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An Investigation into EFL Students' Perceptions towards the Integration of Technology in L2 Writing Classrooms: A Case Study

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Abstract

Despite the widespread attention on applying technology in language writing classrooms, little is known about students' perceptions towards the integration of technology in language writing instruction, learning and assessment. To fill this gap, the current study investigated students' perceptions towards such integration. Three tools, namely, Tencent Docs, iWrite and COCA, were introduced to students. Data was gathered from classroom observation and an interview with one focal participant. The results revealed that the participant was positive towards such integration while acknowledging its limitations. The participant reported changes towards the functions of these tools, indicating their effectiveness and affordances in L2 writing classrooms. The implications for further research and teaching of L2 writing are discussed.

Keywords: technology, L2 writing, language teaching, language learning, language assessment

1. Introduction

Technology has long been viewed as a valuable tool in supporting and enhancing language teaching practices (Williams & Beam, 2019). Under this context, a variety of popular tools have emerged, including Web 2.0 platforms, automated writing evaluation (AWE) systems, and corpus. The integration of these technological tools holds great potential in the field of language education, particularly in the area of L2 writing instruction. However, existing literature mainly investigates the integration of technology from the quantitative perspective, focusing on students' writing performance (Guo et al., 2022; Wang et al., 2013; Liao, 2016), lacking qualitative evidence from students' aspects. Moreover, a growing body of studies center on the development of teachers' digital literacy to use technology tools (Ekmekci, 2023; Zhang, 2023), while students' perceptions on the integration of technology in English writing classrooms remain underexplored.

With an aim of gaining comprehensive insights into the application of technology in the L2 writing classrooms, the present study seeks to delve into students' perspectives on its use. The study aims to explore how these tools are utilized and how they impact the learning and evaluation processes. By examining students' experiences under the guidance of a teacher, June, who adopted an integrated approach combining technology and traditional teaching methods, the research aims to shed light on students' perceptions and attitudes towards this innovative approach.

Language teaching encompasses three key stages: teachers' instruction, students' learning, and the evaluation of students' performance (Weisberger et al., 2021). In this study, the primary focus is on how the teacher, June, effectively integrated technology into each stage. During the instructional phase, June incorporated various digital resources and online platforms to deliver engaging and interactive lessons. The students' learning phase involved them actively engaging with the technology to practice their writing skills, explore language resources, and receive timely feedback. Lastly, the evaluation of students' performance incorporated the use of automated writing evaluation systems and online corpora to provide objective assessments and targeted feedback.

Through examining students' perspectives on the use of technology throughout these stages, the study aims to uncover their perceptions and attitudes in accepting this integrated approach. The current study presents steps of the teacher's integration, with purposes illustrated, with an intention to provide guidance for the application of technology into EFL writing classrooms. A case study was employed, and the participant's interview data was analyzed in order to gain an in-depth understanding of how the EFL learner perceived such integration, including the advantages, limitations, and difficulties the student has encountered. The findings are expected to contribute

to our understanding of the benefits and challenges of incorporating technology in language teaching, and provide insights for educators and practitioners seeking to effectively leverage technology in the L2 writing classrooms.

2. Literature Review

A number of studies have shown that technology sheds light on language education, including enhanced language learning opportunities, personalized and autonomous learning, and collaboration and communication in language learning (Hartley et al., 2001; Lopez-Fernandez & Rodriguez-Illera, 2009; Seyyedrezaei et al., 2022). For example, Lopez and Rodgriguez (2009) investigated undergraduate students' perceptions, attitudes and behavior when an e-portfolio was introduced to support students' learning and assessment. The findings of the study revealed that students held positive attitudes towards the e-portfolio and adopted it as a tool to manage their learning. The majority of systematic reviews (Metruk, 2022; Seyyedrezaei et al., 2022; Zhao, 2022) mentioned the benefits of the integration of technology into language teaching classrooms, giving support to such an approach. These trends indicate that teachers' role should be shifted from knowledge-imparter to the guide of technology, for technology can function as both a tool and tutor. In other words, teachers should encourage and guide students to reap the benefits of technology, and coordinate with technology to maximize its effectiveness.

2.1 Studies on Web 2.0 in Writing Classrooms

Several studies (Kung, 2018; Rice, 2009; Shu & Chuang, 2012) have demonstrated that Web 2.0 technologies can be more interactive for EFL students' to participate in writing classrooms. Common Web 2.0 technologies include social media such as Facebook and collaborative tools (e.g., Wiki and Google Docs). Studies on social media in L2 writing have mainly focused on its effects on writing performance. For example, Dizon (2016) conducted an empirical study on Facebook, and showed that using Facebook can influence EFL students' writing performance when comparing it with paper-pencil writing. The finding revealed that students who deployed Facebook to continue their writing tasks outperformed students in paper-pencil writing in terms of writing fluency, while lexical richness and grammatical accuracy did not show significant progress. This implies that Web 2.0 tools can be considered in L2 writing classrooms. However, this study centered on quantitative methods, while leaving students' attitudes and perceptions undiscussed. In Kung's (2018) study, he explored students' perceptions, motivation and confidence in academic writing through blog-assisted language learning. The interviewee data revealed that students perceived a positive attitude towards the integration of Web 2.0 tools in language learning, but their motivation and confidence were not strengthened. Kung suggested that teachers should be aware of the limitations of Web 2.0 tools. This implies that the design of how to integrate technology into classrooms needs to be further investigated. Web 2.0 plays a pivotal role in facilitating collaborative writing. Rahimi and Fathi (2022) explored the impact of wiki-mediated collaborative writing. With careful design, they found that both quantitative and qualitative data demonstrated that Wiki space can help students improve their writing performance, self-regulation and self-efficacy. In Wiki-space, students participated in peer feedback activities, delivering feedback to their peers in the comment section. Thus, Web 2.0 tools provide affordances to collaborative learning, and it also applies to classroom teaching to facilitate interaction.

To summarize, the research on Web 2.0 tools suggests that the interactive nature of such tools can bring advantages to students in terms of students' writing performance, facilitating students with better output. Web 2.0 tools can make it easier for students to practice writing in a more interactive and collaborative way. It can allow students to receive feedback on their writing from a wider audience. This can include their peers, teachers, and even nature speakers through the sharing of the link.

2.2 Studies on AWE in Writing Classrooms

A plethora of studies have investigated the validity of automated evaluation writing systems and compared their effectiveness in improving writing with teacher feedback and peer feedback. Controversies existed in the effectiveness of AWE on writing improvement. In Wang et al.'s (2013) study, they introduced the AWE software "Correct English" into EFL writing classrooms. According to their results, students in the experimental group made significant improvements in terms of writing accuracy and displayed writing enhancement. Their study suggests that AWE is capable in providing feedback in terms of linguistic forms, leading to students' error correction. However, they also pointed out that AWE has limitations in providing specific feedback, especially when it comes to content and organization. Participants in their studies also expressed that they did not feel real communication with the machine. Though AWE has its effectiveness in helping with writing revisions, how to engage students in meaningful communication is an issue that needs for further consideration. In response to this issue, the combination of teacher feedback with AWE feedback is recommended. Link et al. (2020) have

discussed teacher's feedback practices with the adoption of AWE. The findings of their study revealed that using AWE as a complement to teacher feedback did not improve the amount of high-level feedback compared to the control group with only teacher feedback. Their participants retained their improvement in accuracy in the long-term when teacher feedback and AWE were combined.

Recent trends of studies on AWE have shifted to students' perspectives, instead of solely focusing on the reliability of AWE for improving writing performance. For example, Zhang (2020) investigated students' engagement with AWE feedback. They pointed out that individual students differed from each other in their engagement with AWE feedback, which was influenced by individual and contextual factors. Students made use of the feedback in accordance with their cognitive strategies. Teachers' perspectives on using AWE also have been studied. For example, Koltovskaia (2023) explored postsecondary L2 writing teachers' use and perceptions towards Grammarly. Despite the use of Grammarly, the participants (i.e., the teachers) in her study showed that they would still provide both global and local aspects of feedback in writing, instead of emphasizing the provision of high-order feedback. However, most of the teachers were positive about AWE, while two teachers were being skeptical. Thus, how to integrate AWE properly into L2 writing classrooms deserves our attention.

Overall, recent studies on AWE highlight the importance of understanding students' and teachers' perspectives towards AWE and how to integrate it properly into L2 writing classrooms.

2.3 Studies on Corpora in Writing Classrooms

As valuable sources, corpora have been introduced to writing classrooms as a tool to check linguistic forms. How do students employ corpora in their writing practices, and what training should be provided deserve teachers' attention. Chang (2014) adopted COCA as a reference source in an academic writing classroom for EFL learners. It was suggested that guidance and training sections are needed to facilitate students' successful application of corpora. It was also pointed out that language proficiency is a factor accounting for effective corpus consultation. With this said, student-centered activities such as group discussions are needed to increase students' corpus competence. Instead of regarding corpus as a reference, Yoon (2008) argued that the influence of corpus is more than a linguistic reference. In his study, students assumed more responsibilities as independent writers when corpus was introduced. Participants in his study reported that their language awareness and confidence in writing were strengthened. This indicates that with the help of corpora, students can interact and invest more in their writing works, achieving the improvement of learners' autonomy. Lai and Chen (2015) also compared corpora with dictionaries and studied the actual practice of the two different tools in EFL writing. With training provided, students were required to write three timed essays online using corpora and dictionaries as assistive tools. The results showed that when needing for information related to word and collocation use, students would often turn to corpus, while using bilingual dictionaries to find word form and word meaning. Students would often turn to corpus tools for confirmation after checking dictionaries. The implication is that when in actual classroom practice, teachers can guide students to check dictionaries and then consult corpora, so as to engage in meaningful negotiation.

Considering the effectiveness of corpora in writing classrooms, teachers' literacy in using corpora has caught researchers' attention. It is reported that teachers face considerable challenges in incorporating corpora into writing classrooms. Thus, scaffolding and recommendations are needed in providing teacher training (Crosthwaite et al., 2021). In order to address these challenges, Schmidt (2023) organized an online corpus-based pedagogy workshop in her study, aiming to encourage and improve in-service teachers' adoption of corpora in their classrooms. The analysis of the data showed that teachers tend to be planners or seekers when incorporating corpora into writing classrooms, and they reported increased confidence and willingness to use corpora for their teaching.

In general, incorporating corpora into teaching design is a promising strategy to help improve EFL students' writing, for corpora can provide a large amount of authentic language data. By consulting and analyzing these data, students can develop a metacognitive awareness. Thus, it is imperative for teachers to gain a deeper understanding of corpora so that they can better plan their lessons and guide students properly. However, students' perspectives on using corpora also need to be further investigated.

Against the backdrop, the following research question is proposed.

How did the student perceive the integration of technology (in this case, Web 2.0 tools, AWE, and corpora) in L2 writing classrooms?

The paper first describes the use of these tools in a real L2 writing classroom, followed by the participant's interview data and analysis.

3. The Study

3.1 Research Context and the Participant

The study reported the practice of the integration of technology in English writing classrooms at a university in Jiangxi province of China. Jiangxi is a landlocked province located in Eastern China. The students in the writing course were English majors in their second year of studying, preparing for TEM-4 test. TEM-4 is a standardized English language proficiency test that is administered in China for English majors. English writing accounts for 20% of the total score in the test. Thus, the purpose of this writing classroom included improving students' writing ability so that they can pass TEM-4, while developing their critical thinking by practicing argumentative writing. The students met the teacher 80 minutes per week for the course. Twenty-nine students joined the class, among which one student (Lily) volunteered to be the interviewee in the present study. Lily was the monitor of the class. She finished her K-12 study in a less-developed area in Jiangxi. After taking the college entrance exam, Lily went to the provincial city of Jiangxi for her college study. Before going to college, Lily knew little about Web 2.0 tools, except for WeChat and Tencent QQ, and neither did she know about AWE and corpora. One of the class monitor's responsibilities was collecting basic information about her classmates, so Lily learned how to use Tencent Docs as an office tool. Lily was selected for the present study for the following reasons. First, Lily witnessed great change in interacting with the teacher. In the first few classes, Lily was shy when being asked questions by the teacher. Later on, she actively spoke up her answers in the classroom. Second, most of her classmates were from less-developed areas of Jiangxi province and had little knowledge of technology such as AWE and corpora, so Lily could represent the majority of her classmates. Lily reported herself as intermediate in English proficiency with strong motivation in learning. She was good at spoken English, but found it challenging to write properly.

3.2 Data Collection and Analysis

The present study is based on the qualitative data collected from the semi-interview with the participant (Lily) over the whole semester, with teaching materials and classroom observation assisted. The interview was conducted for an hour, in which the participant was guided to share more about her experience and feelings on the teacher's integration of technology in the writing classrooms. Deductive analysis (Azungah, 2018) was adopted, with an aim to discover more on the participant's perceptions towards the technology-enhanced classrooms. Teaching materials were analyzed by the researchers to identify the steps of how the teacher made such integration. The steps and designs of the teacher's integration were decoded in the following. The researchers also participated in the classroom to observe students' changes when interacting with the teacher, their peers, and technology. Two coders, with a background in applied linguistics, analyzed the data, and the agreement reached 90%. Any interpretation uncertainties were resolved by discussion with the interviewee.

3.3 The Teacher's Practices

The teacher, June, adopted and integrated Tencent Docs (Web 2.0 tool), iWrite (an AWE system) and COCA (a free online corpus) into her writing classrooms.

3.3.1 Tencent Docs

Tencent Docs has emerged as a popular collaborative editing platform in China. Currently, it is primarily viewed as an office tool by teachers and students, mainly used for collecting student information, rather than being recognized as a powerful technology-enhanced tool.

At the beginning of the semester, after detecting students' shyness and reluctance to speak out their answers in public, the teacher (June) sought other ways to facilitate classroom interaction. Tencent Docs, as its introduction describes, is an online tool that can support real-time collaboration among multiple users. Having been familiar with Tencent Docs, June adopted it in her classrooms.

In a writing task, e.g., rewriting sentences, June presented the tasks through the Tencent Docs link to the students. The students chose to write in the online tool or upload their writing, with no personal information displayed (except for their WeChat name when they were editing). The purpose was to facilitate students' interaction with the teacher in a comfortable environment, so that the students would not be afraid of face-to-face pressure while finishing their writing. For another, the teacher can check students' understanding and provide timely feedback. Later in her class, after students displayed active participation and were gradually willing to speak out their answers, June stopped using Tencent Docs for on-spot interaction, while retaining its use only for peer review.

Tencent Docs can also help teachers monitor the process of students' peer-assessment. June required students to self-reflect on their own work after finishing a writing task. After self-assessment was finished, the students were required to conduct peer assessment by uploading their writing in Tencent Docs, with guiding questions provided.

The online platform enabled June to track students' participation in the peer-assessment process by the comments provided from the students, and intervened when students encountered difficulties or did not finish their peer review.

3.3.2 iWrite

iWrite is an AWE system developed by Foreign Language Teaching and Research Press in China. It has been used widely across the country and is relatively reliable when compared to pigai.org (another popular AWE in China). Like most AWE, iWrite can provide students with machine intelligence evaluation from various aspects of writing, especially from linguistic forms. What distinguishes iWrite from other AWE systems is that it can detect some inappropriate cohesive devices and coherence breakdown. As an automated evaluation system, it can provide timely and individual feedback and suggestions to students, from global and local perspectives. In addition, teachers can check students' writing and error types in the platform, so that teachers can provide focused feedback to students after checking their mistakes. June introduced iWrite to students as a tool to assist students to revise their writing.

3.3.3 Online Corpora – COCA

A corpus is a large, principled collection of naturally occurring texts stored electronically (Reppen, 2010). Unlike dictionaries, corpora can also offer a number of authentic language data from real-life contexts. June introduced COCA, a large corpus containing 1.0 billion words in English, to students as a tool for them to check word choice and collocation use. June also designed activities for students to explore corpus by themselves, with the purpose of developing students' skills in using corpus, thus enabling students to become autonomous learners. The activities are presented below.

(1) Distinguish two similar words: sculpture vs statue

The teacher noticed that the students used these two words interchangeably. While they may have similar meanings in Chinese translation, there are subtle distinctions between the two words.

Step 1: The teacher first guided students to consult dictionaries to see the difference in definitions of these two words.

According to the Collins dictionary, a sculpture refers to "a work of art that is produced by carving or shaping stones, wood, clay, or other materials", while a statue is "a large sculpture of a person or animal, made of stone or metal".

Step 2: The teacher guided students to discuss the difference between these two words according to the definitions.

Sculpture is a broader term than statue. Statue emphasizes the large size, while sculpture includes carving works of various sizes.

Step 3: The teacher guided students to consult COCA to verify their discussion using the "compare" function. The result showed that the word "statue" is often modified by words like "equestrian", "colossal", "tall", "life-size", while "sculpture" is modified by "outdoor" "figurative" and "figural", which confirms with students' thinking.

(2) Discover diversified expressions

Unlike Chinese, English places stress on diversification in expressions. In order to make our English writing more readable, instead of over-repetition (e.g., using the word "important" repeatedly), one strategy is to use synonyms. COCA also offers such a function through search with wildcard "=the word", so that a list of different expressions for the same word would appear. The following is a demonstration of the word "important".

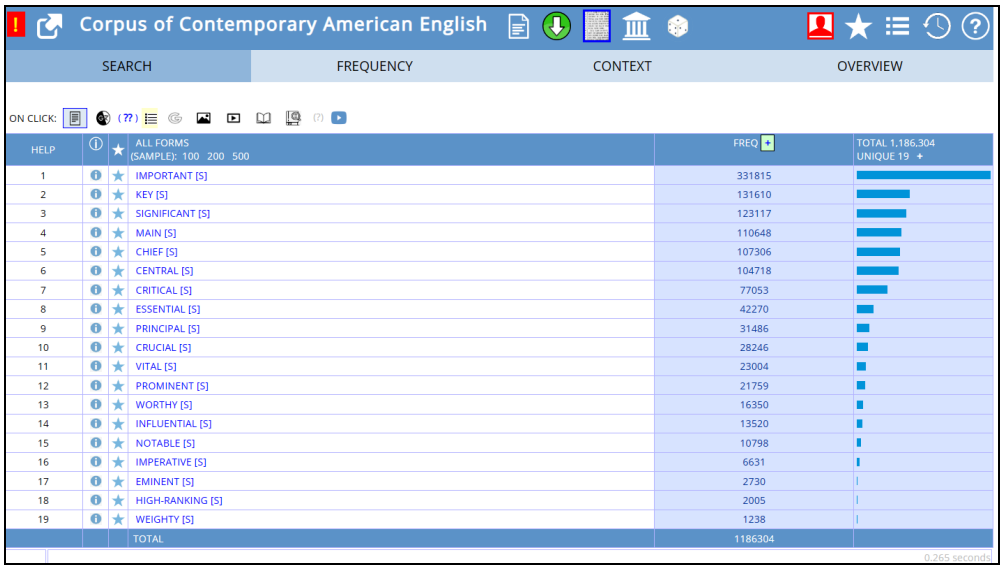

Figure 1. An example for synonyms of "important"

(3) Check collocations

One difficulty for EFL learners in writing is to find proper collocations. With the help of the frequency list in COCA, students can determine whether the collocations are appropriate in the target language (i.e., English). The following is the demonstration by comparing the frequency of "learn knowledge" and "acquire knowledge" to check which is more frequently used.

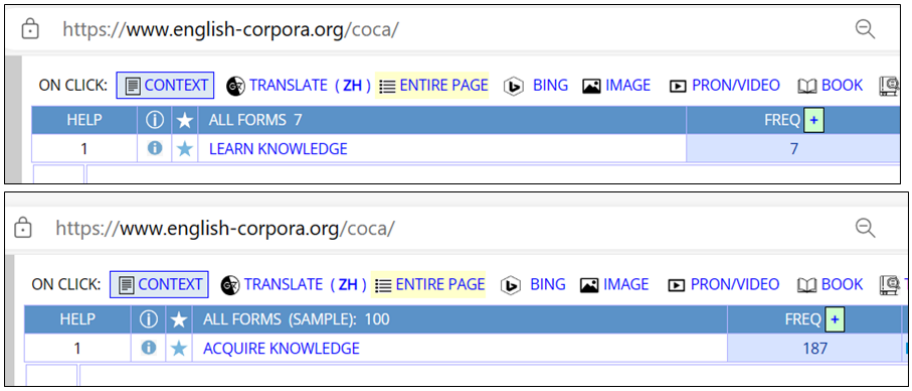

Figure 2. An example for checking collocation use

(4) Tackle with redundancy in language

As observed by June, students were often redundant in their language use, impeding them to generate authentic language. Thus, June encouraged students to use the corpus COCA to check the redundancy in language.

Step 1: Students are presented with examples of redundancy to detect the problem in language use (e.g., accelerate the pace of).

Step 2: Students are encouraged to input the example into COCA, and limit the scope to news or academic papers, to avoid disruption from unreliable resources.

Step 3: If the page comes up with the sentence "No results found!", it indicates that such expressions are not used in actual language data. When the page comes up with concordance lines and context, it indicates that such expressions are used in language, with frequency provided.

(5) Feedback-provided

One function in COCA is "Text-analyzer". Through inputting the writing essay in the analyzer, it would soon come up with the analyzed result, with different colors marked: bule for high frequency, green for medium frequency, and yellow for low frequency. When switching to the mode "phrase", one can choose the

low-frequency word to search for more appropriate words in context. June would guide students to input their essays in the analyzer to get data-supported feedback.

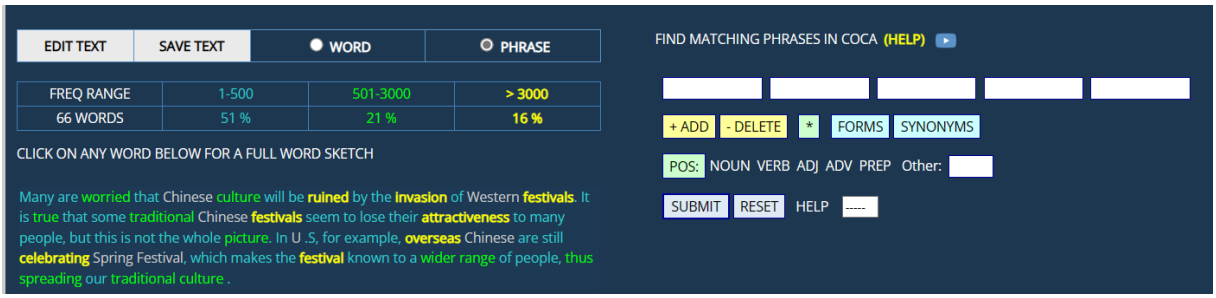

Figure 3. An example for the function "text-analyzer"

4. Results

Lily has shown positive attitudes towards the integration of technology into classrooms. She commented, "Now, it's a digital age, and the use of technology in our classrooms can facilitate both teaching and learning. Many teachers would forbid students from using mobile phones in the classrooms, fearing students' being distracted by these digital gadgets. However, in this semester, the teacher guided us to use these tools, making our learning interesting."

4.1 Perceptions towards Tencent Docs

Tencent Docs: A tool in office to a helper in language teaching classrooms

Lily expressed her enjoyment of using Tencent Docs for its collaborative nature.

"In the past, I regarded Tencent Docs as a tool for us to fill in the forms or collect information. This semester, we used it in our English writing class. Through the upload of my classmates, I can read others' work, and comment on them. Through reading their works, I have collected many useful expressions, and I also learned their way of organizing a text. Besides, I can receive comments from my peers in a timely manner once my classmates have posted comments. It's like a learning community. Also, I felt less awkward without feeling face-to-face on-spot pressure."

Lily also pointed out the limitations of using Tencent Docs.

"I appreciated the comments written by my peers. I knew they were trying to help me improve. However, some of the comments were unclear to me, and I would like to discuss them with the comment provider, but I could not find out who wrote the comments. It would be better if I had the chance to have a more dialogic conversation with the providers."

Lily's account suggests that her understanding of the use of Tencent Docs has extended to a learning-facilitated domain.

4.2 Perceptions towards iWrite

iWrite: A quick respondent

The participant pointed out the usefulness of iWrite in correcting mistakes in spelling and grammar, and made suggestions for AWE development.

"In terms of its advantage, with a simple upload, I can check my mistakes in iWrite within a few seconds. It is very useful and accurate in finding out my mistakes in spelling and grammar, with suggestions offered. If I want feedback on how to correct my linguistic forms immediately, iWrite is my first choice. It is like an error-correcting machine. However, I think most of the automated writing evaluation systems have limitations in providing feedback in terms of logical aspects. Argumentative writing emphasizes not only linguistic forms, but also logic. Sometimes I could understand my own logic, but others find it difficult to follow, so it would be better if the machine can provide feedback in logical aspects."

4.3 Perceptions towards Corpus

COCA: From a stranger to a close friend

Lily shared her in-depth enthusiasm for applying corpus to facilitate her own writing.

"When the teacher first showed us the use of COCA, I was amazed by the large amount of information it can provide. I enjoyed using COCA because it is like a search engine. I can search for whatever I need. In the past,

when I was in high school, the teacher asked us to recite some phrases like ‘pay highly attention to sth.’, but when I searched them in COCA, and no results were found, indicating that there are no such phrases used by the native speakers. COCA is such a large database, and it can always provide me with data-supported evidence to correct some mistakes that I have never noticed before. Besides checking COCA for my writing, I found it interesting to witness how an expression is used in different genres for COCA classifying the language data according to different sections and times. Maybe this can be used for some kind of research. Except for COCA, I have self-explored other corpora like CQPWeb. CQPWeb owns many freely available corpora, including learner English corpora section and English corpora section. Reading and observing others’ essays in these corpora really helped me improve. What is different from corpus and AWE is that we need to search COCA by ourselves, to test our hypothesis about a linguistic form, while AWE can quickly highlight the mistakes we made. It is sure that AWE is speedy in generating results, but corpus engages me to discover the results by myself, so that I can be aware of the mistakes and correct them gradually.”

5. Conclusion

This study set out to investigate how EFL learners perceive the integration of technology in the writing classroom. From the interview data by the participant, it can be seen that the student held positive attitudes towards the practice.

One reason lies in the interactivity offered by technology. In English writing, reader awareness is of great significance. Interactivity can help facilitate the growth of reader awareness due to its dialogic nature. In traditional classrooms, teachers often play the role of being an evaluator of students’ work. However, teachers have to face heavy workloads so that individualized feedback could not be provided to the students in a timely manner. Wang et al. (2022) have shown that the delivery time and mode of feedback have an impact on students’ writing performance. Thus, in order to cultivate EFL learners’ reader awareness, more potential readers should be sought. Technology can make the writing process more interactive and engaging for students. Tencent Docs allows the students to edit and share their writing with their peers in real time, which can promote effective feedback and revision processes. Students can easily collaborate and communicate with their peers, and they can also share the Docs link with other readers on the Internet, facilitating discussions between readers and writers. AWE can also facilitate reader awareness in helping students correct and improve language use. AWE can provide instant feedback on students’ writing, allowing them to identify and correct errors, which is time-saving for students. Corpus, unlike machine evaluation, provides a wide range of authentic samples, allowing students to discover new words, phrases, and expressions. This exposure to real-world language helps students expand their vocabulary and engage them to do their own search. Conducting a search can be viewed as a dialogue between the corpus and the learners.

The findings of this study imply that the integration of technology in writing classrooms is feasible. As the participant mentioned the disadvantages of the tools in the process of providing effective feedback, more design elements should be considered to help students maximize the use of technology. In order to address these limitations, the following solutions are proposed, with an aim to provide pedagogical insights for future practices. One suggestion is to combine Tencent Docs with AWE and corpora. Since AWE can provide timely feedback to students, teachers can guide students to use it to check their linguistic forms in the first round. In the following, students can input their texts or some expressions in a corpus to do the hands-on search by themselves, to compare their writing with authentic language data, so as to improve the accuracy of their writing. After the errors in linguistic forms are detected and corrected, teachers can then engage students to do peer feedback in terms of content (e.g., organization and logic) using Tencent Docs. After multiple rounds of revision, focused feedback can be delivered by teachers. This also applies to distance learning such as MOOC. Besides, in order to maintain dialogic conversation, when asking students to do peer feedback in Tencent Docs, teachers can guide students to write down their names when providing feedback to their peers, or ask students to form groups for better management, and off-line activities can also be organized for discussions. Moreover, the use of corpus can also be not only focused on as a tool for correction and for searching diversified expressions, it can also be acted as an analysis tool. AntConc is one of the free corpus tools that can be used for textual analysis. By inputting teaching materials into AntConc, the teacher can guide students to analyze the textual features of the materials, not only making the teaching materials more alive, but also developing students’ analysis ability.

With the growing interest in AI technology, future designs of introducing AI technology can also be considered introduced in language teaching classrooms. AI can act as a potential reader when given different prompts. Instead of regarding technology as a distraction to classrooms, teachers can make proper designs to maximize its effectiveness to help students improve.

There are three limitations of this study. First, the article presents a case study, with teaching materials, interviews and observations as data. However, it would gain a more comprehensive picture if it is combined with quantitative data. Second, such an integration approach was only used in university settings. Both secondary and primary teachers' and students' perspectives on its designs and effects deserve further investigation. If language teachers from different settings have enough technological knowledge to design their lessons, and the technical conditions to implement their lessons, more students' perceptions can be obtained to further improve this approach. Lastly, the teacher (June) in this study is a teacher with in-depth interest and knowledge on technology, so her digital literacy is at an upper level. However, for other teachers, their digital literacy needs to be surveyed before conducting the technology-integrated approach in classrooms.

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