

The Transition from Pens to Keyboards: How May Teachers Generate Reforms towards Learners' Spelling Mistakes?

BOUKHIAR Bouchra* 

University of Sidi Bel-Abbes Djillali Liabes, Algeria
bouchra.boukhiar@univ-sba.dz

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ABSTRACT: *Under the current abrupt intervention of technology, the transition from handwriting to keyboard texting challenges Orthography in terms of logography and spelling. The sensorimotor skills are majorly impacted by the unbalanced modes of writing. Speaking about learning one skill of a foreign language, which is writing, the impact of social media, particularly texting, deteriorates the quality of that respective acquisition. Accordingly, correlational research was proceeded in the Algerian context, operating on, first, an experimental investigation of causality between texting and learners' spelling mistakes, followed by teachers' observation outcomes, where the ultimate aim was to enhance teachers' observation and critical thinking towards spelling mistakes reasons, in addition to improve their teaching autonomy through their consideration of respective reforms to the alleged matter. The researcher opted for a 30 pupils' sample, at third-year middle school level, where she led an experiment, embedding 60 words and non-words constituted from one to four syllables in a text. This research is constituted of six test stages upon both modes: typing and writing, where the unit of measurement was the calculation of mistakes rate for each mode, followed by teachers' observation for each stage. The first experiment showed that pupils commit fewer spelling and logographic mistakes as hand writers on a repetitive process, accompanied with the same result concerning the transition from handwriting to keyboard typing, compared to the reversed transition. This highlights that, unlike the typing mode, handwriting motivates visual, haptic, and fine motor skills, which stimulates the sensory memory, through practicing writing, to assimilate and conceptualize the logographic aspect of a word, which leads to its correct spelling. The second stage outcomes, demonstrated that teachers could identify the difference between both modes and suggested reforms respectively, which emphasize on teacher capacity to lead a self-oriented training based on reflection on action.*

KEYWORDS: Handwriting, keyboarding, teachers' autonomy, spelling error, teachers' self-education.

* Corresponding author: **BOUKHIAR Bouchra** bouchra.boukhiar@univ-sba.dz

Introduction

The problem of spelling errors increases year after year. Researches in the field of linguistics show that the reason behind these failures returns to different factors. Corder (1973) exemplified in error analysis that these failures return, mainly, to influences of someone's multilingual repertoire, or to personal conducts in learning a language. However, from a pedagogical perspective, reasons state that pupils do not read as required (Alfaki, 2015), in addition to the abrupt intervention of social media texting according to Chaudhuri (2020) and Albeshier (2018), where a combination of letters and number clusters are mostly an 'invented language' as online means of communication, which deteriorates the orthographic quality of a word. Nevertheless, this research theorizes that, adding to the cited reasons of spelling errors, the collision between handwriting and keyboard typing is worth of investigation to explain the provenance of these errors. As a vivid example, the comparison between the 'pen-oriented' generation and the 'keyboard' generation is a proof. Accordingly, the previous generation used handwriting in response to any domain, massively in academic spheres, informal letters, job applications and related fields, where the probability of re-writing a given word is elevated, enhancing the working memory, which prevents from falling in orthographic errors. However, the current generation is facing two types of writing utilized in an unbalanced proportion, the first one being handwriting, which concerns restrictive areas, mainly note-taking in academic spheres, however, apart from this, electronic typing is the ultimate option. Therefore, in regards to this, the researcher in this matter, leading correlational research in the scope of Psycholinguistics and teacher training, attempts to investigate the relation between keyboard typing and spelling errors, in the Algerian context among third-year middle school pupils learning English as a foreign language. The importance of this research regards the attempt to investigate the coexistence of electronic typing and handwriting as a major reason for orthographic and morphological errors. Accordingly, this research considers cognitive factors as variables, mainly memory and its impact on sensory motors proper to writing mainly visual and haptic skills.

This paper is divided into two parts explored in the theoretical and practical part respectively. The theoretical part relates notions and previous studies with the difference between handwriting and keyboarding. Whereas, the practical part regards the methodology to investigate two complementary research questions stated as follows:

- 1- How does the transition from Keyboard typing to handwriting influence spelling errors?
- 2- How may teachers develop professional autonomy in taking reforms towards spelling mistakes?

Hypothesis:

1. Electronic typing augments the rate of spelling errors when shifting to handwriting, because of the concordance nature between fine motor skills, visual—perceptual skills and orthography.
2. Teachers develop a sense of self-oriented training for teaching writing skills through observation of causality, identification of the issue, and reflect on action.

This research comports two objectives. The first objective is to state that the condition of spelling errors, increase, returns to the unbalanced correlation between electronic typing and handwriting, which impacts on respective cognitive functions. The second objective is to enhance teachers to develop their observation skills and critical thinking, through an autonomous process of identifying the problems of handwriting and propose respective practical solutions.

Why Spelling Errors and not Spelling Mistakes?

The difference between errors and mistakes lays on the linguistic profile and its advancement proper to the individual. Accordingly, Corder (1973) was the first linguist who made the distinction between both terms.

Errors

Errors in linguistics are systematic failures caused by a lack of connivance about a given rule. They usually occur within students in their first stage of learning a language, as it can be due to fossilization¹. According to Richard et al., (2002), an error is the use of a word, speech act or grammatical items in such a way that it seems imperfect and significant of an incomplete learning.

Errors are stratified into overt and covert errors. Overt errors are the concern of this research, and they are an erroneous grammatical or orthographic form of a given word, as it appears in these examples: he goed to school, or in saying the girl~~e~~ is helping here~~e~~ mother. However, Corder (1974) explained that covert errors constitute of correct grammatical forms of an utterance however, this latter presents a default at the level of a discourse, as in saying:

- How do you consider current climate change actions?
- I find the weather nice today.

In linguistics, errors analysis in writing regard four factors.

Interlingual errors. These errors result from the interference as of L1 to L2, saying that he is a teacher and she is a teacher~~e~~, where the influence here is from French (L1) to English (L2), where the 'e' is commonly used in French nouns to refer to the feminine form.

Overgeneralization. As its name indicates, it refers to the generalization of a grammatical rule upon all cases, for example, I know where was he going. The generalization here is upon the question form associated with (where). Where the correct form is I know where he was going.

Simplification. The simplification process in errors analysis states that individuals tend to omit some linguistic features judging their existence as not important. It happens usually in the English language with the suppression of the "s" for the third personal pronoun, as in saying: Egypt attract(s) an important number of visitors each year.

Communication biased. This matter regards personal modification of the target language, as inventing new words, in saying airball to refer to the air balloon.

Mistakes

Unlike errors, mistakes are unsystematic and they are occasional lapses, they may be the consequence of slip of tongues, confusion, and rapidity in writing... According to Corder (1997): "a mistake is a problem not of knowing but of application" and "mistakes are of no significance to the process of language learning" Corder (1981:10). Accordingly, mistakes do not happen on a habitual process, while errors occur repeatedly.

Spelling Errors in Digital Era

Orthographic errors may be less seen when it concerns electronic typing, where writing an article on Word Office or another platform, texting a friend or writing an email, concerns an equipment with correctors, which both identify the language proper to the text and correct it accordingly, by showing that it is an error through a colored underlying Macarthur (1999). Even phones keyboards are equipped with suggestions

¹ Fossilization in linguistics is borrowed from paleontology; it refers to the stage where a cessation occurs in language learning from L1 to L2. Fossilization includes "linguistic items, rules, which speakers of a particular native language will tend to keep in their target language" (Selinker, 1972:215)

related to the word someone wants to write, even if the targeted word is written in a deteriorated form to a given percentage, respective algorithms provide correction or alternatives. Consequently, this matter provides a certain kind of 'laziness' within individuals, especially if electronic typing monopolizes various spheres in someone's daily life as mentioned by Chemin (2018), so the need for correcting one's handwriting texts in terms of errors is given less importance, thinking that in the coming years, this scripting with pens will be archaic.

Nevertheless, assessing students writing deprives learners' autonomy, as Ghufron and Fathia (2018) show in their research concerning the role of Grammarly in assessing EFL writing, where they state that Grammarly is more effective, in the respective task in terms of rapidity and results, comparing to teacher's indirect corrective feedback. Yet, students' learning autonomy vanishes, which explains, from one part, the demotivation and difficulty faced by learners to both identify and correct their errors through handwriting.

Moreover, as an answer to the increase of spelling errors, the development of various approaches answers the issue. In Thailand, after the notification of the raise of misspelled Thai words, a game-based learning approach was developed. This game entitled "The Herd of Calf teach Thai" operates on an Android smartphone, as an application, with a gyroscope sensor². It is executed on three levels of difficulty in five stages. The game enhances self-education as a process, which is about a frequent use of words that are often misspelled engaging in different activities. Accordingly, to test the efficiency of this application, Saksrisathaporn and Krittiya (2020), led an experiment with Thai Bachelor's students of Art, through testing their autonomous correction of common misspelled words occurring within these students through comparing pre-test and post-test scores. The result show that posttest scores were 15.027 points higher than pretest scores (Saksrisathaporn and Krittiya, 2020). This demonstrates that game-based learning ameliorates the level of learners in spelling assessment.

Furthermore, the question of spelling errors in digital era is interesting in the sense to predict the future of handwriting. This research attempts to explain that the abrupt intervention of digital notions governing various domains of individuals daily life, affects negatively handwriting in terms of orthography and morphology, however, the question here is to ask whether or not handwriting will persist for the coming generation. Accordingly, to investigate this, the very first pattern to look at is the technological development rate for each nation. Speaking about the United States of America for example, the rate of implementing electronic devices in academic spheres is important and it covers a large percentage of daily usages comparing to Algeria, which witnesses the slow process of conceptualizing technology especially in education. Even with the small intervention of electronic tablets at some schools, the remaining number of underprivileged schools is massive. In the same sense, Algeria is, at its debutant stages, experimenting the collision between handwriting and electronic typing since handwriting tasks remain under the influence of social media texting and internet exchanges, this situation makes the process to test the theory of electronic typing negative influence on Orthographic errors possible and clear.

Handwriting as a Cognitive Behavior

Handwriting is an ancient skill acquired and developed by humans, it has been a tool for communication since the stone ages, by which the brain progressed mechanisms proper to this behavior. Accordingly, writing is more than scripting some shapes to express a given meaning, beyond that; it is a mechanism to ameliorate composition and expression, in addition to its capacity to develop motor-skills.

²Gyroscope sensors are ships usually used to measure rotational speed and calculate rotational change.

To explain the effect of handwriting on the brain, Bounds (2010) explicates in his research paper that writing by hands enhances the neuronal activity within children who use to print by hands comparing to their peers who just observe letter sequences. In the same line, there is an interesting detail about manipulating and drawing orthographic forms related to the development of human cognition.

However, despite the fact that the brain adapts to human activities, two actions for the same activity may be challenging, speaking about writing by hand as an ancient human skill versus the resulting letter sequences through computing. To highlight the cited query, James (2008) led a research on adults learning Chinese at a very debutant stage, with the aim to have a neutral phase on which the only variables to be tested are the difference between pens usage and keyboard usage with no reference to the semantic aspect. Accordingly, James asked participants to distinguish between new characters sequences and a mirror image of them, after distinguishing between the two patterns, he asked to report them differing pen reporters and keyboard reporters. The study shows that those who write with hands recognize easily words and characters comparing to those operating through keyboards. This states that the process of handwriting through structured movements helped the visual identification of orthographic and morphological shapes proper to each word.

Therefore, there is a relation between the hand and the brain when it concerns scripting a graphic shape. Where to write the letter 'A' for example, three lines are coordinated but for the 'C' it is the half of a circle. Whereas, when it comes to linking letters to formulate a word, the process is about shaping letters and linking them in a cursive manner. Just like drawing or riding a bicycle, this operation, after a repetitive task, makes the brain memorize and recognize the orthography and morphology of words. However, comparing to keyboard typing, the whole letter is selected by one touch which is similar to all letters, where the letter 'A' is one touch, similar to the letter 'B' and this applies to all letters and characters existing in the keyboard. Keyboarding, as a 'rigid' manner of typing letters, makes the brain less creative and thoughtful, to reinforce this idea, Berninger (2004) emphasized that sequential finger movements directly activate brain regions responsible of thinking, language and sensory memory, after she observed that pupils express more ideas while writing by hands comparing to keyboarding.

Haptic and Visual-Perceptual Skills Involved in Writing

In an advanced manner than keyboarding, the act of handwriting coordinates haptic and visual skills with brain regions proper to the memory, as highlighted in the research of Palmis et al., (2017) on motor control of handwriting in the developing brain.

Haptic Writing

Refers to a 'conscious' process of scripting characters, from where the capacity of fine motor skills, such pen writing, manipulates and controls respective muscle movements, which activates the sensory memory. Correspondingly, the haptic skill permits to sensate the script and visualize it through a mental image accordingly Smoker et al.,(2009). The intervention of haptic skills in writing equips hands with the capacity to have a proper orthographic and morphological shape distinguished from others; this also explains the fact of trying to re-write a word virtually when individuals are not sure of its spelling. The fact of reproducing a virtual writing of letter sequences makes the hand movements recall the way in which the word used to be written. However, the haptic skill cannot operate alone; it is tightly related to a respective visual process.

The Visual Perceptual Skill

Visual-perceptual and kinesthetic inputs correlate together for target written characters. The efficiency of the outcomes depends on the development of both skills starting from the schooling process. After individuals learn how to hold the pen and manipulate it, the visual perceptual skill develops to identify the written characters and check the degree of the text correctness Tse et al., (2014), where the visual-perceptual skill helps to assist writing and check if the translation of abstract visual images into script is the one targeted. To elucidate, in a rapid writing process under pressure, as at it's the case at the last minutes during a final exam, the visual-perceptual activity decelerates, where the visual attention to check the spelling or word orthography is mostly deactivated under stress, and the haptic skill takes over relying on the kinesthetic memory to translate ideas into written characters.

Situation Analysis of Spelling Errors in Algeria.

Algeria is classified as a country of a native level of speaking Arabic. However, the Algerian dialect dominates the linguistic profile of the country, which is a variety of an Arabic syntax and a vocabulary rich of a morphologically modified Arabic, French, Berber and other varieties. This dialect, from a cognitive perspective, constitutes a native variety for Algerians as highlighted by Benrabah (2007), where modern standard Arabic, acquired at schools, would be in a second position in this case, followed by French, then English. Accordingly, in terms of education, Algerian pupils face an important struggle of acquiring a written vocabulary and distinguishing between French and English in terms of spelling (Dendane, 2002), which leads usually to a negative transfer. In this matter, the question of judging spelling mistakes in the Algerian context may be biased, where the judgment of spelling errors origins may be the result of French and English acquisition collision, as it can be the result of keyboarding influence on handwriting. In order to answer this issue, and focus on the effect of keyboarding on handwriting, the researcher designed a text of 250 words with 60 English words and non-words distributed according to the context, taking into consideration the possible errors that may happen through negative transfers from French to English.

Research Methodology

The First Stage

In order to investigate the relation between spelling errors and the influence of keyboard typing on handwriting, the researcher opted for experimental research. Since the objective of this research is to rely on factual results that may be replicated for future research, the research paradigm of this scope regards positivism, focusing on quantitative methods relying on an accustomed test followed by a respective unstructured observation. The test is proceeded on six stages. Accordingly, the researcher opted for an exploratory instrumental case study method, with the aim to explore the issue of spelling errors and provide respective insights. In terms of informants' quantity, the researcher opted for a representative group of pupils with the aim to generalize the research outcomes.

Participants

The sample of this research is constituted of 30 pupils enrolled in the third-year of middle school. The paradigm proper to informants' orientation regards representative sampling, with the aim to generalize the outcomes in regards to the hypothesis. Accordingly, probability sampling is the method followed to formulate participants, where one classroom has been chosen from all Algerian classrooms, with reference to the fact that they hold common characteristics with Algerian pupils. Since the important characteristic

related to the research was the mastery of writing in English, from which, the choice of third-year level pupils of middle school, returns to reason that these learners had two years and half of notions regarding the English language. For the sake to respect axiology, the name of the school cannot be revealed, and the specification of gender, since it has no interference on the study.

Research instruments

Since the scope of this investigation is positivism, the need of quantitative primary data collection is required. Accordingly, the researcher followed an experimental approach focusing on chronologically related stages. To collect respective data, the researcher developed a test, which regards the analyses of spelling behaviors towards a text of 250 words. This text is constituted of a systematic correlation of 60 embedded words collected from Oxford dictionary and non-words formulated of two syllables, three syllables and four syllables. Accordingly, these words serve as variables on which the rate to correctly spelling them or misspelling them is the indicator for results orientation. This test is stratified on six stages, accompanied with a respective observation proper to writing rapidity, fine motor skills control, and the reporting quality and quantity.

Procedures

The process of applying tests and observation went through three phases.

A pre-test phase.

Before launching the respective research methods, the researcher spent 3 months looking for English words from Oxford dictionary that would be of a low probability to cause a negative transfer from French to English, in addition to constituting non-words. After forming a text with 250 words compromising the 60 target words, the researcher pilot the text in an informal manner on pupils having the same level of education and age as the participants, so that she confirms if the text can be operable or not in terms of time and visual recognition. Accordingly, she took into consideration any struggle or misconception in regards to the instructions.

The test phase.

After that, the researcher made sure that the text could be operable; she structured the phase of data collection on *six* stages.

In the first stage, she presented the test with no respective instruction. The aim of this phase was to observe visual recognition and attention within learners. The period of this phase was 7 minutes, where learners proceeded with a focus stage. A 15 minutes break was provided to them, so that it creates an interval and to dismiss the hypothesis that the visual memory would have an impact on the outcomes.

The second stage regards the split of pupils into two groups A and B, where group A regards pupils who know a frequent smartphones usage comparing to their peers whose parents are restricting the use of electronic devices who are represented in group B. In order to divide them, two parameters were taken into consideration. The first one regards the parental behavior towards their children's electronic usages and time limitations accordingly. The second parameter concerns the possession of smartphones inside classrooms and teacher's testimony of their frequent use from these pupils.

The third stage. In the third stage, was a displayed as a challenge, where pupils are asked to report the text in front of them in 5 minutes for those with smartphones and 10 minutes for handwriting group, taking into consideration that keyboarding is faster than handwriting. The text was impossible to be copied in this

period for both groups, yet the objective here was to test the haptic skill in relation to the kinesthetic memory, and implicitly detect the writing frequency within these pupils through measuring their mistakes.

The settling of 10 min for hand writers and 5 minutes for typists is systematically done after that the researcher calculated the difference between an average time consumption between typing and wiring words in regards to the contained syllables. Furthermore, as a notification, the researcher deactivated the possibility to use a dictionary or respective mobile assessment, for keyboarding group.

The fourth stage occurred in the subsequent day. This stage is a repetitive exercise of the third stage. However, in this phase, the advancement of words quantity was expected to be excessive than yesterday, also the awareness towards previous spotted errors.

The fifth stage happened in the third day, and again it is proceeded exactly as the fifth stage.

The Sixth stage. After getting reporting the text three times in a successive manner, the sixth stage required to shift groups, where those who handwrite are going to type and vice versa. During the same minutes as prescribed in stage three. This phase is important in the sense to test the efficiency of the previous stages by which to confirm or disconfirm the hypothesis that modes transition influences spelling errors.

The post-test phase.

After the conduct of research methods formally in concordance with each stage, and data were collected, the researcher opted to explain the signification of hard words, as well as she identified for them non-words and explained their non-signification.

Results

The phase of visual recognition of words, and groups' stratification, which respectively refer to phase one and two, represent the initial part of the experimental research. Where in phase one there was no real distraction within participants, the focus process was as required and expected. Accordingly, the researcher observed that pupils paid attention to non-words, without identifying their semantic status. The researcher arrived to this result, after she received many questions asking for the signification of the words.

	Group A	Group B
Reported words	151	170
Test related words	40	46
Misspelled words	30	24

Table1. *Text collected words for research stage 3.*

During the third stage, the researcher found that pupils with smartphones reported a sum of 151 words with 40 of targeted words. The average of repetitive misspelled words, within Group A, was the sum of 30 misspelled targeted words upon these 40 words. However, for group B the sum of reported words was the average of 170 words with 46 of test related words. The average of misspelled words was of 24 words.

	Group A	Group B
Reported words	166	180
Test related words	45	51
Misspelled words	25	17

Table 2. Text collected words for research stage 4.

During the fourth stage, the writing speed rises for hand-writers, comparing to keyboarding group who kept a same writing pace as the previous day. The number of reported words augmented by an average of 15 words for group A comparing to 17 words for group B with 5 extra targeted words. Accordingly, the spelling errors spotted were of a lower rate comparing to the previous stage, by an average of 16.66% for group A, and 29.16% for group B.

	Group A	Group B
Reported words	180	200
Test related words	45	51
Misspelled words	20	12

Table 3. Analyzed words for research stage 5.

In stage five, the speed rate of writing augmented comparing to the previous stages with the sum of reported words by 14 words for group A and 20 words for group B, where there was no targeted words in this passage. For misspelled words, the rate got lower by 29.41% for handwriting with 20% for electronic typing comparing to the fourth experimental phase.

Accordingly, from stage *three* to stage *five*, the rate of overcoming spelling mistakes was marked by 33.34% for group A, and 50% for group B.

	Group A	Group B
Reported words	100	170
Test related words	37	46
Misspelled words	18	9

Table 4. Analyzed words for research stage 6.

The shift from handwriting to keyboarding and vice versa between group A and B, results in the fact that group A marked a high rate of 48.64% of errors in writing, whereas it was somehow constant for group B who presented 19.56% of typing errors. Whereas for reported words it was a sum of 68% report of the text for group B comparing to 40% for group A. However, group B performed in a high typing speed, comparing to the writing pace of group A.

Discussion

The stratification of the research in six stages was systematic to analyze each section apart, and respectively link outcomes in a chronological order and confirm or disconfirm the first hypothesis, which states that keyboard typing is negatively contributing in the increase of errors especially on the handwriting level.

The results show that, for the first phase and through observation, the researcher found that pupils could identify the non-words by thinking that they are hard words, or words they have never encounter. This refers to the fact that third-year pupils have already employed, read, heard, or even saw a number of English words before, which make them recognize the previous words and struggle only with non-words.

The third phase remarked a higher rate of spelling errors for both groups comparing to the fourth, and fifth phase, where the more pupils reported the text the less errors they made, proportionally regarding each group apart. This returns to the factor that the more they practice, the less stressful they get. Along with this, the combination between haptic skill and visual memory makes the word recognizable where the rate of falling into lapses got lower, and the shape of the word became recognizable no matter of its semantics through the re-writing process. This motion joins the idea of N400 (Negativity 400) embedded correction system highlighted by Friederici (2011), where the human brain tends to correct mistakes after a 400ms of awareness regarding an already acquired word.

Accordingly, the rate of misspelled words was higher for the electronic typing category comparing to handwriting, which returns to the orthographical procedures to script words, which lacks meanwhile in keyboarding. During the writing process, the scripting of words in a repetitive manner enhances words recognition and makes the process of reproducing that word a subconscious process, being aware of the shape that each character takes. This notion was also highlighted by Bounds (2020) who demonstrated through his experiment proper to neuronal enhancement through hand printing. However, in typing, letters are represented by a common touch, that makes no recognition apart from the placement, with ignorance towards letters orthographical and logographical properties. From the other part, the recognition of words is also responsible of the speed rate proper to the writing process appearing in the experimental process.

Moreover, the findings explained proper to stage number three to five demonstrate that there was an optimization of results from group B through self-assistance in errors correction. As it demonstrates also that there is a difference between handwriting and keyboard typing in terms spelling errors, which answers the first research question.

The sixth stage of this research demonstrates that the impact of keyboarding on handwriting has a negative impact in augmenting spelling errors, while the opposite operation is approximately neutral. Where group B being in the position of Group A did not struggle in reporting words, comparing to their peers who were habituated on typing, where letters were not distinguished by a logographic aspect. Respectively, this exhibits that the transition from hand scripting to electronic typing is easier than the opposite transition in terms of resulting errors, which answers the second research question.

The experiment findings, after the text test and accompanied observations, demonstrate that, effectively, as stated in the general hypothesis, electronic typing augments the rate of spelling errors, because of the concordance nature between motor skills and orthography.

The Second Stage

The second stage of this correlational research, regards interpretivism. It concerns teachers' observation outcomes of the first stage. There observation, according to the second hypothesis, is designed to operate on three phases. The first one concerns the detection of spelling mistakes problems, the second one regards the identification of spelling errors reasons, and the third phase concerns providing solution respective to that matter. The mentioned chronological phases are established to focus on the motion of teachers' autonomy to lead their own methodology of teaching when it regards writing skills, mainly problems of misspelling. The aim of correlational research is to make a relation between two variables with no matter to their orientation. Accordingly, the reason of correlating both investigations, is to, first, help teachers in

identifying one of the major reasons behind spelling mistakes, and to, second, motivate teachers to reflect on the action, through developing critical thinking in providing solutions after analyzing the problematic situation, a matter which falls in subconscious learning, nearing the concept of acquisition as defined by Krashen (1970), which leads to an autonomous development of teachers' teaching methodology.

Participants

In order to gather data for the second stage, and confirm or disconfirm the second hypothesis, 10 middle school English language teachers were asked to join the experiment. After obtaining the consent of the middle school director, and the consent of the teacher responsible for the session of the English language, the sampling model went through Informative-rich paradigm stratified in non-probability convenience sampling (Cohen, 2007), with the aim to result transferability.

Research Instrument

The second stage, as alleged above, concerns interpretivism, where the concern is to gather teachers attitudes and observation outcomes, through a semi-structured interview, entertained between teachers and the researcher. After taking teachers' consent to be recorded, the Semi-structured interview, contained three open-ended questions concerning their observation outcomes, in addition to an open discussion proper to the section of suggestions. Teachers were asked to note any kind of information they found relevant to students' attitudes during the first stage, which served to answer the three first questions.

Data Collection

To gather data for the second stage, the ten teachers were asked to observe the six phases proper to the first stage, and take notes according to their own designed observation protocol. Teachers during their observation stage, could identify the difference between handwriting and keyboarding. After being exposed to the results gathered by the researcher, from the first stage, teachers summarized their answers to analyze that the repetitive task of writing is useful to avoid spelling mistakes, where 4 teachers emphasized on the motion that practice makes perfect.

Moreover, teachers highlighted the fact relating to their experience during their teaching sessions, learners writing skills are deteriorating because of the massive exposition to social media texting, which leads to implement letters with numbers, as their orthography is being not very readable comparing to the previous generations and theirs in particular.

Followingly, they highlighted during their observation that the ones concerned with the scripting process seemed more focused with the writing comparing to the others.

The last section of the interview concerned the proposition of solutions as positive reform towards decreasing spelling mistakes according to the experiment they witnessed. In that respect, teachers provided the following suggestions, which they made through introspection and their experience in the field.

- Five teachers, of the overall informants, stated that, to enhance learners' writing skills, it is essential to invite them to read, according to their level, to train their visual memory on letters succession, and report the main ideas of what has been read in a written report, with the aim to correct mistakes during the lecture. This category of teachers, focused on reading, as they consider this latter as the ultimate solution for spelling mistakes.

- Four teachers focused on the solution that teachers should provide learners with reporting activities. Being inspired by the experiment of the first stage, they stated to ask learners to reporting a text each week, and discuss repetitive mistakes.
- One teacher, who found the idea of using non-words useful, suggested that it would be useful to provide learners with two texts, one original and one comports misspelled words and invite them to look for these words and to do the correction while comparing with the original text.
- Seven of the overall number of informants stated that, for the coming sessions, they will start using repetitive reporting with emphases on the explanation of words so that the retention would be of a permanent effect. They stated as far that the idea of embedding non-words was an inspiration to implement misspelled words inside texts and request learners to identify the mistake and correct it respectively, following comparison, or dictionary usages. Last but not least, these teachers found the results of the first stage interesting, where they testified to attribute attention and focus on repetitive writing and reporting, especially the one of the acquired lexical proper to the lecture they would be having.

Discussion

The fact of synchronically starting by the first experiment and successively abording the second stage, returns to the purpose of making the first stage as a small protocol of teacher training about, implicitly, enhancing the methodology of investigating writing skills issues. The main purpose was to invite teachers to raise their awareness towards identifying spelling errors problems, relating the matter to their experience, and to think of solutions which would be reforms to enhance writing skill in terms of spelling.

The results of data collection showed that the second hypothesis was confirmed. Teachers during the first stage of the research were focused with the writing behavior of the present pupils, they followed their development during all the phases, which led them to develop attitudes proper to judge and identify the origin of spelling problems. Respective to that motion, after that teachers, identified the problem, they could go far to explain their experienced situations of spelling problems and the deterioration of orthography.

The fact of exposing teachers to the first experiment did not limit them only to make observations or explain previous encountered situations during their lectures, it also leaded them to build suggested reforms to the concerned writing issue, which was vividly demonstrated through their suggestions and aim to ameliorate their teaching methodology in regard to spelling.

The feature of identifying, and relating to their previous teaching experience and providing reforms, makes the aim of the second stage accomplished, since the ultimate objective was to enhance teacher autonomy to reflect on action by being exposed to a concrete situation familiar to the teaching subject. Furthermore, the fact that teachers were not provided guidelines to observe specific aspects, or execute similar tasks, makes the process of autonomy a currency for the experiment. They were completely free to observe features that they found significant to be noted. Correspondingly, there reflection was interesting in the sense where they took into consideration the first experiment outcomes to build solutions and plan to rectify their teaching methodology.

Conclusion

Under the successive innovation of electronic devices, writing, as a language skill witnesses a major change mainly in orthography and growing results of spelling errors. Writing, just like hearing, and speaking, enhances

the brain to adapt its function to form logographic shapes and to recognize characters and their succession for a respective spelling, which takes a cognitive process relying on fine motor skills and sensory memory, resulting in a self-assessed process for scripting. Keyboarding is an alternative for writing which requires proper cognitive consideration, a matter of adaptability of which Algerian students are producing spelling errors.

Moreover, this investigation is correlating two parts relevant to language teaching subjects' and methodology. The first part regards an investigation of the reasons of spelling errors. Whereas the second part concerns reflect on action executed by teachers after witnessing the processing of the first part experiment. The objective of this investigation was to create a small protocol of language teacher training in terms of raising attention towards identifying problems of spelling, enhancing their observation skills, inviting them to relate to their own experience, along with inducing them to reflect on the matter by providing respective solutions. The execution of these steps results in language teacher autonomy to lead their training based on observation and reflection. Furthermore, for this investigation, the researcher opted for the Algerian context, because it is at its primary phase of witnessing the collision between technology in drafting and handwriting in different domains. Therefore, the objective was to prove that the impact of electronic typing is negatively affecting handwriting, taking spelling mistakes as evidence. To investigate this issue, the researcher decided to lead a text-test formed by words and non-words divided on different stages and analysed on a compared stratification between hand-reporters and typists. The findings demonstrated that, effectively, electronic typing is affecting language in terms of spelling, and the respective transition from keyboarding to handwriting, not the opposite, augments the possibility of spelling errors occurrence and the deterioration of writing quality.

Based on the outcomes of the first experiment, the second phase of the research was established. Correspondingly, in order to enhance autonomy in teachers' self-oriented training, the researcher focused on providing no influence or guidelines for the ten English language teachers during their observation process or their reflections. The fact of enabling teachers to lead non-participant uncontrolled observation returns to the idea of extracting results of training autonomy with exclusion of other possible influences. In addition, teachers were also observing the methodology in which the researcher was operating, which would be an implicit training for them to gain onsite experience on how to develop research methodologies for prospective actions research. The outcomes of the second stage proved that observation and reflection are essential points to build self-oriented training.

To conclude, the shift from pencils to keyboards is shifting Orthography as a concept; even with the existence of embedded platforms to electronically draft, the question of the brain capacity to adapt easily with a multi-writing resource is important. After investigating the impact of keyboarding on hand writing, and implementing teachers to reflect on that respective prospect, there would be of a need to suggest likewise autonomous training for language teachers to reflect on similar problems related to language mastery problems that may result during learners' classroom practices.

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Authors' biography

BOUKHIAR Bouchra, is a doctoral researcher at Djillali Liabes University of Sidi Bel-Abbes. Her research focus is about teacher self-oriented training. She was a teacher of the English Language for more than six years, as she occupies, currently, the position of a university teacher of Study Skills at the department of English, University of Tlemcen, Algeria. Bouchra is also interested in Education quality as part of SDGs, where she offers lectures of French to Down syndrome pupils for the objective of resulting academic inclusion and equity for this category learners.