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INTEGRATING ICT TOOLS TO IMPROVE ESP STUDENTS' ACADEMIC WRITING PROFICIENCY

دمج تكنولوجيا المعلومات والاتصال لتحسين مهارة الكتابة الأكاديمية لطلبة الانجليزية لأغراض خاصة

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Abstract:
The main focus of this investigation is to explore the effect of integrating different information and communication technologies on ESP students' academic writing. This experimental study was conducted with a control and an experimental group of students from the Department of Biology, M'sila University. The students in the experimental group were asked to use only ICTs (CALL and CMC) during their academic writing course. On the other hand, students in the control group were asked to accomplish all the writing stages on paper only, i.e., as conventionally done. This study used also a focused group interview to triangulate the data gathered and to understand students' percep8tions towards the use of ICTs. The analysis of data showed that the experimental group using ICTs significantly outperformed the control group. The research demonstrated also a welcoming sign of interest among the students and, the students were quite motivated to using ICTs which helped them to improve their academic writing skills.
Key Words: Information Communication and Technologies; Computer-Mediated Communication; Computer Assisted Language Learning; Academic Writing; ESP.

ملخص البحث
هذا البحث إلى إظهار أثر استعمال مختلف تقنيات المعلومات والاتصالات لتحسين مستوى الكتابة الأكاديمية لطلاب اللغة الانجليزية لأغراض خاصة. أجريت هذه الدراسة التجريبية على

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مجموعتين مختلفين من الطلبة (مجموعة ضابطة و أخرى تجريبية) من قسم علم الأحياء، جامعة المسيلة حيث طُلب من طلبة المجموعة التجريبية استخدام تكنولوجيا المعلومات والاتصالات فقط أثناء عملية الكتابة الأكاديمية وذالك بإتباع إرشادات الباحث. من ناحية أخرى، طُلب من طلبة المجموعة الضابطة إتمام جميع مراحل الكتابة باستخدام الورق و القلم فقط. أظهرت البيانات التي تم جمعها أن المجموعة التجريبية التي تستخدم تكنولوجيات المعلومات والاتصالات تفوقت بشكل كبير على المجموعة الضابطة. استخدمت الدراسة أيضًا مقابلة جماعية مركزة لتثليث البيانات التي تم جمعها وفهم تصورات الطلاب تجاه استخدام تكنولوجيا المعلومات والاتصالات. أظهر البحث نتائج و دلائل ايجابية لدى الطلاب ، وكان الطلاب متحمسين لاستخدام تكنولوجيا المعلومات والاتصالات ، مما ساعد على تحسين مهاراتهم في الكتابة الأكاديمية.

الكلمات المفتاحية: تكنولوجيا المعلومات والاتصالات. الاتصالات بوساطة الحاسوب؛ تعلم اللغة بمساعدة الحاسوب؛ كتابة أكاديمية؛ اللغة الانجليزية لأغراض خاصة.

I– Introduction

A growing number of teachers are turning to online information and communication technologies as mediums of interaction and information access to facilitate the foreign language teaching process. In education, the academic writing is characterized not only for its formality, coherence, and unity, but also for its stages, which range from planning, writing, and revising to applying strategies in writing to crediting the source materials. However, academic work has never been to such large amount in the past until technology exhibited in 1940. When ICT was fully integrated to the academic fields of study, it became indispensable for the academics (e.g., scholars, teachers, and students) to use it to develop students' language skills. Language practitioners are now turning to the integration of ICTs to develop literacy. In this respect, Andrews (2004, p. 1) states "governments worldwide are investing heavily in the provision of hardware and software to educational institutions as well as in the training of

teachers and students of all ages in the application of ICT in literacy learning". Becoming literate involves students also to develop their academic writing. The development of this academic skill is not the concern of only teachers and students, but even higher educational institutions and technology organizations which are creating different applications and teaching programs to meet the standards of the academic writing form.

Despite this special attention given to bolster academic writing, students at university still encounter some difficulties when making their academic written assignments especially in ESP contexts. Different researchers tried to explore the problems which ESP students encounter when writing academically. Examples of these researchers include Abdulkareem (2013) and Al-khasawneh (2010) which investigated the difficulties encountered by technology and business students (i.e., ESP contexts). Their research findings confirm that most academic writing problems in ESP contexts are related to sentence and text structure, expressing ideas, using vocabulary, spelling, paraphrasing, achieving coherence and cohesion (Hidri, 2018, p. 161). As a result of these problems and previous researches, the current study attempts to reveal the extent to which different information and communication technologies such as Computer Assisted Language Learning (CALL) (e.g., word processor) and Computer-Mediated Communication (CMC) (e.g., email, internet, synchronous, and asynchronous) help ESP students recognize the different features and stages of the academic writing process, i.e., this research tends to answer two main research questions;

1) Does the integration of ICTs assist ESP students to accomplish all academic writing stages which in turn allow them to provide good academic written productions?
2) What are the ESP students' perceptions of integrating ICTs during their academic writing process?

Based on literature review, the researcher puts forward two main research hypotheses which are as following;

1) If ESP teachers at M'sila University are encouraged to employ the CALL and CMC strategies and tools in their ESP instructional time, students would show a change in accomplishing their academic writing process and improve the quality of their academic written productions.
2) ESP students might show positive perception if they integrate different ICTs during their academic writing process.

In order to address the previous research questions and hypotheses, the current investigation undertakes an experimental study of two main groups of students. The experiment consists of three main stages; before the treatment phase, the treatment phase, and after the treatment phase.

II– Literature Review

Different researches have been undertaken to better understand, learn, and teach academic writing. According to Hyland (2004, p. X) academics such as students and even writers view academic writing as a set of decontextualised skills which can be transferred from one discipline to another different one. In a research undertaken by Warschauer (2002), this previous perspective comes under the umbrella of formalist and constructivist approaches, where the main concerns of writers are grammatical correctness and the development of cognitive processes. Yet, other researches have demonstrated that academic texts and discourses have significant variations within various disciplines. That is to say, Swales and Feak (2000, p. 03) explained the second perspective by defining the positioning of the academic writer (constructionist approach)- the means by which he produces a piece of academic writing which reflects his relevance and knowledge to a particular discipline (i.e., coherence).

Recent researches such as Warschauer (2002) and Barker (2002) demonstrated that ICTs have an effect on the way students

write academically. Warschauer (2002) justifies the link between these two variables in which he states that "Technology does not constitute a method; rather, it is a resource that can be used to support a variety of approaches and methods …. technology can be used to support diametrically different approaches to the teaching of academic writing". That is to say, even if academics focus on both grammatical correctness and mental processes or on their relevance to a particular discipline during their writing process, the use of information and communication technologies seems to have a positive effect on academic writing in both approaches (i.e., formalist and constructivist, or social constructionist).

Information and Communication Technology (ICT) is the result of integrating both hardware (computers) in its associated software (applications and systems). Bibri (2015, p.39) defines ICT as " an umbrella term that describes a set of technologies used to access, create, store, retrieve, disseminate, exchange, manage, and transmit information in a digital format. ICT involves computing systems (e.g., laptops, wearable computers, smart mobile phones, augmented-reality devices, Internet network, telecommunication systems, sensors and actuators, etc.) and the associated innumerable software applications". Technologies are nowadays used in different ways and for different purposes (Knezek & Voogt, 2008, p. 643). Therefore, applications which are installed in these technologies are also distinguished now according to their function, context, and purpose. The development and integration between such technologies and applications has led to the emergence of two notable fields in ICT; the Computer Assisted Language Learning (CALL) and the Computer-Mediated Communication (CMC).

Warschauer (2002) mentioned three different cases which were undertaken by three different teachers in order to illustrate the relationship between academic writing and ICT (namely CALL and CMC). For the formalist and constructivist approaches, Both Mary Sanders and Joan Conners demonstrated that the use of ICT tools such as word processor, email, World Wide Web, and video conferencing helped students to improve

their ability to produce correct grammatical structures and to develop their cognitive skills such as brainstorming, drafting, editing, and proofreading. On the other hand, Luz Santos concluded in her research that the integration of ICTs like video conferencing, chat applications, e-mail, blogs, wikis, and file-sharing applications helped both teachers and students inside and outside the classroom to discuss, learn, and practice more about the citations, references, and style formats of texts related to a particular discipline. To better understand the effect of both CALL and CMC applications and tools on academic writing, the researcher discusses each element in isolation in the following paragraphs:

Computer Assisted Language Learning (CALL) refers to a field in applied linguistics that is designed to exploit technology for language teaching and learning purposes. This field was expanded and developed years after 1940 in parallel with the emergence of computers, multimedia, and the internet. On the other hand, CALL comprises both English Language Teaching (ELT) software, and the web 2.0 tools such as blogs wikis, podcast, forums, and word processors which are integrated in teaching and learning environments (Poole, 2001, p. 40).

Word processor refers to the most common basic application in the rapid change in the world of technology. This astounding tool superseded the traditional typewriter, for it implements and executes several functions and tasks respectively. Both the traditional and the contemporary tools share the same purpose; still, they differ in many others. Therefore, it is better to compare and contrast the two general-purpose mediums. In terms of purpose, both mediums share the same purpose of writing such as writing letters, CVs, research papers, reports…etc. Moreover, the two similarly are filled out using a keyboard. Not to mention, both use the same basic paper size. Nevertheless, when it comes to speed the typewriter is gradually slow due to its difficulty for some writers, but the word processor is rapid at a competitive speed and simple to use. Others would have problem with spelling, and waste much of their time correcting their misspellings when using; for instance, the typewriter has no

spelling check function, which makes it prone to typed mistakes. Besides, the writer cannot change, edit, or delete a misspelled word or letter. While the word processor features the spelling check, grammar check, paste, delete, font, and size, i.e., functions that are completely handful (Sigafoos & Green, 2007, p. 45).

"Word processor can help you readily fulfill the conventions of academic writing and the formatting function that our instructor may insist on" (Raimes & Jerskey, 2013, p. 58).Word processor is a powerful tool that makes use of editing and revising the text. It permits its users to produce professional documents. The writing process is complicated, as the writer is waved into a number of simultaneous actions such as spelling the letters of words, checking for grammar as putting pauses and emphases… etc. In turn, the word processor stages all these tasks making it more manageable. Moreover, it helps the student to accomplish stages in the writing process such as planning, writing directly onto the computer (the first draft) without paying attention to spelling mistakes unless the draft is finished; thus, moving to the rewriting stage where the student revises, edits, and proofreads his work (Galloway & Norton, 2011, pp. 37-45). In conclusion, Ryan and Cooper stated, "The more students edit their writing, the more they learn about the writing process. In this respect, the word processor engages students and enhances thinking, making it a cognitive tool." (Ryan & Cooper, 2013, p. 202).

Computer-Mediated Communication (CMC*)* is a term which describes the use of the internet as a means of fostering teaching and learning. This term can be taken through a classification of synchronous/asynchronous. In addition, the students experienced this specification outside the classroom. Nonetheless, one of its main benefits is encouraging collaboration among scholars (Buck & Wighwick, 2013, pp. 50-51). The term synchronous indicates a web-based communication form, which is characterized by the spontaneity of its various uses. Those uses include the Chat and IMs, video conferencing. Web-based communications can be used for formative assessment if they are recorded; they can be useful for helping students assess the

others' point of views about writing task. Furthermore, students use specific terminology, especially when international students interact with native speakers. This allows the natives to decipher the target language and its literacies, seek for clarification as well as recasting the meaning (i.e., where the receiver corrects and sends back the correct answer) (Buck & Wighwick, 2013, p. 51).

Video-conferences allow the scholars to make conferences in advance. The conference can occur between both students, and teacher of the same subject matter. Therefore, it makes a sense of instant collaboration; for instance, the teacher can assist his students to commence the writing process. Thus, the scholars become enthusiastic and inclined to continue his work. (Buck & Wighwick, 2013, p. 51).

On the other hand, asynchronous refers to the second type of CMC which involves non- simultaneous communication. That is, it indicates the communication that can be undertaken and edited at different moments in time (Ribbers & Waringa, 2015, p. 24). Therefore, it is closely linked to writing. It offers its users the ability to check their writing throughout the process before submitting. It comprises the e-mail, blogs, wikis, and file-sharing applications. First, the e-mail, despite being it traditional, it is still valuable for communicating between students and teachers. For instance, the students learn to write formal letters, and send them to their seniors, managers, university professors abroad, and others involved in academic fields. Second, blogs can be a useful ICT tool, which allows the student to make class blogs where they can discuss critical matters using the writing form; thus, he/she can improve his/her writing skills through revision, editing, and proofreading. Third, wikis are powerful tools that offers the students a plenty amount of information shared all over the globe.

III– Method and Tools

The main focus of this research is to investigate the correctional effect of the two variables academic writing and ICTs in an ESP context. In order to reach this purpose, the researcher conducted an experiment with students from the Department of Biology, M'sila University.

III.1 Participants

Participants of the current investigation included 36 master students from the Department of Biology, M'sila University. The students were collected randomly and divided into two main groups; control and experimental group. In other words, each group included 18 participants. Students of the experimental group were taught the different academic writing stages and features for 8 weeks in the laboratory using different CMC and CALL tools during the treatment phase. The other 18 students of the control group were taught the same content through the traditional method (i.e., in the classroom without using ICTs).

III .2 Research Design and Procedure

The researcher conducted an experimental study which involved two main groups; a control and an experimental group. This experiment lasted for 12 weeks where the two groups went through three main stages. During the first stage, both control and experimental groups were asked to write a paragraph about a particular topic without using ICT tools. In other words, during the pre- treatment phase, both two groups accomplished the writing task under the same circumstances. The next phase required the researcher to teach ESP students (i.e., the experimental group) the academic writing stages and features through the implementation of ICTs in a laboratory for 8 weeks. The researcher integrated the different ICTs such as internet, e-mail, word processor, video conferences, blogs, and file sharing applications to teach students the academic writing stages like pre-writing (e.g., brainstorming, outlining, drafting), during writing (typing, editing), post writing (e.g., grammar checking, proofreading) and the different academic writing features such as maintaining coherence, achieving cohesion, acknowledging sources, avoiding plagiarism, and accomplishing text organization and form.

After the treatment phase, both control and experimental groups were asked again to undertake a post writing task. The students in the experimental group were required to use only ICTs (CALL and CMC) during their academic writing process. On the

other hand, students in the control group were asked to accomplish all the writing stages on paper only. Hence, the researcher collected two types of written assignments, electronic and manual versions. These assignments were analyzed, evaluated, and compared in order to recognize to what extent the integration of ICTs including CALL and CMC tools helped students to accomplish the whole academic writing process.

III.3 Data Collection

In order to collect the necessary information which helps the researcher to test the hypothesized correlation between the two variables academic writing and ICTs, this investigation used two main research instruments. The first one included pre and post writing tests. These two tests were undertaken by the control and experimental groups before and after the treatment phase. The results collected from these tests were analyzed according to certain academic writing criteria. The second research instrument used in this study is a focused group interview to triangulate the data gathered and to understand ESP students' perceptions towards the use of ICT tools when undertaking an academic writing task.

III.4 Data Analysis

The current investigation relied on the analysis of data collected from two main research instruments including pre and post writing tests and a focused group interview. The results of these two tests were assessed according to a group of academic writing criteria such as coherence, cohesion, plagiarism, vocabulary appropriateness, grammar, text organization, and form. That is, each criterion is out of 4. Hence, both pre and post tests are scored out of 24. The researcher tends to give the same importance to all these criteria when assessing students' academic writing. As a result of this assessment grid, the researcher used descriptive statistics including means and standard deviation in order to check and compare the two groups' writing performances before and after the treatment phase. On the other hand, the data collected from the focused group interview paved the way to the researcher to answer the second research question which referred

to ESP students' perceptions towards the use of ICTs. The data were quantitatively and qualitatively analyzed.

IV– Results and Discussion

Table 1 presents the different scores of means and standard deviation of students' performance in the pre and post writing tests of the two groups. The researcher compared the scores (i.e., the means and standard deviation) of the pre writing tests in order to check whether the control and experimental ESP groups are different in terms of their academic writing proficiency before they were taught the use of ICTs during the intervention phase. According to the results presented in this table, it is noticed that ESP students in both control and experimental groups have comparable academic writing proficiency before the intervention phase. This means that the mean scores of the two groups (experimental group; 12.73 and control group; 13.52) are approximately the same. After the treatment phase, it is noticed in the same table that students of the experimental group have improved their academic writing proficiency. This finding is based on the significant increase in the means score of the experimental group performance during the pre and post writing tests ($12.73 < 17.25$). For the control group, the results show that students have slightly improved their academic writing simply because the mean scores of the control groups are approximately the same in the pre and post writing tests ($13.52 \approx 14.95$). This may indicate that the significant increase recorded in the experimental group's academic writing has been affected by the use of ICT tools during the treatment phase, i.e., using word processor, email, internet sites, and blogs helped students to better accomplish the writing task in which they showed good writing performance.

	Pre - writing test				Post –writing test		
	N	Mean	SD		N	Mean	SD
Experimental group	18	12.73	5.45		18	17.25	9.53
Control group	18	13.52	6.58		18	14.95	7.25

Table 1: ESP Students' Academic Writing Performance before and after the Treatment Phase

Table 2 indicates the frequency of errors made by ESP students in their productions which were written before and after the treatment phase. Before the treatment phase, the results show that the percentages of errors in the written productions of both experimental and control groups have no significant difference in terms of frequency. This result confirms the finding in table 1 which emphasizes that both groups shared comparable academic writing proficiency before the treatment phase. After the treatment phase, the results in table 2 indicate that there is a significant statistical difference in the frequency of errors, i.e., the frequency of errors of the experimental group (14%, 25%, 31%, 11%, 19%) is lower than the frequency of errors of the control group (23%, 32%, 56%, 18%, 39%) regarding certain academic writing criteria such as coherence, cohesion, spelling, grammar and plagiarism. This result may indicate that ICTs such as word processor, email, internet sites, and blogs helped students to check and correct their errors. These ICTs had also a positive effect on accomplishing the different writing stages and strategies like brainstorming, drafting, editing, and proofreading. It is also noticed that the frequency of errors of the experimental group in the post writing test has significantly decreased in comparison to the frequency of errors of the same group in the pre writing test. It is therefore concluded that the use of ICTs helps ESP students to learn and accomplish the academic writing features in their assignments.

	Percentage of frequency			
	Pre writing test		Post writing test	
Academic writing criterion	Control group N = 18	Experimental group N = 18	Control group N = 18	Experimental group N = 18
Coherence Errors	39%	42%	23%	14%
Cohesion Errors	52%	48%	32%	25%
Spelling Errors	62%	71%	56%	31%
Vocabulary Appropriateness Errors	22%	28%	18%	11%
Grammar Errors	48%	51%	27%	16%
Acknowledging Sources Errors (Plagiarism)	43%	51%	39%	19%
Text Organization and Form Errors	23%	19%	25%	11%

Table 2: Participants' frequency of errors before and after the treatment

Table 3 indicates students' scores above and below the average in pre and post writing tests. Before the treatment phase, majority of students in both control and experimental group scored below the average. This result reflects students' low writing proficiency. After the treatment phase, majority of students in the experimental group (14) scored above the average, while few students in the control group (9) scored above the average. The difference of students above the avergae in both experimental group (14) and control group (9) asserts the positive impact of using ICTs on the participants' acadmic writing writing achievement.

	Pre test		Post test	
	Control group	Experimental group	Control group	Experimental group
Above the average	8	6	9	14
Below the average	10	12	9	4
Total of Students	18	18	18	18

Table 3: Students above and below the average

ICTs used during post writing test		The Percentage of ICT Use		
ICTs	Purpose for use	Pre writing	During Writing	Post writing
Internet search sites	Brainstorming, Outlining,	52%	19%	7%
Word processor	Typing, correcting, Editing, Revising, Proofreading, Acknowledging sources	69%	89%	51%
E-mail	Receiving feedback	00%	21%	48%
Blogs	Sharing assignments, Receiving feedback	00%	16%	52%
Wikis	Collecting sources	49%	52%	9%
Chat and IMs, video conferencing.	Receiving feedback	13%	6%	28%

Table 4: ESP Students' Perceptions towards the Use of ICTs during the Academic Writing Process

The results collected from the focused group interview also provided evidence for the success of using ICT tools such as internet, word processor, e-mail, blog, wiki, chat and video conference applications to accomplish a good academic written assignment. As it is presented in table 4, ESP students demonstrated a welcoming sign of interest to the use of ICTs. In addition, students are fully aware that each ICT tool has its own time of use and purpose. For example, word processor can be used in the pre, during, and post writing stages and for different purposes such as typing, correcting, editing, checking, revising, proofreading, and acknowledging sources. According to their answers in the interview, students emphasize that their use of different CALL and CMC tools is strongly welcomed to motivate, engage, and activate their knowledge during all writing stages.

V– Conclusion

The results obtained from this investigation yielded interesting findings in relation to the research hypotheses. The data collected from the pre and post writing tests stipulate that the integration of ICTs including CALL and CMC helps ESP students accomplish all the academic writing features and stages which in turn allow them to provide good academic written productions. On the other hand, the analysis of the results gathered from the students' focused group interview demonstrates a welcoming and positive sign of interest among the students towards the use of ICTs such as word processor, email, blog, wiki, chat and video conferencing in the pre, during, and post writing stages. As a result of this investigation, a set of recommendations were provided. First, teachers are advised to incorporate ICT-based teaching strategies in the ESP classes to aid students work independently while acquiring the academic writing skill. They are also invited to rely on the ICT-assisted writing process as a tool in their lesson plans to motivate ESP students to write so that they gain confidence writing in English. Second, students' use of different CALL and CMC tools is strongly recommended to motivate, engage and activate their knowledge during all writing stages. Finally, the university stakeholders are recommended to maintain a modern atmosphere including labs equipped with ICTs where both teachers and students can work on the academic writing.

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