

Developing College EFL Writers' Critical Thinking Skills Through Online Resources: A Case Study

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Abstract

This study reports on how the supplementation of online resources, informed by systemic functional linguistics (SFL), impacted English-as-a-foreign-language (EFL) student writers' development of critical thinking skills. Through qualitative analyses of student-teacher interactions, interviews with students, and students' written documents, the case study shows that through 1 semester of intensive exposure to SFL-based online resources in a college Chinese EFL writing classroom, EFL writers were able to develop critical thinking skills in regard to the construction of effective academic writing, although it was a process of encountering and overcoming challenges. Through teacher mediation and their own efforts, they could adjust to the online resources-based classroom, exemplified by their utilization of SFL-related categories offered through online resources to analyze and evaluate the interrelationship between language features and the content manifested in valued texts, and regulate the content of their own academic writing.

Keywords

academic writing, critical thinking, EFL learners, online resources, systemic functional linguistics

Introduction

Developing students' critical thinking skills has been a crucial component of the language teaching curriculum, as it fosters students' abilities to analyze and evaluate information, as well as to make their own decisions related to their academic success (Nold, 2017). Take academic English writing as an example. Experienced writers have to construct texts at the dual levels of content and language as endorsed by academic English communities (Fang & Schleppegrell, 2010). This means that English-as-a-foreign-language (EFL) writers have to gain corresponding critical thinking skills, and through them, deconstruct valued English texts and construct their own content on the two levels, projecting their professional identity as culturally and linguistically endorsed academic writers (Hyland, 2002).

Unfortunately, despite the importance of critical thinking skills in the process of writing construction, they are still largely ignored in the writing classroom, which primarily focuses on the teaching of grammar or structure and hampers students from composing effective essays (Lee, 2008; Zhang, 2017). Even in international communities that try to develop English writers' critical thinking skills, actual writing teaching practices are still limited to non-linguistic strategies (e.g., using questions), which are often too abstract or inaccessible for students' writing literacy development on both the

content and language levels (Mok, 2009). In EFL writing contexts, teaching critical thinking skills is, in addition, challenged by conventional classroom practices in which teachers often lack effective educational training and are constrained by the contents of the textbook, leading to a scenario where teachers dominate the classroom and provide limited space for students' development of critical thinking (DeWaesche, 2015; Zhang, 2017). In other words, there is a lack of effective learning materials and teaching strategies in EFL contexts that can cement critical thinking skills with writing construction and help students harness contextually embedded linguistic choices to compose effective writing (Rose & Martin, 2012). Therefore, this case study attempts to explore how a language learning theory (i.e., systemic functional linguistics [SFL]) based on the adoption and use of instructional resources (i.e., online resources) can help EFL writers critically navigate the complexities of academic writing literacy on the levels of both language and content. It

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aims to call EFL writing teachers' attention to the importance of teaching critical thinking skills as well as to provide them with an accessible tool for adopting and using supplementary materials in the classroom while developing their students' critical thinking skills in regard to the construction of effective writing.

Theoretical Framework

Critical Thinking Skills

The core tenets of critical thinking skills related to English language learners reside in their understanding of language as semiotic resources to participate in discourses and their ability to analyze, evaluate, and regulate communicative discourses (Bloom, 1956; O'Halloran, Tan, & Marissa, 2017; Paul & Elder, 2013; Siegel & Carey, 1989). However, the existing research on EFL learners' critical thinking skills has either focused on whether students have critical thinking skills or how students' critical thinking skills are exemplified from a non-linguistic perspective; that is, how students demonstrate their ability to analyze or evaluate authors' or teachers' challenging texts while expressing their own voice. For example, DeWaelche (2015), on the basis of Korean English-major students' responses and interviews over a semester conversation course, showed that teachers' questioning was useful for students' development of their critical thinking skills whereby students became actively engaged in talking about specific topics.

Worse still, even less empirical research has been conducted to investigate EFL students' critical thinking skills related to academic writing instruction and learning, although academic writing and critical thinking are intertwined and are germane to students' academic success (McKinley, 2013; Sun, 2011). Among the limited studies on writing and critical thinking skills in EFL contexts, Liu and Stapleton (2014) revealed that Chinese college students who were taught counterargument gained enhanced critical thinking skills in analyzing and evaluating different opinions in academic writing. Similar to this study, which emphasizes non-linguistic teaching strategies and equates students' critical thinking skills with their general learning skills in evaluating or analyzing discourse contents, McKinley (2013), in a discussion paper, also suggested that argument-based writing was an optimal way to train students' critical thinking as it helped them analyze and evaluate different types of evidence and project authorial stances. Apparently, along with the traditional line of research in EFL educational settings, which has centered on providing non-linguistic strategies and equated critical thinking with students' general cognitive skills, there is also a lack of praxis that explicitly and conveniently guides EFL writers' development of their critical thinking skills in regard to the creation of meaningful texts at the linguistic level, although it is also closely related to students' writing success (Fang & Schleppegrell, 2010).

Indeed, students' success in academic writing is contingent on construing meaningful discourse with contextually appropriate linguistic choices (i.e., grammar and vocabulary; Pally, 2001). To train successful EFL writers, teachers have to guide students through critical analysis, evaluating texts, and regulating their own writing in terms of both language choices and meaning. As such, Siegel and Carey (1989) argued that "having a theory of critical thinking in which language plays a key role opens up instructional potentials" (p. 9), which may help students with critical appropriation or the construction of meaningful English discourse. In other words, a theory-driven curriculum that guides students in understanding and harnessing the correlation between linguistic features and content construction would be potentially optimal for critical writing instruction.

The compatibility between Halliday's (1994) systemic functional linguistics (SFL) as a language learning theory and the development of EFL writers' critical thinking skills resides in SFL's multilayer constructs for demystifying a particular communicative discourse (e.g., writing) through unpacking the relationship among linguistic choices, meaning (i.e., the content of discourses), and context (e.g., the context of academic writing). As such, SFL as a learning theory synergizes nicely with the demand for explicit teaching of critical thinking skills in the writing classroom, which are needed to analyze and evaluate texts, and to produce similar texts that demand contextually appropriate language resources (Ryan, 2011; Siegel & Carey, 1989).

SFL as a Teaching Praxis

In particular, SFL as a comprehensive language learning theory offers the following constructs to critically deconstruct valued academic texts and construct writing at the level of meaning and linguistic features. That is, at a macro-level, the context of culture shows how a text serves different purposes (e.g., to inform) and organizes meaning in a specified way (e.g., the structure of introduction, body, and conclusion in an expository essay). Within the context of culture, the context of situation provides three variables, further anchoring the background of human communication: field (the communication event), tenor (the interrelationship between those involved in communication), and mode (the channel of communication). Responding respectively to the three contexts of situational variables, the three meta-meanings of a discourse are highlighted in the context of situation, and are ultimately organized in response to the context of culture. That is, ideational meaning is the manifestation of field, representing the discourse composers' experiences of this world and the logic-semantic relationship between events. Interpersonal meaning is the manifestation of tenor, showing how discourse composers negotiate within and out of a text (i.e., speech function) as well as their evaluative stances (i.e., appraisal system). Textual meaning, as a realization of mode, focuses on the organization or the fluency of a text. Most importantly, the

construct of lexico-grammar in SFL serves as an interface in the process of realizing the three meta-meanings in language communication as this construct provides categories to further deconstruct or construct the meaning/content of texts. That is, for ideational meaning, major categories include participants (noun phrases), process (verb phrases), and circumstances (prepositional phrases). For interpersonal meaning, major categories are subject (in the traditional sense), predicate (in the traditional sense), residue (adverbial phrases, prepositional phrases), and appraisal resources that include the use of lexical resources (adjectives or non-adjectives) in explicitly or implicitly projecting authorial stance (i.e., attitude), or showing the source and certainty of information (i.e., engagement) and intensifying/weakening information (i.e., graduation). For textual meaning, major categories are theme (i.e., the starting point of a sentence), rheme (i.e., the rest of a sentence), and cohesive devices (e.g., conjunction words, synonyms). Through these categories, typical features of academic writing have been illuminated, such as the use of inanimate participants (e.g., nominalization) and implicit evaluative resources or frequent use of engagement resources to enhance the reliability of the content in expository writing (Fang & Schleppegrell, 2010). In sum, the multiple layers in SFL offer a visible and accessible tool for demystifying academic texts and fostering student writers' critical thinking skills through a linguistic channel.

Indeed, recent SFL-based research in English-as-a-second-language (ESL) contexts has emerged regarding how students become more engaged in critically talking about texts and constructing their own texts. For example, in an Australian university, Ryan (2011) reported that the teaching of SFL, especially the ideational and textual meaning constructs, enabled students to critically deconstruct texts and project the academically endorsed content with appropriate features (e.g., nominalization, and the use of cohesive ties such as conjunction words) when writing a reflection on their field experiences in a local elementary school. Similarly, in an ESL elementary classroom in the United States, O'Hallaron, Palincsar, and Schleppegrell (2015) showed that explicit teaching of the SFL-based appraisal system and its embedded linguistic realization enabled students to gain a critical perspective on information texts, in which they could analyze and evaluate the social relationships hidden in texts by observing the lexico-grammatical resources used (e.g., *fortunately* and *interestingly*), and transfer these critical insights into their own written texts. In other words, as Fang and Schleppegrell (2010) noted, SFL's "focus is not on analysis for its own sake, but analysis to get at meanings so that students learn content at the same time they develop critical thinking skill. . . ." (p. 596).

Despite the potential of SFL instruction to enhance students' critical thinking and develop their English academic writing, a paucity of relevant empirical research has been conducted in EFL contexts. This was also exacerbated by a lack of relevant teaching materials in the classroom (Zhang, 2018).

E-Learning Resources as Learning Materials

Many studies have documented the importance of materials in the language learning classroom in both ESL and EFL contexts (e.g., Tomlinson, 2012; Zhang, 2018). Namely, they are the resources students and teachers depend on to deliver and accumulate knowledge, respectively. Unfortunately, no textbook is perfect, which could be due to a variety of factors, such as textbook editors' understanding of language learning theory or the demand of a market that might only prefer a particular dimension of language knowledge, for example, speaking (Tomlinson, 2012; You, 2004; Zhang, 2017). For instance, in the EFL context, writing textbooks is mainly concerned with the structure or grammar of writing (Menkabu & Harwood, 2014; You, 2004). As a result, teachers and students who rely on textbooks often feel poorly guided in the construction of critical writing at both the language and meaning levels, which call for the adoption of learning materials to supplement the textbook, such as online resources, because of their easy and free access on the Internet (Zhang, 2018).

However, research on online resources in relation to writing instruction is still limited. Relevant studies on online resources have focused on the convenience of online resources as a technological tool to facilitate students' learning, such as computer-student interactions, in comparison with traditional classroom interactions (Yang, Chuang, Li, & Tseng, 2013).

In addition, while online resources have been used to promote language learners' critical thinking skills, this line of research is limited to speaking and listening (e.g., Yang & Chou, 2008; Yang et al., 2013); almost no research has particularly showcased the relationship between students' critical thinking skills and online resources in the writing classroom. Even among the research on online resources and critical thinking skills, studies along these lines have primarily focused on using online technology itself, such as discussion forums, to facilitate language learners' critical thinking skills in dealing with discourse content. For example, in Yang et al.'s (2013) research, which focused on a semester-long general education course in a university in Taiwan, their quantitative research demonstrated that through an online platform as well as teacher mediation, students became able to actively invest themselves in analyzing or evaluating listening or speaking content. Regarding this issue, researchers have called for attention to be paid to the pedagogical design of online resources and to focus more on the way of using and implementing online resources as learning materials in the classroom (Taffs & Holt, 2013; Zhang, 2018). Given the integrated relationship between language and meaning embedded in writing, it seems worthwhile to explore the use of online resources as learning materials to impart the interplay between language and meaning and engage students in critically understanding and composing writing.

As seen above, SFL can potentially help students to critically understand writing as a meaningful and linguistic unit through its multiple layers. In addition, it seems helpful to use online resources as learning materials in EFL writing contexts. As such, this case study explores, (a) how students adapt to an SFL-based curriculum design that included the use of online resources as learning materials, and (b) how the curriculum assisted EFL students with critically engaging in writing literacy. The purpose of this research is aimed at presenting innovative ways of material use and the instruction of critical thinking skills in the writing classroom.

Research Method

Research Context: Participants and Curriculum Content

The study was conducted in a weekly, semester-long expository writing course at a top university that is reputed for its English teaching in China. Students who attended this course were second-semester freshmen English-major students, all of whom had just learned narrative writing. All of them were informed of the nature of the study at the beginning of the semester. They all agreed to join in this project, and none withdrew from the project when their final grade was posted. In particular, prior to the pre-project survey, students were asked about their core knowledge relative to critical thinking skills as EFL writers (e.g., analysis, evaluation, and regulation) as well as their experiences with online resources as learning resources. Unfortunately, the writing knowledge of the surveyed students had been mainly constrained to making grammatically correct sentences in writing or reading texts, with vague awareness of constructing meaningful written content. In addition, their previous exposure to online resources was primarily limited to the use of gathering ideas for a writing topic. During the project, three students—Laura, Clair, and Kim (all pseudonyms)—were selected as focal students, although the whole class was willing to participate in this study. The three students were selected because they were similar to other classmates or those in a larger EFL context who lacked critical thinking skills as EFL writers and who relied on the textbook for learning writing (DeWaelche, 2015; Zhang, 2018). More important, they felt comfortable about sharing their in-class and out-of-class writing pieces, including their essays and reflections, and they also felt comfortable about being interviewed several times for this project, which also ensured the ethical appropriateness of this study.

Over the semester, the course began with teaching the basic elements of the expository essay (e.g., the structure of an expository essay). Following that, the course started to zoom in on developing students' critical understanding of writing in terms of the co-relationship between language resources and meaning making from the perspective of SFL. Understandably, the mandatory textbook used in the

classroom did not have SFL-related knowledge, as it mainly included reading texts and only sporadically mentioned relevant knowledge (e.g., cohesion) without elaborated explanations. As such, the SFL-based materials were mainly collected from the Internet, including audio and video resources. Each time, these material resources were sent to students via e-mail beforehand when one construct of SFL was to be instructed (e.g., genre, register, three meanings). After in-class teaching of the online resources, additional materials were also sent to the students for the purpose of clarifying or practicing the knowledge they had learned or for further readings. The ultimate purpose was focused on mediating students' ability to analyze and evaluate the features of texts used in the classroom, and ultimately become regulatory in their own writing.

Every time a construct was taught, the instructor (the author of the study) followed the pattern of joint deconstruction of sample texts where he guided the students in critically understanding sample texts, eventually leading them to independent deconstruction (Rose & Martin, 2012), unearthing the interaction between meaning and linguistic resources in texts. The sample texts for each subtype of expository writing (e.g., compare and contrast, exemplification) included quality writing in the textbook, online resources from authoritative publishing houses that were verified by English language literacy experts who speak English as their native language, as well as students' work that needed to be improved. In addition, students' independent writing was required, although written feedback and after-class oral feedback (both of which were provided in indirect ways) were offered. The reason for providing indirect feedback (such as, *do you think we need to replace the verb in the one with less semantic load?*) was to encourage students to use their newly found SFL knowledge to revise their writing in as many rounds as possible, and meet the standards of being an effective writer on both the language and meaning levels.

Arguably, SFL can be complex and not easy to understand. The researcher, as an expert in SFL, used the plainest words possible and the students' first language when teaching the theory. Indeed, the SFL-related pedagogy is not to train students to become linguists but to afford them the most accessible explanation of the myth of academic writing (Macken-Horarik, Love, & Unsworth, 2011). Because of students' language proficiency in the English language, the teaching process was complex but still manageable.

Data Collection and Analysis

Data were collected over the academic semester. Included were a pre-study survey, audio-recordings of student-teacher interactions, students' written documents, peer comments, and students' reflections over the course of the semester, along with interviews over the academic semester. In particular, audio-recordings of student-teacher interactions in the

writing course were collected across the semester in alignment with the researcher's observations/field notes. Students' peer comments for each essay (one round for each essay) and writing samples (four expository essays with a word count of approximately 500 words, excluding references) were also collected. In addition, multiple rounds of interviews across the semester and the students' biweekly written reflections on their learning experiences with SFL-based writing instruction were also collected. It has to be noted that interviews were conducted in students' first language (i.e., Chinese) to best elicit their response. They were translated into English and reported in this study for the sake of the international audience.

A qualitative content analysis scheme was mainly used to analyze and code the multiple sources of data, where data sets were triangulated and constantly compared and rejected to ensure the trustworthiness of the analysis (Creswell, 2012). In particular, data analysis was conducted in the original language (e.g., students' interviews were conducted in Chinese, but classroom interactions and students' reflections were in English). Following this, a deductive coding of a chain of data was conducted to reveal categories (e.g., students' perceptions of online resources, their struggle with the different learning styles, or their reactions to SFL's perspective on writing), which were combined to generate salient themes in relation to the research questions (i.e., trajectory of being critical thinkers while learning academic writing from an SFL-based perspective). The students' own writings (including what they wrote both at the beginning and at the end of the semester) and their feedback as peer reviewers were analyzed through codes from SFL (e.g., the linguistic features, three meta-meanings) to investigate the development of their critical thinking skills (O'Halloran et al., 2017; Pally, 2001). A colleague in the field of qualitative research also volunteered to check and agreed with the analyses; peer debriefing was also harnessed to mitigate potential biases of the data analysis.

Findings

Compared with the pre-study survey, which showed that students' knowledge of writing was constrained to structural accuracy as well as their limited experiences with online resources, over the semester, the students constructed their understanding of the value of online resources as learning materials, through which they developed an awareness of the use of language resources in constructing or deconstructing writing content on both the language and meaning levels, although not fully fledged, along with a zigzag trajectory. In particular, student writers could conduct analysis, and evaluate and regulate the appropriateness of a text at the language and meaning levels, showing the development of their critical thinking skills as academic writers. The following subsections illuminate the trajectory of their development.

Research Question 1: How did students adapt to the online resources-based classroom?

Students' Initial Perception of Online Resources as Informal Learning Materials

The students did not take online resources seriously. For them, these were only ancillary materials as they had associated the learning of mandatory textbooks with formal education. As Laura said,

We never used such a large number of online resources as learning resources . . . I feel kind of funny . . . although the contents of these online learning resources are new.

Echoing Kim, she also said,

I am not saying online resources are not good or useful . . . I have just never been exposed to such a teaching and learning style.

Apparently, the students' previous learning style (textbook-based) had remained ingrained. In this context, it would be no surprise that they would not invest much of themselves in learning the online resources right away. The students' decision to learn the content of online resources was seemingly because they were part of obligatory learning content in the class. As Clair said in the interview, "either way we had to learn them [online resources] since they are part of required learning." In other words, while they were not completely resistant to the use of online resources, the students' learning of them initially seemed tinged with their passivity and did so to fulfill curricular requirements.

Adjustment Facilitated by Knowledge Repertoire

The students' initial reaction to online resources seemed particularly related to the learning styles they had been exposed to and caused their initial adjustment difficulties. Nevertheless, learning new knowledge and their experience with the usefulness of the new knowledge from online resources seemed to help galvanize their interest in continuing their learning. For instance, in the curriculum, textual meaning and related linguistic manifestation were first taught to the students, which consumed about 2 weeks in and out of class. During this time, students learned more about the role of not only conjunction words (part of which could be found in their textbook), but also thematic progression, which had never been taught before. Because of this, the students seemed more open to using online resources in the classroom. As Laura mentioned in the reflection, "The knowledge offered in the online resources is new and I have never experienced this before . . . more importantly, they clarified and enhanced my previous understanding." Indeed, as shown in the pre-survey, students had knowledge about the use of conjunction words, but they did not know why; instead, they just

accepted it passively and as rules. In other words, the students felt motivated to learn online resources, in contrast with their previous learning and passive reaction to online resources. Because of their experience with the power of language knowledge offered by online resources, their increased language knowledge and positive experiences served as a catalyst for their engagement in a new curriculum.

Challenges Posed to Students' Adaption

Yet, the progressive knowledge conveyed from the online materials seemed to emotionally frustrate the students from time to time, exemplified by their dual challenges of both understanding and practicing the newly gained knowledge. Indeed, when the researcher first introduced the theory in a broad way, emphasizing the importance of meaning making in context, this was met with students' inactive responses in class. For example, students would be very reticent to participate in dialoguing with the instructor, especially in the initial phase of learning SFL (field notes). This especially occurred at the dimension of the way to present logical relationships (a component of ideational meaning) and the way to project appraisal resources. For example, the students could not project logical connections well through the use of explicit connectors (e.g., *because*, *although*, and *however*), although in their reflections, they felt that they were learning the new knowledge. This seems to stem from the intervention of their first language background. As Clair said,

I understand the expectations of English discourse and the generic expectations of expository writing in terms of logical relationships, but this seems different from my first language where explicit logic connectors are not required.

Indeed, in the students' first language (i.e., Chinese), its discourse generally expects readers to decode meaning (Lian, 1993). As such, it is no surprise that logical relationships were not well demonstrated by the students.

The apparent frustration among these students seemed related to their difficulty in understanding the SFL theory within a short period in class as well as their previous education. As Clair said in the interview,

The SFL looks rather promising in helping me become a better English learner and know more about how to compose effective essays. However, I just have no linguistic background . . . so it takes me time to understand this . . . also SFL emphasizes things differently from what I have learned [grammar-based writing] . . . It also takes time for me to shift my perspective.

In this regard, students' previous educational exposure that was primarily focused on the sentential accuracy of writing hampered their transition into the curriculum where the perspective on writing was in sharp contrast with their previous understanding, which was exacerbated by intensive learning.

However, the challenges the students encountered were also related to the specific demand of expository writing, where supporting details are supposed to be fact-based. Yet, in the students' writing, they could not understand the value of the appraisal system to support their construction of supporting details. As Kim said,

I understand it [the appraisal system] talks about how to convey interpersonal meaning. But how can I relate the knowledge to my expository writing? This still looks difficult to me? Maybe I am not very familiar with the expectations of expository writing . . . and the appraisal system.

Indeed, in the students' writing, personal comments were often infused in places where facts or details should have been provided. For example, when Kim elaborated on how carbon dioxide impacted global warming, she mentioned her personal comment ("Therefore, we should use low carbon fuels"; field notes), where the modal verb *should* carries a strong personal position. This may only be explained by her immature knowledge of the appraisal system as well as generic expectations of expository writing as shown in her interview.

Mediation and Self-Agency as a Way of Expediting Students' Transition to the Curriculum

The student writers' struggle with SFL, however, was constantly offset by their teacher's mediation and their own determination to better themselves. As Kim mentioned in her reflection,

Of course, learning each construct is not easy . . . as it is very different from what we have learned or emphasized . . . but since we already have extensive knowledge of grammar, we should learn something new . . . also, in class and out of class, my teacher used our first language or daily examples to explain this theory . . . it really helps clarify my confusion and calm me down in the face of the new knowledge.

Obviously, as advanced language learners who were knowledgeable about structural grammar, the students wanted to improve. This actually galvanized students in overcoming their difficulties associated with learning SFL's multiple constructs; the students' alignment with SFL was further enhanced because of their teacher's multiple ways of mediation in and out of class, allowing them to gain a better understanding of SFL. This occurred in the latter half of the academic semester.

EFL writers' critical understanding of writing gained from online resources in relation to the construct of register. Students' familiarity with register gradually offered them three variables in contextually understanding the content constructed in written texts, empowering them with a critical lens into the relationship between context and text content. As Laura said in the interview,

I knew there was difference between spoken English and written English. But I just did not know why it was the case . . . The construct [register] shows me and [now] I know why; this is related to the contextual variables of writing [field, tenor and mode].

As shown from the above excerpt, the students transitioned from being mechanical language learners who focused on structural accuracy to ones who could view writing as contextually embedded activities.

The three meta-meanings-based critical understanding gained from online learning materials. The SFL-based three meta-meanings enabled students to go beyond their habitual focus on literal meaning and also overcome their habit of relying on their intuition when decoding the content of written discourse. Instead, they transitioned into students who can attend to all three meanings constructed in the content of written texts.

Ideational meaning and students' critical understanding. The construct of ideational meaning helped the EFL students understand logical meanings in texts, which were not emphasized in their first language and were underexplored in their previous English writing classrooms. As Kim noted,

The construct reminds me of the logical relationship . . . My previous teacher did not mention this . . . and I also feel Chinese does not highlight this . . . Knowing this, I keep reminding myself to watch this in sample texts and think about it during my own writing, in addition to understanding the importance of using topic-related words.

In other words, because of the negative influence of their previous learning experiences with their first language (i.e., Chinese) or in prior English classrooms, the students had ignored logical relationships within their writing (Lian, 1993). The construct of SFL-based ideational meaning enhanced the students' awareness of the literal meaning of the text, particularly by emphasizing the logical relationship as a part of the students' knowledge base of text deconstruction or construction.

Interpersonal meaning and students' critical understanding. Over time, the students seemed reactive to the role of the appraisal system in analyzing, evaluating, or regulating texts. For instance, Laura wrote in her reflection,

I had an attitude when I wrote an essay on the difference between college and high school . . . I used "students always need to learn as much as possible." The "always," when connected with the appraisal system, helped me realize that I am actually biased toward college life.

In a similar vein, Clair also mentioned in the interview,

I can now tell the explicit attitude of authors, but also nuanced attitude . . . in reading texts . . . such as the way they use verbs . . . Once I read a computer and life text . . . the author used the verb "revolutionized" . . . This implicitly showed how the author actively aligned with technology.

In other words, the interpersonal meaning and its subcategory (i.e., appraisal system) helped students transcend the literal meaning and understand the evaluative stance of texts, which added to their repertoire of critical thinking skills.

Textual meaning and students' critical understanding. The construct of textual meaning afforded students' awareness of how information is organized in sample texts and their own texts. As shown in the students' interviews,

Kim: I can tell most materials are coherent through the use of conjunction words or lexical cohesion . . . but my writing was missing this somehow . . . and I was not aware of this . . . because I had no idea.

Laura: Grammatical conjunction is fine. I know this . . . But I feel theme-rheme pattern and lexical cohesion are really new to me . . . They also help me analyze sample texts or regulate my own writing through connecting back to grammatical cohesion.

That is, the construct of textual meaning prompted them to think about the fluency and meaning organization in terms of analyzing, evaluating, or regulating texts.

Lexico-grammar categories and students' critical understanding. This construct is closely linked to the three meta-meanings, which enhanced students' writing knowledge by providing linguistic categories that are related to encoding or decoding meaning, such as "participants," "theme," and "cohesive devices," and enabled students to compare features of the texts. For instance, Clair mentioned in her reflection,

The categories offer another layer of sources in showing how meaning is encoded in texts . . . I can use these categories to analyze and compare meanings in a really clear way . . . everything can be labeled . . . and I won't feel lost.

Thus, the students' writing knowledge in terms of analysis, evaluation, or regulation developed on a scale of visibility from register to lexico-grammar. At the level of lexico-grammar, the students' experiences with the linguistic codes particularly broadened their perspective of SFL as a tool for critically constructing or deconstructing texts by focusing on lexico-grammatical choices.

Research Question 2: How did SFL-based learning impact EFL student writers' critical thinking skills?

Critical Thinking Skills: Using the SFL-Based Knowledge in Analyzing Texts?

The dialogues below were centered on a cause-effect sample text (the effects of weather on Kublai Khan), which was selected from the Cengage Publishing House and is downloadable online. As usual, following their familiarity with contextual background (e.g., information about a specific type of expository essay), the students were invited to talk about the texts or decode the texts before they wrote their own. To better show how students demonstrated their SFL-based skills in the classroom, the following selected excerpts center on the three focal students. It has to be noted that the dialogues occurred in the latter half of the semester when the students had mastered sufficient knowledge of SFL.

The dialogue excerpt below shows how students could apply their knowledge of ideational meaning gained from online resources:

Teacher: It is about the effect of monsoons, right? In terms of ideational meaning, can you tell me the features of the participant and the process? [The teacher also repeated the same meaning in Chinese]. Any volunteers? Who can tell me?

Clair: Yes, they [participants] are all Kublai Khan . . . and they [participants] are all action verbs.

Teacher: So, why is that the case?

Clair: It is because it is related to the topic . . . the thesis is about cause and effect . . . and action verbs can vigorously show this event . . . to readers.

Teacher: Great. Those are the linguistic features of the ideational meaning in this work . . . Nice job.

As shown in this excerpt, with the teacher's minimal guidance that featured SFL-based linguistic constructs as well as the students' first language (i.e., Chinese), Clair obviously picked up on the instructor's cues, elaborating on how participants and verbs were contextually selected to show the causal relationship in the text. Also, Clair was able to use an SFL perspective to explain why the ideational content was constructed through the key linguistic resources (e.g., action verbs and processes), indicating her skill in verbalizing her critical thinking from the perspective of SFL.

In terms of interpersonal meaning, the students also seemed to actively decode the interpersonal meaning by unearthing implicit or explicit lexico-grammatical resources.

Teacher: What is your overall impression of the text? Subjective or objective?

Students: (following a round of discussion) Objective.

Teacher: Good. But is it really objective?

Laura: No . . . but I think I can see the author's attitude?

Teacher: How? How can you tell, I mean?

Laura: The author used "unexpected" to indicate Kublai Khan's failure connected to the monsoon. I think the word shows that the author is nice to Kublai Khan.

Teacher: Nice . . . you see . . . exposition is about showing information objectively . . . but there are still explicit or implicit (like you see here) words that may show an author's stance.

Students: That is amazing.

As shown in the excerpt, Laura utilized the knowledge of the SFL-based appraisal system, speaking about the realization of interpersonal meaning at the level of the texts, and she was able to see how an academic writer shuffles between being objective and evaluative, as shown by Laura's identification of the implicit appraisal resource "unexpected" in the above dialogue.

Another dimension of SFL-related textual meaning was also demonstrated by students' practices, as illuminated by using more than conjunction words to unpack the mechanism of written discourse. For instance:

Teacher: Now let's look at the cohesion. Is the text fluent?

Students: (pause for a few seconds) Yes.

Teacher: How? And can you tell me in an explicit way?(Students talk to each other)

Kim: It is like a constant theme pattern.

Teacher: Great . . . so we can learn from it, right? Any other cohesive devices?

Clair: Conjunction words, indicating cause and effect relationship.

Teacher: Great . . . Now tell me your overall impression.

Students: Really fluent and good.

Kim and Clair also used SFL-based constructs to discuss how the text was constructed in a fluent way by analyzing and evaluating the texts through "theme" and "cohesive ties." This was in sharp contrast with their performance at the beginning of the semester when they did not know about drawing on the knowledge and the theme knowledge in deconstructing written discourse.

Indeed, at the beginning of the semester, when the students were not familiar with the theory of SFL, they tended to be quiet and unwilling to participate in classroom discussions (observation notes; M. Liu & Jackson, 2008). Echoing interview excerpts about the development of their SFL-based writing knowledge, the dialogue excerpts above illustrate that the students were able to use the SFL-based knowledge in the actual classroom and actively engage in analyzing a writing sample, obviously overcoming their prior knowledge that was limited to grammatical accuracy or learning new words.

Critical Thinking Skills: Using SFL-Based Knowledge to Make Evaluations

The focal students' ability to make evaluations was particularly exemplified in their capacity as peer evaluators. It has to be noted that the students were not fully developed as professional academic writers. The three focal students, like other students in the classroom, still had some writing issues even at the end of the semester. What is noteworthy, however, is that the focal students, as representatives of the whole class, developed the ability to make evaluations, which they did not have before. As Kim said,

As a peer evaluator, I also can have more to offer aside from grammatical accuracy. It is like making decisions or more than just that . . . I can help double-check the appropriateness of my peer classmates' meaning realization by focusing on those linguistic devices.

Indeed, the three students adroitly commented on their classmates' writing from the three dimensions, such as the appropriate use of modal verbs in relation to evidence. Exemplification of the students' critical thinking through evaluating their classmates' writings are shown as follows:

Ideational meaning: The students could evaluate the ideational meaning of their classmates' writings, including their choice of verbs or participants as well as the logical relationships. For instance, Laura commented on her classmate's essay that "It [the writing] is clear and logical. The author used proper words and brings readers close to the text." Laura also commented on another classmate's essay that "[please] watch the circular reasoning here when you make interpretations."

Interpersonal meaning: The students could comment on the appraisal resources used in their classmates' writings. For example, Clair commented, "You [one of Clair's classmates'] used 'lead to' and 'suffer' well, showing your negative stance." For another student, Clair also commented that "You [the classmate] also used engagement well to elaborate on your supporting details." Similarly, Kim made the comments, "He hides his stance, and makes his essay objective"; "He used 'immediately' to show an implicit attitude." In a different way, Laura commented, "Modal verbs should be watched when you make statements or provide details."

Textual meaning: The students could comment on the use of cohesive devices and theme pattern. For example, as Kim commented, "The text is fluent, but there are places where the use of thematic progression is not good." "Try to use linguistic signals, such as, 'in addition,' when you split your main claim into two sub-claims in one paragraph." Kim also commented on another student's writing, "The transition

from background information to your thesis is not smooth."

As shown above, the three students adroitly commented on their classmates' writing from the three dimensions, such as the appropriate use of modal verbs in relation to evidence.

Critical Thinking Skills: Using SFL-Based Knowledge in Independently Regulating Writing

The EFL students gradually projected their self-regulation as advanced academic writers. Again, it has to be noted that their self-regulation was not fully developed. Rather, the self-regulation was more related to the students' ability to make revisions from their instructor's or classmates' implicit feedback. As Clair said,

Through constant practice in class, I could also apply it to checking my own writing upon completion . . . though I might miss something . . . but it does help me to make revisions on my own.

As seen from the above excerpt, the students' mastery of hands-on skills also enabled them to go beyond their knowledge boundary and realize the importance of regulating their own writing.

Indeed, over the semester, the students were requested to improve their writing following their instructor's or their classmates' implicit feedback on the levels of language and content (the three meanings; e.g., Do you think these paragraphs are logically connected? Do you think it is a good lexical choice here?). An SFL-based analysis conducted on the students' early writings and final writings showed that the three focal students' critical thinking skills in regulation were obviously mapped to their own writings, which suggests an increased imprint of SFL-based critical thinking skills development. The quality of these students' final versions of their essays was also endorsed by an expert whose first language is English and who has years of writing instruction experience at the college level. The changes in the students before and after their familiarity with SFL are shown below, out of a discourse analysis of the participating students' essays, including their early writings (the first two essays) and later writings (the last two essays and their final version of the first two essays submitted at the end of the semester):

Ideational meaning: Prior to the students' familiarity with the new curriculum, the students' writing lacked explicit logical relationships, overused animate subjects, including the first person, and verbs were chosen randomly (e.g., inappropriate use of *there be* structure). However, in the final writings submitted, the logical relationships between sentences had improved through the explicit use of linguistic markers (e.g.,

however, as a result). There was also appropriate use of nominalized phrases or the third person (researchers' names). In addition, appropriate verbs were chosen to show actions related to a topic, not random choices.

Interpersonal meaning: In their early writings, the students sometimes used spoken language (e.g., the use of *pretty* as an intensifier). The students also used questions to emotionally engage readers. There was also inappropriate projection of personal comments through the use of the modal verb *should*. In addition, the students' writings made limited use of reporting verbs (i.e., predominant use of "say," regardless of the evidence available in the process of citation). However, in their latter writings, the students used written English language to create a formal tone, and there was good control of evaluative language (e.g., flexible use of modal verbs, not abusing the use of *should*; the use of non-adjectives to indirectly show evaluative stance). They also projected their knowledge of semantic variations of reporting verbs based on the strength of evidence (e.g., flexible use of the words *say*, *implicate*, *suggest*, and *claim*).

Textural meaning: The students' early writings lacked the use of cohesive devices, and many sentences seemed isolated without connection. However, in their latter writings, there was flexible use of cohesive devices (e.g., the use of lexical chain through synonyms). They also used theme patterns (e.g., linear patterns that are characterized by starting sentences with similar semantic content) to create connections between sentences.

As shown above, the students apparently displayed their critical thinking skills in regulating their writing when constructing or revising their own texts by the end of the semester, in comparison with their previous writing. As Clair further noted in the interview by the end of the semester, "Using these dimensions [SFL-based constructs] and composing my writing beyond grammar . . . obviously refreshed my way of constructing academic writing and boosted my confidence."

Discussions and Implications

In response to the importance of learning materials and educators' struggle for accessible tools to develop students' critical thinking skills in EFL classrooms, this study shows that in a writing classroom that synergized online resources and SFL, students gained knowledge on how online linguistic resources could be utilized for text analysis, evaluation, and regulation. Albeit, the process was not smooth in that their adjustment was constrained by their first language background and the contents of learning materials as well as their previous learning experiences. However, with the increased knowledge gained from online resources, the students

became better able to adjust to the teaching and learning of online resources, along with teacher mediation, as shown when composing writing instead of focusing on structural rules (e.g., their understanding of cohesive devices and discourse fluency or the use of implicit words denoting authors' attitudes). In this regard, while research exists that explores the relationship between the use of online resources and the development of students' critical thinking skills, it has mainly focused on the role of online resources as technology itself (e.g., the use of online discussion forums), and was centered on speaking and listening (e.g., Yang & Chou, 2008; Yang et al., 2013). In contrast, this study particularly shows the power of an SFL-based design of online materials in offering students an in-depth understanding of linguistic resources to construct meaning. In other words, this case study has filled an important gap and contributed to research on the co-relationship between online material development and critical thinking in the writing classroom (cf. Taffs & Holt, 2013; Tomlinson, 2012). In addition, the finding illustrates the relationships among students' knowledge repertoire, teacher mediation, and learning motivation, in which the former two facilitate students' learning engagement (Ushioda, 2011). Most importantly, the finding empirically illuminates the feasibility of an SFL-based design of online resources in fostering language learners' critical thinking in the EFL classroom (Siegel & Carey, 1989). However, emerging literature has merely demonstrated the positive impact of SFL on ESL learners' critical thinking in the traditional classroom where hardcopy textbooks are used (cf., Ryan, 2011).

In addition, the SFL-based critical thinking, characterized by students' understanding of writing from the triadic relationship among meaning, linguistic features, and context is obviously more enriched thinking than what has been revealed among EFL learners in previous studies (e.g., their awareness of challenging authority in the process of writing; Liu & Stapleton, 2014), in that it provides multiple constructs (e.g., register, lexico-grammar) for language learners' orchestration of cognitive activities (e.g., analysis or evaluation). The study particularly reveals that the students' SFL-based critical thinking skills could be exemplified in their literacy practices where they used their knowledge to analyze and evaluate texts, and regulate writing. For instance, by utilizing their critical thinking, EFL students broke the silence in class and felt capable of projecting their critical readership or authorship through analyzing and evaluating texts available to them in and out of their classroom. In addition, through a new curriculum, as shown in this study, the EFL writers challenged their previous learning practices and regulated their own writing using the three dimensions from SFL. In other words, the current study answered Mok's (2009) call for "creating a context that supports student inquiry, genuine communication and reflection in class" (p. 265) and furthers our understanding of the role of SFL in supporting language learners' critical thinking in the international community (e.g., O'Hallaron et al., 2015). In the

meantime, these findings complement previous studies that ignore linguistic challenges of EFL students and focus on teaching EFL students' critical thinking at the non-linguistic level, such as questioning strategies (cf. DeWaesche, 2015) or the use of counterargument in writing (e.g., Liu & Stapleton, 2014).

The findings of this study have several implications for enhancing EFL students' critical thinking in academic writing. First, given the importance of materials in the classroom, the urgent need to develop EFL students' critical thinking, and the limited studies on SFL-based teacher education in EFL contexts (Zhang, 2017), it seems promising to promote SFL-based language education and the use of online resources among educators, thus, providing them with an accessible praxis and learning materials to harness when developing students' critical thinking in the language classroom. Second, this study suggests that students' silence or lack of critical thinking in EFL classrooms could be due to their lack of a linguistic repertoire to participate in in-class discussions. To promote in-class discussions, it seems plausible to promote SFL in the language classroom (including reading and writing literacy), so that students have more practical skills to use in critically deconstructing texts at multiple dimensions beyond the sentence level. Most importantly, the study also suggests that exposing students to dual focus of language form and meaning in academic contexts may facilitate students' development of critical thinking. In other words, second language acquisitions theories, such as SFL, that emphasize the role of language as social semiotics, may be taken into critical thinking-based classrooms.

Conclusion

Through a case study, this research shows that an SFL-based design of online materials was helpful for developing students' knowledge of writing at the linguistic level in terms of the co-relationship between language form and meaning. This facilitated students' demonstration of critical thinking skills as student writers.

While this study aimed to reveal how the use of online resources and SFL instruction impacted college EFL students' critical thinking in academic writing, it is noteworthy that the acquisition of SFL-related linguistic knowledge from online resources and its application in academic writing can be a slow process, depending on students' language proficiency or teachers' instructional skills. In addition, arguably, there are other important dimensions of critical thinking related to academic writing that were not included in this study as it was focused on students' critical thinking at the linguistic dimension. Future research could adopt a longitudinal case study approach to investigate the learning process in SFL instruction and identify the difficulties and challenges experienced by students while incorporating other potential strategies useful for students' development of critical thinking skills. In addition, the current study zoomed in on

expository writing; future research on developing language learners' critical thinking skills could be conducted on other genres of writing instruction (e.g., argumentative writing).

Limitations of this study have to be acknowledged. First, the case study was only focused on three students. Their high proficiency in the English language may help facilitate their adaptation to the curriculum. In addition, this study relied on qualitative analyses of three EFL students' writing and in-class performance. A quantitative analysis of more EFL students' writing samples or an adoption of questionnaires to survey students may provide further evidence of their critical thinking development.

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