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ORIGINAL ARTICLE

Effects of web-based pre-writing activities on college EFL students' writing performance and their writing apprehension

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Abstract This study assesses whether multimedia-based concept-mapping and online reading before writing affected the quality of students' compositions and their writing apprehension. The study made use of the Dally and Miller (1975) scale as a measure of writing apprehension and the TOEFL Writing Test Scoring Guidelines as a tool for assessing writing quality. The experimental method of research was utilized, with an experimental design of pre-test–post-test, control group, consisting of two experimental groups and a control group, each of which comprised of 36 students equated on socio-economic and educational status, as well as on language achievement level. Each student wrote three drafts of opinion essays under conditions of multimedia-based concept-mapping, utilizing Blackboard facilities, online reading before writing, and no treatment in the control group. Besides, a one-way analysis of variance (ANOVA) test was used to address the questions raised in the study regarding the effect of the treatment conditions on the dependent variables, with a Scheffé test as a follow-up test for post-comparisons to identify the directionality of significant differences. Results showed no statistically significant differences overall in the writing under the three conditions. However, students were found to write longer and richer drafts in the conditions of online concept-mapping and online reading before writing, yet poorer, shorter drafts after teacher-led talk in the traditional, no treatment group. The results also revealed that both treatments had significant effects on improving the students' writing quality; however, they

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increased the students' writing apprehension. The study finally bore out recommendations, suggestions and implications for curricular and pedagogical applications.

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1. Introduction

Writing is an important productive skill that can be used in learning other receptive and productive skills (Zhu, 2004). Notwithstanding this importance, students of writing, and their teachers, too, experience a variety of unfavorable emotions, ranging from fear, to trepidation to elation (Byrd, 2010; Zhu, 2004; Arnold, 2007) which potentially hinder the development of their writing skills.

Educators, however, believe that writing instruction can best be done through an approach that involves generation of ideas, accommodation of audience, multiple drafting and revising; the underpinning assumption is that writing is a complex process that allows writers to explore thoughts and ideas, making them visible and concrete (Calkins, 1986; Poulsen, 1991; Hairston, 1992; Susser, 1994; Perego and Boyle, 1997; Atkinson, 2003; Mekheimer, 2005; Byrd, 2010; Dovey, 2010).

Educators also recognize that Internet resources can also be a valuable learning tool for students to find information and apply them to EFL learning (Heine et al., 2003; Honey et al., 2005; Al-Mezher, 2006; Al-Shahrani, 2000; Gocsik, 2009; Alshumaimeri, 2009; Gromik, 2010; Aldosari, 2010a,b).

Writing encourages thinking and learning, now that it motivates communication and makes thought available for reflection (Mekheimer, 2005). When thought is written down, ideas can be examined, reconsidered, superseded, rearranged, and changed. Still, existing composing theories and research on the pedagogy of writing concur that this skill needs to be taught as a process rather than a product (Hairston, 1992; Perego and Boyle, 1997). This approach allows students to manage the complexity of the writing task as they go through the different stages of writing, prewriting, drafting, revising, editing and publishing (Calkins, 1986, Emig, 1981; Kroll, 1990; Perego and Boyle, 1997; Matsuda, 2003; Paltridge, 2004).

Prior research has showed that ESL/EFL writers had demonstrated improved attitudes (Neu and Scarella, 1991; Phinney and Mathis, 1990) and decreased apprehension when they write with computers (Phinney, 1991a,b); however, there is little empirical testimony as to how they write with computers or how their approach to writing might change with experience in using computers to write. Most studies of native student writers describe both novice writers and novice computer users, but very few have attempted ESL/EFL writers.

2. Theoretical framework

According to Halliday and Hasan (1985) and Grabe and Kaplan (1996), it has been quite customary to think of writing as not being an innate skill or potential capacity or aptitude; rather, it is deemed a technology that has to be learned. In other words, writing is a skill that requires certain technical capacity which involves cognitive-psychomotor cooperation (Paltridge, 2004). In this context, Huff and Kline (1987) have elaborated on a writing paradigm that includes three main process-oriented phases, including rehearsing, composing, and valuing:

“a writing curriculum must provide daily and systematically focused rehearsal of writing skills; it must incorporate a thorough, well grounded understanding of the composing process, and it must assist students in developing skills to value and judge their own and others' writing” (p.1).

As can be deduced from this process paradigm, writing is a complex process that allows writers to explore thoughts and ideas, making them visible and concrete (Matsuda, 2003). As such, it fosters thinking and learning in an active fashion, as it eases communication and makes thoughts accessible for expression and consequent reflection (Ghaith, 2004; Mekheimer, 2005).

According to Grabe and Kaplan (1996), it has been quite customary to think of writing not as an innate skill or potential aptitude, but as a developmental capacity that can be nurtured in similar ways as other cognitive and psychomotor skills can be developed. Hence, researchers and classroom practitioners highly estimate the process approach in which writing develops in a procession of three phases: pre-writing, writing and post-writing. Considered primarily as a process, pre-writing is the first essential phase of the writing process. In this fashion, Bax (2000) aptly observes:

“Classroom approaches in this model (integrating process and product) already encourage pupils to write to someone other than the teacher, to offer responses to content rather than form, and to think about the whole process of brainstorming, drafting, responding, redrafting and so on.” (p. 215).

The initial phase is prewriting, recognized as ‘the wellspring of composing’ (Huff and Kline, 1987); this phase consists of all the activities that intervene between the initial decision to write and the beginning of a sustained first draft, thus dubbed as ‘pre-drafting’.

With the shift of the instructional paradigm from writing as a product to writing as a process, increasing attention has been focused on what students do before writing a draft, and on the discovery of what to say – often called ‘invention writing’, which “increases a student's ability to do intellectual work” (Schwartz et al., 1994, p. 137).

Many researchers began urging that students to use various methods to explore a topic prior to writing a draft: making use of meditation, journals, analogies, brainstorming, clustering, grouping and free writing (Barnett, 1989; Ashwell, 2000a,b; Muncie, 2002; Davis, 2005; Crawford and Smolkowski, 2008).

Reading before writing was encouraged in this way as a pre-writing technique as well (Cobine, 1995; Hirvela, 2004, 2005; Hewett, 2006; Plakans, 2008; Yang, 2010). Carson and Leki (1993) adeptly claim, “reading can be, and in academic settings nearly always is, the basis for writing” (p. 1).

One educational tool designed for learning, and rooted in the Ausubelian assimilation theory is the concept map (often termed as advance organizers or semantic maps) developed by Novak (Novak and Cañas, 2006; Novak, 1998, 2006, 2010). Concept maps or advance organisers are designed to clarify for both students and teachers the key ideas to be focused on in any learning task. These key ideas (concepts) are

then linked through connecting words form meaningful propositions (Novak and Gowin, 1984).

According to Novak (2006), concepts are a crucial compass in the attainment of new knowledge by a student. When a new regularity or event is recognized, students invent concepts designated by vocabulary, signs, or symbols.

Prior research has investigated the effectiveness of the advance organizers on the comprehension of oral texts, pictures, and written passages (Herron, 1994). More recent research has explored the effectiveness of advance organizers in foreign language education, video comprehension, and computer-based learning (Chiquito, 1995; Herron, 1994; Herron et al., 1995; Williams and Butterfield, 1992a,b; Lengfeld et al., 2009; Salmérón et al., 2009; Wetzels et al., 2010).

One method for combining many different examples and representations of a concept for individualizing instruction is through computer-based instruction. Hypermedia can enhance learning by providing learner control of content that enables students to construct meaning from multiple examples, visual aids, and simultaneous instructional modes (Heinich et al., 1996). Yang (1996) asserted that hypermedia encourages associative or relational thinking when students actively seek meaning instead of passively absorbing information. Learners may explore related ideas that facilitate the integration of knowledge (Yang, 1996).

Other researchers have proposed that the nonlinearity of hypermedia is similar to the way people think and learn (Doherty and Maddux, 2002). Hypermedia may also resemble how people mentally organize information with both concepts and their relationships (Heinich et al., 1996).

Concept-mapping in multimedia environments has been hailed as important as online reading is Liao (1998). Both semantic mapping and online reading can be manipulated to generate meaningful contexts for the writing process; in this vein, Ferris and Hedgcock (2005) aptly observed:

“Reading becomes the basis of writing because the information acquired through reading contains print-encoded messages as well as clues about how the messages’ grammatical, lexical, semantic, pragmatic, and rhetorical constituents combine to make the message meaningful (p. 31).

Furthermore, online reading before writing has been hailed as a good alternative to impromptu writing in academic contexts (Yagelski and Grabill, 1992; Mauriello et al., 1995; Carson and Leki, 1993; Hirvela, 2004, 2005; Plakans, 2008; Yoshimura, 2009; Kuteeva, 2010; Zaid, accepted for publication).

According to Hirvela (2005), second language scholarship has led to the belief that literacy acquisition is “a situated activity rather than the teaching of generic or decontextualized reading and writing skills”, which warrants the use of both reading and writing to complement each other (p. 339). In addition, the use of computer-assisted language learning (CALL) techniques and tutorials is conducive to improved process writing development in a fashion akin to Vygotsky’s “zone of proximal development” (Schwartz, et al., 1994). In this vein, Hirvela (2005) aptly observes:

“Because of the nature of the computer screen itself, as well as the development of the Internet and World Wide Web and the almost limitless access to texts and reading situations this development has generated, it is necessary in this “second wave” to reconceive writing and reading instruction.” (p. 339).

Slatin (1990) explains that the case is being so because online “interactive reading and its more or less inevitable concomitant, interactive writing” (p. 871) can emerge when EFL learners find and read electronic texts, incorporate material from the text into their writing, and manipulate computer facilities that ease the writing process, such as spelling and grammar checkers.

3. The study

This study builds on prior research on the pre-drafting stage and its different strategies and techniques to improve student’s writing. This research has investigated the effects of reading paired with pre-writing (Brodney et al., 1999), and the effects of repeated practice and contextual experience writing, employing different techniques, such as hypermedia-based reading, repeated practice in context, (guided) reading before writing, and wikis (Slatin, 1990; Johstone et al., 2002; Hirvela, 2004, 2005; Yoshimura, 2009; Kuteeva, 2010; Yang, 2010). But, this study has focused mainly on two pre-drafting activities – namely concept-mapping in hypermedia environments and online reading before writing.

Therefore, the problem of the study can be tacitly couched in the following research question:

What are the effects of pre-writing techniques, namely concept-mapping in hypermedia environments and online reading before writing, on improving the quality of writing, and reducing writing apprehension in male freshmen at the College of Languages and Translation, at Abha?

The following sub-questions arise thereof:

Is hypermedia-based concept mapping more effective than traditional instruction in improving writing quality and reducing writing apprehension in EFL college freshmen?

Is online reading before writing more effective than traditional instruction in improving writing quality and reducing writing apprehension in EFL college freshmen?

Is hypermedia-based concept mapping more effective than online reading before writing in improving writing quality and reducing writing apprehension in EFL college freshmen?

4. Hypotheses

The following hypotheses have been formulated to address the research questions:

There will be no statistically significant difference in the writing quality of the hypermedia-based concept mapping and traditional instruction groups (with the level of significance being 0.05).

There will be no statistically significant difference in the writing apprehension of the hypermedia-based concept mapping and traditional instruction groups (with the level of significance being 0.05).

There will be no statistically significant difference in the writing quality of online reading and traditional instruction groups (with the level of significance being 0.05).

There will be no statistically significant difference in the writing apprehension of the online reading and traditional instruction groups (with the level of significance being 0.05).

There will be no statistically significant difference in the writing quality of the hypermedia-based concept mapping and reading (with the level of significance being 0.05).

There will be no statistically significant difference in the writing apprehension of the hypermedia-based concept mapping and online reading (with the level of significance being 0.05).

5. Research methodology

5.1. Subjects and sampling

Participants in the study were students enrolled in the Writing I course in the English Department, College of Languages and Translation, Abha, King Khalid University.

The participants in this study are specifically three classes: Class A includes 36 students, subjected to instruction after the multimedia-based concept mapping strategy, and Class B comprises 36 students, subjected to the online reading before writing strategy instruction, and Class C, which comprised 36 students. This last class functioned as a control group, and it was being instructed in the traditional method.

Their mean age was 18.3 years. Students in these classes were similar in many ways, e.g., they had similar linguistic backgrounds; Arabic was their native language; and they had all received education at schools that teach English as a foreign language for the same period of time and taught after the same EFL curriculum in Saudi public schools.

Students were all former students of high schools in the eastern south of Saudi Arabia, and they have been studying English for about 6 years. At the time of the study, all three classes were taught by the same instructor who had a Ph.D. in Applied Linguistics, with a concentration into TEFL.

5.2. Instrumentation

To assess their writing apprehension, students were administered the Writing Apprehension Scale developed by Dally and Miller (1975) (Appendix I) as pre and post-test. Students took approximate 30 min to complete the scale each time. The Writing Apprehension Scale is a 26-item-Likert scale instrument that has been extensively proven to be a reliable instrument which measures writing anxiety.

The reliability of the instrument was also obtained by a split half technique (Dally and Miller, 1975). In this case, the top half of the test was compared with the bottom half. Corrected for attenuation, the obtained reliability was .94. Test-retest reliability of the instrument was .92.

Writers respond to each of the 26 items on the Writing Apprehension Scale by answering 1 (strongly agree), 2 (Agree), 3 (uncertain), 4 (disagree) and 5 (strongly disagree). Thus, a strongly agree response to a negative question is scored as "5", and strongly agree response to a positive question is scored as "1".

Accordingly, the scoring gives a point range from 26 to 130. As such, scores of 78 or below are considered to reflect low apprehension, scores of 79–99 are considered to reflect high apprehension, and scores above 100 are considered to reflect very high apprehension (Dally and Miller, 1975).

In addition to the Scale, students were also asked to produce well-organized essays. To assess the quality of writing products, holistic scoring was used. It is a single qualitative holistic judgment based on the factors of ideas, organization, style, vocabulary, and sentence structure (Appendix II).

To measure the participants' quality of writing, students were asked to write two essays each week; one without introducing any of the treatments, and the other after introducing the treatment.

These tests were the writing tasks or topics given to students before and after the treatment (Appendix III). These essays functioned as measures to evaluate the students' quality of writing before and after the experiment.

5.3. Research design

A quasi-experimental design was employed since a true experimental design which requires random assignment of students to groups was not possible. Thus, intact classes were used but the treatment conditions were randomly assigned to these classes. The presence of control group and pre-tests helps in controlling for internal validity threats. The pre-test is crucial because it helps in knowing whether the treatment is going to lead to improvement or changes in the student's scores which are determined by the post-test.

5.4. Procedures

The study was conducted during the second semester of 2010. Data were gathered in several ways. Three intact classes were selected to participate in this study: Group A (experimental group 1 instructed in multimedia-based concept-mapping - only) and Group B (experimental group 2 instructed in online reading before writing - only), and Group C functioned as the control group, and was instructed in a traditional, teacher talk, product-based method of writing instruction.

All classes wrote one essay (pre-test) before each treatment, and they were asked to write on the same topic after the experiment. The independent variables of multimedia-based concept-mapping and online reading were taught only to the experimental groups one by one.

The essays were written by the research groups to control for the internal validity as mentioned before, and to compare them with the scores of the post-test results to see whether the student's writing reflected improvement (Appendix III).

For the control group (Group C), the teacher did not teach any pre-drafting activity in class C (the control group). He wrote the topic on the board, and asked the students to write about it. In this class, however, the teacher ignored any pre-drafting activities. Teaching after this approach continued for the whole semester.

In Group A, located in Computer Lab A, the teacher taught his students the technique of multimedia-based concept-mapping before writing their first draft about one of the post-topics. The teacher in this pre-drafting activity used leading keywords to get students think about the topic or idea being considered, and generate concept maps using the multimedia facilities available with a special concept maps tool, designed after Alpert and Grueneberg (2001), and uploaded to the Blackboard®.

Concept maps depict the concepts and relationships in a domain in a graph that is arranged in a hierarchical way, thus depicting relationships between keywords suggested by the teacher through the use of crosslinks (Novak and Gowin, 1984). In this way, using the software's concept map as a browser functioned to provide an inherent organizational structure that is more useful to the learner for navigating information in a

hypermedia environment than more typically used interfaces such as web pages and linked text. Teaching after this approach continued for the whole semester.

In Group B, the teacher introduced the second technique to experimental group II, namely online reading (before writing) in the experimental class in Lab B. In each class, the teacher uploaded a reading text, related to the topic to be written about later, to the experimental group students of this group, employing the Blackboard Announcement facility.

The course online readings provided a platform for carrying out writing tasks and assignments focusing on three major topics: paragraph structure, coherence, and argumentation. The structure of the wiki was defined by the course instructor, too. The texts searched and downloaded by the students on an individual basis were also analyzed and discussed in class and afterwards revised online, thus fostering and extending peer review and collaboration.

Students read the texts silently and intensively online during class time in the lab. This text was a useful tool for generating ideas for writing as well as a means of exposing the students to vocabulary, idioms, and conventions related to the topic to be written about later. They were also asked to go online, and download from the general Internet reading material of relevance as they chose. After reading on the screen, discussing, and analyzing the main reading text, students wrote their essays. Teaching after this approach continued for the whole semester.

At the inception of the experiment, all students filled out the Writing Apprehension Scale; they also did the same after the treatment was halted. They also wrote an essay on a suggested topic before they started taking the writing I course in all three classes, and after the experiment was over, approximately three months later, they were asked to write full-blown essays on the same topic.

5.5. Findings and analysis

Pretesting and post-testing scores on the Writing Apprehension Scale demonstrate whether the student's trepidation with writing is reduced or not after the treatments had been administered to the two experimental groups by comparing the two

scores of the students. The Writing Apprehension Scale shows that 78 or below are considered to reflect low apprehensive the testees are; scores of 79–99 are considered to reflect high apprehension, and scores above 100 are considered to reflect very high apprehension.

By employing the Statistical Package for Social Sciences (SPSS) MS Windows version 14 for analyzing tabulated data, descriptive statistics (means and standard deviation values) were reported for the research groups with regard to the measurement of the quality of the testees, again by comparing pre-testing scores with post-testing scores.

The mean scores for the students in Group C (the control group) were compared to the mean scores for students who were introduced to multimedia concept mapping and online reading in both experimental groups, A and B. To verify that all groups (experimental and control) were equivalent on pre-testing for quality of writing and writing apprehension variables, One-way ANOVA was utilized. Table 1 summarizes the findings as below:

The table above shows that there were no statistically significant differences between experimental and control groups on pretesting for quality of writing and writing apprehension, and in this way, all groups were equivalent on pretesting. To address the research question, and the hypotheses consequently formulated, a One-way ANOVA was manipulated for post-testing on quality of writing test and on writing apprehension test. *First*: One-way ANOVA was manipulated for post-testing on quality of writing test as showed by the following table (Table 2):

The table above shows statistically significant differences between all research groups, the experimental and the control, on post-testing quality of writing. In order to recognize which group performed more significantly on post-testing, a Scheffé post-comparison follow-up statistical test was conducted. Table 3 sums up the results:

The above table shows that...

- (1) There was a statistically significant difference between the control group and the multimedia concept mapping treatment in the writing quality; consequently, the first hypothesis is rejected since the multimedia concept map-

Table 1 One-way ANOVA findings for pre-testing equivalence of groups on quality of writing and writing apprehension variables.

Dependent variable	Source	Sum of squares	df	Mean square	F	Sig.
Quality of writing	Between groups	2.921	2	1.332	1.288	.0001
	Within groups	83.117	105	1.009		
	Total	86.038	107			
Writing apprehension	Between groups	31.157	2	16.339	.988	.005
	Within groups	1114.243	105	17.225		
	Total	1145.4	107			

Table 2 One-way ANOVA findings for post-testing equivalence of groups on quality of writing variable.

Source	Sum of squares	df	Mean square	F	Sig.
Between groups	18.917	2	9.779	26.002	.000
Within groups	31.151	105	.398		
Total	50.068	107			

Table 3 Scheffé post-comparison follow-up test results for comparing post-testing results on quality of writing for experimental groups of the study.

(I) Group	(J) Group	Mean difference (I – J)	Sig.
Exp1	Exp2	.56698*	.006
	Cont	1.24022*	.000
Exp2	Cont	.66321*	.001

* The mean difference is significant at the .05 level.

ping treatment has proved to be more effective than traditional instruction in improving student's writing quality.

- (2) There was a statistically significant difference between the control group and the online reading treatment in the writing quality, and as a result, the third hypothesis is rejected since the online reading treatment has proven to be more effective than traditional instruction in improving the student's writing quality.
- (3) There was a statistically significant difference between the online reading treatment and multimedia concept mapping treatment in the writing quality. The results showed that the multimedia concept mapping treatment is more effective than the online reading treatment, and as a result, the fifth hypothesis is rejected.

Second: One-way ANOVA was manipulated for post-testing on writing test apprehension test as showed by the following table (Table 4):

The table above shows statistically significant differences between all research groups, the experimental and the control, on post-testing writing apprehension. In order to recognize which group performed more significantly on post-testing, a Scheffé test was further conducted (Table 5).

The above table shows that...

Table 4 One-way ANOVA findings for post-testing equivalence of groups on writing apprehension test.

Source	Sum of squares	df	Mean square	F	Sig.
Between groups	522.001	2	233.887	33.021	.000
Within groups	579.113	105	7.891		
Total	1101.114	107			

Table 5 Scheffé post-comparison follow-up test results for comparing post-testing results on quality of writing for experimental groups of the study.

(I) Group	(J) Group	Mean difference (I – J)	Sig.
Exp1	Exp2	2.00000*	.041
	Con	6.15385*	.000
Exp2	Con	4.15385*	.000

* The mean difference is significant at the .05 level.

- (1) There was a statistically significant difference between the control group and the multimedia concept mapping treatment in writing apprehension, and as a result, the second hypothesis of the study is rejected due to the increase of writing apprehension after introducing the multimedia concept mapping treatment.
- (2) There was a statistically significant difference between the control group and the online reading treatment in writing apprehension, and as a result, the fourth hypothesis is rejected due to the increase of writing apprehension after introducing the reading treatment.
- (3) There was a statistically significant difference between the online reading treatment and multimedia concept mapping treatment in writing apprehension, and as a result, the sixth hypothesis is rejected. The student's writing apprehension increased when introducing the multimedia concept mapping pre-writing technique. This treatment has made the students feel anxious more than their peers in the online reading group.

6. Conclusions and implications

The Writing Apprehension Scale showed that the student's apprehension increased after introducing the new pre-writing treatments. This may seem unusual, since most of the studies show the opposite; however, this does not mean that prewriting techniques are not effective since as will be demonstrated later, they affect the quality of writing positively. This increase in the students' apprehension levels may be attributed to the pressure such techniques put on them, especially the multimedia concept mapping, which was done using special software that was highly demanding and sophisticated. This, however, goes commensurately with some few prior research that suggested that language proficiency at large, and writing adequacy, may not be strongly correlated with computer experience as to differentiating how students could write better on computer than on hand-written activities (Collier, 1983; Bridwell et al., 1985; Benesch, 1987; van Waes, 1992; Phinney and Khouri, 1993). Case studies in prior research showed that using computers, and by extension, using hypermedia techniques may result in "typical negative writing behaviors such as premature editing, avoidance behavior, a concern with form over substance" (Phinney and Khouri, 1993, p. 271). This explains why the participants in the present research have come up with such bizarre findings.

In addition, EFL writers usually tend to focus on lower level revising and/or editing techniques (Sommers, 1980). The computer may aggravate this tendency, and may foster their inclination to plagiarise or directly take from the Internet unobtrusively. Even college writers who may have substantial experience may make more substitutions and more surface-level changes on the computer (Lutz, 1987; Hill et al., 1991). EFL college writers using computers may also shift their focus, revising more in the early stages than in the later stages of their compositions, or most probably, revising and reviewing less than they do with pen and paper (Haas, 1990; van Waes, 1992).

By the same token, the researcher believes that such new pre-writing techniques have made the students feel more responsible for the production of ideas for their essays. Such

results, notwithstanding their ambiguity and obvious perplexity, demonstrate that by teaching these pre-writing strategies, students are now able to recognize where to begin brainstorming for new ideas for the suggested topics, collecting data for their essays, and organizing this data in usable schemes for their outlines; as such, they can recognize what ideas to include and what to exclude, and whether they are on the right track without digressing from what the teacher requires, or not.

With regard to the quality of writing, students in both research treatments showed significant improvement and changes in their writing quality. They wrote more organized and developed essays, their sentence structure and word choice were more adequate, and they supported their ideas with appropriate details and examples. In addition, their ideas were clearly recognized in their introductions, the body and the conclusions, showing signs that they have effectively addressed the writing tasks assigned to them appropriately.

These results stress the importance of pre-drafting strategies in the art of composing. They also highlight the significance of pre-writing as a discovery phase where students should be engaged in meaningful exercises and techniques. This study, like many other studies, encourages teachers to engage students in as many pre-writing activities as possible, employing CALL technology, since they will put them on the right track of good writing, help them overcome the writer's block, improve their writing quality, and provide them with a variety of ideas related to the topic easily accessible by dint of technology.

In the end, for computer-mediated and web-assisted composition to continue as a medium for changing and facilitating the writing process, more substantial and longitudinal research, including long-term observation, is needed to tap into the relationship between the way students' approach writing in second and foreign languages, both by hand and on computer in Blackboard-assisted environments.

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