earlier, spelling mistakes top the chart with an average of 4 words per essay. The figure also indicates various types of mistakes recording high numbers with strikethroughs, punctuations, verb tense, and subject-verb agreement. Although figure three presents the same data, it divulges interesting information. It shows that the number of some errors is considerably lower than that of others, specifically fragment, preposition, conjunction, the use of articles, adding a transition, and starting a new paragraph. All these combined represent only 11 % of mistakes made. The explanation of such reading goes to the fact that in the process of avoiding spelling mistakes students have to trade complex sentences with rather very simple ones. This simplicity then is reflected in ideas expressed which do hardly

need any transition words or longer paragraphs. Furthermore, the style used in their essays can be perceived as very casual and is not satisfactory for university students. The analysis of the pretest results confirms that the fear of committing spelling mistakes and the lack of vocabulary are contributing factors in the insufficiencies students face in their writing.

Post-test (with assisting technologies)

Table 2. Statistical overview on the post-test (without assisting technologies) - Number of words

	Range	Minimum	Maximum	Mean	Std. Deviation
Pretest	90.00	35.00	125.00	65.77	23.27219
Posttest	263	110	373	214.44	94.63

In the endeavor to understand the effect of using assisting technologies by students on their writing skills, comparing the results of the posttest and the pretest reveals valuable information. The first element to look at is students' production in terms of number of words. Table 2 and figure 4 demonstrate a noticeable difference between the number of words students produced in the pretest and the posttest, as every student has shown progress without exception. The average of words written has jumped from 65 to 214 with a minimum of 110 and a maximum of 373. In other terms, students wrote essays three times longer than those of the pretest.

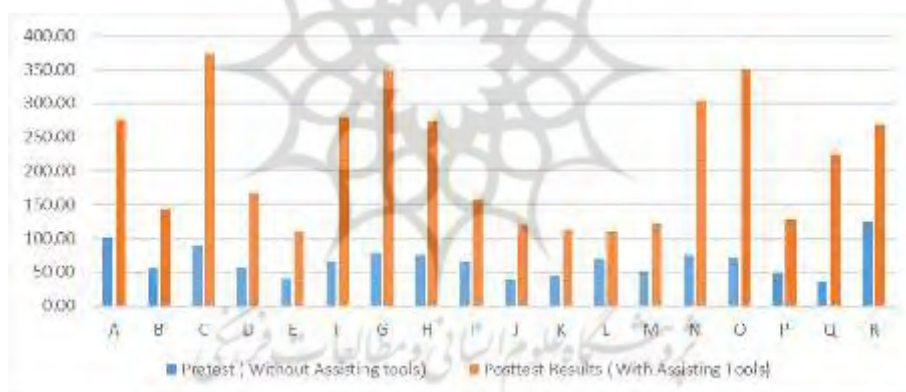


Figure 4. Post-test and pre-test comparison - Number of words

The comparison in table 2 indicates that most values are tripled. The reason behind such perceptible improvement is credited to the students' ability to mobilize passive vocabulary without the fear of committing spelling mistakes since the assisting tools intervene and notify the writer when there is one. The jump in the standard deviation value also shows that some students benefited more from the utilization of technology than others. Those students have a wide and rich vocabulary yet were hindered by the lack of knowledge of the exact spelling of words.

However, figure 5 still designates some spelling mistakes found in essays of participants A, D, G, J, K, and L. When the latter are asked about the reason that led them to ignore mistakes despite notifications, the answers varied between "I did not pay attention" and "I did not have time to correct them". Such answers can have two explanations. First, they can reflect some student's attitude towards spelling mistakes which are often taken lightly. Second, one should not overlook the fact that some students did not take the experiment seriously.

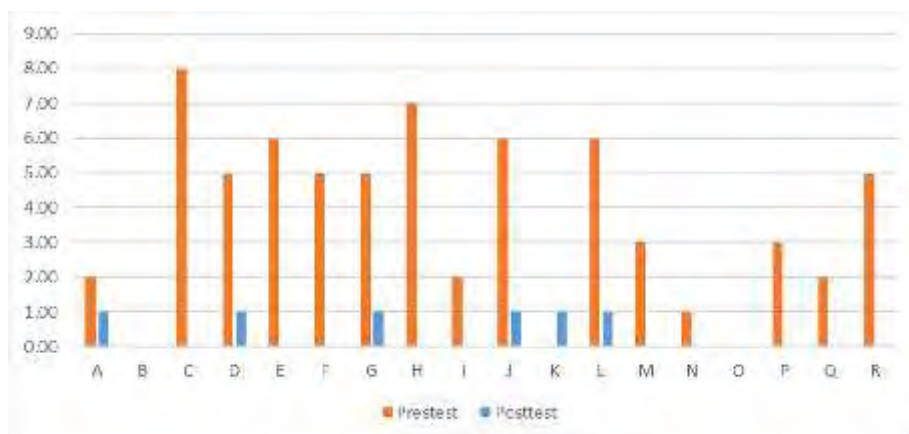


Figure 5. Pre-test and post-test results comparison - Spelling mistakes

Comparing the averages of all mistakes between the pretest and posttest reveals two opposite readings. Therefore, instead of presenting all the elements in one chart, the results are split into two figures: 6 and 7. The former discloses a decrease in the number of strikethroughs which obviously are reduced to 0 as with the use of computers, the editing process leaves no trace. Following the same direction, mistakes in punctuations, capitalization, verb tense, and subject-verb agreement have been reduced by about 60 %.

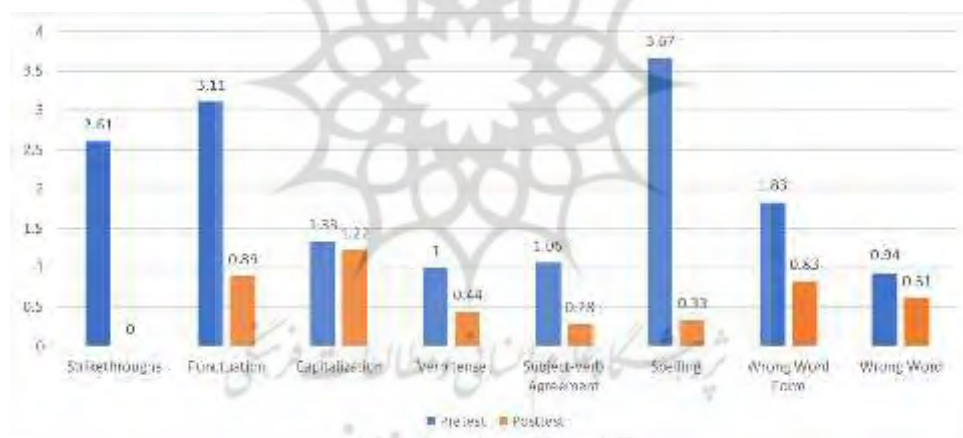


Figure 6. Pre-test and post-test results comparison - Averages of mistakes

By contrast, in chart 7, figures take a different behavior mostly showing an increase in the number of mistakes. This behavior is linked to two factors. First, it should be noted that such readings in these kinds of mistakes would not have been possible without students being able to produce longer and complex sentences. For instance, mistakes related to run-on sentences and conjunctions are doubled showing that instead of the simple sentences that are found in the pretest, the posttest essays comprise more elaborated words and adjectives. The lack of transition words also indicates that ideas have become more compound to be accommodated in short sentences. The second reason has to do with the sample itself, as second-year LMD students of English still do not possess sufficient experience in writing. More particularly, they are still concerned with lessons that tackle the subjects of most mistakes they have done such as run-on sentences, conjunctions, and fragments.

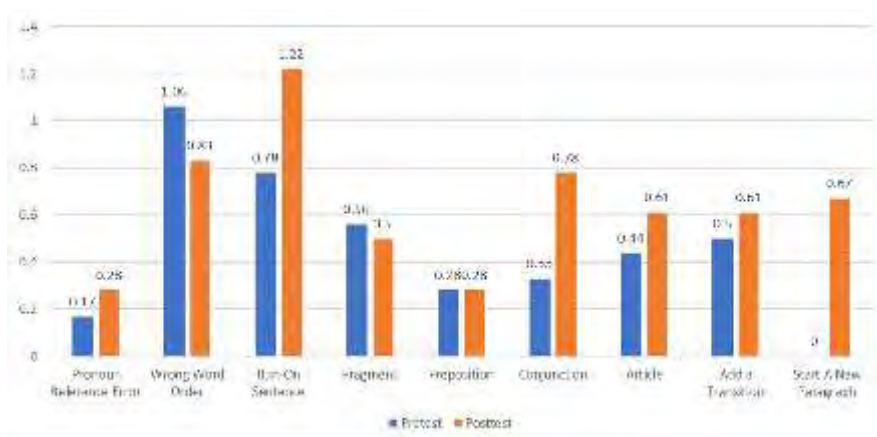


Figure 7. Pre-test and post-test comparison - Averages of mistakes

The results of the posttest can be intricate to interpret and perhaps a purely objective statement, based solely on numbers, might not come out in favor of the research hypothesis due to the fact that what has occurred is that some errors are substituted for others. Indeed, that will hold true if the pretest and the posttest are corrected by different teachers. Nevertheless, from the standpoint of one teacher, the progress students have shown cannot be neglected especially when the short time span of the experiment is taken into consideration.

Drawbacks

Publications that tackle the subject of enhancing writing skills often skip spelling and emphasize more advanced aspects. However, with second language learners who usually speak English only in class, the problem of spelling mistakes is always present as the students need to take extra efforts to remember the exact word formations. It is evident that this issue is covered with the utilization of spell-checkers and autocorrect technology, but another arises due to the extensive and prolonged use of the same technology.

Observing the students during the experiment reveals a troublesome behavior. Some of them simply stopped making any effort to write correctly. Knowing that the exact spelling will be provided, all that they had to do was make a suggestion and the software would do the rest. Although the research cannot systematically answer the question of what repercussions of such a behavior would be for a long-term, it is clear that retaining exact spelling will not be a priority which means that they will become dependent on such a technology unable to write correctly without it. In this respect, the solution lies with teachers as through their observation and guidance students can get the best of what these technological tools offer without risking falling into another problem.

Implications for teachers

All aspects in language teaching are related and aligned from content, activities, roles, to assessment. Thus, altering one of them for sure has implications for the others. In our case, the change is introduced at the level of tools employed. Consequently, teachers need to adapt to such changes and adjust their role accordingly. First, teachers need themselves to be knowledgeable about these tools. Second, in relation with the drawbacks stated earlier, teachers will have a responsibility to guide students for safe usage of writing assistive technology.

In regard to assessment, when interviewed, most students implied that teachers often state that it is not content that matters to them but rather correct use of language. Of course, it is not like that teachers do not care about content but since students show major deficiencies in matter of writing skills, teachers find themselves unable to focus on other aspects. However, the shift that has

occurred in the types of mistakes between the pretest and the posttest would have implications for the way teachers evaluate their students' essays. With the absence of spelling mistakes and the complexity of the sentences the students would produce with the assistive technology, teachers can focus on important matters such as organization, style, and content.

Conclusion

The hypothesis driving the research asserts that the utilization of assistive technology improves writing skills which will be reflected in students' accuracy and style. Thus, the starting point in the literature review of this work was on establishing a relationship between writing and the importance of having a rich vocabulary. Next, by linking writing skills and technology, it was evident how the latter can activate passive knowledge of words which a student can use in writing. Having these in mind, the aim of the practical side of the paper is to demonstrate the effectiveness of technology with university students.

Indeed, the experiment indicated perceptible improvement in writing skills of the selected group of students in a short time span. The first positive indicator aligns with what was discussed in the literature review as the use of assistive tools enables students to yield significantly longer essays attributable to two reasons. Writing assistive technology helps students to mobilize more words for writing by transferring passive vocabulary items into active ones. Second, with the fear of committing spelling mistakes being quelled, confidence and creativity take place instead. Consequently, assistive technology offers students the capacity to express their ideas and be creative in more elaborated and complex sentences.

However, solving the problem of accuracy also opens the door for style-related errors. The experiment showed that there was a substitution of spelling and grammatical errors with those linked with style. Admittedly, technology so far can only provide limited hints in relation to these types of errors leaving novice students struggling. Now, coming to discuss style after spelling mistakes were the acute problem, still can be seen a solid evidence that assistive technology has a tremendous effect on writing. Nevertheless, proving the hypothesis has far-reaching implications for how such technology should be perceived by teachers and the education system in general.

If assistive technology is adapted as a tool in university classrooms and specifically during official exams that would clearly mean that essays will no longer be plagued by spelling mistakes. A situation that also will require examiners to change the way their evaluation is carried out. Nevertheless, all that was said can not be achieved without introducing new regulations that should govern the utilization and the misuse of the technology.

Finally, although the experiment was designed to detect the advantages of the implementation of technology in EFL classroom, drawbacks are also noticed despite the short life of the experiment. Excessive usage and total reliance on the technology can for sure have lasting negative consequences as students can become dependent on it to the extent they would forget and neglect the correct spelling of words. Still, this is a topic of further investigations that require long time observation.

Limitations of the study

The study can be criticized on the ground of three limitations. The size of the sample is a downfall in the research methodology. Thus, having a diverse and a large sample that covers different levels would yield a more accurate result. Second, the results would have gained more credibility if students' productions have been corrected by multiple teachers with the same and different students for cross-referencing. The final drawback lies in the researcher as the latter is not a specialist in teaching written expression, therefore, a better and qualified teacher can provide more insight into the methodology and the analysis procedure. Finally, the time span of the experiment

is also a downside because extra sessions and more data to compare and analyze would be more accurate.

Recommendations

Various striking facts emerge from the results of the research; the first of these is that the use of assistive technology receives positive attitudes on the part of Algerian EFL learners. The other positive point is that technology use for writing essays yields better results in terms of language learning and proficiency. The data obtained from the research, although inconclusive, allow us to propose the following recommendations:

- While designing language learning activities such as writing essays, short and long paragraphs, adopting assistive technology in class would prove more than efficient as learners achieve higher proficiency.
- Educators should encourage the use of assistive technology in EFL classes to enrich the vocabulary and improve the writing skills.
- New applications have to be developed specifically to invite learners and teachers as well to embark on the use of technology for foreign language learning/teaching.
- Teachers have to design intelligent tutorials to facilitate comprehension and use of new technologies in class.

Nowadays, learning English through assistive technology has become one of the main factors underlying academic success. Not only that, the various ways of using technology in class, such as CALL (Computer-Assisted Language Learning) and MALL (Mobile-Assisted Language Learning) through pocket electronic dictionaries, personal digital assistants (PDAs), mobile phones, MP3 players, and ultra-portable tablet PCs has proven to be most effective as it develops motivation for foreign language learning.

As a last word, one can say that assistive technology provides a suitable educational environment for learners of English as a foreign language. It must be taken into consideration for future strategic educational and higher educational goals since it will not only improve learners' levels, but it will also give a new impetus to the learning and teaching process in Algeria.

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