The Effectiveness of Cloud Computing in Developing Saudi-University Students' Writing Skill

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Abstract: The aim of this study was to test the effectiveness of cloud computing in developing the writing skill of Saudi-university students. The participants of the study consisted of (120) students, selected randomly from Al-Qassim University distributed between the experimental and control groups. Both groups were pretested. The experimental-group students were taught by using a proposed model implementing a suggested cloud-computing strategy. The control-group students had their regular writing classes. Then, the posttest was administered. Results indicated that there were statistically significant differences between the mean scores of the two groups on the post test, in favor of the experimental group. However, there were no significant differences between the mean scores of males and females in the experimental group in the post administration of the test.

(**Keywords**: Cloud Computing, Teaching Model, Writing Skill, Saudi-University Students)

فعالية الحوسبة السحابية في تنمية مهارة الكتابة لطلاب الجامعة السعوديين

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ملخص: هدفت الدراسة الحالية إلى اختبار فعالية الحوسبة السحابية في تنمية مهارة الكتابة لطلاب الجامعة السعوديين. اشتملت الدراسة على (120) طالبًا وطالبة تم اختيارهم بطريقة عشوائية من جامعة القصيم، وتم توزيعهم على مجموعتين: تجريبية وضابطة. تم اختبار المجموعتين قبليًا. درست المجموعة التجريبية باستخدام النموذج المقترح بالاعتماد على الاستراتيجية المقترحة. بينما تلقت المجموعة الضابطة دراستها بالطريقة المعتادة. تم بعد ذلك تطبيق الاختبار البعدي. وكشفت النتائج وجود فروق دالة إحصائيًا بين متوسطي درجات طلاب المجموعتين في التطبيق البعدي للاختبار لصالح المجموعة التجريبية. ولم توجد فروق دالة إحصائيًا بين متوسطات الذكور والإناث في المجموعة التجريبية في التطبيق البعدي للاختبار.

(الكلمات المفتاحية: الحوسبة السحابية، نموذج تدريسي، مهارة الكتابة، طلاب الجامعة السعوديون)

Introduction

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From a linguistic and pedagogic point of view, writing comes last in the hierarchical order of the four skills: listening, speaking, reading and writing (Nasr, 2019). Developing writing skills has been for long a target for so many ardent teachers who gave vent to their efforts in the form of new methods and strategies (Ahmad, 2015). Writing-research efforts have concentrated on examining the active and interactive nature of writing skills and the processes involved beneath writing as a global skill and its inherent sub-skills. Similar efforts were exerted investigating the active role of modern technologies in developing writing skills. Cloud-computing comes to loom large as one of these promising technologies. Cloud computing refers to "internet computing". The internet is commonly visualized as clouds. Some people use the terms grid computing, utility computing or application-service providers to describe the same storage, computation and data-management ideas that constitute cloud computing. With cloud computing, users can access database resources *via* the internet from anywhere, for as long as they need. Cloud computing provides the facility to access shared resources and common infrastructure, offering services on demand over the network to perform operations.

Cloud computing refers to both the applications/software offered on the internet as well as the hardware and all the programming facilities that make it easy for these services to be provided. Such services provide easy access to different applications, which enable users to store, share, maintain and generally manage material and communicate online from anywhere, using almost any device. According to Mell and Grance (2011), cloud computing has five essential characteristics: on-demand self-service, broad network access, resource pooling, rapid elasticity and measured service. In cloud computing, no hardware upgrades are needed. Everything will be managed virtually. Colleges benefit from many online tools and applications in the clouds, such as emails, contact lists, document storage, calendars, photo-sharing, creation and sharing (spreadsheets, word processed documents, presentations,.. etc), and the ability to create websites.

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Cloud computing has many benefits in education, (e.g. providing educational resource storage and databases, e-mails, educational applications and tools for students, teachers and clients located all over the world involving in an educational programme). The main advantage is cost effectiveness for the implementation of hardware and software. This technology can improve the quality of the current system of education at an affordable cost (Ghazizadeh, 2012).

Cloud computing comprises virtualized servers, networks, database storage, applications and services which are delivered over the internet. Cloud computing is a distributed computing paradigm that enables access to virtualized resources, including computers, networks, storage, development platforms or applications *via* the internet (Mell & Grance, 2011). Cloud computing has altered the way data is processed and stored. Instead of computers being isolated units, cloud computers run software and functions on remote servers that can be accessed by any local client. The unique possibility presented by such a paradigm shift is that multiple users can run the same programme simultaneously and thereby interact with one another. For word processing, this means that multiple users could access, create and edit the same document.

Cloud-computing technologies, such as Google Docs, Adobe Creative Cloud, Dropbox, and Microsoft Windows Live, have become increasingly appreciated to the next generation of digital learning tools. They encourage students' active engagement, collaboration and participation in their learning, facilitate group work and support knowledge or information sharing among students. With the cloud features, learning can be accessed anywhere at any time and the world can be a classroom. Students can learn from anywhere and teachers can teach from anywhere. Cloud-based application features, such as convenient and on-demand network access to a shared pool of files, can indeed provide support for learning and instruction. Learning is now turned into anywhere learning and collaboration, both locally and globally (Slahor, 2011). According to Barnatt (2010), cloud computing is used where "dynamically scalable", "device-independent" and "task-centric" computing resources are obtained over the internet, with any charges (where payable) being on a per usage basis (p.14).

Cloud computing uses the internet and central remote servers to maintain shared documents, files, software, knowledge and applications through a cloud-based service that computers or mobile devices can access on demand. Cloud-based services are free for users to support learning, social interaction, publishing and collaboration. A user of cloud computing can access stored data and applications anytime and anywhere. Cloud computing is used extensively in education for a wide variety of functions, including documents, spreadsheets, collaboration, videoconferences and e-mail. Examples of cloud-based services include Google Apps, Dropbox and YouTube (Slahor, 2011). In cloud computing, "customers" plug into the "cloud" to access IT resources which are priced and provided "on demand". Cloud computing is simply IT services sold and delivered over the internet (Burford, 2010).

Cloud computing, typically entails (Rao et al., 2009):

• High scalability: Cloud environments enable servicing for larger audiences, through high scalability.

• Agility: The cloud works in the "distributed-mode" environment. It shares resources among users and tasks while improving efficiency and agility (responsiveness).

• High availability and reliability: Availability of servers is high and more reliable, as the chances of infrastructure failure are minimal.

• Multi-sharing: With the cloud working in a distributed and shared mode, multiple users and applications can work more efficiently with cost reductions by sharing common infrastructure.

• Services in pay-per-use mode: -SLAs between the provider and the user must be defined when offering services in pay-per-use mode. This may be based on the complexity of the services offered.

There are different types of clouds that one can subscribe to depending on needs (Huth and Cebul, 2011):

1. *Public Cloud*: It can be accessed by any subscriber with an internet connection and access to the cloud space.

2. *Private Cloud:* It is established for a specific group or organization and limits access to just that group.

3. *Community Cloud:* It is shared among two or more organizations that have similar cloud requirements.

4. *Hybrid Cloud*: It is essentially a combination of at least two clouds, where the clouds included are a mixture of public, private or community clouds.

The cloud is composed of "five essential components" (namely, on-demand self-service, broad network access, resource pooling, rapid elasticity and measured service). It has "three service models" (namely, Software as a Service – SaaS, Platform as a Service – PaaS and Infrastructure as a Service - IaaS). Cloud technologies have the potential to improve the quality of provided educational services by allowing access to anything from anywhere at anytime on any device by anyone, sharing of knowledge that facilitates collaboration, providing opportunities for remote interactions and monitoring of learners' progress, processing of large datasets through the availability of increased computational power and offering an access to state-of-the-art tools and services without the need of purchasing and maintaining hardware or installing and updating software (Sultan, 2010).

Empirically speaking, ardent research efforts have been exerted to investigate the effectiveness of certain cloud-computing strategies in developing language skills, one of which is writing. Mell and Grance (2011) assessed the feasibility of implementing e-learning systems in a cloud-based infrastructure for secondary schools in Tanzania. The study adopted a questionnaire and document reviews as data-collection tools. A total of (820) students successfully returned the questionnaire from seven secondary schools in Tanzania. The study found that (11%) of government secondary schools had computer labs with (20.1%) of them connected to the internet. More than a half of surveyed students (56.6%) had access to mobile phones at home with (53.5%) using the phones to access the internet. The study showed that e-learning implementation in the cloud for secondary schools in Tanzania is feasible.

Ghazizadeh (2012) conducted a study to better explain the need for web-based modules and their effectiveness based on the existing e-learning system. A paper-based survey among the students had been conducted and reported on their assessments. Eighty-five students from different

faculties had been engaged. An open-source Moodle e-learning platform was implemented at many public and private universities in Egypt, as an aid to deliver e-content for implementing asynchronous e-learning web-based modules. Results showed a strong influence attributed to the effectiveness of e-learning by improving the quality of students' comprehension.

Chiu (2014) constructed a Cloud-Based Student, Teacher and Parent Platform (CSTPP) in collaboration with a Taiwanese textbook publisher. Junior high-school students' attitudes to learning English using the developed system were subsequently examined. The study participants were divided into (3) groups: Those in group A employed the CSTPP with parental participation, those in group B employed the CSTPP without parental participation and those in the control group received traditional lectures. A learning-attitude questionnaire was used. Results indicated that the students who used the CSTPP with parental participation exhibited altered attitudes toward the teaching methods within (1) month. After the experiment, a system-satisfaction survey was conducted. Both groups of students obtained high scores.

Kafyulilo (2014) explored the access, use and perceptions of teachers and students towards mobile phones as a tool for facilitating teaching and learning using a sample of (29) teachers and (40) students from Kibasila secondary school in Tanzania. The study showed that (60 %) of students owned mobile phones or had access to mobile phones, in favor of the use of mobile phones for learning.

Orndorff (2015) examined the efficacy of using technology to improve student note-taking. Collaborative note participants used Google Drive under direction of an instructor to assess performance differences. Strong evidence was found that such groups improved grades and related learning outcomes.

Ofemile (2015) investigated Teacher Educators' (TE) assessment of the affordances of selected cloud-computing tools ranked among the top (100) for the year 2010. Participants in the study were randomly selected Nigerian TEs studying in the United Kingdom. They used the tools for various activities and their assessments were measured against a checklist. They were also asked to think aloud while using the tools while the

researcher took notes of what they said. Their assessments were classified according to thematic paradigms. Results indicated that TEs were able to correctly identify intended, perceived, unintended and false affordances.

Wang (2017) addressed the implementation of Google Docs, in a higher-education course to develop writing. Using the questionnaire as an instrument to study, the system provided an effective learning environment. Factors influencing students' learning experience based on cloud applications included frequency of interaction online and students' technology experience..

Tarimo and Kavishe (2017) investigated internet access and usage by secondary-school students in Morogoro, Tanzania using a sample of (120) students. Interestingly, (82%) of students indicated that they were using the internet for searching academic information, while (87.6%) of them were using it for playing and downloading music.

Öztürk (2018) attempted to determine primary-school and Turkish teachers' anxiety level about using tablet PCs in learning and teaching. The anxiety scale for tablet PC-assisted teaching developed by the researcher was administered to the teachers. In order to determine the teachers' anxiety level, a cross-sectional survey technique was used. Results revealed that Turkish teachers' anxiety level about teaching with tablet PCs was higher than that of primary-school teachers. Also, in both branches of teaching, females had a higher anxiety level about teaching with tablet PCs than males.

Kasrani et al. (2018) explored the use of real-time speech recognition, language translation, speech synthesis and language intelligibility assessment technologies to provide automatic assessment and instant feedback of language-speaking performance. Results demonstrated that the proposed system could sufficiently analyze the intelligibility of one's speaking, accurately identify mispronounced words and define a feedback that localized and highlighted errors for helping continuous practice toward perfection.

Heidari et al. (2018) compared the effectiveness of the face-to-face instruction with telegram-mobile instruction. Based on a TOEFL test, 60 English foreign-language learners were selected and randomly assigned to the class-attendees' group, which received the intended treatment programme in a classroom environment and the telegram group which received the treatment in a virtual environment. Two pre-tests and post-tests were administered. Results were encouraging for the telegram group. Findings showed that telegram mobile-learning/teaching could provide new opportunities for the teaching-learning process. Teaching/learning through new mobile-based methods, telegram m-learning/ teaching in particular, helped students perform better on narrative writing tasks.

Asadi et al. (2020) aimed at developing and validating an instrument to investigate the determinants of cloud-computing services (CCSs) based on the theory of planned behavior (TPB). Faculty members totaling (240) in a medical university participated in this study. Exploratory-factor analysis indicated an optimal reduced solution with (30) items and (5) factors. The factors identified included attitude toward CCSs' use, perceived privacy/security, perceived behavioral control, intention to use CCSs and subjective norms. Findings demonstrated validity, reliability, simplicity and functionality of the TPB-CCSQ.

Statement of the Problem

Drawing upon the aforementioned theoretical background, the problem of the current study stemmed in the first instance from the low level of Saudi-university students in writing skill. Such a state is not at all shocking. It is an expected outcome of the weak emphasis writing receives in the courses taught as well as using methods and strategies which are not in accordance with the nature of such a skill. Moreover, writing activities currently employed -as proven by a pilot study conducted by the researcher- have fallen short of enabling students to master writing skill. In an attempt to provide an interpretation for such a state, the researcher assumes that the methods and strategies employed by most of English teachers when teaching writing may provide a key answer in this respect. Such methods and strategies may be responsible for the low level of students' writing. Out of the researcher's long experience in E.F.L. (for more than 25 years), he has noticed that teaching writing proceeds through certain predetermined steps which teachers have become used to. Throughout the researcher's examination of students' written papers as well as teachers' practices, he has come upon the miserable Cinderella status of writing in our schools as well

as universities. Writing activities are dealt with in a routine manner. Quantity and mechanical aspects come to the fore as the outstanding qualities of writing. Students are obsessed so much with giving as much information as possible about the topic regardless of the value, technicality or aesthetics of writing. For sure, the net result will be a flabby paragraph or essay that cannot fulfill the requirements of academic writing. Furthermore, the teachers' main interest is in such an accumulated amount of information as long as it is coated in beautiful handwriting, good spelling, grammar and punctuation. Whenever the two poles of the learning-teaching situation, the teacher and the student, come to this poor concept about writing, it is expected to a great extent to reach the current result.

This state propelled the researcher to investigate the effect of using cloud-computing technologies on developing writing skills of Saudi-university students. The researcher was given momentum to conduct the present study *via* the following:

1- The wealthy and wide-range experience of the researcher in the field of English-language teaching for a long time documented that writing doesn't receive the attention it is due in our teaching practices. The researcher felt that there is a dire need for more research to find new innovative strategies using modern technologies that are apt to develop such a complex skill.

2- A thorough review of pertinent literature in the area revealed that there is a noticeable dearth in research conducted to develop writing skills of Al-Qassim-University students.

3- Recommendations of other researchers in the field (e.g. Stockwell, 2008; Begum, 2011; Abdel-Hack & Helwa, 2014; Zaki & Yunus, 2015; Orndorff, 2015; Wang, 2017; Heidari et al. 2018; El-Attar et al., 2019; El Mhouti & Erradi, 2019; Asadi et al., 2020) the plethora of which stress the significance of writing as well as the utility of cloud computing and recommend that more studies should be conducted to devise new strategies in order to develop writing skills.

Questions of the Study

The present study attempted to find answers for the following questions:

1. What are the bases for proposing a teaching model using cloud-computing technologies aiming at developing writing skills of Al-Qassim-University students?

2. What is the effectiveness of the proposed model in developing writing skills of those students?

3. Is there a difference between males and females in writing skills as per the effect of using cloud computing?

Hypotheses of the Study

The present study tested the following hypotheses:

1. There will be statistically significant differences at 0.05 level between the mean scores of the students of the experimental and control groups in the post-administration of the writing test in favor of the experimental group.

2. There will be no statistically significant differences between the mean scores of males and females in the experimental group in the post- administration of the writing test.

Objectives of the Study

The current study aimed at fulfilling a two-fold objective: An instructional objective that is proposing a teaching model using a cloud-computing strategy intended to develop writing skills of Al-Qassim-University students and a research objective that is testing the effectiveness of the suggested model in developing writing skills of Al-Qassim-University students, as well as investigating the difference between males and females in writing skills as per the effect of using cloud computing.

Significance of the Study

The significance of the current study emanates from the fact that it may lead to shed light on the crucial role played by writing in the qualification of university students. The study may propel us to deem writing as an active and demanding skill of language which needs to be looked after.

Moreover, the study proposes a model as well as a strategy using cloud-computing technologies which aims at developing writing skills of Saudi-university students. In addition, the study may help students, teachers and course designers *via* helping students develop their writing skills, guiding English teachers by improving their teaching practices of writing and providing course designers with what's needed to develop writing skills of university students.

To the best knowledge of the researcher, no study had been conducted to propose and use such a type of teaching model in Saudi Arabia for the stage chosen. As a result, the present study tried to fill in this gap.

Limitations of the Study

The study was conducted in Al-Qassim, Saudi Arabia where the researcher lives and works. It was undertaken on (120) students selected randomly out of Al-Qassim University, including both males and females. The experimental study lasted for (7) weeks, approximately four hours per week. The study was conducted during the first semester of the academic year 2019/2020.

Operational Definitions of Terms

The following terms were used in the present study:

Cloud Computing

According to the U.S. National Institute of Standards and Technology (NIST), cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service-provider interaction. This definition suits the purpose of the present study, and so it will be operationally implemented.

Writing

Writing is the fourth in the hierarchical order of the four language skills. It comes last,since it requires development in all language skills. Writing is the tangible manifestation of our thoughts. It enables our ideas and thoughts to be seen. For the purpose of the present study, the researcher defines the term "writing" as a complex skill subsuming beneath it a number of sub-skills, which are:

1) Identifying the position and parts of the topic sentence;

2) Achieving unity in a paragraph;

3) Making an outline for a paragraph;

4) Achieving coherence in a paragraph;

5) Organizing ideas in a paragraph.

Such sub-skills were assessed using a standardized writing test prepared by the researcher.

Population and Participants

The study was undertaken on (120) students, selected randomly out of the Faculty of Sciences and Arts, Al-Qassim University. Students were distributed equally between the experimental and control groups. The participants included both males and females.

Instruments of the Study

I-The Proposed Model

Objectives of the Model

The major objectives of the proposed model were to develop the following writing skills:

1) Identifying the position and parts of the topic sentence;

2) Achieving unity in a paragraph;

3) Making an outline for a paragraph;

4) Achieving coherence in a paragraph;

5) Organizing ideas in a paragraph.

Instructional Content

The content comprised the first three units of *Effective Academic Writing I, Alice Savage and Masoud Shafiei, OUP* (2007). The textbook is prescribed for level-1, English-language students, Department of English and Translation.

The Proposed Teaching Strategy

The researcher proposed a teaching strategy based on using cloud computing. Its procedures went as follows:

1- Participants were introduced to the content to be studied and to the cloud-learning environment in an orientation session.

2- Students were introduced to the Google-Docs application and received a training session on how to use it and to co-write a group project together.

3- Students who did not have a Google Gmail account were asked to create one in order to be able to open the Google Docs website.

4- Students were asked to create their first document, save and retrieve the file as they would do on a Microsoft Word application.

5- Students were taught how to tag and share a document with other readers. They were given an opportunity to view their peers' documents and a permission to edit and co-write the document.

6- When students got more familiar with Google Docs app, they were assigned a writing project. They were asked to work in groups, using Google Docs to edit and make amendments. The main intent here was to motivate students to continue their work and share accomplishments anywhere and anytime in a cloud.

7- While working with each other, students also interacted with the instructor in the cloud.

8- The instructor edited students' writings and posted his comments both to the individuals and the groups.

9- A variety of activities along with those of Google Docs made use of including reading the assignment instructions or others' documents online, editing one's own document or others' work, suggesting or commenting on others' documents and sharing one's own documents.

10- The instructor still recommended his students to store their documents both online and in a hard copy.

Via such a strategy, Google-Docs app supported synchronous communication through synchronous chat services during the cloud activities. It therefore fostered students' self-expression through interacting at the same time. It fostered team work, computer skills and development of communication skills. It also provided a stable service and secure platform *via* enabling a number of students to simultaneously edit or comment on a document without geographical or temporal limits. Some participants admitted that Google Docs is a tool that is easy to use and it also provided technical support when they encountered some technical problems.

Participants noted that Google Docs is productive. They said that it runs its own functions, can update easily and spares a lot of time.

Activities Accompanying the Model

The researcher made the utmost use of the following activities:

Reading Activities

- Reading instructions.

- Reading others' documents.

Editing Activities

- Editing one's own document.

- Editing others' documents.

- Working on assignments and group projects.

Suggesting Activities

- Providing suggestions on others' documents.

Sharing Activities

- Posting and sharing one's own Google-Docs activities.

- Sharing work and collaborating with classmates.

- Communicating through Google Classroom.

Methods of Evaluation

Two types of evaluation were used while conducting the experiment:

a- A pre-test before administering the experiment.

b- A post test after administering the model.

Validating the Model

Layout of the proposed model was submitted to a panel of specialists in curricula, instruction and linguistics to show their opinions. The researcher put the juries' observations into consideration.

Pilot Administration

The researcher piloted the model using the proposed strategy prior to the real experiment. The pilot study lasted for one week. Twelve students participated in this pilot study.

II-The Writing Test

Goal of the Test

The test aimed at testing writing skills of Al-Qassim-University students. It was employed as

a pre-post test in order to determine the effectiveness of the proposed model.

Description of the Test

The researcher prepared the test in light of the goals, objectives and skills previously specified. The test consisted of (10) questions. Students were given blank spaces to write their answers on the same page.

Validating the Test

The test was submitted to a jury committee of specialists in curricula, instruction and linguistics to show their opinions. The jury members agreed upon the validity of the test. Thus, content validity was assured. Moreover, the researcher proved self-validity of the test which reached (0.93).

Reliability of the Test

The researcher used the test-retest method with a time span of (15) days. Reliability coefficient reached (0.88).

Facility, Difficulty and Discrimination Indices of the Test

Facility, difficulty and discrimination indices were computed. They were 0.72, 0.28 and 0.20, respectively.

Pilot Administration of the Test

The researcher administered the test to a pilot sample of (12) students not taking part in the experiment. The purpose was to make sure of the suitability of the test, calculate the mean time needed, compute reliability and diagnose problems that might arise while administering it.

Results

Concerning the first hypothesis *"there will be statistically significant differences at (0.05) level between the mean scores of the students of the experimental and control groups in the post-administration of the writing test in favor of the experimental group"*, the researcher used t. test as follows:

Table (1)

Terminal Means, Standard Deviations and t. Test Results for the Scores of the Experimental and Control Groups in the Post Administration of the Test.

Group	Number	Means	Standard Deviations	Difference between Means	Free Score	Calculated t.	Tabulated t.	Level of Significance
Exp.	60	24.97	5.87	9.87	118	9.73	2.39	Sig. at 0.05
Con.	60	15.10	5.13					

From the above Table, it may be noticed that there are statistically significant differences at (0.05) level between the mean scores of the students of the experimental and control groups in favor of the experimental group. In this way, the first hypothesis of the study was accepted. This result may be attributed in the first instance to the proposed model of teaching used with the experimental group. The model managed to develop writing skills *via* using cloud-computing technologies. The proposed model may be said to have fulfilled a bevy of results. Students got to assume responsibility for their own learning. This put them in a better position to make the best use of the proposed model for the purpose of developing their writing skills. Students' awareness of such skills in advance may be said to have provided them with opportunities to get ready for the challenging tasks of writing.

In addition, providing students with the objectives of each lesson beforehand may be assumed to have motivated their latent expertise and potentialities beforehand. Such a statement of objectives can be said to have placed the students in a better position to deal with writing skills. It helped students assess their progress step by step. Feedback had a vital role to play in this juncture. Moreover, the proposed cloud-computing strategy engaged students in what writers actually do. It brought into use students' content knowledge and core vocabulary about a certain topic to be tackled. Such a strategy gave boom to all of the learning/teaching situation. It can be said to have empowered the students, reduced teacher's domination, eliminated traditional routine and monotony, gave momentum to students' latent writing potentialities and participation and saved classroom time for practicing more writing

activities that appealed to the students. The researcher maintains that the proposed model with the suggested strategy may be said to have aided students to deal with writing skills at higher levels of sophistication. Moreover, the classes used to go in an atmosphere that was similar to a workshop. Instant advice was asked for and offered. Immediate help was provided. On-the-spot feedback was available. Mistakes were discussed publicly. Written works were exchanged for peer and group editing.

As per the control-group students, they had their regular courses in their traditional classes. They did not use the proposed model. They did not use the suggested cloud-computing strategy. As a result, it may be said that those students dealt with writing in the traditional mechanical way. The

overuse of traditional teaching strategies has weakened students' enthusiasm for writing. Students' latent writing potentialities have been underutilized. On the other extreme, the chance offered to the experimental-group students *via* the proposed model using the cloud-computing strategy may be said to have put those students in a proper position to tackle writing skills. The teacher (researcher) was always there, ready for any intervention.

Concerning the second hypothesis *"there will be no statistically significant differences between the mean scores of males and females in the experimental group in the post administration of the writing skills test",* the researcher used t. test as follows:

Table (2)

Terminal Means, Standard Deviations and t. Test Results for the Scores of Males and Females in the Experimental Group in the Post-Administration of the Test.

Group	Number	Means	Standard Deviations	Difference between Means	Free Score	C. t	T. t	Level of Significance
Males	30	23.89	5.18	1.3	58	0.28	2.45	Insignificant.
Females	30	24.3	5.98					

It can be noticed from the above table that there are no statistically significant differences between the mean scores of males and females in the experimental group in the post-administration of the test. This provides an evidence for accepting the second hypothesis.

Such a result may illustrate that difference in gender did not render difference in writing skills. Inherent complexities, potentialities and cognitive processes of such skills may be said to depend primarily on the coordination of other cognitive, psychological, technical, psychomotor and methodological variables that may not be affected by difference in gender. Since information-processing and cognitive processes may be similar in males and females, such skills may be affected by other factors rather than difference in gender.

Discussion

The main intent of the current study was to investigate the effectiveness of using cloud computing in developing writing skills of Saudi-university students. *Via* experimentation, cloud computing proved to be effective in rendering the target. It proved to be practical, flexible and easy to

use. It was cost-effective and offered high scalability. Furthermore, with all of its affordances, which allowed for interaction, communication, collaboration, finding, sharing and storing material, it was able to support writing. In this juncture, one has to mention also productivity suites offered by Google, including Mail, Drive, Classroom, Google Docs, Sheets, Slides, Sites, Calendar and other applications. Students were given lots of possibilities to interact with each other, work on a project together, edit and modify each other's saved files. This increased the effectiveness of instruction.

The effectiveness of the proposed cloud-computing model in rendering what it was intended for may be ascribed to a crop of reasons: First, adopting a scientific method in designing the model. It was validated and piloted prior to real experimentation; second, identifying writing skills needed by Al-Qassim-University students beforehand; third, presenting the objectives of each lesson to the students before starting it; fourth, enriching the model with various activities; fifth, using various teaching techniques subsumed beneath the cloud-computing strategy; sixth, using

different kinds of teaching aids; seventh, using various kinds of evaluation before, during and after the experiment. Moreover, types of interaction and inherent relations among the students and between the students and the researcher may be said to have given momentum to students' latent potentialities. For sure, students' taking lead of the learning/teaching situation gave them vent that enhanced their performance. All through administering the experiment, the researcher got to detect that the cloud-computing strategy augmented positive interdependence among students whenever they got involved in group processing. This may be said to have augmented their social skills in face-to-face interaction. It encouraged speed up learning, increased collaboration efficiency, supported information sharing and enhanced self-expression. It provided opportunities for chatting simultaneously with fast update in a secure environment. Moreover, it offered a stable data-storage capacity.

It is evident that *via* using the cloud-computing strategy, many benefits accrued. It was cheap and more reliable. There was no need to worry about hardware failures. Results revealed a significant substantial positive relationship between social networking apps' experience and user preference. The students with more social networking apps experience tended to prefer learning in the cloud. Moreover, the cloud provided opportunities to work together with peers. It provided opportunities for self-expression as well as secure environment to save documents. Additionally, electronic notes were "eco-friendly" and saved the need for paper. Cloud computing offered ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications and services) that could be rapidly provisioned and released with minimal management effort. With some guidance by a user, Google Apps proved to be flexible in adapting to individual needs. Google Drive was accessible through simple and intuitive access with a Gmail/Google account, regardless of a user's experience. A wide range of literacy and language skills needed only to be accommodated. The Google Docs application allowed students to access and share documents with others as viewers, collaborators or publishers on the Web. It offered opportunities for collaboration of many students working on the common document. During the collaboration activity, the work could be accessible

to anyone from anywhere. Google Docs supported synchronous editing, comment writing and saving versions of the document. The purpose of these individual assignments was to encourage students to share or obtain suggestions with/from their peers on document editing through the Google Docs collaborative tool. Furthermore, communication and collaboration functionalities of cloud-based tools and applications helped learners make meaning at the individual level as part of their active participation in collaborative learning activities.

It might be assumed that cloud computing provided a shared pool of resources, including data storage space, networks, computer processing power and specialized corporate and user applications. It offered opportunities for individualized learning by allowing for anytime and anyplace access to learning resources, state-of-the-art tools and virtual learning environments. Cloud-based applications and tools facilitated learning in a way that was meaningful to the learner and relevant to real-world contexts. There was also a potential to maximize benefits from the delivery of inquiry-based learning scenarios. Moreover, learners could engage in data-elaboration processes, individually or in collaboration with peers and present their own findings. Such a process provided learners with the appropriate cloud-based tools and applications that helped them focus on inquiry-based activities rather than being bothered with issues of practical and technical nature.

The contribution of cloud technologies to the personalization of learning is also to be considered in this respect. In such a context, cloud-based learning was able to balance supply and demand, improved availability of resources, responded better to queries for learning objects and facilitated interoperability. Thus, the teacher/learner could create, edit and share innovative learning material, with the use of media-rich content, by taking advantage of cloud-based services and tools. While using cloud computing, the teacher's role could be changed from a knowledge-provider to students' guide. Learning indeed could be accessed 24/7/365 from anywhere at any time. In this juncture, it is plausible to cast light on Google Drive, as it offers three primary services not available with other tools: (a) users can interact inside the programme, (b) Google saves are made automatically and simultaneously and (c) Google Drive informs users

of changes by other writers. It allows files to be stored remotely and accessed from any computer. In addition, it comes with a free tool, Google Documents, which allows for editing remotely in a word processor. Multiple users can edit the same document, chat and work together in real time. Google Drive can be used by a nearly unlimited number of individuals at the same time. Users can actually edit a single document simultaneously.

Findings of the current study corroborate with those reached by (Stockwell, 2008; Begum, 2011; Abdel-Hack & Helwa, 2014; Zaki & Yunus, 2015; Orndorff, 2015; Wang, 2017; Heidari et al., 2018; Jiao & Huang, 2019; Çakiroglu & Erdemir, 2019; Kaymak & Akgun, 2019).

As for gender differences as detected by the current study, such a finding is in line with that reached by Nasr (2019) who found out that there was no significant difference in writing between males and females. There is still paucity in research in this area. Therefore, the researcher seizes the opportunity to call other researchers to further investigate this topic.

Recommendations

In light of what has been revealed in the current study, the researcher recommends that:

- Cloud-computing strategies should be part and parcel of teaching writing. Students should be trained in making use of such strategies from the early days of schooling.
- An intense theoretical background should be offered to teachers as well as students about the cloud-computing strategies. Various innovative strategies should be available in order to suit each individual learner as well as each skill in every learning situation.
- Professional courses and programmes should be designed for teachers in order to train them in using cloud-computing strategies in a sound pedagogical way.
- Following in the same vein of the current study, the researcher thinks that more studies are needed to examine the effect of cloud-computing strategies on other language skills as well as to investigate teachers' and students' attitudes towards cloud-computing strategies. There is a dire need also to design similar models using different kinds of strategies for developing other language skills, replicate the proposed model for other educational stages, further investigate the difference between males and females in (writing skills), and investigate students' preferences for certain kinds of cloud-computing strategies.

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