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Fostering Self-Directed Writers Using AWE and WBMT

—A Pilot Case Study—

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Abstract

L2 learners, particularly at beginner and intermediate levels, often struggle with lexico-grammatical accuracy and writing fluency errors, which are fundamental aspects of quality academic writing. Writers must adhere to recognized English grammar conventions (i.e., spelling, punctuation, grammar, and sentence structure) within their writing to clearly and accurately convey their ideas, and often academic or career success depends on how well they do so. However, mastering academic writing takes much time and effort, and many writers continue to struggle throughout their schooling and beyond. The purpose of this pilot qualitative case study was to investigate the writing affordances and constraints that the automated writing evaluation (AWE) Grammarly and the web-based machine translation (WBMT) DeepL had on an adult English language learner's academic writing. This study demonstrates how these technologies can be systematically integrated into a learner's writing process as a tool to support their editing/revising and foster self-directed writing. Although the participant had low technology proficiency and confidence to begin, survey and interview results revealed that Grammarly and DeepL provided several key affordances and aided in scaffolding the participant's learning, lowering cognitive burden and anxiety and resulting in increased writing confidence and motivation. Interventions explicitly demonstrating to learners how to utilize AWE and WBMT technologies show promise in fostering self-directed writing and promoting writing fluency for ELLs.

Keywords

Academic writing, AWE, WBMT, Grammarly, DeepL

1. Introduction

Lexico-grammatical accuracy is fundamental to quality academic writing (Cavaleri & Dianati, 2016). Students need to adhere to recognized English grammar conventions (i.e., spelling, punctuation, capitalization, grammar, and sentence structure) within their writing to clearly and accurately convey their ideas. Often their success (e.g., assignment grade, standardized test score) depends on how well they are able to do this. However, mastering academic writing takes much time and effort. Many students struggle with lexical and grammatical accuracy throughout their schooling and beyond, negatively impacting the comprehension and quality of their writing (Myhill, 2009).

This can be especially true for English language learners (ELLs), who often have difficulties recognizing and integrating aspects of English grammar into their writing that differs from that of their L1, such as word formation or the order and use of articles, prepositions, pronouns, and plural forms (Cavaleri & Dianati, 2016). Thus, while lexico-grammatical accuracy is not the only factor contributing to good academic English writing, it plays an integral role (Lee, 2020). As such, students need to be equipped with strategies and tools to support them in continually developing their writing.

2. Literature Review

2.1 Corrective Feedback

Receiving corrective feedback (CF) on one's writing is considered to be one of the most effective methods for improvement (Lee, 2020; Mohsen, 2022), with numerous studies having documented its positive effects (e.g., Karim & Nassaji, 2020; Zhang, 2021). This is because CF enables writers to notice and identify the lexico-grammatical errors they tend to make while also learning how to rectify them, promoting further writing development (Barrot, 2021).

Several different types of CF exist that learners can receive to aid them in their writing (Ellis, 2009; Barrot, 2021). One distinction is between *direct CF*, in which the writer is explicitly shown their errors and provided with the correct form, and *indirect CF*, in which the writer is made aware that a mistake exists but is left to review and correct it on their own (Karim & Nassaji, 2020). Another distinction is between *focused CF*, which identifies and corrects only a few specific (focused) types of errors, and *unfocused CF*, which comprehensively identifies and corrects most to all writing errors (Mohsen, 2022; Zhang, 2021). Lastly, CF can also be *metalinguistic*, in which the writer is not only provided with the location and correct form of their error but also the type of error made (e.g., through error codes) and given a brief explanation as to the nature of the error. Combined with direct CF, this can help facilitate self-reflection in learners

regarding why the errors occurred and how to prevent them in future writing (Barrot, 2021).

However, even though research demonstrates that CF can positively improve students' writing, a major obstacle to it being used to its fullest potential is the significant effort it requires from educators. Especially in classrooms with a large number of learners, time and energy constraints make it challenging for many teachers to adequately provide comprehensive CF to everyone regarding their lexico-grammatical errors (Lee, 2020; Mohsen, 2022). Thus while ELLs and native learners alike need significant CF support to foster development in their writing, teachers are often in a position where they are unable (or unwilling) to adequately provide it on a consistent basis (Cavaleri & Dianati, 2016). To this end, one potential promising solution to this dilemma is the use of automated written evaluation (AWE) and web-based machine translation (WBMT) technologies, which have the capability to autonomously and immediately provide CF to writers independent of a teacher

2.2 Technology as a Solution

2.2.1 Automated Written Evaluation (AWE) Systems and Grammarly

Modern technological advancement has resulted in the creation of AWE systems, which utilize “sophisticated natural language processing (NLP) techniques, latent semantic analysis, and Artificial Intelligence (AI) to offer more accurate yet flexible affordances for automatic corrective feedback” (Barrot, 2021, p. 1). These AWE systems can provide many of the basic CF affordances that teachers struggle to do much more quickly (Mohsen, 2022). In seconds they can analyze an entire text and highlight spelling, punctuation, and lexico-grammatical errors, then provide real-time direct CF demonstrating the correct forms for students to self-edit their writing as needed. AWE systems can also give metalinguistic CF explaining the type of error that was made, for learners to become aware of gaps in their knowledge and enable them to prevent making the same mistakes in future writing. Some AWE systems even offer CF on word choice and writing fluency (Cavaleri & Dianati, 2016).

AWE systems can also provide some unique affordances. Unlike teachers, whose CF may at times be inconsistent due to subjective factors such as mood, energy level, or pre-held biases, AWE systems will consistently provide neutral and objective feedback. Furthermore, since students are engaging independently with the AWE software, it can help foster their self-efficacy regarding their writing and promote self-directed learning (Barrot, 2021). Lastly, learners can engage with the AWE system independently and at their own pace, resulting in a more relaxed atmosphere for them, reducing writing anxiety (AbuSeileek, 2009; Cavaleri & Dianati, 2016).

However, AWE systems are not infallible. Studies (e.g., Barrot, 2021; Mohsen, 2022) have reported several issues with their use, such as inaccurate error recommendations, an overcorrecting of errors leading to cognitive overload for students, and limited or confusing metalinguistic explanations, demonstrating that as accurate as they may be, they are still lacking a “human pedagogical touch” (Barrot, 2021, p. 3). Nevertheless, despite these limitations, AWE systems’ overall ability to provide immediate and customized basic CF support to learners can still be incredibly advantageous, particularly for fostering self-directed writing. While there are several popular AWE systems available today which claim to offer effective and efficient feedback and suggestions on writers’ grammar, this study will focus on one in particular, Grammarly.

Grammarly is currently used by over 30 million people worldwide (Grammarly, 2022). It can be used on PC web browsers (Chrome, Safari, and Firefox) or digital devices (iOS, Android, and Mac). It comes in both a free version, which provides spelling, grammar, punctuation, and conciseness CF, and a premium version which also offers recommendations regarding word choice, fluency, and clarity, and it can detect plagiarism. Grammarly works by analyzing a text and then identifying errors, classifying them through the use of different colored underlines. It then provides real-time direct and metalinguistic CF recommendations that the learner can choose to accept or ignore. Learners are also able to tell Grammarly the general purpose of the writing (e.g., school, work, other) and what type of CF they most want help with.

Several research studies conducted on Grammarly have shown it to be reliable and accurate in identifying errors (e.g., Dembsey, 2017; Dizon & Gayed, 2021), effective in reducing errors (Ghufron & Rosyida, 2018), and promoting metalinguistic noticing (Barrot, 2021). Overall, participants in the studies had a positive perception of Grammarly, finding it useful and easy to use, helpful in addressing shortcomings in their lexico-grammatical knowledge and word usage, and overall fostering their writing improvement (Cavaleri & Dianati, 2016).

2.2.2 Web-Based Machine Translation (WBMT) and DeepL

WBMT is using computer software to translate a text from one language to another without human involvement (Lee, 2020). This study will focus on DeepL, which has been touted since its launch in 2017 as the world’s most accurate and nuanced WBMT, with over 1 billion users worldwide. DeepL’s website claims to be over three times more accurate than its closest competitors due to its groundbreaking AI technology and development of a new generation of neural networks, which enables it to “grasp the

subtle meanings of sentences and translate them to a target language in an unprecedented way” (DeepL, 2022). Users simply need to go to the website, paste their text into the left-hand box, and then select the language they would like it translated into, and within a few seconds DeepL will provide its complete translation in the right-hand box.

Research has shown that WBMT can serve as an effective supplementary learning tool for writers by providing linguistic, cognitive, and affective affordances (Lee, 2020). Linguistically, it can support lexico-grammatical knowledge (Bahri & Mahadi, 2016; Doherty & Kenny, 2014) and promote reading comprehension and writing (Alhaisoni & Alhaysony, 2017). Cognitively, it can reduce learners’ cognitive load (Baraniello et al., 2016) and promote self-directed learning (Godwin-Jones, 2015), while affectively, it can help to lower second language (L2) anxiety (Bahri & Mahadi, 2016; Jin, 2013) and increase learner motivation and confidence (Kliffer, 2008).

A number of studies have applied WBMT to L2 writing, revealing that it can serve as a scaffold for students during the editing and revising process and help enhance the overall quality of their writing (Godwin-Jones, 2015). It does so by assisting learners in writing more naturally and with fewer errors (Ali & Alireza, 2014), increasing their lexical fluency (Chen et al., 2015), using more context-appropriate words and authentic expressions (Lee, 2020), and developing better metalinguistic awareness (Correa, 2014). WBMT can also offer two unique affordances to writers. The first is its utility as a substitute or complement to a dictionary for comprehending unknown text. Studies that contrasted WBMT to traditional dictionaries and other electronic reference tools demonstrated that it could more effectively translate vocabulary, technical jargon, collocations, and phrases (Bahri & Mahadi, 2016; Lee, 2020). This is because a dictionary simply provides the definition(s) of a word in isolation from its current use or context, while WBMT translates the entire passage and thus is more sensitive to the context of how the word/phrase is being used (Doherty & Kenny, 2014).

The second affordance it can provide is individualized scaffolding for writers during post-editing. WBMT can suggest the “best” language forms in its translations, but these are rarely 100% accurate. Thus while it provides potentially helpful forms, it still requires the learner to think critically and consider word choice and meaning usage. This fosters metalinguistic reflection, as the writer constantly needs to strategically select the best form based on their previous knowledge and combine it with their original sentences by paraphrasing (Lee, 2020). In this regard, WBMT functions similarly to a peer editor, providing suggestions that the writer considers whether or not to use, and how best to integrate them with their original writing.

In summary, both native learners and ELLs struggle with mastering both the lower-level (spelling, punctuation, grammar) and higher-level aspects (organization, content, coherence) of writing, making them prone to errors (Link et al., 2022). Furthermore, while research has demonstrated CF to be effective in improving students' writing, comprehensive and consistent teacher-provided CF for individual students is often limited due to time and energy constraints. Therefore, in these circumstances, AWE and WBMT technologies can be effective supplementary tools to scaffold and improve learners' writing while fostering their self-directed learning.

3. Research Design

3.1 Purpose and Research Questions

As discussed above, research has demonstrated that AWE and WBMT technologies can foster self-directed learning in students and act as a scaffold to support their L2 writing. However, the above studies were done with adolescent students in a school setting, where they still had access to a teacher to instruct them, provide CF, and support their writing development. Less research has been done to explore the use of AWE and WBMT technologies on L2 writers' self-directed learning, particularly for individuals not in a school setting. As such, this pilot case study aimed to investigate the affordances and constraints that the AWE Grammarly and the WBMT DeepL had on an adult English language learner's writing accuracy and their impact on fostering self-directed writing. It employed a single-case interpretive qualitative case study design (Merriam, 2009). A qualitative case study is particularly advantageous because it can develop context-specific understandings as well as bigger-picture generalizations, to help inform and improve practice and lead to better academic and social outcomes (Creswell & Poth, 2018).

This study employed Davis' (1989) Technology Acceptance Model (TAM), which asserts two key factors determine the likelihood of an individual using new technology: 1) its perceived usefulness, or how well the technology helps the individual achieve their goal(s), and 2) its perceived ease of use, or how easy or difficult it is for the individual to use the technology. These factors will determine Grammarly and DeepL's overall effectiveness for the participant.

Specifically, three research questions were addressed:

1. What were the writing affordances and constraints of Grammarly for the participant?
2. What were the writing affordances and constraints of DeepL for the

participant?

3. How effective were Grammarly and DeepL in supporting the participant's self-directed writing?

3.2 Participant

The learner in this study is Nana (pseudonym), a warm and outgoing Japanese woman in her early 30s. Nana is a native Japanese language speaker from a large city in central Japan and currently works as an operating room nurse at a hospital in the Kansai area. She describes herself as a studious person, but also someone who overthinks things and is at times forgetful. She plays the acoustic guitar and loves listening to Western music, and in her free time enjoys watching movies, sightseeing, and practicing yoga. Additionally, she is an avid reader, particularly of nonfiction books related to nursing, medicine, psychology, and the biographies of famous people.

I met Nana at a social event for an English conversation school that a former colleague of mine owns. She shared that she has been interested in English since high school but has few opportunities to use English these days, as her job duties do not require it. However, she has been independently trying to improve her English in her free time. She shared that although she received an overall 5.0 on the IELTS, she does not have confidence in her writing, in which she scored a 4.5. She self-identified her level of writing as intermediate. According to Peregoy and Boyle (2017), intermediate-level writers have developed a general knowledge of simple sentence types and writing conventions, but need continued support in developing their word choice and overall writing fluency. Furthermore, they are still prone to making spelling and lexicogrammatical errors.

Nana's interest in English ties into her passion for conducting action research at her hospital to continually improve workplace conditions and better serve their patients. Currently, she does research only in Japanese. However, she expressed a desire to become more skilled at reading academic nursing and medical articles in English and writing research more effectively to publish one day in an English nursing journal.

3.3 Data Collection

Past writing sample. To ascertain what genre of writing Nana's interests lay and get a preliminary understanding of her writing abilities and needs, a past English writing sample was collected. The sample was a summary of an academic nursing article she wrote the prior year as part of her studies to obtain a medical interpreter license.

Interest Inventory. Information about Nana's interests and personality was collected through an Interest Inventory Word document (Appendix A). It comprised ten questions.

Semi-structured Writing interview. Information about Nana's educational experiences and attitudes toward writing was collected via a 40-minute semi-structured interview in English on Zoom. It comprised eight main questions (Appendix B).

Article summary writing drafts. Three writing drafts of the Article Summary & Reflection Handout were collected during the span of this intervention: Nana's initial draft (Appendix C), her edited draft using Grammarly (Appendix D), and her final revised draft using DeepL (Appendix E).

TAM-based Survey responses. Several times (after each of the above three writing drafts), TAM-based Likert Scale questions were collected to determine the ease of use and usefulness of the technologies for Nana during the writing process.

Participant observation. Data was also collected through observations of Nana throughout the writing intervention, which was conducted over two lessons using Zoom.

3.4 Writing Intervention Design and Learning Objectives

Preceding the writing intervention, I asked Nana to share a prior English writing sample in the genre she was interested in to help me understand her writing abilities and needs. She provided a summary of an academic nursing article she recently wrote as part of her studies to obtain a medical interpreter license. In addition, Nana was asked to complete an Interest Inventory (Appendix A) comprising questions about her family, personality, hobbies, and interests, to help me learn more about her holistically as a person. For effective differentiated instruction, not only the learner's language development but also their social, psychological, and cognitive traits need to be considered to best support their learning (Peregoy & Boyle, 2017).

Also, prior to our writing intervention, I conducted a semi-structured writing interview with Nana. The purpose of this was to understand better her educational background, language experiences, and attitudes and habits regarding writing, in order to develop appropriate intervention lessons to assist her with her specific English writing goals. The interview lasted 40 minutes and was conducted in English using Zoom. It comprised eight main questions (Appendix B). Since English is not Nana's first language, the questions were provided to her by email beforehand, allowing her time to look them over and begin thinking about her responses. During the interview, I also asked her follow-up questions to clarify her responses or to delve deeper into something she had said. With her permission, the interview was recorded so I could focus entirely on what she was saying without splitting my attention for note-taking. I listened to the interview

again the following day to transcribe it and take notes.

At the end of the interview, Nana expressed her desire to be more proficient at summarizing English nursing-related articles and more clearly expressing her opinions about them and applying them to her work context and research studies. Additionally, Nana wished to improve her word choice and conventions (correctness in punctuation, grammar, and spelling) while writing in English. Since she is a working adult, she does not have access to a teacher to check her writing. As such, she wanted to learn practical strategies that she could employ herself to analyze, edit, and revise her writing. Thus, we decided to center the writing intervention on an English academic nursing article Nana was interested in reading and writing about.

During the writing interview, Nana lamented having low confidence and an aversion to using technology, predominantly due to her general lack of experience and understanding regarding computer use. Therefore, as the basis of the intervention, I chose to introduce to Nana two types of technologies—the AWE Grammarly and the WBMT DeepL—to act as scaffolding tools to aid her in her goals of improving her word choice, conventions, and fluency, and becoming a self-regulated writer. The writing intervention lesson design and overall objectives were as follows:

Nana will be able to....

1. Utilize DeepL as a tool to comprehend unknown English words and expressions within their original context
2. Summarize an academic nursing article in English
3. Reflect on the contents of an English academic nursing article by explaining how it relates to her working context and how she might apply it
4. Utilize Grammarly to analyze and self-edit her writing (conventions, word choice) and identify commonly recurring errors
5. Utilize DeepL to aid in revising her draft (sentence fluency)
6. Reflect on her use of the process approach to writing, the technologies Grammarly and DeepL, and self-identify areas for future writing improvement

4. Writing Intervention Procedure and Results

4.1 Lesson 1: Prewriting and Drafting Phases

The writing intervention was broken into two separate Zoom lessons and centered on the process approach to writing, which comprises five main phases: prewriting, drafting, revising, editing, and publishing. Research has shown this to be an effective teaching strategy for both first and second-language writers (Peregoy & Boyle, 2017). Additionally, studies have identified six traits that make up good writing: ideas/content, organization, voice, word choice, sentence fluency, and conventions (Culham, 2003; Peregoy & Boyle, 2017). Nana and I decided to focus on her word choice, conventions, and sentence fluency for this intervention. Before the first lesson, Nana was asked to find, read, and take brief notes on the first two paragraphs of an English academic nursing article she would like to read and write about. She chose the Nursing Times article *Breaking news of death to relatives* (Reid et al., 2011).

For our first lesson, I began by introducing the process approach to writing, focusing specifically on the prewriting and drafting phases. We reviewed how to read and understand academic articles, their main parts (e.g., abstract, section headings, citations, references), and their purpose. We also discussed how to identify main ideas and key details, what plagiarism is, and how to avoid it using paraphrasing strategies. For practice, I asked Nana to write down the main ideas of the article's first two paragraphs and, using her notes, add key supporting details to the first paragraph. I then showed her how to create an outline using main ideas and supporting details, and then how to use her outline to construct a summary paragraph. Following this, I asked Nana to write the first paragraph of her article summary using her outline, and we reviewed it together.

Next, I introduced the WBMT DeepL, explaining what it is and how it can support her reading comprehension of academic articles. I demonstrated how any unknown words, sentences, or passages of English text she encounters while reading can be copy/pasted into it to provide the Japanese translation, and discussed how this tool could at times be a superior alternative to a dictionary (her usual strategy) because it can provide the meaning of the vocabulary within its specific context, rather than just isolated definition(s). To practice, I asked her to read several sentences of her article where she had highlighted words she did not know and to copy/paste the sentence or passage into DeepL to review the Japanese translation. We then discussed if it helped her to understand the unknown words.

I concluded this first lesson by asking Nana if she had any further questions

about the first two phases of process writing or how to use DeepL. Her task for next time was to independently finish reading the article, then complete the Article Summary & Reflection Handout (Appendix C). This would be used as both an initial diagnostic of her writing ability and the focus for the next intervention lesson.

4.2 Lesson 2: Editing and Revising Phases

One week later, Nana finished reading her article and completed the Article Summary & Reflection Handout (Appendix C). She emailed me a copy, and we arranged a time to meet for the second part of the intervention. To begin, Nana was asked to respond to the following TAM-based reflection questions (Davis, 1989) regarding her use of DeepL for comprehending the article:

1. On a scale of 0-5 (0 = never, 5 = very often), how often did you use DeepL to look up unknown words? Why?
2. On a scale of 0-5 (0 = not at all useful, 5 = extremely useful), how useful was DeepL? Why?
3. On a scale of 0-5 (0 = extremely difficult, 5 = extremely easy), how easy was DeepL to use? Why?
4. On a scale of 0-5 (0 = never, 5 = extremely often), how likely are you to use DeepL again in the future? Why?

Regarding her frequency of using DeepL to look up unknown words, Nana answered five. She found DeepL much quicker and more efficient for looking up the meaning of unknown text than word by word using a dictionary as she used to. She shared that she would read a paragraph on her own first, highlighting unknown words and trying to figure out the meaning from context. Then she copy/pasted the entire paragraph into DeepL to get the complete translation of the paragraph, and used that to figure out the meaning of her highlighted words by how they were used in context within the sentence. For both questions #2 and #3, Nana also answered five. Before using DeepL, Nana shared she had always felt much stress when reading English-only text, especially academic articles. However, the affordances DeepL provided to easily and immediately translate an entire passage of text into Japanese made her feel “more light” and less stressed when she was reading and summarizing her chosen article. Lastly, for Question #4 regarding her likelihood of using DeepL again in the future, Nana responded with a five, expressing that she will continue to use DeepL as she did for this lesson to aid in her reading comprehension of future work or research-related English articles.

4.2.1 Editing phase

In the writing interview, Nana shared that she would usually “roughly” write an initial draft, then stop and rest and return to it again later. Often between these writing

sessions, she would research more to better understand the topic and vocabulary, then review and revise her writing before continuing. However, when I asked her if she ever uses spelling and grammar check software to help her write, she looked embarrassed, stating, “I don’t know about that kind of software...” and “I’m just not good at computers....” On her initial writing draft in Microsoft Word, I noticed no blue or red underlined words, meaning that her Japanese version of Word was not automatically set to checking English errors (only Japanese ones). She shared she also did not know how to do a manual spelling and grammar check on Microsoft Word. Thus, Nana had used very few technology support functions in her writing thus far to aid her and seemed to struggle with using writing technologies in general. As such, I was particularly interested in her responses to the TAM-based reflection questions about her use of Grammarly.

We first reviewed the process approach to writing, focusing on the iterative aspect of the editing and revising phases. We discussed how Nana generally goes about editing and revising her writing, focusing on her chosen goals of improved word choice, writing conventions, and sentence fluency. I then introduced to Nana the AWE software Grammarly, explaining what it is, how it works, and how it can be a valuable tool to help writers independently improve their writing. I directed Nana to the website to download the free version of Grammarly (Microsoft Word add-on). I then assisted her while she read through the tutorial and practiced using Grammarly by working through the sample text the website provides new users.

After showing Nana how to activate Grammarly on her article summary draft in Word, her draft lit up with red underlines, where Grammarly identified errors (Figure 1).

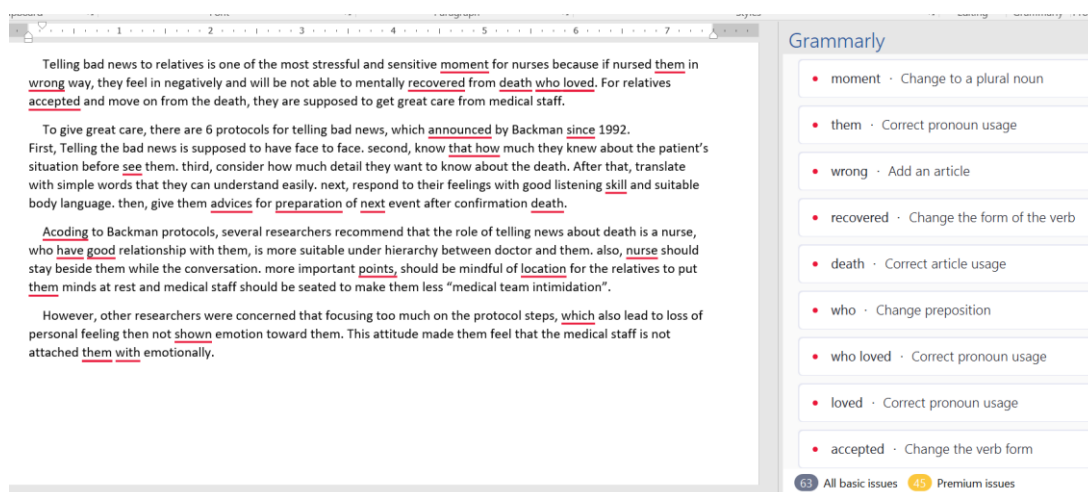


Figure 1. Example of Grammarly Convention Suggestions for Nana’s Initial Draft

Overall, Grammarly identified 63 basic (convention) errors in Nana’s paper that she

had missed during her self-revisions. Together we reviewed the suggestions for her first paragraph, then discussed the types of errors she had made and edited them accordingly. After this, I provided Nana time to edit the rest of her draft herself using Grammarly. While doing this, I also asked her to pay attention to what kinds of recurring errors she was correcting and to make a list of them for us to discuss afterward (Table 1).

Table 1. Error Types and Frequency of Errors in Nana's Initial Draft

Error Type	Frequency of Error
Change preposition	12
Spelling mistake	11
Pronoun usage	7
Verb form	7
Article usage	6
Punctuation (remove/add a comma or space)	5
Agreement mistake	4
Missing or unnecessary verb	3
Missing article	3
Word choice mistake	3
Change to plural noun	1
Subject-verb agreement	1

We next used the specific metalinguistic CF Grammarly provided to analyze her most common writing errors and ways to mitigate them in future writing. Lastly, we discussed the following TAM-based reflection questions regarding her overall experience using Grammarly to self-edit:

1. On a scale of 0-5 (0 = extremely difficult, 5 = extremely easy), how easy was Grammarly to use to edit your writing? Why?
2. On a scale of 0-5 (0 = not at all useful, 5 = extremely useful), how useful was Grammarly to edit your writing? Why?
3. On a scale of 0-5 (0 = never, 5 = extremely often), how likely are you to use Grammarly again in the future? Why?

For all three questions, Nana responded with a score of five. She explained that Grammarly had been surprisingly easy to use and incredibly helpful. It immediately provided her with direct feedback on where the remaining errors were in her draft by underlining them clearly in red, and suggested clear revisions on correcting them—most of which she had agreed with and accepted, resulting in more comprehensible writing. She stated that thanks to this, she did not need to spend much time or effort trying to find the errors on her own or worrying if any errors remained. In fact, she admitted she was surprised and embarrassed to still have so many basic errors remaining after her

self-check of her draft, so she was very grateful that Grammarly could support her with this.

Additionally, thanks to the accompanying metalinguistic CF Grammarly provided, Nana could also learn what recurring errors she made, namely regarding prepositions, pronoun and article usage, verb form, and spelling. She stated that Grammarly had helped improve her grammar awareness and knowledge and that she planned to review the grammar rules for these points to prevent making these same mistakes again in the future. Overall, Nana was very satisfied with Grammarly's role in her self-editing, explaining that it was like she had a teacher beside her while writing. Using it was very time efficient and significantly reduced the stress she usually felt self-editing. As such, she stated she plans to keep using it to support her writing development.

4.2.2 Revising phase

During the Writing Interview, Nana shared that she felt proficient at writing individual sentences in English but had difficulty connecting sentences fluently and logically, using conjunctions correctly, and making her writing clear and concise. Toward this end, the next part of the lesson focused on these aspects and the revising phase of process writing. First, I asked Nana to reread the first paragraph of her edited draft. We then discussed it, and I highlighted some remaining sentence fluency issues. I explained that while AWE systems like Grammarly can be a great tool to help with identifying and editing punctuation, spelling, and grammar, they often cannot accurately handle sentence fluency. While using Grammarly helped Nana to self-edit the 63 writing convention errors, resulting in more comprehensible writing, the free version did not provide any suggestions regarding the 45 “premium” errors that remained. Many of these related to fluency issues. Therefore, to aid Nana with improving this aspect of her writing independently, I introduced her to another useful application of the WBMT DeepL.

On the DeepL website, she copy/pasted the first sentence of her paragraph into it to get the Japanese translation. I then asked her to read the Japanese translation on the right-hand box and edit it (the Japanese) until it accurately expressed what she wanted to say in that sentence. Following this, I showed her how to reverse-translate the corrected Japanese back into English by copy/pasting the Japanese from the right-hand box into the left-hand box. We then compared DeepL's English translation of the Japanese with her original English sentence. I asked her to repeat the above process until she was satisfied that both the Japanese and English sentences correctly conveyed what she wanted to express.

We then repeated this process together with the rest of the paragraph (sentence-by-

sentence) for practice to ensure she understood how to use DeepL this way as a scaffolding tool to improve her writing. DeepL's English translations often utilized different word choices, style, conjunctions, and sentence forms than Nana's original draft, allowing her to compare and consider ways to further develop and improve her sentences. Nana was then given time to revise the rest of her draft independently. Afterward, we discussed her experience using DeepL to revise her paper using the following TAM-based reflection questions:

1. On a scale of 0-5 (0 = extremely difficult, 5 = extremely easy), how easy was DeepL to use to help you revise your writing? Why?
2. On a scale of 0-5 (0 = not at all useful, 5 = extremely useful), how useful was DeepL to help you revise your writing? Why?
3. On a scale of 0-5 (0 = never, 5 = extremely often), how likely are you to use DeepL to help you revise your writing in the future? Why?

For questions #1 and #2, Nana responded with a four. Regarding ease of use, she explained that it was not difficult to copy/paste her English sentences into DeepL, then revise the given Japanese translation on the right-hand side, and then reverse-translate that back into English. She was surprised and impressed with the resulting DeepL English translations, which often included different sentence styles comprising new word choices, collocations, and more concise sentence forms. She found comparing these to her sentences and using them to help her improve on them incredibly useful.

For example, comparing the first paragraph of her edited draft with that of the revised draft, we can see that DeepL helped her to shorten and rephrase her initial lengthy sentence more clearly and concisely and to rewrite the second sentence in the active voice rather than the passive. She also learned new collocations, 'giving bad news' rather than 'telling bad news' and 'need extensive care' rather than 'get great care,' and a more appropriate word choice using 'situations' rather than 'moments' (Figure 2).

Grammatically-only Condition

Telling bad news to relatives is one of the most stressful and sensitive moments for nurses because if nursed them in a wrong way, they feel in negatively and will be not able to mentally recover from the death of who loved. For relatives to accept and move on from death, they are supposed to get great care from medical staff.

DeepL Condition

Giving bad news to relatives is one of the most stressful and sensitive situations for nurses. Relatives need extensive care from the medical staff to help them accept the death and recover from it.

Note: Underlines were added by the researcher to show the contrast between the two drafts.

Figure 2. Sample Comparison of Nana's Edited Draft Using Grammarly with her Revised Draft Using DeepL

For Nana, using DeepL in this way provided exposure to various new language forms,

allowing her to incorporate less frequently used vocabulary and increase the level of richness. Overall this resulted in a significantly more accurate and comprehensible writing product than her initial and self-edited drafts (Appendix E).

However, Nana did report that DeepL's Japanese translations were sometimes inaccurate, requiring her to rewrite them to have the English translation match what she wanted to say. Likewise, the final English translations were sometimes flawed or had removed information that she wanted to include. These were viewed as inconveniences in the technology and required additional time and effort by Nana to complete revising her draft. Nevertheless, overall, these constraints were minimal, and Nana scored question #3 with a five, stating that she found DeepL to be extremely useful and wanted to continue using it in this way to help her with her English writing.

5. Discussion

This pilot qualitative case study investigated the writing affordances and constraints the AWE software Grammarly and the WBMT DeepL had for an adult ELL, as well as its ability to foster self-directed writing. This was explored through the writing intervention and using the two TAM factors of perceived usefulness and ease of use. Despite having shared during the writing interview that her computer skills were poor and she was technology-averse, Nana reported few difficulties using both Grammarly and DeepL, expressing surprise by how easy they were to use and how effective they had been supporting her throughout the stages of process writing.

Regarding Grammarly, the direct CF it provided by underlining in red errors was very clear, and the suggested corrections were easy to use to self-edit her writing. Furthermore, the metalinguistic CF it provided explaining the types of lexico-grammatical errors she made and how to fix them allowed her to notice her recurring errors and improved her grammatical knowledge. She expressed that this motivated her to study and learn those grammatical points, to avoid making the same errors in future writing. The individualized CF and scaffolding of Grammarly effectively increased Nana's writing self-efficacy and her overall confidence in her writing capabilities.

These findings are consistent with Mohsen's (2022) meta-analysis of the role of AWE on L2 writing improvement, which revealed that it can especially benefit beginner and intermediate learners. It accomplishes this by acting as a form of scaffolding, supporting them in identifying recurring errors and enabling them to self-edit using the CF provided by the AWE, overall improving their L2 grammatical competence. They also echo Cavaleri and Dianati's (2016) findings that Grammarly increased students' understanding of grammatical concepts, motivation in the writing process, and

confidence in writing.

However, similar to some participants in the above study, Nana also reported that sometimes the suggestions provided by Grammarly were flawed or inappropriate, which led to confusion and uncertainty in the accuracy of her word choice. Yet this constraint can also be viewed as an affordance; since Grammarly's suggestions are not always accurate, they still require critical reflection by learners to discern which corrections to accept and which to ignore as flawed, further developing learner lexicogrammatical error and fluency. Another constraint was (the free version of) Grammarly's inability to support writing fluency errors. Mohsen's (2022) findings also reported that AWE systems are not as useful for improving L2 writing fluency or handling content errors. This was the justification in this study for using Grammarly for only the editing phase and DeepL instead to support the revising phase of the intervention.

Regarding DeepL, compared to her prior method of using an electronic dictionary, Nana found it more effective because she could use it to look up individual words and view the meaning of an entire sentence or passage to see the meaning within the context of the reading. This reduced the uncertainty she sometimes felt when a dictionary provided her with several definitions for a word or without useful context. Additionally, Nana shared that using DeepL to revise her draft had been incredibly helpful, describing it as similar to receiving CF from a teacher. DeepL's translations enabled her to select more appropriate and contextualized word choices and use more authentic expressions, thus enhancing the overall quality of her writing. These findings were consistent with the findings of Chen et al. (2015) that MT technology can increase lexical fluency, as well as that of Lee (2020) that it can aid in the use of more appropriate word choice and expressions and improve participants' paraphrasing skills. However, similar to her use of Grammarly, Nana also reported a limitation of DeepL, namely inaccuracies at times in its translations. This constraint can also be viewed as an affordance, though, since while DeepL provides potentially helpful translations, it still requires the writer's critical thinking and metalinguistic reflection to consider the provided word forms and strategically decide how best to integrate them into their writing draft.

Overall for Nana, using Grammarly and DeepL proved to be effective tools in supporting her writing development. However, some limitations of this pilot study were its small sample size and short intervention time frame, which make it difficult to generalize its results to other populations. Therefore, future studies should incorporate larger and more varied sample sizes and take a longitudinal design to see how learners' writing develops over time. Additionally, it would be noteworthy to see if a short

intervention like this can be successfully applied to a school setting to teach students to resolve lower-level CF writing issues themselves, thus lessening the burden on teachers and freeing up their time and energy to provide higher-level CF.

6. Conclusion

The present study demonstrated how the AWE Grammarly and WBMT DeepL could be systematically integrated into a learner's writing process as a scaffolding tool to support their editing and revising, fostering self-directed writing. The fact that the participant initially had low technology proficiency yet scored Grammarly and DeepL highly on the TAM is very promising. L2 learners, particularly at beginner or intermediate levels, often struggle with lexico-grammatical accuracy and writing fluency errors. However, this pilot study has demonstrated that Grammarly and DeepL can provide several affordances to support writers' development without the presence of a teacher. These technologies could scaffold the participant's learning, lowering her cognitive burden and anxiety and resulting in increased writing confidence and output. Interventions demonstrating to learners how to utilize AWE and WBMT technologies show promise in fostering self-directed writing and promoting writing fluency.

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Appendices

A. Interest Inventory

Name:

Preferred Gender Identification:

- 1.) Where is your hometown? Where are you living/working now?
- 2.) Please tell me a little about your family.
- 3.) How would you describe your personality? Why?
- 4.) What are some of your hobbies?
- 5.) What are your favorite weekend plans?
- 6.) What kind of movies and TV shows do you like?
- 7.) What kind of music do you like? Can you play any instruments?
- 8.) What kinds of things do you like/usually read? Why?
- 9.) Have you travelled abroad? If so, where and how was it?
- 10.) Your own topic – feel free to share something interesting about yourself or something you would like me to know about you!

B. Writing Interview Questions

- 1.) How did you learn to write in English?
- 2.) What experiences did you have with academic writing in school? (in both Japanese and English)
- 3.) In general, what kinds of materials do you write these days? (in both Japanese and in English)
 - What tools do you use to write?
- 4.) Do you consider yourself a good writer? (in both Japanese and in English) Why or why not?
 - In general, what are your attitudes about writing? (in both Japanese and in English)
- 5.) When you are writing in English and come to a point where you are having trouble, what are some strategies you use to help?
 - Do you do all your writing at once? Or do you write some, then take a break and return to it at a later time to continue?
 - Do you use any spellcheck/grammar check software to help you in your writing?
- 6.) If you knew someone was having trouble writing, what advice would you recommend to help them?
- 7.) What would you like to improve most about your writing?
- 8.) What motivates you to write (better)?

C. Article Summary & Reflection Handout (Nana's original version)

Part 1: Article Summary

Telling bad news to relatives is one of the most stressful and sensitive moment for nurses because if nursed them in wrong way, they feel in negatively and will be not able to mentally recovered from death who loved. For relatives accepted and move on from the death, they are supposed to get great care from medical staff.

To give great care, there are 6 protocols for telling bad news, which announced by Backman since 1992. First, Telling the bad news is supposed to have face to face. second, know that how much they knew about the patient's situation before see them. third, consider how much detail they want to know about the death. After that, translate with simple words that they can understand easily. next, respond to their feelings with good listening skill and suitable body language. then, give them advices for preparation of next event after confirmation death.

Acoding to Backman protocols, several researchers recommend that the role of telling news about death is a nurse, who have good relationship with them, is more suitable under hierarchy between doctor and them. also, nurse should stay beside them while the conversation. more important points, should be mindful of location for the relatives to put them minds at rest and medical staff should be seated to make them less "medical team intimidation".

However, other researchers were concerned that focusing too much on the protocol steps, which also lead to loss of personal feeling then not shown emotion toward them. This attitude made them feel that the medical staff is not attached them with emotionally.

Part 2: Reflection Questions

What new or interesting thing(s) did you learn from the reading?

Buckman's 6 protocols to breaking bad news is basic methods for medical staff in over the world. although, I did not lean about this at my nursing class and hospitals. Also the location is the most important manner for relatives, which I also concerned about this when I had the experiences at my work place.

What is your opinion or impression about the reading/topics? Why?

I am an operating room nurse. during the surgery we sometimes have inoperative result after diagnose inner body. The surgeons have to tell the relatives about the bad news so we often face their crisis and always feel dilemma about unsuitable the envelopment so I researched what is the operating room nurses feel dilemma during the conversation then found out 4factors such as ward nurse ,who in

charged the patient and the relatives do not attend the conversation, the location of the conversation is not suitable room because other patients passing by them during the conversation, doctors are wearing bloody gown and gloves then talking them with one side and more the relatives and doctors are standing, further more even relatives crying the surgeons and operating nurses should back to the patient's operating room and leave the relatives alone at the waiting room.

For relatives, depend on the way to get the bad news of the patient, their grieving process would become difficult. Regarding this article, the relationship between relatives and medical staff and how the relatives knew about the health situation of the patient and the location to have the conversation and medical staff's performance, sometimes misunderstanding happened. Also medical staff's outfit and behave give the relatives "medical team intimation" so nurses should be close toward the relatives and stay with them and translate the information for them to prevent their misunderstanding.

How/when might you able to use what you read?

I have been researching about the impact between the relatives and nurses when they face the bad news of their patients in Japan so I could use this article on my research study to be more persuasive to change the environment at my work place.

D. Article Summary & Reflection Handout (after Grammarly editing)

Part 1: Article Summary

Telling bad news to relatives is one of the most stressful and sensitive moments for nurses because if nursed them in a wrong way, they feel in negatively and will be not able to mentally recover from the death of who loved. For relatives to accept and move on from death, they are supposed to get great care from medical staff.

To give great care, there are 6 protocols for telling bad news, which were announced by Backman in 1992. First, Telling the bad news is supposed to have face to face. second, know how much they knew about the patient's situation before seeing them. third, consider how much detail they want to know about the death. After that, translate with simple words that they can understand easily. next, respond to their feelings with good listening skills and suitable body language. then, give them advice for the preparation of the next event after confirmation of death.

According to Backman protocols, several researchers recommend that the role of telling news about death is a nurse, who has a good relationship with them, is more suitable under hierarchy between doctor and them. also, the nurse should stay beside them while the conversation. more important points should be mindful of the location for the relatives to put their minds at rest and medical staff should be seated to make them less "medical team intimidation".

However, other researchers were concerned that focusing too much on the protocol steps, also lead to loss of personal feeling then not showing emotion toward them. This attitude made them feel that the medical staff is not attached to them emotionally.

Part 2: Reflection Questions

What new or interesting thing(s) did you learn from the reading?

Buckman's 6 protocols for breaking bad news are basic methods for medical staff in over the world. although, I did not learn about this in my nursing class and hospitals. Also, the location is the most important manner for relatives, which I was also concerned about this when I had the experiences at my workplace.

What is your opinion or impression about the reading/topics? Why?

I am an operating room nurse. during the surgery, we sometimes have inoperative results after diagnosing the inner body. The surgeons have to tell the relatives about the bad news so we often face their crisis and always feel dilemma about unsuitable envelopment so I researched what the operating room nurses feel dilemma during the conversation then found out 4factors such as ward nurse, who is charged the

patient and the relatives do not attend the conversation, the location of the conversation is not suitable room because other patients passing by them during the conversation, doctors are wearing bloody gown and groves then talking them with one-side and more the relatives and doctors are standing, furthermore even relatives crying the surgeons and operating nurses should back to the patient's operating room and leave the relatives alone at the waiting room.

For relatives, who depend on the way to get the bad news about the patient, their grieving process would become difficult. Regarding this article, the relationship between relatives and medical staff and how the relatives knew about the health situation of the patient and the location to have the conversation and medical staff's performance, sometimes misunderstanding happened. Also medical staff's outfits and behavior give the relatives "medical team intimation" so nurses should be close to the relatives and stay with them and translate the information for them to prevent their misunderstanding.

How/when might you be able to use what you read?

I have been researching the impact between the relatives and nurses when they face the bad news of their patients in Japan so I could use this article in my research study to be more persuasive to change the environment at my workplace.

E. Article Summary & Reflection Handout (after DeepL revisions)

Part 1: Article Summary:

Giving bad news to relatives is one of the most stressful and sensitive situations for nurses. Relatives need extensive care from the medical staff to help them accept the death and recover from it.

To help medical staff provide proper care, In 1992, Bachman published “Six Protocols for Communicating Bad News” First, when giving bad news, it should be face-to-face; second, the health care provider should be aware of the extent to which the relative knew about the situation before meeting the relative; and third, the health care provider should consider how much detail the relatives want to know about the death. Fourth, use simple language that they can easily understand. Fifth, listen carefully to their feelings and respond with an appropriate attitude; Lastly, advise them on how to prepare for the next event after the death is confirmed.

According to the Bachman protocols, a hierarchical relationship occurs between the physician and the relatives, making the relatives more vulnerable. Therefore, several researchers recommend that the role of conveying the news of death is best performed by a nurse who has a good relationship with the relatives. More importantly, try to create a space where the relatives feel at ease and the medical staff can be seated and speak, thereby reducing the “intimidation of the medical team” that the relatives may feel. However, other researchers were concerned that the medical staff, in focusing so much on the steps of the protocols, would lose their personal touch and show less emotion on the relatives’ side. This attitude makes the relatives feel as if the medical staff is not emotionally invested in them.

Part 2: Reflection Questions

What new or interesting thing(s) did you learn from the reading?

Bachman’s “Six Protocols for Communicating Bad News” are the basic methods used by medical staff around the world. However, I did not learn this in my nursing classes or the hospital. In addition, using Bachman’s protocol as a benchmark, various researchers have made recommendations for more specific ways to relate to relatives, which are easy to put into practice. On the other hand, it has been suggested that over-reliance on protocols can lead to a tendency to relate to relatives without personal feelings.

What is your opinion or impression about the reading/topics? Why?

In Japan, the method of delivering bad news was left to the experience of medical professionals. Post-graduate nurse education is provided in the workplace, but there is no hospital-wide education on how to give bad news.

I work as an operating room nurse. During surgery, I sometimes encounter situations where an intra-abdominal diagnosis renders the operation inoperable. As a nurse, find me in the dilemma of how to relate to a relative who reacts in crisis when the surgeon delivers bad news to the relative. Therefore, we conducted an interview survey on the dilemmas felt by operating room nurses in their relationships with their relatives and found four difficulties. First, the nurses of the ward, who already know the relatives, are not present; second, no conversation takes place in the private room. Third, the doctor stands in a bloody gown and gloves and explains one-sidedly to the relatives. Fifth, the surgeon or surgical nurse returns to the operating room and leaves the crying relative alone in the waiting room.

Comparing these factors with Bachman's six protocols for delivering bad news, The behavior of the medical staff shows a lack of proper interaction with the relatives.

How/when might you be able to use what you read?

I am conducting a study in Japan on the difficulties nurses face when dealing with relatives who have received bad news. You may use this article as a reference for the discussion of this research. As we continue this research, we would like to encourage the entire workplace to improve the way they relate to their relatives when given bad news.