

AUTOMATED WRITING EVALUATIONS IN THE ESL CLASSROOM

by

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Declaration of Authorship

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Dedication

This thesis is dedicated to the loving memory of my mom, who had always wanted me to do a postgraduate study in English language teaching.

Abstract

Automated feedback systems have taken center stage in global education. It is unarguably evident that there have been noticeable increases in attempts by many technological companies to develop automated feedback tools that support, enhance, and facilitate assessments and language learning in the classrooms. For most English as a Second Language Student (ESL) students, quality feedback is fundamental to correct use of English language for academic purpose, especially in their academic writing tasks. However, one of the major challenges has been the inability of many ESL students to access effective feedback that is timely, appropriate, and supportive. Another challenge that most ESL students face is the lack of autonomy and collaborations in the feedback review process. Most peer review and automated writing feedback tools follow a one-way communication style where the students are forced to accept the feedback passively. A solution to this ordeal of most ESL students may be found in the automated writing tool called, Auto-peer. Auto-Peer as an automated writing tool enhances effective peer review system whereby students feel comfortable to self-reflect and make correct writing decision following the timely, appropriate, and supportive guidance of Auto-Peer. This research therefore presents how Auto-Peer enhances student feedback literacy, autonomy, and student writer agency with a focus on topic sentence openers of ESL students in their academic writing.

Keywords: Student feedback literacy, peer review, writer agency, writer autonomy, automated writing feedback.

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Chapter 1. Introduction

Advancements in technology over the past two decades in conjunction with the current global emphasis on writing instruction have given viability to Automated Writing Evaluation (AWE) software in the global market (Hockly, 2019). Education companies such as the Education Testing Service (ETS) and Vantage Learning have successfully created educational products that put their scoring engines on a commercial scale (Burstein et al., 2001). According to Warschauer (2006), a further company, Pearson Knowledge Technologies, was involved in sharing their programs with other commercial partners to be used for various projects. Patronage from their commercial partners was gained because these products are able to provide numerical scores and useful feedback (Streeter et al., 2011).

The first AWE experience dates back to 1960 and was used for Project Essay, *Grade PEG* for short (Page, 2003). Easy scoring of voluminous high school students' essays was facilitated by the technology. The state of technology at the time was shallow and it hindered the expansion of knowledge related to AWE. The shallow state of technology also limited accessibility of prospective users to the technology. However, with the advent of microcomputers in the early 1980s, the PEG model was rekindled, leading to a new writing technology called 'Writer's Workbench' While feedback was only limited to flagging concerns related to spelling, sentence structure, and sentence type, the model paved the way for the present focus on feedback in AWE (Page, 2003).

In this thesis, I argue that Auto-Peer, an automated writing feedback tool, can be an effective medium in the English as a Second Language (ESL) classrooms because Auto-Peer provides immediate and quality feedback to learners on the development of their writing skills (McCarthy et al., 2021). Automated writing feedback is defined by Shermin and Burstin (2003) as the use of technological software in the evaluation and scoring of

writing tasks. Despite its popularity and use by many English language experts, there are some misgivings about its accuracy and reliability especially when used for tests and assessments. Thus, I address the importance of Auto-Peer with regards to its ability to facilitate improved writing experiences among ESL students by providing guidance without enforcing its suggestions on the students.

I support my position on the importance of Auto-Peer as an automated writing tool in the ESL classroom with the following three arguments. First, in agreement with McCarthy et al. (2021), I argue that Auto-Peer is beneficial because it supports student feedback literacy through self-review among students, thereby enhancing their ability to re-think and re-strategize regarding their writing. Second, I argue that Auto-Peer encourages student writer agency via a collaborative writing procedure that allows students to learn from each other. Third, I argue that Auto-Peer encourages the peer assessment skill in students by its use of facilitative computer software applications that complement ESL instructors in diagnostic and holistic assessments of ESL students' writing.

I also consider alternative positions against using automated writing feedback in ESL classrooms. These arguments include that an automated writing feedback tool may not take into account its effect on students' attitudes and how these effects can influence teachers' use of automated writing feedback tools (Pei-ling, 2013). There is also the argument that feedback to students is too rigid and vague when using automated writing feedback tools. Another claim against automated writing feedback concerns its limitation in effective execution of its pedagogical implications. Finally, there is also the assumption that existing research in an ESL classroom context has not considered the significance of holistic scores in AWE as well as their pedagogical values. Therefore, these limitations highlight the need for further classroom strategies to enhance sufficient revision and excellent writing development. Therefore, in this study, I explore the effectiveness of Auto-

Peer at enhancing writer's agency and students' feedback literacy by focusing on a corpus of 200 topic sentence from ESL students at the American University of Sharjah.

1.1 Statement of the Problem

The technological architecture of AWE software enhances effective scoring of students' essays. According to Warschauer and Grimes (2010), AWE's technology and tools are built on various crucial platforms such as artificial intelligence (AI), natural language processing, and mathematical algorithms. These tools enhance effective written text evaluations faster than their manual counterpart. Liu and Kunnan (2016) confirmed that since the emergence of computer-assisted language learning, there have been significant improvements in the use of AWE tools for scoring essays and detecting errors. For example, the essays of 28 adult Japanese ESL students were analyzed for errors by Otsoshi (2005) using an AWE tool called, Criterion. Likewise, Chen et al. (2009) employed Criterion for error detection with the aim of examining its efficacy at detecting errors in English language mechanics, sentence types, and structure. Furthermore, feedback relating to errors on 150 essays of some ESL students in Taiwan were also analyzed using Criterion. The success rate with regards to grammatical accuracy was 79%. This percentage enhanced the argument of Chen et al. (2009) who claimed that the feedback, especially with regards to local language features, was instrumental in helping Taiwanese ESL students improve their writing skills and accuracy. An updated version of Criterion was also adjudged to be better as it helps language instructors reduce work overload as well as facilitates the writing development of ESL learners.

Most language instructors are laden with the responsibility of assessing hundreds of writing tasks of ESL students within a very short time frame (Dikli, 2010). This enormous responsibility runs the risk of causing instructors to provide hurried feedback that may be full of ambiguities that confuse the students (Boud et al., 2013). In most cases,

such feedback is generic in nature and often adds little or no value to the students (Evans, 2013). As a result, AWE has been employed to provide feedback on ESL students' writing tasks beyond its surface features of generic error corrections in the areas of grammar, spelling, punctuation, word, and sentence order (Wang & Wang, 2012).

One approach to feedback is student peer review. Peer review is a standardized procedure through which summative and formative feedback on a piece of writing are given or received from others to aid improvement on a piece of work (Treat, 2012). Peer review enhances students' engagement with writing by enhancing genuine self-reflections that initiate critical thinking process in the students (Nelson, 2009). As a result, students have an increased opportunity of becoming effective thinkers with a self-reflective skill that questions values, opinions, and the status quo (Nilson, 2003). Therefore, peer reviews that operate only at the surface level may not be effective since the focus is usually on error correction, especially in grammar (Kellogg et al. 2010). To resolve this common issue of peer reviews among ESL students, Jinrong and Volker (2015) suggests a blend of holistic and peripheral peer-reviewing where using both virtual and face to face media is employed, thereby enhancing the overall effectiveness of the peer-review systems in the classroom, especially among ESL students.

Feedback has been an effective support system for many ESL students especially in the area of error correction. However, the writing needs of ESL students transcend focus on error correction. Instead, there is a need for attention to be given to student feedback literacy and student writer agency, among other crucial academic writing features. According to Doud and Molloy (2013), "Student feedback literacy denotes the understandings, capacities and dispositions needed to make sense of information and use it to enhance work or learning strategies" (P.1). Nevertheless, Hyland and Hyland (2006) claimed that peer reviewing are conditioned with strict guidelines to be followed by each

ESL peer reviewers without which successful peer reviews will be impossible (Guardado & Shi, 2007).

Challenges attributed to peer reviews in both first language and ESL classes are similar. First, students' varied learning styles and how students' anxieties of feedback can be mitigated are a few first challenges of peer reviews (Matsumura & Hann, 2004). Students have differing learning styles and instructors may not consider these multiple learning styles during peer reviewing process, leading to some limitations in the procedure. Students may also become anxious in anticipation of the unknown, as they engage in the peer review procedure. Another bottleneck to peer review is the one-way communication that may pay little or no attention to students' feedback in the peer review process (Guardado & Shi, 2007). According to Díez-Bedmar and Pérez-Paredes (2012), many students feel compelled to passively accept peer reviews without a chance for a follow-up from their instructors. This attitude plays a negative role in the peer-review process. Another issue for peer reviewing is the provision of shallow and or overly complex reviews that are either too shallow because of poor explanation from peers, or too complex to comprehend by peers (Tunison & Noonan 2001). The procedure involved in the process of peer review may also be one of the major drawbacks. The time frame between giving feedback and peer comments' receptions (Ho & Savignon, 2007) can be a major challenge as a result of lengthy delays (Ertmer et al., 2007; Guardado & Shi 2007).

1.2 Significance of the Research

One approach to addressing the issue of peer review is automated feedback. Automated writing feedback enhances simple classroom management techniques. This technique of simplified writing instructions has enhanced time management and created more engaging lessons that enable both learners and instructors to focus on more technical

aspects of writing such as argumentation and rhetoric. According to Link et. al. (2014), despite the claim of rigidity and vagueness of automated writing feedback, there is strong evidence that it enhances accuracy and autonomy. Thus, to support this argument, I present evidence of instances where automated writing feedback has been of benefit in ESL writing classrooms.

Automated writing feedback is also an effective means through which ESL learners can engage in practical writing activities with the advantage of gaining speedy feedback on their writing discourse (Saricaoglu, 2019). Furthermore, through its popular application platforms such as Criterion, My Access! WriteToLearn, and Write & Improve, automated writing feedback has empowered instructors beyond ESL classrooms.

Automated writing feedback is now used by major examination bodies and corporations that conveniently teach and monitor students' improvement in their writing as well as measure their proficiency levels in the target language via various assessments such as placement tests, SAT, GRE, GMAT, formative and summative assessments (Hockly, 2018). Taking this argumentation positively will enhance all the above-mentioned benefits, and also create opportunities to become more creative about other beneficial functions of automated writing feedback in the classroom. However, failure to accept this argument may make ESL writing a struggle. Assessing writing tasks will also be manually corrected, which most ESL instructors find daunting and laborious (Dikli, 2010). Feedback on learners' writing tasks will be delayed, and the instructors may be overwhelmed with correcting learners' writing tasks with a deadline in mind. Instructors may become anxious thereby affecting their mental wellness (Hamp-Lyons and Kroll, 1997).

One example of an automated writing tool that may solve these problems of student peer reviews is Auto-Peer (McCarthy et al., 2021). Auto-Peer closes the chasm between the language instructors and the learners by providing the detailed and meaningful

feedback that may often be missing in face to face sessions. Language instructors' time is also spent more judiciously as attention may be given to students who may need more guidance and explanations with regards to the writing process (Huong, 2016). As mentioned by McCarthy et al. (2021), peer-review is a crucial element of writing and must be given adequate attention to enhance a robust and improved writing process among ESL writers. Auto-Peer is created to see to it that this aspect is well enhanced to complement other impressive functions of AWE systems.

One of Auto-Peer's areas of focus is supporting ESL writers. The writing needs of ESL writers are considered paramount, as a result, the Auto-Peer team members, who are based in the Gulf region, facilitated the debut use of the application by international students in Africa, the Middle East, Asia, North America, and Europe (McCarthy et al., 2021). The broad spectrum of the global use of the application has made Auto-Peer an AWE tool with an architectural interface that factors into its design, the linguistic diversity of the international students who employ the application in their essays thereby making provisions for different linguistic barriers that each student may encounter in their writing with regards to their regional or local English use (see Min & McCarthy, 2013; McCarthy et. al., 2007).

The software application can easily be downloaded by anyone in need of peer-evaluation. Students are guided by the software application on one of the best writing approaches through its automated feedback on the students' essays. According to McCarthy et al., (2021), this application grants access to students who may not be privileged to have face to face interactions with peers and their language instructors. For example, during the COVID-19 pandemic there was a significant growth of virtual and blended learning. Additionally, students are likely to enjoy having their essays analyzed for

different writing issues, they will receive suggestions on how best to structure their texts and receive a feedback report that can be useful for face to face interactions.

In this thesis, I focus on the AWE called Auto-Peer. Auto-Peer follows a stringent procedure to achieve its goals. Once Auto-Peer has identified the writing issues of the students, the software asks the students to either amend their writing or explain their writing choices (McCarthy et al., 2021, p.4). As such, the students experience improved writing skills while the language instructor is free to spend more time on student-teacher interactions instead of engaging in continuous repetitive written feedback.

1.3 Research Questions

This study aims to answer the following research questions:

1. What are the benefits of automated writing feedback? What are the benefits of using Auto-Peer to facilitate students' feedback literacy through self-review with a focus on topic sentence openers?
2. How does Auto-Peer as an automated writing feedback tool support ESL learners? Through data from use of Auto-Peer for academic writing, how can Auto-Peer enhance students' writer agency and autonomy?
3. Why should automated writing feedback be encouraged in ESL classrooms?

Chapter one is the introduction that addressed the key points of the purpose of this study. The research questions are also outlined. The remaining research is organized thus: Chapter Two reviews crucial concepts in AWE, peer reviews, peer feedback.

Definition of terms, contributions of AWE to language learning and teaching, limitations and attempts at proffering solutions to some of the limitations of AWE in the past are explored. Furthermore, Auto-Peer as an effective automated writing feedback tool is discussed in detail. Its probable ability as a tool to remedy some of the problems cum limitations associated with automated writing feedback are also discussed. Chapter Three

summarizes the current study by reiterating key points of the study, the research questions, and procedures to answer the research questions. Chapter Four contains an outline of the research method alongside detailed explanations of the research procedure, and tools for data collection. Chapter five gives a summary as well as the analysis of the research findings. Lastly, Chapter Six concludes the research by discussing the research findings, looking at the pedagogical implications of the findings, exploring limitations to the study, and suggesting areas for future research that is followed by a final conclusion.

Chapter 2. Literature Review

Use of technology in the ESL classroom has recently experienced considerable growth. Many language instructors now integrate technology into their classroom pedagogy, unlike previous wariness of using technology because at a point in time it focused majorly on providing answers to students instead of supporting their learning (Heick, 2015 & Himmelsbach, 2019). As a result, various technologies have developed software that can be applied to teaching and learning in an ESL classroom, and the most crucial one for this study is the software technology that provides intelligent assistance to students in their academic writing.

2.1 Automated Writing Feedback

Software development for academic writing has become prominent in language classrooms. For example, there are currently writing tools and techniques that have been developed to handle various areas of writing such as summarizing and grading of various writing tasks. Examples of such writing tools and techniques include ETS's e-rater (Attali & Burstein, 2006) and Latent Semantic Analysis (Landauer et al., 2003) that are used to grade writing; Summary Street (Franzke et al., 2022) to summarize writing; Coh-Metrix (McNamara et al., 2014) to analyze writing, and IntelliMetric (Cotos, 2014) among others is used to evaluate writing's efficiency and performance (McCarthy, 2001).

Peer-reviewing in academic writing has also caught the attention of software developers. The emergence of English as a global academic discipline makes peer-reviewing a welcomed development as it reduces for language instructors the excessive strain of marking, grading, and giving feedback to ESL students on their written essays (Cotos, 2014). However, McCarthy (2001) pointed out that most of the automated peer-reviewing tools are not easily accessible to ESL writers, and in situations where they are

available, their technological interfaces are too complex for easy use by ESL writers. McCarthy (2021) also mentioned that the readily available peer-review options for ESL writers are Grammarly, Peerceptiv, and calibrated Peer Review tools that are riddled with many limitations despite their usefulness. One of their limitations, according to McCarthy (2021), includes the non-easy availability of expert systems in these tools for college students and ESL writers and has led to the creation of Auto-Peer, which McCarthy and Ahmed (2019) described as a "... notable realistic example of IA for ESL students" (p.7).

Intelligent Assistants (IA) support ESL students in their writing. In the field of education, IA's technological design has an automated infrastructure that assists college students in making correct decisions regarding their writing (Boy & Gruber, 1990). The virtual agents, who also function as conversational partners, have been described by Macedonia et al. (2014) and Wik and Hjalmarsson (2009) as the most prominent application of IA in ESL classrooms because IA software often takes on the character of a non-authoritarian companion (McCarthy et al., 2021).

2.2 Auto-Peer as an Automated Writing Feedback Tool

Auto-Peer is a typical example of IA. Auto-Peer as a computational peer-review software was first developed to support students' writing in the Gulf countries (McCarthy & Ahmed, 2021). The Gulf region is predominantly home to Arabs and several other Asian and Sub-Saharan African nationalities, giving Auto-Peer an environment to function at its best. Although the architectural design of Auto-Peer can also meet the writing needs of first language speakers, it has some special features that cater to the local language needs of ESL students. Examples of some of these features include the ability of Auto-Peer to give examples and explanations that are both "...culturally sensitive and regionally inclusive" (McCarthy & Ahmed, 2019, p.9).

Auto-Peer follows a stringent procedure to achieve its goals. Once Auto-Peer has identified the writing issues of the students, the software asks the students to either “1) modify their text or 2) justify their writing choices” (McCarthy et al., 2021, p.4). Therefore, one of the major advantages of Auto-Peer is the ability to enhance learner agency by assisting students to independently take ownership of their writing decisions. Enhancing learner agency among students will not only relieve language instructors of the burden of excessive corrections of students’ writing, it will also make learning the rudimentary of academic writing effective and memorable for the students.

Auto-Peer’s writing support for students is broad and constantly evolving. The fact that the stakeholders in the development of this application are predominantly ESL students and language instructors make the development of Auto-Peer continuous (McCarthy et al., 2021). As a result, Auto-Peer focuses on students’ confusion on their overall writing cohesion, topic sentence openers, complex and wandering expressions, appropriate diction, managing arguments, and appropriate conclusions (McCarthy & Ahmed, 2019).

2.3 Auto-Peer’s User Interface

User-friendliness of an automated writing tool is paramount. According to Pass and Kester (2006) and Van Merriënboer et al. (2006), simplicity is crucial in an automated learning environment. Therefore, according to McCarthy and Ahmed (2019), Auto-Peer is “...designed as an optimally user-friendly *paste & click* system” (p.8). Thus, all the students need to do for a full auto-review of their writing as shown in Figure 1 is to copy and paste their written task into the Auto-Peer text box, click on the “Analyze” button and then select whatever service(s) they need from Auto-Peer regarding their writing from a wide range of options. As McCarthy and Ahmed (2019) put it, the ease of operating Auto-

Peer frequently supports students' engagement in self-review after which they justify or modify their writing decisions.



Figure 1. The Auto-Peer interface showing links to various automated writing functions.

Auto-Peer does not grade or correct students' writings; instead, it only identifies various areas where students may need clarity and support regarding their writing. Tips and guidance are provided by the software, but the students have to make the final decision regarding all suggestions from Auto-Peer by either justifying their position regarding their writing choices or modifying them based on Auto-Peer's suggestions. An advantage of engaging in this automated writing peer-review procedure by the students is that it reinforces teachers' instructions and also enhances self-review among the students, which is a crucial aspect of learning as students are able to re-think and re-strategize regarding their writing (McCarthy et al., 2021).

Real-time peer-review is one of Auto-Peer’s strengths. The software application instantly analyses inputted information that is instantly processed. The user is able to observe the scanning process as the software races through the analysis of the inputted information in seconds via a long and small text bar that is next to “Show Explanation Box.” In less than one minute the software scans through the inputted information for possible writing errors (as shown in Figure 2 below). The result of the scanned information is displayed on the screen of the software.

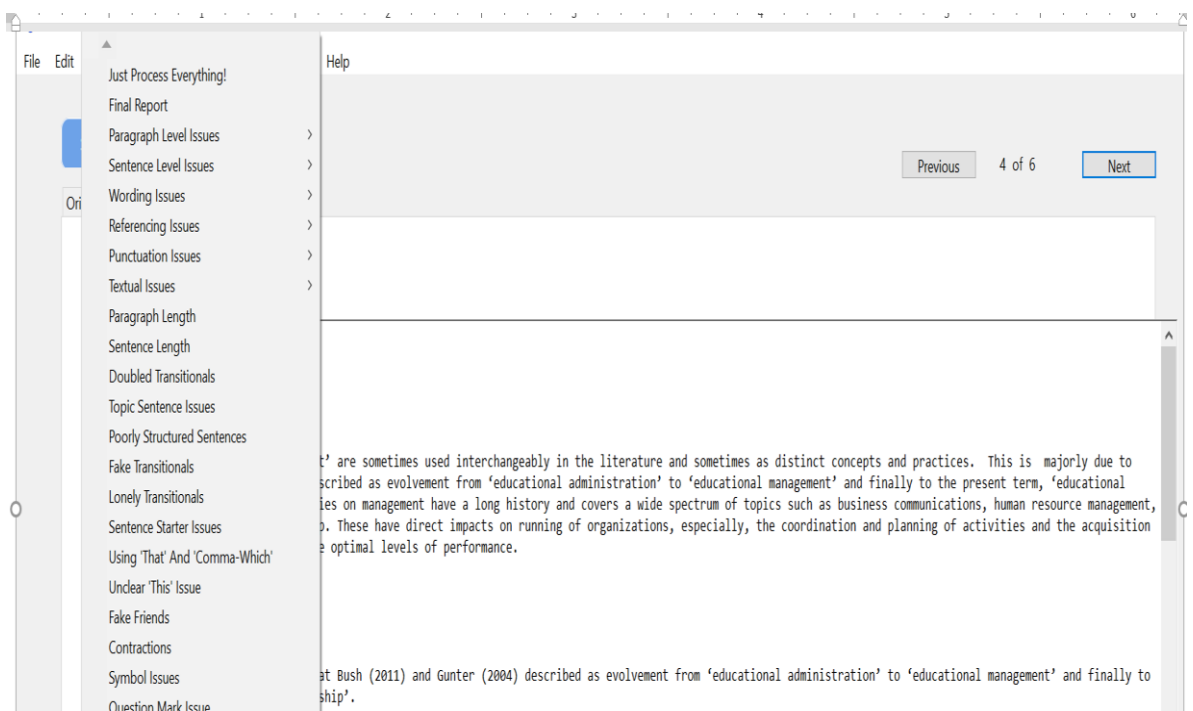


Figure 2. The Auto-Peer Interface showing a dropdown list of information in the “Explanations” section.

The analysis first introduces the students to the discovered writing issues with examples of these issues from the entire written task. Each example of the flagged writing issues is followed by an explanation of the problem with suggested solutions and guidance for further writing practice (see Figure 3). Afterwards, students may either justify their writing decisions or modify their papers before giving them to their instructors who may

ask for Auto-Peer's report with the aim to compare the report to the students' self-reviews for consistency. McCarthy and Ahmed (2019) suggested that this may help language instructors save time and make them focus on other crucial aspect of their students' writing.

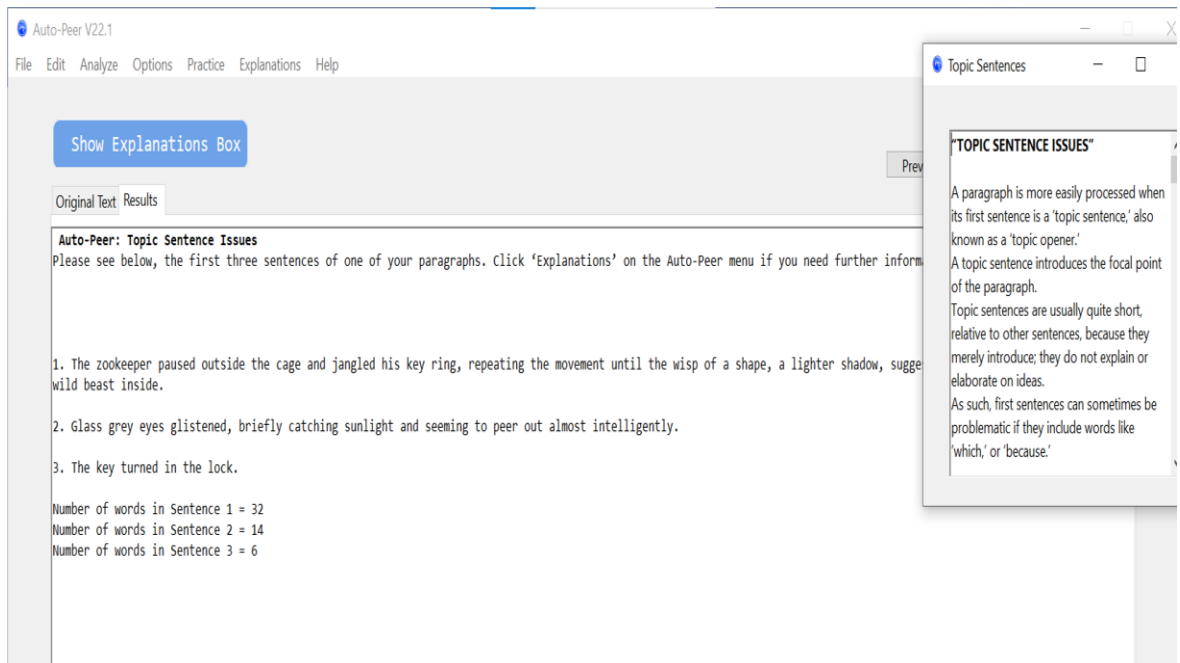


Figure 3. The Auto-Peer interface giving guidance regarding a student's writing.

2.4 Auto-Peer's Operational Principles

Corrective feedback from instructors may be crucial to students' success in the ESL classroom. Most ESL students need constant feedback from their instructors to prevent fossilization of errors that may occur at different levels of their writing (Peng, 2012). Some studies have also concluded that language instructors' feedback may be the most crucial factor for ESL students (Hattie & Timperley, 2007). Based on the aforementioned, a reasonable conclusion is that Auto-Peer has the potential to make significant impact on ESL students' writing as the application provides very useful feedback to the students just like an instructor would in conventional classroom (McCarthy & Ahmed, 2021).

Effective feedback is another highlight of Auto-Peer. According to McCarthy and Ahmed (2019), the feedback procedure hinges on three principles: timeliness, voice, and appropriacy. Mulliner and Tucker (2015) and Weaver (2006) claimed that the invaluable factor of timeliness in ascertaining effective feedback. Delay in giving feedback was observed to lead to anger and frustrations which made many students abandon their various writing tasks (Brooks et al., 2019). However, such frustrations are not experienced by students who receive feedback on their writing tasks on time (Williams & Kane 2008).

Feedback from language instructors to their students can take time. According to Mulliner and Tucker (2015), feedback from language instructors may take close to two or more weeks. Timeliness is therefore one of the strong points of Auto-Peer as instant virtual feedback of the analyzed text is always provided. The language instructors can then focus on engaging the students in the human interactions that they may need in their writing feedback.

Voice is another principle on which Auto-Peer is focused. According to Storch (2010), many students expect a certain degree of politeness when they receive feedback from their instructors. There are several books that guide instructors on the best way to go about giving positive feedback that reinforce understanding without making the student feel inadequate (Nilson, 2003). Therefore, instructors are saddled with the responsibility of making the voice of their feedback to their students constructive, suggestive, and functional (McCarthy & Ahmed, 2019). Positive feedback is crucial to motivate students and for students' improvement in their tasks in general. However, unlike face to face interactive feedback, it is difficult to ascertain the level of politeness an automated writing tool can offer during virtual feedback to students. The situation may be more complex in an ESL classroom given the multicultural compositions of most ESL classrooms. As a result, the multicultural milieu may likely dictate how individual student reacts to feedback (Brooks et

al., 2019). Therefore, Auto-Peer considers its users' reactions when giving feedback to the students, and McCarthy and Ahmed (2021) opined that Auto-Peer's "...initial and default feedback voice is polite, humble, and *peer-like*" (p.12).

Appropriacy is the final principle of Auto-Peer. Courteous and timely feedback can only be effective in the context of appropriateness that is hinged on relevant explanation and presentation (Halpern et al., 2007 and Mayer, 2001). It is therefore pertinent at this juncture to reiterate that Auto-Peer does not judge students' work by grading them. The software only identifies potential issues relating to a written task and provides guidance on how to elevate a piece of writing to acceptable academic standards.

The non-judgmental configuration of Auto-Peer is of great importance. First, the non-judgmental configuration automatically upgrades Auto-Peer to the status of a student companion that provides suggestions regarding their writing without forcing its choices on the students. Second, the non-judgmental nature of Auto-Peer allows students to self-review and self-reflect on their writing choices as they compare and contrast their writing to Auto-Peer's suggestions.

2.5 Topic Sentences

In this study, I show how Auto-Peer may be used to facilitate students' feedback literacy through students' engagement in self-review of their sentence openers based on guidance provided by Auto-Peer. The notion of using a topic sentence at the beginning of a paragraph is not new. Angus (1862) claimed that where to place a topic sentence in a paragraph has been the focus of research studies for more than a century. The idea of where to place a topic sentence was also discussed in a book written by John McElroy in 1885; however, it began earlier in Alexander Bain's book titled, "Composition and Rhetorics" published in 1866. McCarthy (2008) also claims that empirical study of topic sentences did

not begin until Meade and Ellis (1970) embarked on a research study and concluded that “...writers often ignore traditional instruction and use alternative structures (McCarthy, 2008, p. 5).

The description of a topic sentence has some basic rules explaining the composition of a paragraph as well as the positioning of the topic sentence. Rodeger (1965) opined that the topic sentences may appear in any positions in a paragraph. One of the rules, the sixth rule of theories and practice of narrative writing of Brian Richardson, who is an expert in narrative writing and the history of the novel (Alber, 2013) agrees with Rodeger’s (1965) view that a paragraph must have a topic sentence, but disagrees with Rodeger’s (1965) view on the positioning of a topic sentence. Brian’s theory states that the topic sentence must be at the initial or beginning of the paragraph (Craig, 2008).

Topic sentences have some basic compositions. Despite its many definitions by various scholars, there seem to be a consensus regarding the features of a topic sentence in that it should have the following characteristics. First, topic sentences give clues about what the entire paragraph is all about. Most topic sentences are structured to help the readers predict the main idea in the paragraph. Second, topic sentences in most cases appear at the beginning of a paragraph. In other words, they tend to serve as sentence paragraph openers. Third, they are expatiated and/or supported by other sentences that may be references and claims of findings relating to the topic sentences. Finally, topic sentences are more often used in expository texts than narrative writings (McCarthy, 2008).

Some essays may not begin with a topic sentence. This is reflected in a study conducted by Braddock (2020) when it was discovered that 87% of the paragraphs in an expository essay did not begin with a topic sentence (Braddock, 1974). Braddock’s (1974) study is often used to buttress the need for modifications of reading and writing instructions to enhance proper understanding of the function and importance of topic sentences in

academic writing. For example, most students are taught that the topic sentence gives the overview of what a paragraph contains. They are often informed to pay attention to the opening sentence of each paragraph as it holds the key to the message of the paragraph. Therefore, inability of such students to find the topic sentences at the initial stages of each paragraph can be challenging as they often struggled to understand the main idea of the paragraph leading to reading and writing difficulties (Horowitz, 1981).

Organization and logical sequencing of ideas are crucial elements of academic writing. This has been turbulent water to navigate for many ESL writers who often found the process of organizing their thoughts a daunting experience (Francis, 2007). This perspective is further supported by de Oliveira (2011) who argues that writing is taught in both secondary and post-secondary institutions; however, most of the faculty members who are laden with the responsibility of teaching writing may not be well-equipped with the professional and pedagogical wherewithal needed to facilitate and sustain good knowledge of using topic sentences in their writing.

Topic sentences are excellent means for idea recall. Several studies across the fields of psychology and linguistics have been able to confirm that topic sentences enhance readers' memories of texts (Aulls, 1975). This ability to recall information is mostly possible where the topic sentence is at the initial position of the paragraph. Most topic sentences are simple sentences and this makes it easier for readers to easily recall crucial information in different expository essays. Therefore, in this study, I investigate the efficacy of Auto-Peer at enhancing student writer agency via a collaborative writing procedure.

Chapter 3. Current Study

As previously discussed, feedback on learners' writing in the ESL classroom is crucial. There are many automated writing evaluation tools that have been helpful in relieving language instructors of the burden of grading substantial amounts of students' writing to the detriment of their physical, mental and emotional health (Dikli, 2010), which as a result, has left many ESL students confused as a result of inefficient feedback from their overworked instructors (Boud et al., 2013). ESL learners apply feedback on their writing tasks to facilitate acquisition of very good writing standards, and to correct instances that may lead to fossilization of errors (Treat, 20112). However, feedback on error correction is not sufficient for ESL learners. Attention needs to be paid to student feedback literacy and student writer agency. Peer-review is a means to achieve this as it is identified as a better version of feedback based on its ability to facilitate genuine self-reflections that initiates critical thinking processes in the students (Linda, 2003; Nelson, 2009).

I also stated that peer-review in both first language and ESL classrooms has similar challenges. These challenges were said to have the triggers that may provoke students' feedback anxieties, and may not align with the varied learning styles that are too complex for instructors to manage. Additionally, problems are encountered with one-way communication with no emphasis on students' responses to feedback that forces students to passively take their instructors' feedback. Furthermore, peer review processes may often provide shallow or overly complex feedback that contributes little or nothing to the students' learning. Therefore, automated writing feedback may be the solution to this gap in academic writing, and a modern automated writing tool proposed in this study is Auto-Peer. Auto-Peer was also said to have the ability to foster learner agency and autonomy, critical thinking skill and self-reflections that query opinions, values, and existing

conditions (Linda, 2003). Auto-peer also bridges the wide divide between language instructors and the learners via detailed and meaningful feedback that is usually absent in physical classroom sessions.

Correct construction of topic sentences in academic writing by ESL students can be challenging. Logical organization and sequencing of ideas by ESL students in academic writing may be a herculean task as many of the ESL students find it difficult to organize their thoughts. Therefore, this study examines how Auto-Peer may be used to facilitate students' feedback literacy through students' engagement in self-review of their topic sentences based on guidance provided by Auto-Peer.

3.1 The Research Questions

What are the benefits of automated writing feedback? Here, the researcher explores the benefits of using Auto-Peer to facilitate students' feedback literacy through self-review with focus on topic sentence openers. Additionally, if there are any benefits, how does Auto-Peer as an automated writing feedback tool support ESL learners? Through data from the use of Auto-Peer for academic writing, evaluations of how Auto-Peer enhances students' writer agency via a collaborative writing procedure is explored. The final research question is why automated writing feedback should be encouraged in an ESL classroom? Through data analysis of findings from the study, the need to encourage automated writing feedback in ESL classrooms is discussed.

To answer the research question, what are the benefits of automated writing feedback, the researcher explores the benefits of using Auto-Peer to facilitate students' feedback literacy through self-review with a focus on topic sentence openers. Additionally, if there are any benefits, how does Auto-Peer as an automated writing feedback tool support ESL learners? Through data from the use of Auto-Peer for academic writing,

evaluations of how Auto-Peer enhances students writer agency via a collaborative writing procedure is explored. The final research question is why automated writing feedback should be encouraged in an ESL classroom? Through data analysis of findings from the study, the need to encourage automated writing feedback in ESL classrooms is discussed.

To address these research questions, an *expert judge* approach as prescribed by Duran et al. (2007) was used. The expert judge approach allows for provision of judgement with regards to certain criteria and expertise in a specific field or discipline (Graesser et al., 2005). The judges are professional English/TESOL teachers and trained judges. These judges evaluated 200 sentence paragraph extracts for their effectiveness as topic openers. The effectiveness of each topic sentence was rated out of 6; 6 being very good while 1 means poor. For analysis, a series of t-tests is later used to evaluate each judge's ratings.

Chapter 4. Methodology

In this study, 200 topic sentence opener issues were identified from essays written by students in the American University of Sharjah. The papers were from an existing corpus collected from students in 2020. All the students were informed that the papers would be used for research purposes and consent was provided. Two hundred out of six hundred topic sentences that were flagged by Auto-Peer for modification were randomly selected and examined by the researcher. Craig (2008) advises that a topic sentence is expected to appear at the opening of a paragraph as a simple sentence without encumbrances of explanations, references, examples, conjunctions or transition words. Therefore, I examined the first three sentences in each paragraph that contained flagged topic sentence issues, and modified those following Craig (2008)'s suggestion.

4.1 Procedure

The first simple sentence in each of the selected 100 flagged sentence openers were extracted. Sentences with grammar issues were adjusted for clarity. The adjusted simple sentences were void of coordinating conjunctions, examples, explanations, references, and some other additional wordss that negated a standard simple topic sentence in academic writing (Craig, 2008). Each type of topic sentence concerns were identified in each topic sentence and grouped under different categories. The categories include examples of items that should not be in a sentence opener but were found in the randomly selected and examined two hundred topic sentences corpora flagged by Auto-peer. For example, sentence openers with coordinating conjunctions, examples, explanations, and references were identified and modified by the researcher. The remaining sentence(s) and/or phrases from the shortened sentences in Sentence 1 were blended into Sentence 2,

and in cases where the second sentence could not contain all the spill overs from Sentence 1, the remaining parts of Sentence 2 were merged with sentence three (see Table 1).

Table 1: Examples of original and modified randomly selected sentence starters.

Examples of topic sentences alongside their next two sentences from the paragraphs flagged by Auto-Peer	Modified versions
<p>1</p> <ol style="list-style-type: none"> 1. Education strengthens community resilience and, enables refugees to learn about themselves and the world around them while striving to rebuild their lives and communities. 2. It is a basic human right, and everyone should be able to reach education easily. 3. The result of the war crisis has left almost 3 million Syrian children out of school and puts their future at risk (Teschendorff, 2015). 	<ol style="list-style-type: none"> 1. Education strengthens community resilience. 2. It is a basic human right that enables refugees to learn about themselves and the world around them while striving to rebuild their lives and communities. 3. The result of the war crisis has left almost 3 million Syrian children out of school and puts their future at risk (Teschendorff, 2015).
<p>2</p> <ol style="list-style-type: none"> 1. In Turkey, national law supports the right of all children to receive education, including children whose families have sought international protection and had to flee out of their countries. 2. Public schools are free of charge and all refugee children have the right to attend these schools. 3. Temporary education centers (TECs) were initially set up in the 25 refugee camps built on the border between Turkey and Syria. 	<ol style="list-style-type: none"> 1. In Turkey, national law supports the right of all children to receive education. 2. This includes children whose families have sought international protection and had to flee out of their countries. 3. Temporary education centers (TECs) were initially set up in the 25 refugee camps which was built on the border between Turkey and Syria but Public schools are also free of charge and all refugee children have the right to attend these schools.
<ol style="list-style-type: none"> 1. We can also make use of our oceans to inhibit the production of substantial quantities of greenhouse gases such as carbon dioxide 	<ol style="list-style-type: none"> 1. We can also make use of our oceans to inhibit the production of substantial quantities of greenhouse gases.

3	<p>by implementing blue-carbon ecosystems.</p> <ol style="list-style-type: none"> 2. These ecosystems are comprised of oceanic forests such as mangroves, seagrasses and salt marshes. 3. These ecosystems play a role in reducing carbon emissions into the atmosphere by almost 10% while only encompassing 1.5% of the areas of terrestrial forests (Hoegh-Guldberg, Northrop & Lubchenco, 2019). 	<ol style="list-style-type: none"> 2. For example, carbon dioxide can be inhibited by implementing blue-carbon ecosystems which are comprised of oceanic forests such as mangroves, seagrasses and salt marshes. 3. These ecosystems play a role in reducing carbon emissions into the atmosphere by almost 10% while only encompassing 1.5% of the areas of terrestrial forests (Hoegh-Guldberg, Northrop & Lubchenco, 2019).
4	<ol style="list-style-type: none"> 1. One of the main sources of production of greenhouse gases like methane and carbon dioxide is the use of non-renewable energy sources such as oil and coal where the process of burning them in order to release energy leads to the release of those gases. 2. On the other hand, there are undertakings that we can pursue such as the replacement of non-renewable resources with forms of renewable energy developed using our oceans. 3. These schemes would lead to a lower production of greenhouse gases and essentially inhibit the promotion of the greenhouse effect leading to climate change, which in essence is targeting the primary foundation of the issue and eliminating it. 	<ol style="list-style-type: none"> 1. One of the main sources of production of greenhouse gases is the use of non-renewable energy sources. 2. For example, methane and carbon dioxide are release when oil and coal go through the process of burning in order to release energy, but there are undertakings that we can pursue such as the replacement of non-renewable resources with forms of renewable energy developed using our oceans. 3. These schemes would lead to a lower production of greenhouse gases and essentially inhibit the promotion of the greenhouse effect leading to climate change, which in essence is targeting the primary foundation of the issue and eliminating it.
5	<ol style="list-style-type: none"> 1. History dictates that major industrial nations tend to leave behind a legacy of environmental damage that can take decades to be reversed. 	<ol style="list-style-type: none"> 1. History dictates that major industrial nations tend to leave behind a legacy of environmental damage.

	<ol style="list-style-type: none"> 2. China is no exception. 3. Since the 1980s, China has risen as an economic powerhouse. 	<ol style="list-style-type: none"> 2. This damage can take decades to be reversed, and china is no exception. 3. Since the 1980s, China has risen as an economic powerhouse.
6	<ol style="list-style-type: none"> 1. Major concerns arise from the issue of particulate matter, particularly PM2.5 and PM10 that are reported to be 30 to 100 times smaller when compared to the size of human hair. 2. PM2.5 has garnered significant attention from medical practitioners and its health impacts are well-documented. 3. Hernandez (2015) reports that PM 2.5 poses risks to humans since the particles can easily penetrate the human body through breathing and become engraved into the lungs. 	<ol style="list-style-type: none"> 1. Major concerns arise from the issue of particulate matter. 2. For example, PM2.5 and PM10 that are reported to be 30 to 100 times smaller when compared to the size of human hair. 3. PM2.5 has garnered significant attention from medical practitioners and its health impacts are well-documented as reflected in Hernandez (2015) reports where it stated that PM 2.5 poses risks to humans since the particles can easily penetrate the human body through breathing and become engraved into the lungs.
7	<ol style="list-style-type: none"> 1. Polluted air in the form of thick smog across major cities is a norm amongst Chinese residents (Kahn & Yardley, 2007). 2. Recently, the Chinese government put in place a new Environmental Protection Law (EPL). 3. Studies suggest that this was China's first attempt to harmonize economic and social development by protecting the environment (Zhang & Cao, 2015). 	<ol style="list-style-type: none"> 1. Polluted air is a norm amongst Chinese residents. 2. Recently, the Chinese government put in place a new Environmental Protection Law (EPL) regarding pollution in the form of thick smog across major cities. 3. Studies suggest that this was China's first attempt to harmonize economic and social development by protecting the environment (Zhang & Cao, 2015).
8	<ol style="list-style-type: none"> 1. The Chinese government needs to encourage Non-Governmental Organizations (NGOs) that may foster innovative thinking and combat the environmental crisis. 	<ol style="list-style-type: none"> 1. The Chinese government needs to encourage Non-Governmental Organizations (NGOs). 2. Some of these NGOs may foster innovative thinking and combat the environmental crisis as

	<ol style="list-style-type: none"> 2. The recent years have seen various private institutions file thousands of pollution lawsuits. 3. As such, NGOs would be a major asset to protect public interests. 	<p>recent years have seen various private institutions file thousands of pollution lawsuits</p> <ol style="list-style-type: none"> 3. As such, NGOs would be a major asset to protect public interests.
9	<ol style="list-style-type: none"> 1. Volpe (2018) mentions that since the inception of NGOs in the 1980s, they have become useful. 2. These NGOs have helped introduce advanced technology and professional expertise. 3. For instance, NGOs can reach the rural Chinese areas where government resources tend to be limited while empowering the local population in taking part in this much needed environmental and social transformation. 	<ol style="list-style-type: none"> 1. NGOs have become useful since their inceptions in the 1980s. 2. These NGOs have helped introduce advanced technology and professional expertise. 3. For instance, NGOs can reach the rural Chinese areas where government resources tend to be limited while empowering the local population in taking part in this much needed environmental and social transformation.
10	<ol style="list-style-type: none"> 1. The implementation of structural and policy reforms that support farming would help combat famine in SSA countries and help solve the problem of malnutrition. 2. For instance, increased farming practices means increased local food production. 3. As such, improving SSA countries' poor agricultural performances would be critical in establishing food security. 	<ol style="list-style-type: none"> 1. The implementation of structural and policy reforms that support farming would help combat famine in SSA countries. 2. This may also help solve the problem of malnutrition because increased farming practices means increased local food production. 3. As such, improving SSA countries' poor agricultural performances would be critical in establishing food security.

4.2 Research Approach

An *expert judge* approach as prescribed by Duran et al. (2007) was used in this study. The expert judge approach allows for provision of judgement with regards to certain criteria and expertise in a specific field or discipline (Graesser et al., 2005). The required expertise needed is often provided by anyone who is knowledgeable with specialized skill,

training or education in topic where such judgement is needed (Duran et al., 2007). However, such experts must not be directly involved in the research study, and as such, external expert personnel with relevant skillsets are often engaged as judges. They are required to either validate, complete, integrate and interpret certain data that are already existing (Graesser et al., 2005). Additionally, a simple percentage method was also applied to measure the consistency of the evaluated sentence openers in comparison to the final feedback from Auto-Peer's post-evaluation.

The expert judges in this study were three trained judges. The judges were specially selected as being the most advanced in terms of writing and they were considered ideal for evaluating the writing under consideration. The judges are professional English/TESOL teachers, two of the judges have worked in American University of Sharjah's (AUS) writing center while one of the judges has completed her master's thesis. They evaluated 100 sentence paragraph extracts for their effectiveness as topic openers from the randomly selected and modified topic sentences. In randomized order, the participants saw both versions (the originals and the modified) and evaluated all examples. The prediction was that the modified versions would receive higher evaluations. All modifications followed the explanations provided by the software. A brief written explanation regarding topic openers was provided prior to the task. The complete procedure took up to four hours. The evaluation by the participant served a purpose of check and balance to enhance consistency.

Chapter 5. Results

The following section represents the results generated from the ratings of the flagged topic sentences by the expert judges.

5.1 Expert Judges' Rating Results

Each expert judge rated the 200 flagged topic sentences by Auto-Peer out of 6. Below is the outcome of each of the expert's ratings.

Table 2: Expert Judge 1

Ratings	Frequency	Percentage (%)
1	2	1
2	15	7.5
3	39	19.5
4	61	30.5
5	73	36.5
6	10	5
Total	200	100

Table 3: Expert Judge 2

Ratings	Frequency	Percentage (%)
1	51	25.5
2	39	19
3	8	4
4	15	7.5
5	77	38.5
6	11	5.5
Total	200	100

Table 4: Expert Judge 3

Ratings	Frequency	Percentage (%)
1	46	23
2	51	25.5
3	45	22.5
4	36	18
5	18	9
6	4	2
Total	200	100

5.1.2 Interpretation

From the table, it is evident that Expert Judges 2 and 3's ratings are quite close with overall low ratings of more than 50%. For example, Expert Judge 2 rated 56% of the topic sentences as poor (1-4) while 44% of the topic sentences were rated good (5-6). Similarly, Expert Judge 3 rated 89% of the topic sentences as poor (1-4) while 11% of the topic sentences were rated good (5-6). Expert Judge 1's rating is different from the other two expert judges'. Expert Judge 1's rating has 41.5% of 1-4, and 58.5% of 5 and 6.

5.1.3 Overall results

The results from all three judges were in line with predictions with ratings for modified texts higher than rating for original texts. For two of the three expert judges, the differences reached a level of significance: Expert Judge 1 (originals mean = 4.01; modified mean = 4.17; $p = \text{n.s.}$); Expert Judge 2 (originals mean = 1.91; modified mean = 4.71; $p < .001$.); Expert Judge 3 (originals mean = 2.46; modified mean = 2.95; $p = .001$). As such, given that judges had minimal training, the results provide compelling evidence that the modified texts demonstrate improved writing.

Chapter 6. Discussion and Conclusion

This section briefly discusses the general results of the simple percentage and the t-test tools used in this study. The results, based on the two research tools, are analyzed with reference to the proposed research questions. The pedagogical implications, limitations, and opportunities for future research are further discussed.

6.1 Discussion of the Findings

The first research question investigated the benefits of using Auto-Peer to facilitate students' feedback literacy through self-review with focus on topic sentence openers. It is evident from two of the expert judges whose rating attained the desired level of significance in the t-test that Auto-Peer correctly flagged the poorly written topic sentences. Additionally, these two expert judges (66.7%) were able to correctly rate these poorly written topic sentences using the standardized principles of what a topic sentence entails (Craig, 2008; Rodeger 1965). Afterwards, the same topic sentences were modified by the researcher using Auto-Peer's automated feedback to facilitate a self-review of why these topic sentences were flagged in the first instance. After careful examinations and extensive reviews of the suggestions provided by Auto-Peer on the flagged sentence openers, I was able to modify the flagged sentence openers correctly. Expert Judge 3, whose results were inconsistent with the other two judges, probably as a result of the short training session, is also suggestive of the fact that a lack of attention to Auto-Peer's guidance may lead to unfavorable writing outcomes. Overall, it is evident that Auto-Peer may facilitate students' feedback literacy through self-reviewing among students without forcing its suggestions on them (McCarthy and Ahmed, 2019).

The procedure involved in the automated evaluation feedback provided by Auto-Peer answered the second research question. As an automated writing feedback tool, Auto-

peer flagged what it considered to be poor topic sentences in less than 1 minute. This processing speed supports Mulliner and Tucker's (2015) and Weaver's (2006) view on timeliness of automated writing feedback. In addition to timeliness, Auto-Peer provided a wide range of information regarding why each of the flagged 200 topic sentences may not have attained high academic writing standards using appropriate tone that is neither rude nor discouraging but polite and supportive (Straub, 2000). A wide range of suggestions on various writing and grammar techniques that can be employed for better sentence openers were also provided. I was able to apply this information to the modification of the 200 sentences for very good academic standards on creating topic sentences. I in this case was able to justify some responses but also accepted that many of the sentence openers needed to be reviewed as suggested by Auto-Peer. This procedure may also encourage ESL learners to rethink their writing choice and re-strategize their responses with regards to a topic sentence (McCarthy et al., 2021). Therefore, there is tangible evidence that Auto-Peer may enhance student writer agency and autonomy via a collaborative writing procedure.

Finally, use of Auto-Peer in ESL classrooms will be of immense benefits to ESL students. Given the procedure involved in the automated feedback where the automated writing tool gave timely and immediate feedback to the student, most ESL students may feel motivated. They will also have access to immediate answers to their language problems unlike face to face feedback and other automated writing feedback tools that take days to give feedback to students. In addition, the user-friendliness and collaborative features of Auto-Peer makes it an excellent option for learners who may feel burdened and anxious to make mistakes in face to face sessions. Based on the analysis of the corpus, a student will only have the computer to deal with. The tone and appropriateness of the software also make the tool an invaluable asset for ESL learners who easily become anxious at being corrected for their language mistakes and errors (McCarthy et al., 2021).

6.2 Pedagogical Implications

Findings from this study may be of benefit to language instructors. First, with regards to encouraging learner autonomy, language instructors may facilitate excellent self-reflections and enhance critical thinking skills of ESL learners by making them use Auto-Peer for automated writing feedback. In this case, ESL learners are less dependent on their instructors for every detail; instead, the students are able to take charge of their own academic writing while the instructors merely facilitate the entire writing process.

Some ESL students may have a problem with general class feedback. Features of Auto-Peer that enhances learner autonomy also do it individually. Therefore, students who are sensitive about making mistakes and errors in language learning may develop more positive attitudes about academic writing. This is because such students are engaged by Auto-Peer in a polite and friendly manner with ample opportunities for help.

Collaborative feedback is another aspect of Auto-Peer that students and language instructors can take advantage of. The implication is that students would depend less on the instructors while the instructors would have more time for other important aspect of teaching and learning other than being a beast of burden to scoring large amount of students' essays. Finally, since topic sentences are a crucial aspect of academic writing, ESL students who usually struggle with organizing their thought in a logical sequence can benefit from various suggestions of Auto-Peer on how best to write their topic sentences in an academic writing task.

6.3 Limitations to the Study and Opportunities for Future Research

This study may have a number of limitations that could affect its interpretations. First, and foremost, the corpus used for this study stems from ESL students. As such, the information may not transfer to first language writers. Second, the modification of the

original topic sentences was carried out by the researcher via Auto-Peer's guidance, so there may be significant variations if carried out by a different researcher. Additionally, there are different schools of thought on what makes an effective topic sentence. As a result, some scholars may allow some vocabulary that were disallowed in this research as part of a topic sentence. For example, some research experts may allow references or conjunctions as part of a topic sentence. Furthermore, the expert judges had a limited amount of time for training. This short-time training may have impacted their overall ratings which may also have impacted the overall result of the study.

Future research is necessary to investigate how effectively Auto-Peer can support ESL learners in argumentative writing procedures within paragraphs. For instance, ESL learners may learn via use of Auto-Peer how to argue out a point from various research perspectives within a paragraph. Auto-Peer may also be used to teach ESL students how to effectively use discourse markers and transition words in academic writing. Finally, Auto-Peer may still be used to examine correct use of topic sentences from a different research perspective.

6.4 Conclusion

Findings from this study may provide insight into some important benefits of automated writing feedback. It is crucial that ESL students get timely and accurate support in their academic writing, and this must be carried out in a manner that fosters learner literacy via self-reflection feedback that enhances critical thinking skills that may question values and the status quo. Additionally, automated writing feedback could also enhance student writers' agency and autonomy via collaborative writing procedures. These are some of the many important functions of Auto-Peer as it may have been seen in its ability to facilitate effective topic sentence constructions in the ESL students' writing corpus.

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Vita

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