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Towards a unified English technology-based writing curriculum in the Arabian Gulf countries: the case of Oman

Hussain Al Sharoufi* 

*Correspondence:
alsharoufi@gust.edu.kw

English Department, Gulf
University for Science
and Technology, Mubarak
Al-Abdullah, Kuwait

Abstract

This study investigates the efficacy of a new testing tool, a Web-based application known as the Academic Writing Wizard (AWW), in creating a unified English technology-based writing curriculum in the Arabian Gulf countries, focusing particularly on the case of Oman. The application was piloted in three Oman high schools selected by the Omani Education Ministry. All the schools have class grades 11 and 12 only. Over 2 weeks, 71 students and 6 teachers were trained in the effective use of AWW. In the pre-application phase, the selected students were asked to write a five-paragraph essay without using AWW. In the post-application phase, they were asked to write the same essay employing AWW, specifically elements of the Lexical Cohesive Trio (LCT), combining elements of textual reference: anaphora, cataphora, transitional signals, lexical repetition, and lexical phrases. A total of 71 respondents took part in the study. All were senior grade students (class grades 11 and 12). Comparisons of the two groups with respect to the quantitative and scoring scales were performed on the basis of the nonparametric Mann–Whitney criterion. An analysis of the dynamics of the indexes was conducted on the basis of the nonparametric Wilcoxon criterion. A multifactorial dispersive analysis was performed to study the influence of the factors in class. MANOVA was also conducted to study the influence of two factors simultaneously: the class and the time period. Based on the results of the statistical analysis, the following was found:

1. The dynamics of the index Teacher's Score and the values of indexes in all the grades were higher in the post-application period.
2. There was a statistically significant positive increase across all indexes between the post-application and pre-application periods in each grade.
3. The dynamics of the index Teacher's Score and the values of indexes in all the grades were higher in the post-application period. There was an incremental increase from the post-app period to the pre-app period in the 11th grade and 12th grade of 3%. Thus, the index Teacher's Score was influenced by the Period factor.
4. The dynamics of the Score index were clearly visible. The values of the index Score in all the classes were higher in the post-app period.
5. Based on the results of the multifactorial dispersive analysis per index Score, Teacher's Score and Final Grade were influenced by the Period factor only.

When the index Final Grade is compared, the average score was $46.3 \pm 5.8\%$ in the 11th grade in the pre-app period, which increased by 13% to $59.3 \pm 5.5\%$ ($P < 0.0001$) during the post-app period. In the 12th grade, the average score of the same index was $48.1 \pm 8.4\%$ in the pre-app period, which increased by approximately 13% to $61.0 \pm 7.5\%$ ($P < 0.0001$) during the post-app period. The results further indicate that the application of AWW significantly improved Omani students' English academic writing skills. Therefore, AWW will be a useful tool in the English curriculum of both Omani and Arabian Gulf English schools.

Keywords: Academic Writing Wizard, Lexical Cohesive Trio, English technology-based writing curriculum

Introduction

This study, which was funded by the Kuwait Foundation for the Advancement of Sciences (KFAS), introduces a technological writing curriculum in the high schools of Arabian Gulf countries, specifically Oman, to enable a smoother school-university transition for students. Including technology in academic writing raises awareness among students of the steps, features, and techniques required or commonly used to create a coherent academic text. This study, therefore, marks an important step towards improving Omani students' writing skills. While working with the students on Academic Writing Wizard (AWW), I noted that they found it useful as a new tool for improving their writing skills as it enabled them to experience new ways of creating English texts. Some discovered the importance of employing textual elements such as referential lexical elements, anaphora and cataphora, transitional signals, lexical repetitions, and lexical phrases. Although the students might have previously encountered textual elements fragmentally, they could not combine them in an effective way. Most of the lexical and textual elements of writing are taught to them sporadically and marginally. This study aimed to demonstrate that the application of technology in teaching academic writing could enhance the Gulf Co-operational Council (GCC) students' knowledge of academic writing and related techniques, which will provide them with substantial help at higher university levels. Most high-school students in the GCC countries face difficulties in their transition from Arabic-speaking schools to English-medium universities. This sudden transition rebukes most students, hindering them as such from succeeding in universities whose medium of instruction is English. One of the main obstacles that GCC students face is their inability to produce effective English academic texts. The level of English taught at high schools is far less than what is expected at the tertiary level. In a study conducted by Tryzna and Al Sharoufi on language policy in Kuwait, the authors pinpointed the main obstacles Kuwaiti and GCC students face when learning English as a foreign language "The paper discusses the shortcomings found in creating an effective pedagogical system, capable of producing proficient English language speakers in the state-funded schools in Kuwait. Due to the indispensable role that the English language plays in most Kuwaiti institutions, finding a viable solution to solve language problems in Kuwait is becoming of an insurmountable concern to the educational authorities. This paper suggests that adopting a unified solution at the Gulf Cooperation Council, GCC, countries' level would provide Kuwaiti educational authorities with a workable solution, capable of overcoming language problems currently faced by Kuwaiti students." (Tryzna & Al Sharoufi, 2017).

In another study conducted by Ali Al-Issa on the English writing problems faced by Omani students, he states “When it comes to written expression, the ESL instructor should also be aware that Omani students lack opportunities to communicate freely in writing. Students dwell on a single topic from the textbook, listening to a text about it, reading about it, speaking about it, and eventually writing about it. In general, students think about and produce language in a linear and controlled manner. The topics in OWTE are seldom based on the outward-bound students’ needs and interests. Therefore, students may have little interest in expressing themselves in the Omani classroom.” (Al Issa, 2006).

In another study conducted by Basmah Al Saleem, she enforces the use of computers in modern education and she further states that traditional methods for teaching language skills are already obsolete “In fact, computers in language learning use language skills, be it natural language, foreign language or the so-called second language. Digital technology is used as an educational resource to help language learners improve their language skills, complementing it with other methods of teaching; thereby providing an involved, linguistically rich learning environment. Using computers in learning languages means using computer technology to provide, improve and evaluate the learning material through the use of interactive computer features, its different learning modes, and the Internet. Orthodox techniques are no longer limited to this. In the age of information, technology and communications, educational methods which were effective in the old days are not necessary to be useful. Future education is likely to be based on e-learning, based on the use of modern technologies like computers, intranets and the Internet.” (AlSaleem, 2020). Academic Writing Wizard, and the Lexical Cohesive Trio in particular, is introduced in this study as a possible solution for those high-school students to work on their academic writing even when they are still at their high schools. Although the phrase “academic writing” is mainly used at a tertiary level, it is important to mention that Academic Writing Wizard mainly aims at fixing high-school students’ English and makes it close to the one used at a tertiary level. AWW tries as such to bridge the gap between high-school English and tertiary-level English. The author relies on important studies concerned with applying the LCT framework to help improve students’ academic writing (Al Sharoufi, 2013, 2014).

As for the main questions raised in this study, they are as follows:

1. Can Academic Writing Wizard (AWW) improve high-school students’ academic writing skills and make them able to cope with academic writing at the university level?
2. Can Academic Writing Wizard be an acceptable tool for high-school students?
3. Will high-school students use AWW effectively in their English classes?

Literature review

AWW is based on the notion of conscious writing, which requires an awareness of the textual tools that make up a coherent academic text. Technology is integrated to help quantify these tools and provide an effective academic writing environment for students. These tools play an essential role in creating and conveying coherent meaning. Halliday

and Hasan (1976) argue that cohesion is a semantic and grammatical feature of texts that works internally in structuring written and spoken discourse.

Numerous studies have highlighted the importance of teaching and creating awareness of reference, repetition, and lexical blocks or bundles in academic English writing. Using the right references or pronouns combined with a proper application of transitional signals contributes to improving the lexical and logical connections in writing. Cohen and Fine (1978) argue that for non-native students, a failure to properly understand and use these elements weakens cohesive ties throughout the text. Winter (1979, p. 101) and Hoey (1995, pp. 26–48) discussed the strong relationship between lexical repetition and the creation of meaning in text. In his detailed analysis, Hoey (1995) contends that there are different types of lexical repetitions, namely simple lexical repetition, complex lexical repetition, simple paraphrase, and complex paraphrase. However, Boers et al. (2006) assert that lexical blocks or sequences can substantially affect oral fluency. Ranjbar et al. (2012) note that teaching and employing lexical bundles can improve non-native speakers' academic writing ability. Biber and Barbieri (2007) discussed features of lexical bundles such as incomplete clauses and non-fixed expressions transparent in meaning along with the frequency with which they occur. A database of the most frequently used lexical bundles in academic writing was developed by a group of linguists at the University of Manchester; this database is a component of my Lexical Cohesive Trio (LCT). There is an increasing number of automated writing evaluation systems that focus on a variety of textual features and provide scores thereof. IWrite focuses on grammatical textual features, relevance of writing, and language usage (Liang & Deng, 2020). Another application used for automatic evaluation is iTest checking reading, listening, writing, and translation skills, but this application does not train students on academic writing in particular. Another application is The Intelligent Essay Assessor, which mainly traces specific textual patterns and learns the process of textualizing them as such produce similar patterns, based on which it provides approximate scores (Landauer et al., 2003). E-rater is another application that targets word usage and grammatical and discursual features (Burstein et al., 2004). The main problem with most of these applications is their failure to specifically target lexical cohesion, a feature so indispensable in determining textual coherence. AWW comes to bridge this important research gap. AWW helps English learners understand and apply lexical cohesion in a very effective way.

In this literature review section, I would like to break it down into three main components as follows.

Technology use in education in Arabian Gulf countries, especially in Oman

The main problem that Omani and GCC students face is that the main approach used to teach English is mainly based on teaching simplistic grammatical competence. This approach encroaches on the actual role of language as a communication tool. Al Issa explains the inadequacy of teaching decontextualized grammar as he states "Omani and GCC students spend a considerable amount of their time studying grammar out of context and in isolated sentences in teacher-fronted instruction situations. The teachers themselves were taught through the grammar translation or audiolingual method. Students in Oman and other Arab countries are hardly, if ever, given opportunities to explore grammatical structures in context "to see how and why alternative forms exist to express different communicative meanings" (Nunan, 1998, p. 102-3; Al Issa, 2006). Using technology,

then, is the answer to overcoming the shortcomings caused by grammar-based approaches in English writing. To overcome difficulties caused by older teaching methods, the Omani government paid attention to using technology in Omani schools. A study conducted by Tahani Al-Habsi, Saleh Al-Busaidi, and Ali Al-Issa shows that technology is finding its clear way towards changing the educational scene in Oman. “The present qualitative study is an intervention, which attempted to explore the integration of technology among 11 public school English language teachers in the Sultanate of Oman through the use of community of practice (CoP). As the first in the region, this qualitative study triangulated data using a focus group interview and reflective journals. Three themes emerged from the data analysis. Despite certain challenges, the findings were generally positive and encouraging, and revealed that if a CoP is effectively utilized to the fullest to integrate technology in ELT, it can facilitate policy implementation and Second Language Teacher Education (SLTE) in the Sultanate of Oman, the neighbouring Gulf Cooperation Council countries, some Asian and Far Eastern countries, and beyond.” (Al-Habsi et al., 2022). Although the previous study confirms the importance of using technology in English classrooms, it is far from being fully applied in real life. The present researcher faced some difficulties when piloting Academic Writing Wizard in Omani schools. The main difficulty being weak Internet connectivity. As such, providing the educational sector in Oman with effective Internet infrastructure will boost the process of teaching English writing to Omani students.

Lexical Cohesive Trio

Academic Writing Wizard (AWW) provides easy access to numerous tools through a comprehensive digital environment that helps students visualize and create textual links and receive instantaneous assessments. In his review of Academic Writing Wizard, Adrian Wurr states:

Academic Writing Wizard is a web-based instructional tool to help writers develop cohesive and coherent essays. The program was originally developed for undergraduate EFL students but has been successfully used in secondary and tertiary English L1 and L2 instructional environments. The program is based on the premise that since languages are rule-governed, learning a foreign language is primarily a process of learning how to string meaningful chunks of the target language together. Applying this simple premise to more sophisticated, corpus-based word and phrase databases, Academic Writing Wizard helps developing writers use cohesive links and formulaic academic expressions more consciously in their writing. Recent research (Al Sharoufi, 2014) examining the efficacy of the program found statistically significant ($p < .0001$) improvements in students' use of cohesive devices, lexical repetitions, and phrases. User-friendly tutorials and YouTube videos help instructors register for and use the free-trial program in their classes. Once an account is created, students are led through a four-step process to writing an essay or academic report. First, students must select the number of paragraphs they want their essay to include. Then for each paragraph in the essay, they select the connecting words and types of lexical and phrasal repetition they want to include in the essay in steps 2-5. Step 2 involves selecting connecting words from a list of common conjunctions (e.g., and moreover, indeed). In step 3, students select which type of lexical repetition they want to use, simple, complex, and/or phrasal. Each is developed further in step 4, where drop-down

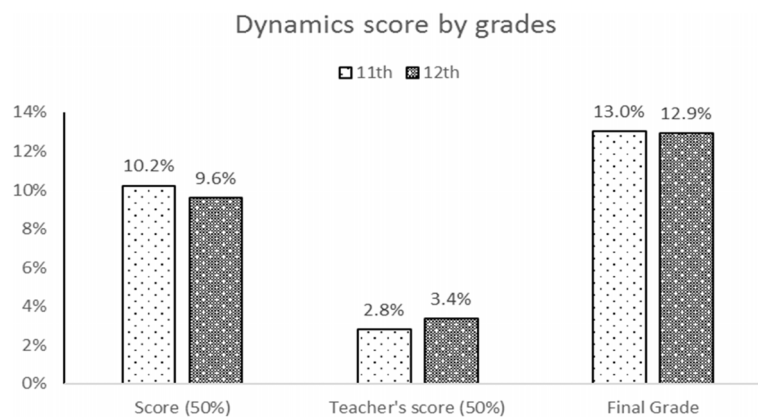


Fig. 1 Relative dynamics of the post-app period and the pre-app period by grade

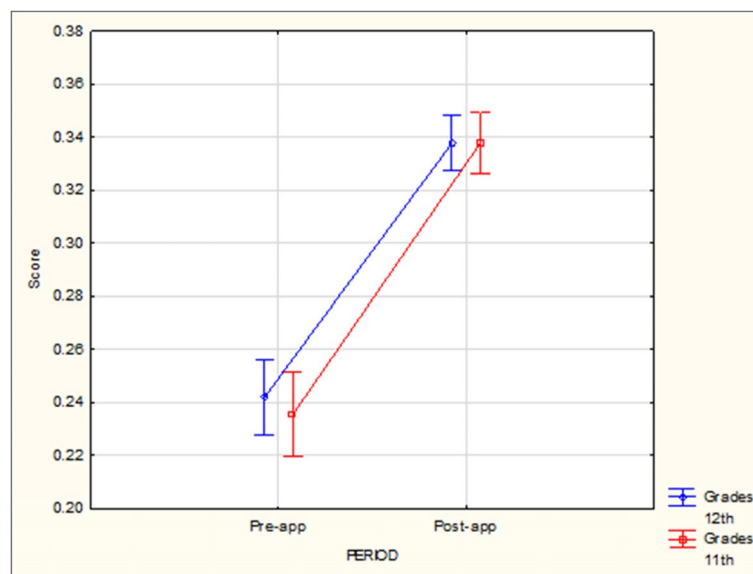


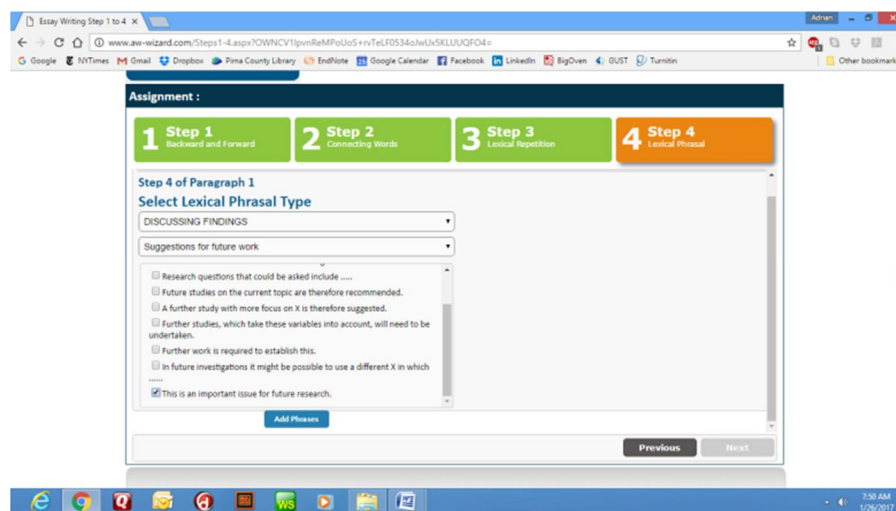
Fig. 2 Multifactorial dispersive analysis of the scores (factors: grades, period)

menus provide the student with a list of options for improving cohesion in different parts for the essay. Figure 1: Step 4 Screenshot -- Selecting lexical phrases commonly used in conclusions to show need for more research For example, Fig. 1 shows a list of lexical phrases commonly used in the conclusion of a research paper for making suggestions for future work on the topic. Finally in step 5, students are shown a visual representation of lexical devices used such as the one in Fig. 2, wherein each cohesive device is identified in color-coded highlights in the text. This final step and screenshot is where the real value of Academic Writing Wizard lies because, however abstract the grammatical concepts of cohesion may seem to developing writers, seeing each cohesive link in their essay highlighted makes intuitive sense. Providing students with immediate feedback on which parts of the essay are stronger and weaker cohesively is akin to how streetlights provide pilots flying over more and less developed landscapes at night with a map of the cities and countryside below. With the information provided in the Cohesive Trio Density Matrix and grammar and style check-

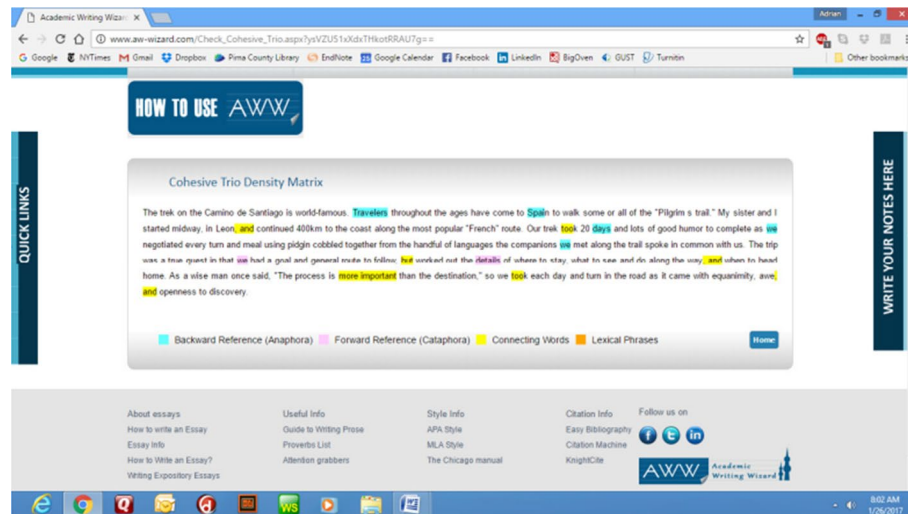
ers, students are able to revise their essays further. In pre- and postsamples of student writing Al Sharoufi (2014) analyzed, students use of transitions, lexical repetition, and lexical phrases increased an impressive 72.9%, 107.6%, and 141.4% respectively! 225

Figure 2: Step 5 Screenshot showing cohesive links used in essay While the form-driven process outlined in steps 1-4 seemed like putting the cart before the horse for me as a native speaker of English, I found the alternate procedure informative: writing my paragraphs first and then identifying the connecting words and cohesive devices I had used using the drop-down menus in steps 2-5. Using the software this way helped me to learn the grammatical terms for different cohesive devices, and more importantly, some of the common expressions of these words and phrases used in different rhetorical moves. Al Sharoufi stated that this was originally the approach to writing he had in mind when he designed the software, but feedback from users led him to allow the composing process to unfold either way – by writing an essay first, then strengthening cohesion with the help of the software, or by composing paragraphs and embedding cohesive links along the way with suggestions from Academic Writing Wizard (personal communication, February 28, 2017). Either way, for the target audience of EFL students and teachers working in more traditional academic settings, Academic Writing Wizard will appear familiar and novel simultaneously because of its high-tech application of traditional writing pedagogies. Indeed, since most writing teachers must teach the forms of writing specified in course and program curricular guidelines, if you are assigned to teach 5-paragraph essays then the only responsible question left to the instructor is how best to teach the genre. Academic Writing Wizard provides teachers and students in situations like this an effective, high-tech option for learning grammar, writing, and computer literacy skills simultaneously. (Wurr, 2017)

Some AWW screenshots



The drop list of lexical phrases in AWW



Step 2 of Paragraph 1
Select connecting words from the below categories

Miscellaneous

☐ Admittedly ☐ All things considered ☐ As a general rule
☐ As far as we know ☐ Astonishingly ☐ Broadly
☐ By and large ☐ Characteristically ☐ Clearly

Add to List

Step 2 of Paragraph 1
Select connecting words from the below categories

Place_Position

☐ above ☐ beyond ☐ in the back
☐ nearby ☐ elsewhere ☐ opposite to
☐ behind ☐ adjacent ☐ here
☐ near ☐ there ☐ far

Add to List

Step 2 of Paragraph 1
Select connecting words from the below categories

Reformulation

☐ in other words ☐ rather ☐ Briefly
☐ put simply ☐ that is to say ☐ to put it more simply
☐ basically

Add to List

-“Miscellaneous:” used to follow up several ideas and information with a one main idea that shows your attitude regarding the subject matter.

-“Place_Position:” used to describe the placement or the location of something.

-“Reformulation:” helps you rephrase an idea in a clearer way, express differently, or summarize.

Examples of drop-down lists

Integrating technology in the classroom can enhance the social dimension of communication (Brown & Duguid, 2000; Carroll & Mack, 1984; Dubrovsky et al., 1991; Murray, 1997; Sproull & Kiesler, 1991; Walther et al., 1994). Montelongo and Herter (2010) explain that by “using technology, teachers can scaffold text comprehension and

improve students' reading and writing skills. Technology encourages improved comprehension of reading and more elaborate writing in the science classroom by motivating students to act on their curiosity, access resources, and embellish their work" (p. 89).

Several studies have discussed the effect of including technology in second language writing. Lin and Griffith (2014) reviewed many of these studies and argued that technology can undoubtedly help in improving the quality of second language writing, reporting that: "The literature review suggests that online collaborative learning environments can have cognitive, sociocultural, and psychological advantages, including enhancing writing skills, critical thinking skills, and knowledge construction, while increasing participation, interaction, motivation, and reducing anxiety" (p. 303). Ahmadi further stresses the indispensable role of technology in improving foreign students' linguistic skills: "Language is one of the significant elements that affects international communication activities. Students utilize different parts of English language skills such as listening, speaking, reading, and writing for their proficiency and communication (Grabe & Stoller, 2002). In addition, Ahmadi (2018) stated that one of the important elements for learning is the method that instructors use in their classes to facilitate language learning process. According to Becker (2000), computers are regarded as an important instructional instrument in language classes in which teachers have convenient access, are sufficiently prepared, and have some freedom in the curriculum. Computer technology is regarded by a lot of teachers to be a significant part of providing a high-quality education" (Ahmadi, 2018).

Notwithstanding potential complaints regarding technological issues or availability in certain schools, the numerous benefits of its integration into the field of academic writing cannot be denied. Through this wide and unlimited environment, students can explore various data and information that are updated instantaneously on the Web. They can further establish their own ideas and create their own essays or research papers in a way that builds connections and relations, starting from the smallest blocks of their written works to the huge academic corpora available on the World Wide Web.

Academic writing expectations in high school versus in college

According to some Omani scholars, Omani students' writing skills are left to be desired. Ali Al Issa stresses that English is not taught as a communication tool. He asserts that "Al-Battashy (1989) and Al-Toubi (1998) state that English is not taught as a language for communication in Oman. They note that the classroom materials, especially the prescribed text *Our World Through English* (OWTE, 1999-2000), and classroom activities are controlled and do not resemble real language use. Saur and Saur (2001) point out 20 ORTESOL Journal knowledge-based tests, mastery of content, and achievement grades dominate the scene and powerfully affect student motivation that the kind of English taught and evaluated in secondary school is different from the kind of English the students need for entry to an English-medium college or university, and Al-Alawi (1997) also notes that it has little connection with the real world." (Al Issa, 2006). It is thus important to find a viable solution to the linguistic problems faced by Omani students if they want to join universities where English is the medium of instruction. The present study tries to provide a viable solution to the problems raised above by

introducing a Web-based application that can help Omani students improve their academic writing skills.

Methodology

Context of the study

This study aims to demonstrate the role of technology in improving writing composition and bridging the gap between high-school education and university education in terms of academic writing. A similar study based on the efficacy of using Lexical Cohesive Trio was conducted on university students at the Gulf University for Science and Technology (GUST) in Kuwait. The results of that study showed that using Lexical Cohesive Trio can robustly enhance students' academic writing skills.

The figures all show significant improvement in and abundance of transitional signals, lexical repetition, and lexical phrases, respectively. Appendix 1 shows a numerical breakdown: Transitional signals were used 417 times before using the framework and 721 times after using the framework; lexical repetitions were used 420 times before using the framework and 872 times after using the framework; finally, lexical phrases were used 447 times before using the framework and 1079 times after using the framework. In particular, the final result, 1079, showing an increase in the number of lexical phrase occurrences in all the collected samples of student essays, constitutes an important guarantor of an improved logical and rhetorical structure. It is this abundance of lexical phrases, occurring naturally in academic articles, which should be emphasized in the conscious teaching of the Lexico-Cohesive Trio. (Al Sharoufi, 2014)

The previous results were further analyzed by SPSS, and the results were indeed promising as follows:

The results were further analysed in light of the t-test, using SPSS. My aim was to statistically ensure the validity of my hypothesis, that the LCT is an efficient framework for teaching academic writing. Based on the table in Fig. 2, three pairwise t-tests on the data have been conducted to examine whether there are significant changes in the two versions, before and after the use of the LCT. A pairwise t-test confirmed that significantly more transitional signals are produced after the framework was used: $t(1,29) = -4.938$ with a p value of less than 0.001. Similarly, a pairwise t-test confirmed that significantly more lexical repetitions were produced after the framework was used: $t(1,29) = -5.218$ with a p value of less than 0.001. Finally, a pairwise t-test confirmed that significantly more lexical phrases were produced after the framework was used: $t(1,29) = -10.672$ with a p value of less than 0.001. These tests present strong evidence in favor of using the LCT, and confirm the significant finding that an increase in students' use of cohesive devices, lexical repetitions, and lexical phrases enhances their ability to write coherent essays. (Al Sharoufi, 2014)

It is thus shown that using LCT has considerably enhanced university students' academic writing. Such promising results have encouraged the author to use the same lexical framework, LCT, with high-school students this time. Based on the previous study,

the author created a new Web-based application for teaching academic writing, Academic Writing Wizard (AWW), to bridge the gap between high-school students and university students in the GCC countries, especially in Kuwait and Oman. Furthermore, the study attempts to pilot AWW at the high-school level to develop comparison and analysis material that links between the following two aspects: technology and LCT elements. In fact, the author conducted a two-phase study: one of which focused on Kuwaiti schools, and the other of which focused on Omani schools, being the current study. So long as the two studies are closely related, I decided to conduct a satisfaction survey on both Kuwaiti and Omani students to investigate their satisfaction after using the Academic Writing Wizard and report the results of the survey in this study.

Design of the study

The crux of this study involves drawing a statistical comparison between pre-application essays and post-application essays in terms of the LCT. This study is based on a previous study on Lexical Cohesive Trio elements that showed a substantial efficacy in improving students' academic writing.

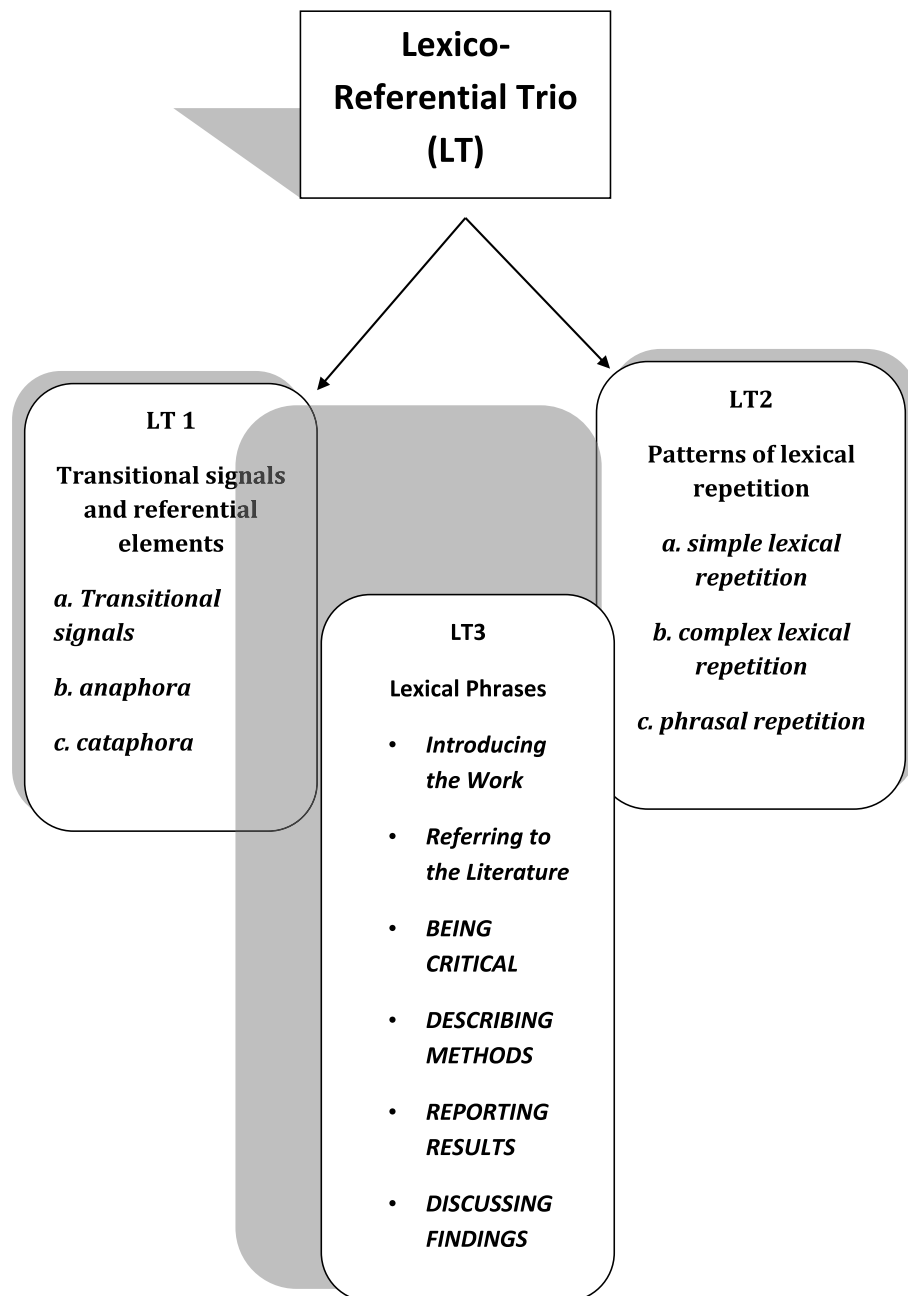
30 junior and senior students from the Gulf University for Science and Technology, GUST, in Kuwait were asked to write two essays for this experiment: one essay was not based on the suggested framework, while the other was. Students were drilled on effectively using the cohesive trio: reference, lexical repetition, and lexical phrases. Each student was requested to draw boxes in which they would write all the necessary details in advance. Within the first box, the students were requested to state the type of reference they would use in the first paragraph, whether anaphoric, cataphoric, etc., specifying each type, the pronoun used, and the referent. Then, in the next box, they had to specify the type of lexical repetition they chose; and, finally, the lexical phrases they found most appropriate to link with the previous two components were placed in the third box. After having performed this process for each paragraph, they would then embark upon writing the essay, which should at this point be a quite straightforward process. (Al Sharoufi, 2014).

The present study expands the application of the LCT framework, using a new Web-based application, Academic Writing Wizard. This study also uses a quantitative approach that aims at detecting and measuring actual textual improvements in students' writing after using AWW to demonstrate the benefit of this technological tool and LCT-based approach in academic writing. Through the obtained data, a comparison can be made between pre-app essays and post-app essays, the latter being heavily influenced by AWW's concept of conscious writing and selection of LCT elements that improve the cohesiveness of the text.

Instruments

The study relies on three main instruments: The first is AWW itself, a Web-based writing application that allows conscious production of texts with the help of ready-made drop lists of referential elements, transitional signals, lexical repetition, and lexical phrases. The study also uses a survey to measure students' satisfaction with the application. The survey focuses on "rating" the application in terms of capability, simplicity, and

convenience on a scale from 1 to 5 points. Finally, the data collected is analyzed through a multi-factor analysis of variance (MANOVA) to test the statistical significance of factors such as grade level (11th and 12th) and period of writing the text (pre-application and post-application).



(Al Sharoufi, [2014](#))

Participants

The researcher visited three high schools in Oman with class grades 11 and 12. These were Musa bin Naseer High School (11-12) and Al-Khoud High School for boys (10-12) and Al-Hassan bin Hashim School, respectively. It is important to mention in this respect that the Ministry of Education in Oman selected the above schools. The researcher had no role in that selection process. It is also important to mention also that the 2-week period spent to train teachers and students in Oman was granted to me by the Omani Ministry of Education, taking into account the time constraint of both teachers and students in all the selected schools. The administrative bodies of these schools selected a group of students from each class grade to participate in this pilot study: 32 11th graders and 39 12th graders. As for the selected students' language proficiency, the selected teachers agreed that their students' proficiency level falls between pre-intermediate and intermediate. The selection process was done entirely by the schools' administrations, and the researcher had no role in this process nor had he any role in selecting the teachers of those classes. Regarding the selected teachers, I was told that all of them hold a BA in English and have over 5 years of teaching English at public schools in Oman.

As for the survey, which was mainly conducted to answer research questions 1 and 2, the sample comprised 73 respondents who answered 12 questions exploring the effectiveness of employing AWW. The respondents were selected and divided based on the number of written works or assignments required from them per semester: 1st group: up to five written assignments, 2nd group: more than six written assignments.

Data collection

Over the course of 2 weeks, the researcher trained the teachers of those grade classes in the systematic application of AWW and trained students on the effective utilization of AWW. The researcher adhered to the following steps to effectively pilot AWW at the selected Omani schools.

Week 1

1. Asking the selected students to write a five-paragraph essay without using AWW was done on day 1 of the study (1 day)
2. Meeting with the English language instructors in the learning resources hall, introducing AWW, and explaining the necessary steps to use it from both the teacher's and the student's perspective was the core of step 1 of this pilot study. The researcher further informed teachers on how to assess students' written assignments and provide feedback. All of this was achieved using in-house computers with Internet connectivity (2 days)
3. The next step was meeting with the students of two classes from the 11th and the 12th grades (students from the English language elective course were chosen),

explaining how to use the program through a data show presentation, and receiving questions and enquiries from students (2 days)

Week 2

4. The third step was based on piloting the program whereby students wrote essays of five paragraphs on a selected topic using AWW (2 days)
5. Assigned teachers were asked to correct some of these essays using AWW (1 day)
6. Giving feedback and gathering opinions on the program was the final step (2 days) (A detailed and documented report of my visit to the above-mentioned schools is attached to this article.)

Referring to the initial phase as the pre-application phase, I asked the students to write a five-paragraph essay on topics chosen by their teachers. Then, I trained them on employing AWW and subsequently asked them to write the same essay using AWW: This second phase is referred to as the post-application phase. By the end of the AWW trial, I was able to collect 71 pre-app and 71 post-app essays for analysis.

Data analysis

I analyzed the collected essays by performing a multi-factor analysis of variance (MANOVA) of the pre-app and post-app phases. In both phases, teachers were asked to grade their students' essays to maintain both objectivity and effectiveness. Furthermore, they were asked to grade their students' essays using AWW. My aim was to test cohesion in accordance with my devised cohesive framework: LCT. Even though the students were asked to simply write a five-paragraph essay without selecting LCT elements in the pre-app phase, AWW is set to automatically detect elements of the LCT and produce cohesion percentages accordingly. Such percentages were entirely based on the cohesive elements suggested by my LCT framework. The teachers then graded their students' post-app essays, to which the learners had added their own selected LCT elements. The final scores obtained after adding the score generated by AWW to that of the teachers were then used for a statistical analysis, whereas the pre-app essays and post-app essays were necessary for a textual analysis that focuses on the students' selection of LCT elements from AWW.

Results of the statistical analysis

A total of 71 respondents took part in the investigation. All were senior grade students (class grades 11 and 12). Comparisons of the two groups with respect to the quantitative and scoring scales were performed on the basis of the nonparametric Mann–Whitney criterion. An analysis of the dynamics of the indexes was conducted on the basis of the nonparametric Wilcoxon criterion. A multifactorial dispersive analysis was performed to study the influence of the factors in class. MANOVA was also conducted to study the influence of two factors simultaneously: the class and the time period. The level of statistical significance was fixed at 0.05. The *P*-values are presented in the report to within a hundred-thousandth.

Table 1 Comparison of scores between grades

Grades				
Period	Variable	M ± S 11th (N = 32)	M ± S 12th (N = 39)	P-value
Pre-app	Score (50%)	23.6 ± 3.8%	24.2 ± 5.0%	0.3860
Pre-app	Teacher's Score (50%)	22.7 ± 2.8%	23.9 ± 4.6%	0.4837
Pre-app	Final Grade	46.3 ± 5.8%	48.1 ± 8.4%	0.3404
Post-app	Score (50%)	33.8 ± 2.9%	33.8 ± 3.6%	0.6353
Post-app	Teacher's Score (50%)	25.6 ± 3.4%	27.2 ± 4.9%	0.2220
Post-app	Final Grade	59.3 ± 5.5%	61.0 ± 7.5%	0.4491

Table 2 Relative dynamics of the post-app period to the pre-app period in each grade

Grade	Variable	M ± S, pre-app	M ± S, post-app	Dynamics	P-value
11th	Score (50%)	23.6 ± 3.8%	33.8 ± 2.9%	10.2%	< 0.0001
11th	Teacher's Score (50%)	22.7 ± 2.8%	25.6 ± 3.4%	2.8%	< 0.0001
11th	Final Grade	46.3 ± 5.8%	59.3 ± 5.5%	13.0%	< 0.0001
12th	Score (50%)	24.2 ± 5.0%	33.8 ± 3.6%	9.6%	0.6353
12th	Teacher's Score (50%)	23.9 ± 4.6%	27.2 ± 4.9%	3.4%	0.2220
12th	Final Grade	48.1 ± 8.4%	61.0 ± 7.5%	12.9%	0.4491

Comparisons by grades

Table 1 presents the results of a statistical analysis of the differences between students' grades. The comparison focuses on two groups (senior grades), 11th grade and 12th grade. The test was performed using the Mann–Whitney criterion. The results did not reveal statistically significant differences for any of the indexes. The total Knowledge Score and Teacher's Score represent the Final Grade. The average assessment of the index Final Grade in the pre-app period was 2% higher in grade 12 than in grade 11. The average assessment of the index Final Grade in the post-app period was 2% higher in grade 12 than in grade 11.

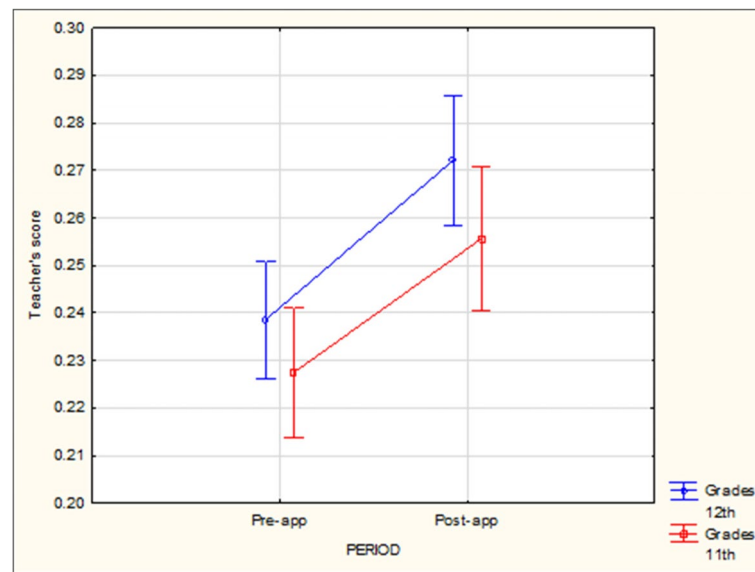
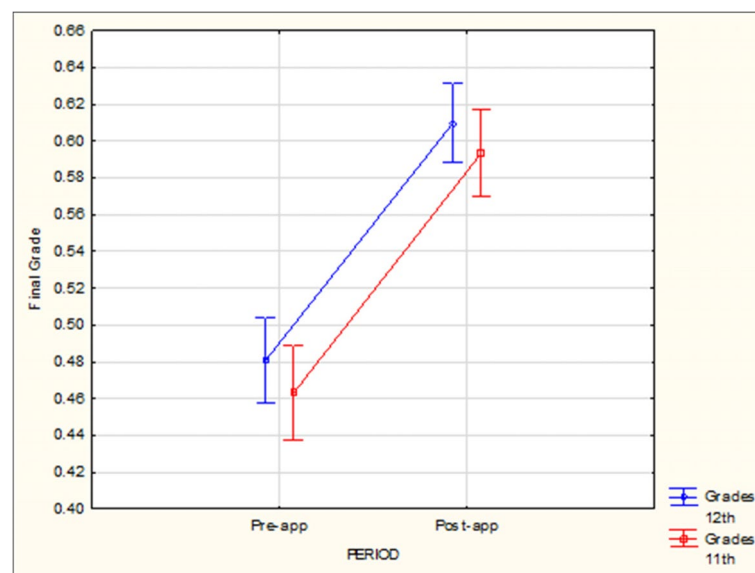
Analysis of the dynamics of grades

Table 2 and Fig. 1 present descriptive statistics (M is the average, and S is the standard deviation) and the relative increment from the post-app period to the pre-app period in each grade. The results indicate that under all indexes and classes, there were statistically significant differences between the post-app and pre-app periods, indicating a difference between the mean values of both. When the index Final Grade is compared, the average score was $46.3 \pm 5.8\%$ in the 11th grade in the pre-app period, which increased by 13% to $59.3 \pm 5.5\%$ ($P < 0.0001$) during the post-app period. In the 12th grade, the average score of the same index was $48.1 \pm 8.4\%$ in the pre-app period, which increased by approximately 13% to $61.0 \pm 7.5\%$ ($P < 0.0001$) during the post-app period.

Figure 1 presents the dynamics for the scores pertaining to students and teachers in the two grades. In both grades, the same increase of 10% was observed in the students' score and of 3% in the teachers' score.

Table 3 Multifactorial dispersive analysis of the index Score, Teacher's Score, and Final Grade with influence factors: grades, period, and period and grades

Factor	P-value (Score)	P-value (Teacher's Score)	P-value (Final Grade)
Grades	0.7017	0.1541	0.2910
Period	< 0.0001	< 0.0001	< 0.0001
Period*grades	0.4031	0.1252	0.9153

**Fig. 3** Multifactorial dispersive analysis of the index Teacher's Score (factors: grades, period)**Fig. 4** Multifactorial dispersive analysis of the index Final Grade (factors: grades, period)

MANOVA

In Table 3 and Figs. 2, 3, and 4, the results of the multifactorial dispersive analysis MANOVA are presented for each index: Score, Teacher's Score, and Final Grade. The *P*-value indicates the statistical significance of the relevant factors: grades, period and period and grades.

As indicated in Table 3, a statistically significant factor, period ($P < 0.0001$), was established for each grade. Given that the factor Period*Grades was not statistically significant for any of the scores ($P > 0.05$), the dynamics in each grade were the same. Moreover, statistically significant differences in grades were not observed for any period.

In Figs. 2, 3, and 4, a statistically significant positive result is observed for the same dynamics by grade for each score. In Fig. 2, the dynamics of the Score index is clearly visible: in the pre-app period, the values of 11th and 12th grades were almost the same and equal to 24%. The values of the index Score in all classes were higher in the post-app period. There was an increment from the post-app period to the pre-app period in the 11th grade and 12th grade of 10%. Thus, the index Score was influenced by the Period factor.

Figure 3 presents the dynamics of the index Teacher's Score. The values of indexes in all the grades were higher in the post-app period. There was an incremental increase from the post-app period to the pre-app period in the 11th grade and 12th grade of 3%. Thus, the index Teacher's Score was influenced by the Period factor.

Figure 4 presents the dynamics of the index Final Grade. The values of indexes in all the grades were higher in the post-app period. There was an increment from the post-app period to the pre-app period in the 11th grade and 12th grade of 13%.

Based on the results of the statistical analysis, the following conclusions can be drawn:

1. The dynamics of the index Teacher's Score and the values of indexes in all the grades were higher in the post-app period.
2. There was a statistically significant positive increase across all indexes between the post-app and pre-app periods in each grade.
3. There was an incremental increase from the post-app period to the pre-app period in the 11th grade and 12th grade of 3%. Thus, the index Teacher's Score was influenced by the Period factor.
4. The dynamics of the Score index were clearly visible; in the pre-app period, the values of 11th and 12th grades were almost the same and equal to 24%. The values of the index Score in all the classes were higher in the post-app period.
5. Based on the results of the multifactorial dispersive analysis per index Score, Teacher's Score and Final Grade were influenced by the Period factor only.

Based on a final report submitted by the Educational Supervisor, Mr. Ahsan Ibrahim Awjanah, at the Omani Ministry of Education, stated that AWW helped students improve their writing skills over a short period of time. He even recommended using the application as an invaluable educational tool, asserting that "No doubt, the program is practical and very useful, and this was quite clear from the instructors' positive feedback and the apparent enthusiasm of the students while using it during the visits to these

three schools. This program may be one of the tools used in the process of continuous educational refinement in high schools. The next step, however, would be setting the program to limit the number of writing compositions ranging from one paragraph to four paragraphs, and setting a different scale for grade distribution from the current one so that the program becomes more fitting for the high-school level. Thus, the success of the program remains connected to improving Internet connections and providing a sufficient number of computers for the students in one class, noting that the student can work through his/her personal computer in the availability of a network and a computer.” (see [Appendix 1](#)).

Textual analysis

The following section compares two essays chosen from the collected data to demonstrate why AWW is an important asset for teaching academic writing. To draw an effective comparison between the pre-phase and post-phase periods, I analyzed the pre-app essay first and then the post-app essay.

Example 1

Step 1 — Pre-framework essay

Time management Sports is an area that almost every teenager is interested in. However, when it gets practiced through the time-management skill, one will guarantee the satisfaction of both sports and study needs.

Allocating time of the day to do sport either on your own or in a sport team, should energize you to study better, in my opinion. The reason behind this is that when you go to do sports in the allocated time, this allows your brain to have less stress and gives your body the chance to activate and exercise.

This controlled pattern of balancing the brain and body needs will result in better study results and healthy body.

Step 2 — LCT framework elements added to the pre-app essay

In this phase, the student rewrote the essay based on his/her choice of LCT elements (see [Appendix 1](#)).

Paragraph 1:

Noun: (Anaphora) skill = it, students = they

Connecting words: since

Repetition: (simple) you, students, important/importance; (complex) crucial, necessity

Lexical: This paper attempts to show that

Paragraph 2:

Noun: (Anaphora) sport = it

Connecting words: however

Repetition: (simple) sport

Lexical: To date, there has been little agreement on what

Paragraph 3:

Noun: (Anaphora) students = their, they

Connecting words: basically

Repetition: (simple) sport, allocated

Lexical: A possible explanation for this might be that

Paragraph 4:

Noun: (Anaphora) people = their

Connecting words: therefore

Repetition: (simple) result, pattern

Lexical: A large and growing body of literature has investigated

Step 3 — Post-framework essay

Time management The final year at school is significantly important to students. Along with this importance comes the necessity of time management. This paper attempts to show that this skill is really crucial since it allows students to enjoy doing all things they want while being effective and productive.

Sport is an area that almost every teenager is interested in. To date, there has been little agreement on what is best to pursue, sports or studies. However, when it gets practiced through the time-management skill, one will guarantee the satisfaction of both sports and study needs.

Allocating time of the day to do sports either alone or in a sport team should energize students to study better, in my opinion. A possible explanation for this might be that when they go to do sports in the allocated time, basically this allows their brains to have less stress and gives their bodies the chance to activate and exercise.

A large and growing body of literature has investigated the importance of balancing studies and sports. Research showed that this controlled pattern of balancing the brain and body needs will result in better study results and healthy body. Therefore, people should follow the right pattern to ensure a good health for their body and mind.

When comparing the two essays, it is clear that the second adopts a more analytical tone than the first pre-framework essay. The second essay also employs a better academic style given the clear research results and lexical phrases used to support the main argument. Furthermore, there is a cohesive internal connection between paragraphs, not

only through lexical phrases but also through simple transitional signals used evenly throughout the essay for a better flow of ideas and perspectives.

Example 2

Step 1 — Pre-framework essay

Technology This century featured more technology compared with the last century. Lots of people say that last century's life is better due to direct connection with people around them all the time. However, I think technology and computer made life easier and faster. Therefore, in this essay I am going to explain the positive impacts of WhatsApp on families.

WhatsApp is a common application which you can find in all the phones. It connects us with our families from different locations and time. We can know more about their daily routine by sending us pictures, videos and recording their voices.

Also, WhatsApp app is a way to invite people to an event that you were planning or meetings. A research results showed that most of the parents preferred that their children have WhatsApp because it makes them closer and they have knowledge about their children even if they spend most of their time out.

In addition, WhatsApp is good way for shy people to apologise. For example, a daughter had a conflict with her mother, she can send a message on WhatsApp to apologise and explain her feelings comfortably. Furthermore, family members can discuss about any subject and exchange information and knowledge.

In conclusion, I believe that technology has two sides, a positive side and negative one. However, it depends on the person who's using it and his awareness.

Step 2 — LCT framework elements added to the pre-app essay

The student chose the following LCT elements to rewrite the essay (see [Appendix 2](#)).

Paragraph 1:

Noun: (Anaphora) people = them

Connecting words: however, therefore

Repetition: (simple) century, life, technology; (phrasal) last century

Lexical: This paper attempts to show that

Paragraph 2:

Noun: (Anaphora) application = which, WhatsApp = it, families = their

Connecting words: basically

Repetition: (simple) phones

Lexical: In recent years, there has been an increasing interest in

Paragraph 3:

Noun: (Anaphora) parents = their, children = them, they

Connecting words: because

Repetition: (simple) WhatsApp, children

Lexical: the most interesting finding was that

Paragraph 4:

Noun: (Anaphora) WhatsApp = it, daughter = she, her

Connecting words: for example

Repetition: (simple) apologise; (complex) problem, conflict

Lexical: Another important finding was that

Paragraph 5:

Noun: (Anaphora) technology = it, person = his

Connecting words: however

Repetition: (simple) side/sides

Lexical: In this paper, I argue that

Step 3 — Post-framework essay

Technology This century introduced more technology compared with the last century. Lots of people say that last century's life is better due to direct connection with people around them all the time. However, I think technology and computer made life easier and faster. Therefore, this paper attempts to show that communication technology like WhatsApp has positive impact on families.

In recent years, there has been an increasing interest in communication technology on smart phones. WhatsApp is the most common application which you can find in all the phones. Basically, it connects us with our families from different locations and time. We can know more about their daily routine by sending us pictures, videos and recording their voices.

Also, WhatsApp is a way to invite people to an event that you were planning or meetings. Additionally, the most interesting finding was that most of the parents preferred that their children have WhatsApp because it makes them closer and they have knowledge about their children even if they spend most of their time out.

Another important finding was that WhatsApp can help solve problems and discuss different issues. For example, it is good way for shy people to apologise. For example, a daughter had a conflict with her mother, she can send a message on WhatsApp to apologise and explain her feelings comfortably. Furthermore, family members can discuss about any subject and exchange information and knowledge.

In this essay, I have argued that technology has two sides, a positive side and negative one. However, it depends on the person who's using it and his awareness.

In comparing the two essays, it is evident that the employment of LCT enhances the student's academic writing by providing textual links or blocks that create a cohesively structured essay. For example, in the second paragraph of the post-framework essay, the lexical phrase "In recent years, there has been an increasing interest in" is a perfect introductory sentence for the paragraph and the body of the essay. The employment of lexical phrases and transitional signals helps to organize and present the ideas in a clearer and more coherent way than in the pre-framework essay. Another example in the same paragraph is the employment of the term "basically," which indicates an addition to the previous point and explains the main argument. Following a similar pattern for the rest of the post-app essay, the student's choice of LCT elements improves the lexical cohesion of the essay and ensure a better evaluation (see [Appendix 2](#)).

Kuwaiti and Omani students' satisfaction survey

In order to answer research questions 1 and 2, a satisfaction survey was conducted for this purpose. Because the objective of the first phase of this study was to introduce a technology-based writing curriculum to schools in the Gulf region, I previously conducted a study in a Kuwaiti high school for girls (unpublished paper), in which I applied the same methodology to study the efficacy of applying AWW in English writing curriculum in Kuwait. It should be noted that the Kuwaiti group of respondents was not included in the above study conducted in Oman.

For the current research, I conducted a survey to gauge both Kuwaiti and Omani students' satisfaction with AWW as a testing Web-based application. The sample comprised 73 respondents who answered 12 questions exploring the effectiveness of employing AWW. All binary answers were summed, which formed a new variable "Rating," scored from 1 to 5 points.

When the respondents were compared, the following groups were identified:

1. Country of residence of the respondent: Kuwait (KW) — 47 students and Oman (OM) — 26 students
2. Age: the respondents were divided into two groups: 34 people up to 18 years of age and 15 people over 19 years of age
3. Number of papers written: the respondents were divided into two groups: 21 people with up to five written works per semester and 16 people with more than six papers.

Materials and methods

The comparisons of the two groups with respect to the quantitative scale were conducted based on the nonparametric Mann–Whitney criterion. After checking the collected data, I found that the data did not meet the requirements of the parametric test (homogeneity of variance and normal distribution). Instead of an independent *t*-test, I decided to use its nonparametric counterpart — the Mann–Whitney test. The statistical

Table 4 Comparison of quantitative variables by country code

Question	Country		
	M \pm S, Kuwait (N = 47)	M \pm S, Oman (N = 26)	P-value
Have you rated the capability of AWW?	3.2 \pm 1.4	3.5 \pm 1.0	0.7640
Rate the simplicity and convenience of AWW	2.8 \pm 1.4	3.4 \pm 1.1	0.2607
Rating	1.9 \pm 1.9	1.5 \pm 2.0	0.5564

Table 5 Comparisons of binary variables by country

Question	Country		
	Kuwait (N = 34)	Oman (N = 15)	P-value
Have you used the Internet for help?	7 (21%)	8 (53%)	0.0219
Have you used AWW?	5 (15%)	6 (40%)	0.0505
Does AWW successfully help you complete the essay?	12 (35%)	3 (20%)	0.2844
Is AWW added to previously taught material?	11 (32%)	4 (27%)	0.6906
Have you improved your rating after using AWW?	13 (39%)	6 (43%)	0.8249
Would you recommend using AWW in other writing courses?	15 (44%)	6 (40%)	0.7884
Would you recommend AWW to other students?	12 (35%)	3 (20%)	0.2844

significance of the different values for binary and nominal variables was determined using a chi-square test. To describe the quantitative variables, the mean value and standard deviation were calculated in the “M \pm S” format. The level of statistical significance was fixed at 0.05. Statistical processing was performed using the statistical package Stastica 10.

Comparisons of variables by country

Table 4 presents the results of a statistical analysis of the differences between Kuwait and Oman. The test was conducted using the Mann–Whitney criterion. There were no statistically significant differences between the respondents in Kuwait and Oman for any of the variables. The average score for the questions “Have you rated the capability of AWW?” and “Rate the simplicity and convenience of AWW” for the respondents in Oman was higher (by 0.3–0.6) than for the respondents in Kuwait. The value of the rating in Kuwait was slightly higher (by 0.4) than that in Oman but this was not statistically significant ($P = 0.5564$).

Table 5 and Fig. 5 present the results of a statistical analysis comparing the binary variables for the countries. The test of differences was conducted using the chi-square test. The results showed that statistically significant differences were observed for the question “Have you used the internet for help?” ($P = 0.0219$). Specifically, 53% of the respondents in Oman and 21% of the respondents in Kuwait used the Internet for help.

The frequency of use of the Internet among respondents in Oman was 32% higher than that for respondents in Kuwait ($P = 0.0219$). The results of the comparisons of nominal variables by country are given in Table 6. In terms of age groups, there were significant

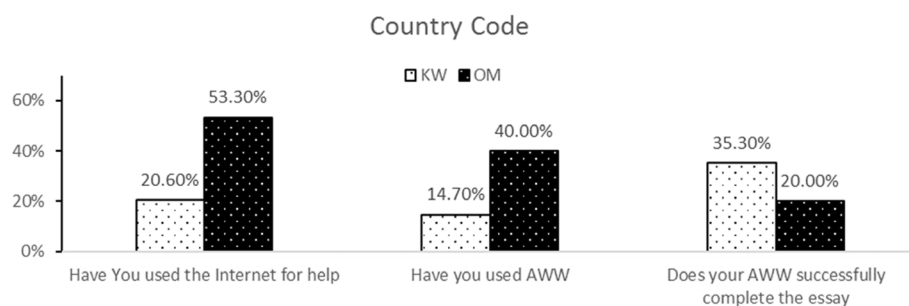


Fig. 5 Have you used the Internet for help? (between country code)

Table 6 Comparisons of nominal variables by country

	Country			
	Kuwait (N = 34)	Oman (N = 15)	Bcero	P-value
Age, years				
Below 18	19 (55.9%)	15 (100.0%)	34	0.002
Above 19	15 (44.1%)	0 (0.0%)	15	0
Number of written assignments for a semester				
Less than 5	18 (52.9%)	7 (50.0%)	25	0.974
From 6 to 10	11 (32.4%)	5 (35.7%)	16	7
From 11 to 15	5 (14.7%)	2	7	

Table 7 Comparison of quantitative variables by students who used AWW

Question	21: Have you used AWW?		P-value
	M ± S, yes (N = 11)	M ± S, no (N = 38)	
Have you rated the capability of AWW?	3.3 ± 1.0	3.3 ± 1.4	0.4836
Rate the simplicity and convenience of AWW	3.0 ± 0.9	3.0 ± 1.4	0.6369
Rating	2.4 ± 2.0	1.6 ± 1.9	0.1306

differences between the respondents ($P = 0.002$). All 15 respondents in Oman were under 18 years old, while in Kuwait 19 respondents were under 18 years old and 15 were above 18 years old. There were no significant differences between the two countries in terms of the number of written assignments per semester ($P = 0.9747$).

Thus, the respondents of Kuwait and Oman differ only in terms of *age groups* and *used the Internet for help*. Therefore, the two countries can be assumed to be compared for further statistical research.

Comparisons of variables by “Used AWW”

Table 7 presents the results of a statistical analysis of the differences between respondents who used AWW and those who did not use AWW. The test was conducted using the Mann–Whitney criterion. The average score for the questions “Have you rated the capability of AWW?” and “Rate the simplicity and convenience of AWW” for the respondents who used/did not use AWW was the same and equal to 3.3 and 3.0, respectively. The “Rating” value for the students who used AWW (2.4 ± 2.0) was higher than for those who did not use AWW (1.6 ± 1.9).

Table 8 and Fig. 6 present the results of a statistical analysis of the differences undertaken using the chi-square test. The results indicated that there were statistically significant differences for the question “Have you used the internet for help?” ($P = 0.0006$); specifically, 73% of the respondents who used AWW and 18% of the respondents who did not use AWW used the Internet for help.

Table 8 Comparison of binary variables by “Used AWW”

Question	21: Have you used AWW?		
	1 (yes) (N = 11)	0 (no) (N = 38)	P-value
Have you used the Internet for help?	8 (73%)	7 (18%)	0.0006
Does AWW enable you to successfully complete the essay?	5 (45%)	10 (26%)	0.2252
Is AWW added to previously taught material?	4 (36%)	11 (29%)	0.6384
Have you improved your rating after using AWW?	6 (60%)	13 (35%)	0.1551
Would you recommend using AWW in other writing courses?	7 (64%)	14 (37%)	0.1138
Would you recommend AWW to other students?	4 (36%)	11 (29%)	0.6384

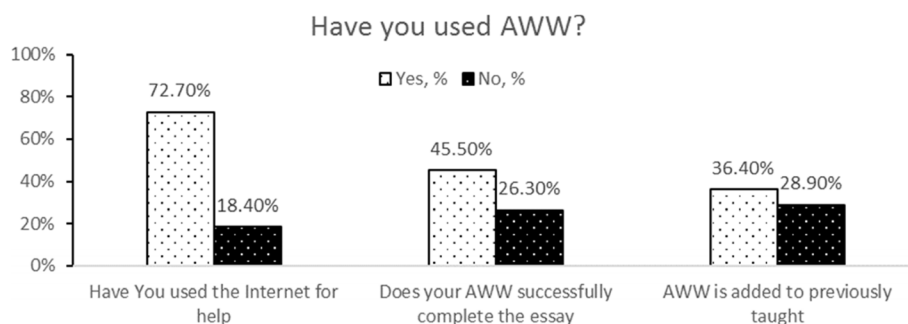


Fig. 6 Comparison of answers to questions regarding who used AWW and who did not

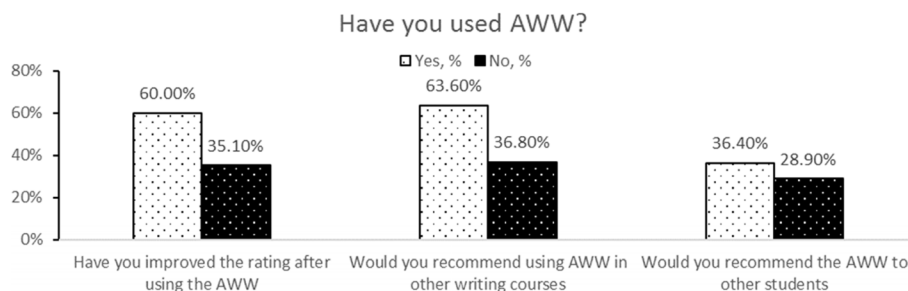


Fig. 7 Comparison of answers to questions regarding who used AWW and who did not

Table 9 Comparison of nominal variables by “Used AWW”

	Have you used AWW?			
	Yes (N = 11)	No (N = 38)	All	P-value
Age, years				
Below 18	9 (81.8%)	25 (65.8%)	34	0.3097
Above 19	2 (18.2%)	13 (34.2%)	15	
Number of written assignments for a semester				
Less than 5	4 (36.4%)	21 (56.8%)	25	0.4885
From 6 to 10	5 (45.5%)	11 (29.7%)	16	
From 11 to 15	2 (18.2%)	5 (13.5%)	7	

Table 10 Comparison of quantitative variables by age group

Question	Age group		P-value
	M ± S before 18 (N = 34)	M ± S after 19 (N = 15)	
Have you rated the capability of AWW?	3.4 ± 1.3	3.2 ± 1.1	0.5405
Rate the simplicity and convenience of AWW	3.1 ± 1.4	2.7 ± 1.3	0.2701
Rating	1.6 ± 1.8	2.1 ± 2.3	0.7259

As shown in Figs. 6 and 7, the frequency of positive responses among respondents who used AWW ranged from 7.5 to 27%, in relation to those who did not use AWW. However, this was not statistically significant ($P > 0.05$). The initial sample should be increased by approximately 2 times in order to draw statistical conclusions.

Table 9 contains the comparison results for the nominal variables for those who used AWW and those who did not. There were no statistically significant differences in age group and the number of written assignments per semester.

Comparison of variables by age group

Table 10 presents the results of a statistical analysis of the differences between respondents under the age of 18 years and those over 19 years. The test was performed using the Mann–Whitney criterion. There were no statistically significant differences for any of the variables.

The average score for the respondents under the age of 18 years was 0.2–0.4 points higher than that of the respondents aged 19 years and above for the questions “Have you rated the capability of AWW?” and “Rate the simplicity and convenience of AWW.”

As indicated in Table 11, there were no statistically significant differences in the respondents’ answers in terms of age group.

Comparisons by the number of written assignments per semester

Table 12 presents the results of a statistical analysis of the differences between respondents who completed up to five written assignments per semester and respondents who completed more than six written assignments per semester. The respondents were

Table 11 Comparison of binary questions by age groups

Question	Age group		
	Below 18 (N = 34)	Above 19 (N = 15)	P-value (df = 1)
Have you used the Internet for help?	12 (35%)	3 (20%)	0.2844
Have you used AWW?	9 (26%)	2 (13%)	0.3097
Does AWW enable you to successfully complete the essay?	9 (26%)	6 (40%)	0.3436
Is AWW added to previously taught material?	9 (26%)	6 (40%)	0.3436
Have you improved your rating after using AWW?	14 (42%)	5 (36%)	0.6682
Would you recommend using AWW in other writing courses?	13 (38%)	8 (53%)	0.3250
Would you recommend AWW to other students?	9 (26%)	6 (40%)	0.3436

Table 12 Comparison of binary questions by number of written assignments for a semester

Question		Age group		
		Have you used AWW?	M ± S Less than 5 (N = 34)	M ± S from 6 to 15 (N = 15)
Have you rated the capability of AWW?	No		3.1 ± 1.6	3.6 ± 1.1
Rate the simplicity and convenience of AWW	No		2.8 ± 1.6	3.2 ± 1.2
Rating	No		2.0 ± 2.0	1.0 ± 1.6
Have you rated the capability of AWW?	Yes		2.8 ± 1.0	3.6 ± 1.0
Rate the simplicity and convenience of AWW	Yes		2.5 ± 0.6	3.3 ± 1.0
Rating	Yes		3.8 ± 1.9	1.6 ± 1.7

Table 13 Comparison of binary questions by number of written assignments for a semester

Question		Number of written assignments for a semester		
		Have you used AWW?	Less than 5 (N = 21)	from 6 to 15 (N = 16)
Have you used the Internet for help?	No		5 (24%)	1 (6%)
Does AWW enable you to successfully complete the essay?	No		7 (33%)	3 (19%)
Is AWW added to previously taught material?	No		8 (38%)	3 (19%)
Have you improved your rating after using AWW?	No		10 (50%)	3 (19%)
Would you recommend using AWW in other writing courses?	No		9 (43%)	5 (31%)
Would you recommend AWW to other students?	No		9 (43%)	2 (12%)

divided into two groups, those who used AWW and those who did not use AWW. The test was undertaken using the Mann–Whitney criterion.

According to Table 13 and Figs. 8 and 9, the frequency of positive approvals was much higher (by 25% or more) among students who used AWW in a group with up to five written assignments per semester than among students who wrote more than six

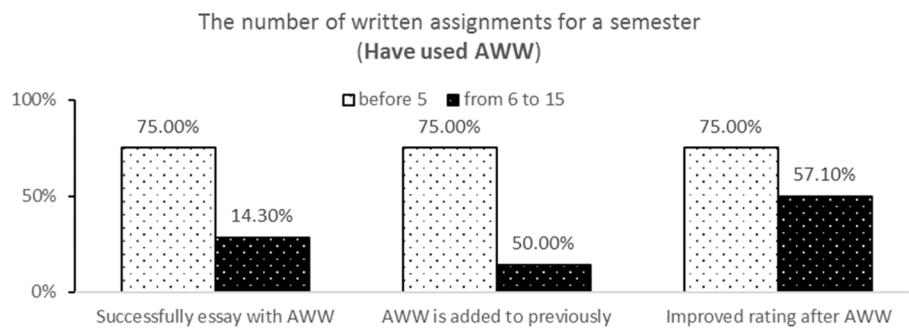


Fig. 8 Frequency of positive questions by number of written assignments for a semester when using AWW

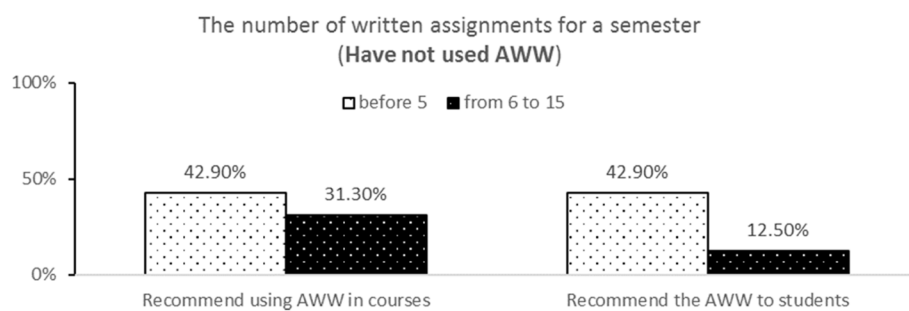


Fig. 9 Frequency of positive questions by number of written assignments for a semester when not using AWW

assignments per semester. To ensure greater reliability of statistical conclusions, the initial sample should be doubled in size.

Conclusion regarding students' satisfaction survey

Based on the results of the statistical analysis, the following primary conclusions can be drawn:

1. Kuwaiti (KW) respondents and Omani (OM) respondents statistically differ only in terms of "Age" and "Used the internet for help." With regard to the frequency of responses, the countries are generally uniform.
2. Students who used AWW respond more positively to employing AWW than those who did not use AWW.
3. There were no statistical differences in answers to questions in terms of age group.
4. In general, the most positive feedback about the AWW service was received from newcomers who have already worked with AWW.

To answer the main research question posed in the introduction:

1. Can Academic Writing Wizard (AWW) improve high-school students' academic writing skills and make them able to cope with academic writing at the university level?
2. Can Academic Writing Wizard be an acceptable tool for high-school students?

3. Will high-school students use AWW effectively in their English classes?

Having analyzed all results obtained statistically, one can affirmatively say that the answer to question 1 is *yes*. All results show cogently that post-application results have improved, which means that AWW helped high-school students improve their academic writing skills. As for questions 2 and 3, the answer is also *yes*. Having conducted the satisfaction survey, one can definitely say that most respondents have affirmatively shown that AWW is a very useful and effective writing tool that can help them excel in their writing classes.

Discussion

The statistical analyses and comparisons of the pre-application and post-application phases describe the benefits of employing AWW as a tool to ease the transition from school to university. The results revealed that AWW helped the students improve the cohesion of their essays and without hindering their flow of ideas. In a study conducted by Al Issa, he highlights the importance of integrating technology into English classrooms. He states “In addition to the important role of teachers in language development, Nunan et al. discuss the importance of education technology, as a means to provide “naturalistic samples” of contextualized language, and time allocated to English on the national curriculum.” (Al-Issa, 2005). Al Issa shows here that using technology can provide more context to English learners, and this is exactly what AWW provides students with, an entire environment that help them contextualize their written texts. AWW has not only managed to improve the text, but also increased students’ confidence and teachers’ satisfaction with the results. The senior English teacher at the Kuwaiti high school for girls had repeatedly encouraged the integration of AWW into the English curriculum, emphasizing the importance of writing. AWW offers clear steps and provides an immediate assessment that increases students’ awareness of the elements of academic writing, helping them to correct their mistakes and improve areas of weakness. As such, AWW provides a simple yet effective and unlimited environment for practice in academic writing.

To discuss the applications of automatic writing evaluation I mentioned earlier in the study, I have shown in this paper that Academic Writing Wizard is a unique application that mainly targets lexical cohesion. IWrite, iTest, and The Intelligent Essay Assessor are all applications used to target surface textual features automatically and without giving human assessors any role in providing their feedback. AWW, however, relies on both automatic evaluation, based on lexical cohesion, and human evaluation, based on instructors’ feedback. In so doing, AWW provides students with a rich environment that helps them to learn academic writing with ease and effectiveness. By manually selecting LCT elements from drop-down lists, students have the opportunity to explore a variety of options to select from, which furnishes them with an abundance of choices to build their sentences, mastering in the process tone and style, as I have shown in my analysis.

There is an increasing number of automated writing evaluation systems that focus on a variety of textual features and provide scores thereof. IWrite focuses on grammatical textual features, relevance of writing, and language usage (Liang & Deng, 2020). Another application used for automatic evaluation is iTest checking reading, listening, writing,

and translation skills, but this application does not train students on academic writing in particular. Another application is The Intelligent Essay Assessor, which mainly traces specific textual patterns and learns the process of textualizing them as such produce similar patterns, based on which it provides approximate scores (Landauer et al., 2003). E-rater is another application that targets word usage and grammatical and discoursal features (Burstein et al., 2004).

Implications for future research and limitations of this study

Maybe one of the main implications of this study for future researchers would be to enhance the LCT framework. AWW misses, in fact, a detailed list of academic collocations, which causes an important limitation to the effective LCT framework. Including a rich list of collocations to the LCT framework, therefore, would definitely boost the effectiveness of the LCT framework. Another element that might be added to the framework is a detailed list of academic words. By adding such steps, one can make the LCT framework suitable for various types of genres. As such, the Academic Writing Wizard itself can be used as an effective tool for teaching specific generic features. AWW can thus be further calibrated to use in English for specific purpose courses too. Experimenting with AWW will open new paths for investigating academic writing and will help both instructors and students overcome the daunting challenges caused by obsolete and sterile teaching methods.

Conclusion

This study has demonstrated the positive effects of conscious writing, using AWW as a testing tool, on the development of academic writing. The results generated by the proper employment of AWW and understanding and implementing elements of the LCT were analyzed and discussed. AWW seems to have the potential for engaging students more positively with the process of academic writing, because it enables them to visualize the whole essay as well as the small building blocks and interconnected lexical relations that help in constructing academic essays in a unique way.

Both the statistical and textual analyses revealed significant differences between the pre-application phase and the post-application phase. For instance, there was a statistically significant positive increase across all indexes (Score, Teacher's Score, and Final Grade) in the post-app period compared to the pre-app period. Textual analysis further identified a significant improvement in students' academic writing skills, mainly in terms of lexical cohesion. AWW allows students to identify their mistakes and weaknesses and deal with them immediately, thus creating better awareness of the process of writing. In sum, AWW can enhance the English curriculum of high schools in the Arabian Gulf region and ease students' transition from school to university with regard to academic writing.

Appendix 1

A report on the researcher Dr. Hussain AlSharoufi's visit

Date: Thursday, 25 Feb. 2016

Introduction In 2013, Dr. Hussain Al-Sharoufi, Associate Professor in Applied Linguistics in GUST, was awarded the Gold Medal at the 6th International Invention Fair in the Middle East, which was held in Kuwait and organized by Kuwait Science Club under

the patronage of His Highness the Amir of Kuwait Sheikh Sabah Al-Ahmad Al-Jaber Al-Sabah. This exhibition is considered one of the largest specialized invention fairs in the Middle East and the second in importance internationally. Dr. Al-Sharoufi was honored for inventing and developing a computer program that helps evaluate and improve students' academic writing skills in English (Academic Writing Wizard). In 2015, Dr. Al-Sharoufi was awarded a financial reward for submitting a research paper entitled "Towards a Unified Approach to the English Language Writing Composition Subject Built on Technology in the Arab Gulf Countries: the State of Kuwait and Sultanate of Oman as Models."

Academic Writing Wizard is a new Web-based application available on the Internet that helps teachers and students alike in achieving their academic goals easily and effectively. This program helps students in outlining, writing, and editing academic essays using a three-step framework, which is a new idea in English academic writing. It also provides an exceptional environment for teachers to assign topics and receive students' essays, assess them, and give appropriate feedback for each paragraph of the essay or the written composition. The program assesses the student's work by giving a score out of 50% of the total grade, and then the teacher adds a score out of 50%. Finally, the program displays the total grade out of 100%.

First: Permission to apply the study in the schools of Muscat Governorate Topic: Facilitating the task of the researcher, Dr. Hussein Al-Sharoufi.

We would like to inform you that Dr. Hussein Al-Sharoufi, Associate Professor at GUST in Kuwait, has submitted a request to carry out a research study for the use of (a computer program he has developed to improve students' skills in English Academic Writing). Through this study, he aspires to devise a unified approach for teaching English at secondary level in the Gulf countries (GCC), especially in the State of Kuwait and the Sultanate of Oman.

In order to apply this study, he will need to train two classes from the 11th and the 12th grades in two different schools in Muscat Governorate. He will also need to train the teachers of these classes in how to use the program effectively. The researcher wishes to apply his study in the governorate during the period between 12 February to 25 February 2016.

We therefore hope for your generosity in facilitating the researcher to apply the study tools according to the procedures. Therefore, kindly:

- 1- Nominate two schools from the governorate for the study application.
- 2- Nominate a representative (supervisor of English language) to be a representative of the Ministry and to accompany the researcher during his visit and his application. We kindly request that you provide us with the name of the candidate and his contact numbers no later than 2016/02/14.

We appreciate your cooperation,

Kindly accept our respect and appreciation,

Suad bint Mubarak bin Said Al-Fouria

Director of the Technical Office for Studies and Development

Second: Visiting the schools Based on the above letter and the letter that the researcher has received from Ms. Haifa bint Ahmed Al-Ma'amriya, a researcher in the Ministry's Technical Office for Studies and Development, Ahsan Ibrahim Awjanah, the Educational Supervisor of the English language, accompanied Dr. Al-Sharoufi from and to the hotel where stayed in South Al-Hail. They visited Musa bin Naseer High School (11-12) and Al-Khoud High School for boys (10-12) during the period from 21 to 24 of Feb. 2016.

The researcher conducted the following steps:

1. Meeting with the English language instructors in the learning resources hall, introducing his program and explaining the necessary steps to use it from both the teacher's and the student's side, informing teachers how to assess the students' written assignments and give them feedback. All this was done using the computer and the internet.
2. Meeting the students of two classes from the 11th and the 12th grades (students from the English language elective course were chosen), explaining how to use the program through a data show presentation, and receiving questions and enquiries from students;
3. Piloting the program where students wrote essays of one to three paragraphs on the topic of "The positive impact of WhatsApp on family life."
4. Assigned teachers were asked to correct some of these essays through the program.
5. 10- Giving feedback and gathering opinions on the program.

With the suggestion of the Educational Supervisor Muna bint Ali Al-Jirwania to visit Hail Al-Awamer High School on Thursday 2016/02/25, approval for the visit was granted through the Senior Supervisor Ms. Al-Ghalia bint Suliman Al-Kendiya from Sheikh Fahad bin Saif Al-Houseni, Assistant Manager of Training and Professional Development. The program for this visit was as follows:

1. Meeting the English language instructors, introducing the program and how to use it for both teachers and students, and receiving teachers' enquiries.
2. Meeting the students of two classes from the 11th and the 12th grades, explaining how to use the program through a data show presentation, and receiving their questions and enquiries.
3. Using their own computers, students attempted to write an essay of one to three paragraphs; some of these samples were assessed in the presence of teachers.

4. Gathering opinions from the teachers and students on the program.

Third: The students' opinions on the program

A) The advantages:

- This is first time such an educational program has been piloted in school.
- The program is considered to be extremely useful and excellent.
- It is easy to use the program after following the necessary steps, and they are all clearly explained.
- The program helps correct common mistakes and improve writing composition skills.
- The program helps in selecting the appropriate vocabulary to rephrase sentences without having to check other websites.
- The program helps in learning new English terminology and developing the student's linguistic knowledge in preparation for university.
- The program helps in learning and specifically improving writing skills through applying punctuation, spelling, grammar, and transitions correctly.
- The program helps the student recognize his/her weaknesses and guides them to the correct method and information.
- The program helps the student recognize his/her spelling mistakes so s/he can avoid them the next time.
- The program helps the student acquire self-confidence, because it gives them the chance to recognize their mistakes and then rephrase sentences.
- The diligent student finds in this program an easy and immediate tool to evaluate their own writing composition in order to improve and refine it without having to wait for their turn to meet the teacher.

B) The challenges:

- Students need training to familiarize themselves with how to use the program.
- The program includes substeps that must be followed, which take time for the student to absorb.
- The program evaluated the writing assignment intensely and strictly, such that the score given could be low even if the composition is very good.
- The Internet is not always available and this hinders the student from working on his/her assignment at home through the program.

Fourthly: The teachers' opinions on the program

A) Advantages:

- The program can be used as an effective educational tool as it provides the students with immediate corrections of their mistakes.

- The program includes helpful tools such as dictionaries, and tools that help link ideas together, producing a better cohesive text which helps the student express themselves well.
- The program helps prepare students for academic writing which they will need at university level.
- The program has features that help enrich the student's writing skills such as refining and linking sentences and paragraphs, and offering diverse vocabulary and adjectives necessary for enriching the composition.
- The program helps students organize their writing and use different terminologies, verbs and transitions, etc.
- The program facilitates the use of references on the Internet and helps students rephrase sentences through the alternative options suggested by the program.
- The program helps the teacher assess students' written assignments and reduces pressure regarding the score awarded.

B) **Challenges:**

- The program requires the use of the Internet, and it is not possible to complete the assignment without a strong Internet connection.
- Weak networks hinder the work of the program in some schools.
- Students might lose the enjoyment of using a pencil and paper for writing if they are limited to using the program alone.
- The unavailability of a sufficient number of computers for the students in one class in some schools is considered an obstacle to utilizing the program.
- Some students do not own personal computers nor do they have an Internet connection at their homes.
- The teacher's burden increases as they need to provide a good follow-up and effective feedback.
- The program is extremely good in terms of the learning aspect, but may not be appropriate in the assessment and examination aspects.

Fifth: Conclusion Without any doubt, the program is practical and extremely useful as an application, and this was quite clear from the instructors' positive feedback and the apparent enthusiasm of the students using it during the visits to these three schools. This program may be one of the tools used in the process of continuous educational refinement in high schools. The next step, however, would be to set the program to limit the number of writing composition ranging from one paragraph to four paragraphs, and setting a different scale for grade distribution so that the program is better suited for high school level. Thus, the success of the program remains dependent on improving Internet connections and providing a sufficient number of computers for the students in one class, noting that the student can work on his/her personal computer in the availability of a network and a computer.

Finally In conclusion, we would like to extend our thanks to everyone who helped, however possible, to make the researcher's visit a success in the service of the higher

purposes of education. We would like to specifically mention the following instructors for their wonderful reception, hospitality, and fruitful cooperation:

1) Hail Al-Awamer High School (10-12):

- a. Ms. Shaikha bint Abdullah Al-Jefiliya, the Headmistress
- b. Ms. Muna bint Ali Al-Jirwania, English Language Educational Supervisor
- c. Ms. Shamsa'a bint Musa Al- Kendiya, English Language Coordinator

2) Musa Bin Naseer High School (11-12):

- a. Mr. Said bin A'mir Al-Aghbari, the Headmaster
- b. Mr. Musbah Abo Al-O'la Subra, English Language Senior Teacher

3) Al-Khoud High School for boys (10-12):

- a. Mr. Khalfan bin Said Al-Sayabi, the Headmaster
- b. Mr. Rashid bin Suliman Al-A'si, English Language Senior Teacher

A sample of students' writing attempts and their assessment

Paragraph 2			Paragraph 3			Paragraph 4		
P.No	Paragraph	Teacher's Comment	Words	Mistake type	Suggestions			
1.	As everyone is aware, new modern technology <u>have</u> changed our life route. It provided human beings with different ways of communication. <u>Whatsapp</u> for an example, is the most common communication app in the world, you can send instant messages to any spot in the globe in a blink of an eye. However, it is becoming increasingly difficult to ignore the lack of privacy of whatsapp		WhatsApp	Error Type : spelling	Replace with :What Replace with :Hats Replace with :Watts Replace with :Halts Replace with :Wasp			
2.	The first main and most important advantage of Whatsapp that it is a perfect communication app; for an example, you can reach any member of your family in any <u>place</u> and at any <u>time</u> you'd like since you have <u>internet</u> connections; not to mention that it is totally free – despite <u>internet</u> charges –. Moreover, you don't <u>have</u> to shout for dinner anymore, just one <u>tap</u> away and your message will be delivered without any struggle.							
3.	Nonetheless, there <u>are</u> a few drawbacks of <u>Whatsapp</u> . Firstly, Whatsapp can weaken family relationships, in any family gathering <u>time</u> you can notice that no one is talking to the other, instead, they stuck their heads on their phones. And another disadvantage of Whatsapp that it has a lack of privacy; for example, your contacts can <u>see</u> <u>when</u> is the last <u>time</u> you <u>ve</u> been online; not to mention that they also can see whether you've read their messages or not and even when. Therefore, no increase in Whatsapp <u>privacy</u> was detected.		whatsapp	Error Type : spelling	Replace with :what Replace with :hats Replace with :Watts Replace with :watts Replace with :wasp			
				Error				

The screenshot shows the 'Academic Writing Wizard' interface. It displays a table of system marks and a summary of the evaluation. The system marks are as follows:

Category	System Marks
Anaphoric and Cataphoric referential percentage	: 02.50 %
Transitional Signal Percentage	: 07.50 %
Lexical Phrases Percentage	: 07.50 %
Lexical Repetition Percentage(Simple,Complex,SMP,SPP)	: 02.59 %
System's mean percentage based on above value (out of 50%) is	: 25.09 %
Essay Level Teacher's Percentage	
Evaluator's mean percentage (out of 50%)	: 46 %

System Marks(Out Of 50%) + Teacher's Marks(Out Of 50%) is : 71.09 %

*Note: The below Marks are only for reference and not included in calculation.

Essay Level System's Percentage With Logical Relation

Category	System Marks
Backward and Forward Conjunction percentage	: 02.50 %
Connecting Words Percentage	: 07.50 %
Lexical Phrases Percentage	: 07.50 %
Logical Relation Percentage	: 00.00 %
Lexical Repetition Percentage(Simple,Complex,SMP,SPP)	: 01.30 %
System's mean percentage with Logical Relation (out of 50%) is	: 18.80 %

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Appendix 2

Example 1: Pre-framework essay evaluation

Writing Assignment

P.No	Paragraph	Teacher's Comment	Words	Mistake type	Suggestions
1.	The final year at school is significantly important to students. Along with <u>this</u> importance comes the necessity of time management. This skill is really crucial as it allows you to enjoy doing all things you <u>wont</u> while being effective and productive.		this	Error Type : grammar	Replace with :this,
2.	<u>Sports</u> is an area that almost every teenager is interested in. However, when it gets practiced through the time-management skill, one will guarantee the satisfaction of both sports and study needs.		wont	Error Type : spelling	Replace with :won't Replace with :want
3.	Allocating time of the day to do sport either on your own or in a sport team, should energize you to study better, in my opinion.		Sports	Error Type : grammar	Replace with :Sport
4.	The reason behind <u>this</u> is the <u>sport</u> that when you go to do sports in the allocated time, <u>that</u> allows your brain to have less stress and gives your body the chance to activate and exercise.		sport	Error Type : spelling	Replace with :spot Replace with :Scot Replace with :sect Replace with :isocet
5.	This controlled pattern of balancing the brain and body needs will <u>result</u> in better study <u>results</u> and healthy body.		result	Error Type : style	Replace with :
			results	Error Type : style	Replace with :

Grading Rubrics : B Range essay (31-40)

states or implies the writer's thesis
logically organizes, supports, and develops ideas
supports its thesis with adequate examples
contains relevant ideas and details
shows adequate use of sentence forms
contains few grammatical errors

Evaluation By WhiteSmoke

Essay Level System's Percentage

Category	System Marks
Anaphoric and Cataphoric referential percentage	: 04.60 %
Transitional Signal Percentage	: 06.60 %
Lexical Phrases Percentage	: 00.00 %
Lexical Repetition Percentage(Simple,Complex,SMP,SPP)	: 00.16 %
System's mean percentage based on above value (out of 50%) is	: 16.36 %
Essay Level Teacher's Percentage	
Evaluator's mean percentage (out of 50%)	: 32 %

System Marks(Out Of 50%) + Teacher's Marks(Out Of 50%) is : 48.36 %

*Note: The below Marks are only for reference and not included in calculation.

Essay Level System's Percentage With Logical Relation

Category	System Marks
Backward and Forward Conjunction percentage	: 04.60 %
Connecting Words Percentage	: 06.60 %
Lexical Phrases Percentage	: 00.00 %
Logical Relation Percentage	: 00.00 %
Lexical Repetition Percentage(Simple,Complex,SMP,SPP)	: 00.08 %
System's mean percentage with Logical Relation (out of 50%) is	: 11.28 %

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Example 1: Framework elements

Writing Assignment						
▼ Paragraph 1						
Step 1				Step 2		
S.No	Noun	Pronoun	Relation	S.No	Category	Transitional Word
1.	skill	it	Anaphora	1.	Result	since
2.	students	they	Anaphora			
Step 3				Step 4		
S.No	Lexical Repetition Type			S.No	Lexical Type	Lexical Phrases
1.	Simple Lexical Repetition			1.	Focus, aim, argument	This paper attempts to show that ...
2.	Complex Lexical Repetition					
▼ Paragraph 2						
Step 1				Step 2		
S.No	Noun	Pronoun	Relation	S.No	Category	Transitional Word
1.	sport	it	Anaphora	1.	Contrast	however
Step 3				Step 4		
S.No	Lexical Repetition Type			S.No	Lexical Type	Lexical Phrases
1.	Simple Lexical Repetition			1.	Highlighting a controversy in the field of study	To date there has been little agreement on what ...
▼ Paragraph 3						
Step 1				Step 2		
S.No	Noun	Pronoun	Relation	S.No	Category	Transitional Word
1.	students	their	Anaphora	1.	Reformulation	basically
2.	students	they	Anaphora			
Step 3				Step 4		
S.No	Lexical Repetition Type			S.No	Lexical Type	Lexical Phrases
1.	Simple Lexical Repetition			1.	Explanations for results	A possible explanation for this might be that
▼ Paragraph 4						
Step 1				Step 2		
S.No	Noun	Pronoun	Relation	S.No	Category	Transitional Word
1.	people	their	Anaphora	1.	Result	therefore
Step 3				Step 4		
S.No	Lexical Repetition Type			S.No	Lexical Type	Lexical Phrases
1.	Simple Lexical Repetition			1.	General descriptions of the relevant literature	A large and growing body of literature has investigated ...

Example 1: Post-framework essay evaluation

P.No	Paragraph	Teacher's Comment	Words	Mistake type	Suggestions
1.	The final year at school is significantly important to students. Along with this importance comes the necessity of time management. This paper attempts to show that this skill is really crucial since it allows students to enjoy doing all things they want while being effective and productive.		this	Error Type : grammar	Replace with :this,
2.	Sport is an area that almost every teenager is interested in. To date there has been little agreement on what is best to pursue, sports or studies. However, when it gets practiced through the time-management skill, one will guarantee the satisfaction of both sports and study needs.		To date	Error Type : grammar	Replace with :To date,
3.	Allocating time of the day to do sports either alone or in a sport team should energize students to study better, in my opinion. A possible explanation for this might be that when they go to do sports in the allocated time, basically this allows their brains to have less stress and gives their bodies the chance to activate and exercise.		sport	Error Type : grammar	Replace with :sport,
4.	A large and growing body of literature has investigated the importance of balancing studies and sports. Research showed that this controlled pattern of balancing the brain and body needs will result in better study results and healthy body. Therefore, people should follow the right pattern to ensure a good health for their body and mind.		result	Error Type : style	Replace with :
			results	Error Type : style	Replace with :

Grading Rubrics : B Range essay (31-40)

states or implies the writer's thesis
logically organizes, supports, and develops ideas
supports its thesis with adequate examples
contains relevant ideas and details
shows adequate use of sentence forms
contains few grammatical errors

Evaluation By WhiteSmoke

Essay Level System's Percentage

	System Marks
Anaphoric and Cataphoric referential percentage	: 10.00 %
Transitional Signal Percentage	: 10.00 %
Lexical Phrases Percentage	: 10.00 %
Lexical Repetition Percentage(Simple,Complex,SMP,SPP)	: 00.64 %
System's mean percentage based on above value (out of 50%) is	: 30.64 %

Essay Level Teacher's Percentage

Evaluator's mean percentage (out of 50%)	: 36 %
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System Marks(Out Of 50%) + Teacher's Marks(Out Of 50%) is : 66.64 %

*Note: The below Marks are only for reference and not included in calculation.

Essay Level System's Percentage With Logical Relation

	System Marks
Backward and Forward Conjunction percentage	: 10.00 %
Connecting Words Percentage	: 10.00 %
Lexical Phrases Percentage	: 10.00 %
Logical Relation Percentage	: 00.00 %
Lexical Repetition Percentage(Simple,Complex,SMP,SPP)	: 00.32 %
System's mean percentage with Logical Relation (out of 50%) is	: 30.32 %

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Example 2: Pre-framework essay evaluation

Writing Assignment

P.No	Paragraph	Teacher's Comment	Words	Mistake type	Suggestions
1.	This century featured more technology compared with the last century. Lots of people say that last century's life is better due to direct connection with people around them all the time. However, I think technology and computer made life easier and faster. Therefore, in this essay I am going to explain the positive impacts of what's app on families.		last	Error Type : style	Replace with : latest Replace with terminal Replace with rearmost Replace with hindmost Replace with endmost
2.	What's app is a common application which you can find in all the phones. It connects us with our families from different locations and time. We can know more about their daily routine by sending us pictures, videos and recording their voices.		last	Error Type : style	Replace with : latest Replace with terminal Replace with rearmost Replace with hindmost Replace with endmost
3.	Also , what's app is a way to invite people to an event that you were planning or meetings. A research results showed that most of the parents preferred that their children have what's app because it makes them closer , and they have knowledge about their children even if they spend most of their time out.		Also	Error Type : style	Replace with Furthermore , Replace with Moreover , Replace with In addition , Replace with Additionally ,
4.	In addition, what's app is good way for shy people to apologize . For example, a daughter had a conflict with her mother , she can send a message on what's app to apologize and explain her feelings comfortably. Furthermore, family members can discuss about any subject and exchange information and knowledge.		A research results	Error Type : grammar	Replace with : Research results Replace with : A research result
5.	In conclusion, I believe that technology has two sides, a positive side and negative one. However, it depends on the person who's using it and his awareness.		closer	Error Type : grammar	Replace with : closer ,

Grading Rubrics : C Range essay (21-30)

states or implies some stable position

organizes and develops ideas

supports its position with adequate examples

contains somewhat relevant ideas and details

may contain grammatical errors

Evaluation By WhiteSmoke

Essay Level System's Percentage

Anaphoric and Cataphoric referential percentage	: 05.00 %
Transitional Signal Percentage	: 10.00 %
Lexical Phrases Percentage	: 01.60 %
Lexical Repetition Percentage(Simple,Complex,SMP,SPP)	: 08.67 %
System's mean percentage based on above value (out of 50%) is	: 30.27 %

Essay Level Teacher's Percentage

Evaluator's mean percentage (out of 50%)	: 26.5 %
--	----------

System Marks(Out Of 50%) + Teacher's Marks(Out Of 50%) is : **56.77 %**

*Note: The below Marks are only for reference and not included in calculation.

Essay Level System's Percentage With Logical Relation

Backward and Forward Conjunction percentage	: 05.00 %
Connecting Words Percentage	: 10.00 %
Lexical Phrases Percentage	: 01.60 %
Logical Relation Percentage	: 00.00 %
Lexical Repetition Percentage(Simple,Complex,SMP,SPP)	: 04.34 %
System's mean percentage with Logical Relation (out of 50%) is	: 20.94 %

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Example 2: Framework elements

Writing Assignment

▼ **Paragraph 1**

Step 1

S.No	Noun	Pronoun	Relation
1.	people	them	Anaphora

Step 2

S.No	Category	Transitional Word
1.	Contrast	however
2.	Result	therefore

Step 3

S.No	Lexical Repetition Type
1.	Simple Lexical Repetition
2.	Phrasal Lexical Repetition

Step 4

S.No	Lexical Type	Lexical Phrases
1.	Focus, aim, argument	This paper attempts to show that ...

▼ **Paragraph 2**

Step 1

S.No	Noun	Pronoun	Relation
1.	application	which	Anaphora
2.	what's app	it	Anaphora
3.	families	their	Anaphora

Step 2

S.No	Category	Transitional Word
1.	Reformulation	basically

Step 3

S.No	Lexical Repetition Type
1.	Simple Lexical Repetition

Step 4

S.No	Lexical Type	Lexical Phrases
1.	Establishing the importance of the topic (time frame given)	In recent years, there has been an increasing interest in ...

▼ **Paragraph 3**

Step 1

S.No	Noun	Pronoun	Relation
1.	parents	their	Anaphora
2.	children	them	Anaphora
3.	children	they	Anaphora

Step 2

S.No	Category	Transitional Word
1.	Result	because

Step 3

S.No	Lexical Repetition Type
1.	Simple Lexical Repetition

Step 4

S.No	Lexical Type	Lexical Phrases
1.	Statements of result (usually with reference to results section)	The most interesting finding was that

▼ **Paragraph 4**

Step 1

S.No	Noun	Pronoun	Relation
1.	what's app	it	Anaphora
2.	daughter	she	Anaphora
3.	daughter	her	Anaphora

Step 2

S.No	Category	Transitional Word
1.	Exemplification	for example

Step 3

S.No	Lexical Repetition Type
1.	Simple Lexical Repetition
2.	Complex Lexical Repetition

Step 4

S.No	Lexical Type	Lexical Phrases
1.	Statements of result (usually with reference to results section)	Another important finding was that

▼ **Paragraph 5**

Step 1

S.No	Noun	Pronoun	Relation
1.	technology	it	Anaphora
2.	person	his	Anaphora

Step 2

S.No	Category	Transitional Word
1.	Contrast	however

Step 3

S.No	Lexical Repetition Type
1.	Simple Lexical Repetition

Step 4

S.No	Lexical Type	Lexical Phrases
1.	Focus, aim, argument	In this paper I argue that ...

Example 2: Post-framework essay evaluation

P.No	Paragraph	Teacher's Comment	Words	Mistake type	Suggestions
1.	This century introduced more technology compared with the last century. Lots of people say that last century's life is better due to direct connection with people around them all the time. However, I think technology and computer made life easier and faster. Therefore, this paper attempts to show that communication technology like what's app has positive impact on families.		last	Error Type : style	Replace with : latest Replace with :terminal Replace with :earmost Replace with :hindmost Replace with :endmost
2.	In recent years, there has been an increasing interest in communication technology on smart phones. What's app is the most common application which you can find in all the phones. Basically, it connects us with our families from different locations and time. We can know more about their daily routine by sending us pictures, videos and recording their voices.		last	Error Type : style	Replace with : latest Replace with :terminal Replace with :earmost Replace with :hindmost Replace with :endmost
			positive	Error Type : grammar	Replace with :a positive Replace with :the positive
3.	Also what's app is a way to invite people to an event that you were planning or meetings. Also the most interesting finding was that most of the parents preferred that their children have what's app because it makes them closer and they have knowledge about their children even if they spend most of their time out.		Also	Error Type : style	Replace with :Furthermore, Replace with :Moreover, Replace with :In addition, Replace with :Additionally,
4.	Another important finding was that What's app can help solve problems and discuss different issues. For example , it is good way for any people to apologize. For example , a daughter had a conflict with her mother , she can send a message on what's app to apologize and explain her feelings comfortably. Furthermore, family members can discuss about any subject and exchange information and knowledge.		Also	Error Type : style	Replace with :Furthermore, Replace with :Moreover, Replace with :In addition, Replace with :Additionally, Replace with : as well Replace with :besides Replace with :equally important
			closer	Error Type : grammar	Replace with :closer,
5.	In this paper , I argue that technology has two sides, a positive side and negative one. However, it depends on the person who's using it and his awareness.		children	Error Type : grammar	Replace with :children,
			For	Error	

Grading Rubrics : C Range essay (21-30)

states or implies some stable position
organizes and develops ideas
supports its position with adequate examples
contains somewhat relevant ideas and details
may contain grammatical errors

Evaluation By WhiteSmoke

Essay Level System's Percentage

	System Marks
Anaphoric and Cataphoric referential percentage	: 10.00 %
Transitional Signal Percentage	: 10.00 %
Lexical Phrases Percentage	: 10.00 %
Lexical Repetition Percentage(Simple,Complex,SMP,SPP)	: 07.60 %
System's mean percentage based on above value (out of 50%) is	: 37.60 %

Essay Level Teacher's Percentage

Evaluator's mean percentage (out of 50%)	: 28 %
--	--------

System Marks(Out Of 50%) + Teacher's Marks(Out Of 50%) is : 65.6 %

*Note: The below Marks are only for reference and not included in calculation.

Essay Level System's Percentage With Logical Relation

	System Marks
Backward and Forward Conjunction percentage	: 10.00 %
Connecting Words Percentage	: 10.00 %
Lexical Phrases Percentage	: 10.00 %
Logical Relation Percentage	: 00.00 %
Lexical Repetition Percentage(Simple,Complex,SMP,SPP)	: 03.80 %
System's mean percentage with Logical Relation (out of 50%) is	: 33.80 %

Back

Abbreviations

AWW	Academic Writing Wizard
pre-app phase	Pre-application phase
post-app phase	Post-application phase
LCT	Lexical Cohesive Trio
MANOVA	Multi-factor analysis of variance

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s40468-022-00178-1>.

Additional file 1. Report on Dr. Hussein Al-Sharoufi's Visit.

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Author's contributions

Dr. HAS, Associate Professor of Applied Linguistics in the English Department at GUST, participated and presented papers at over twenty-six international refereed conferences and published over twenty publications in applied linguistics, pragmatics and discourse analysis, and language teaching in several international refereed academic journals. He is an active member of IPRA International, TESOL International, and TESOL Kuwait. He was the President of TESOL Kuwait for 2 years. He also presented several papers at TESOL International conventions and at international conferences on pragmatics and discourse analysis. He also reviews papers for several international journals, including *Journalism: Theory, Practice & Criticism* (Published by SAGE, UK), *Journal of Pragmatics* (Elsevier-UK), the *International Journal of Language and Communication*, Denmark, and *Reading and Writing Quarterly*. Dr. HAS is known for his creation of the Academic Writing Wizard, AWW, which is a new Web-based application for teaching academic writing. The author(s) read and approved the final manuscript.

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Availability of data and materials

This is the second part of a two-phase project funded by the Kuwait Foundation for the Advancement of Sciences. The study concentrates on the use of a Web-based writing test application in Omani secondary schools. Official letters of endorsement for my project have been sent by the Ministry of Education in the Sultanate of Oman. Since I received formal approval from the Omani Ministry of Education, no further approvals were required for my project. I collected all data on my own after I had visited some Omani schools to pilot Academic Writing Wizard and collect data based on written essays.

Declarations**Competing interests**

The authors declare no competing interests.

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