Journal of Literature and Art Studies, August 2024, Vol. 14, No. 8, 693-702
doi: 10.17265/2159-5836/2024.08.007

Ecological Discourse Analysis Based on the Corpus—A Case Study on the Environmental Discourse of *21st Century*

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Language learning materials not only provide language input for learners but also subtly disseminate ideology and influence readers' behavior. This study, based on the framework of ecological discourse analysis, quantitatively analyzes and qualitatively describes the ecological significance of environmental texts in the *21st Century*. The aim is to provide references for the compilation of environmental discourse in language learning materials, promote the construction of more ecologically beneficial discourse, and facilitate the widespread dissemination of the ecological philosophy of "Diversity and Harmony, Interaction and Co-existence" among young readers. The initial findings of this study are as follows: In the environmental texts of the publication, a large number of relational processes and action processes are used to objectively represent the natural environment; the discourse tends to be ambiguous and beneficial, generally aligning with the ecological philosophy of "Diversity and Harmony, Interaction and Co-existence." This can guide readers to correctly understand and face environmental issues, which is conducive to the healthy development of natural ecosystems.

Keywords: 21st Century, ecological discourse analysis, ecological orientation, a corpus-based study

Introduction

Due to the excessive exploitation and utilization of environmental resources, humanity faces severe ecological issues. Researchers in various academic fields are increasingly recognizing the importance of ecological problems. In the humanities, new disciplines such as ecological aesthetics, ecological literature, ecological translation studies, and ecological linguistics have emerged (Xin & Huang, 2013, pp. 7-10+31). Among these, ecological linguistics is dedicated to studying the close relationship between language and the environment. Against the backdrop of the proposal for "comprehensively promoting a Chinese-style modernization that harmonizes human and natural coexistence," how to correctly construct environmental protection discourse through language, awaken people's ecological civilization awareness, and commit to practical actions in ecological construction has become a significant social responsibility and historical mission for linguists in the new era.

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The newspaper *21st Century*, sponsored and distributed by *China Daily*, is a well-known English media outlet in China. It is designed specifically for primary and secondary school students, featuring domestic and international news highlights. This publication helps to enhance the language proficiency of its readers and also serves as a supplementary resource for teachers in classroom instruction. On the other hand, as a widely circulated foreign language reading material among primary and secondary school students, it plays a crucial role in imparting correct values and guiding readers to form positive behavioral habits. This study takes the environmental texts from the *21st Century* as the research object, based on the ecological philosophy of "Diversity and Harmony, Interaction and Co-existence." Using the Transitivity system from Systemic Functional Linguistics as the research framework, it conducts an ecological discourse analysis. It is hoped that this research can provide insights for the content creation of environmental texts in materials for teenagers in China, promote the construction of more ecological and environmental protection discourses, subtly cultivate the sense of responsibility for ecological protection among the younger generation, and contribute educational strength to the building of a modern society where human and nature coexist in harmony.

Literature Review

Previous Studies on Ecolinguistics

In the 1990s, Halliday, the founder of Systemic Functional Linguistics, delivered an illuminating speech. He emphasized that linguistic research should not overlook the influence and role of the research subject within the context of increasingly severe environmental issues. This perspective inspired numerous scholars to initiate research into the connections between language and the environment. This research paradigm subsequently evolved into the distinct discipline of "ecolinguistics." In the "Halliday paradigm," the most common analysis is of the ecological characteristics of discourse, known as Ecological Discourse Analysis (hereinafter referred to as EDA) (He & Gao, 2020, pp. 127-135). Currently, EDA primarily investigates the impact of language on natural or social ecology. In terms of natural ecology, researchers have extensively studied nature poetry (Ma & Liang, 2021, et al.). Liu Jiahuan (2022), a doctoral student supervised by Professor He, compared the ecological aspects of the "Belt and Road" news frameworks in mainstream media from China, the U.S., Russia, Singapore, and Australia in her dissertation, exploring the construction of news discourse. These scholars have undoubtedly enriched the research scope of EDA in China, demonstrating the universality of the EDA framework constructed by He et al (2021), and enabling a better understanding of the relationships between humans, nature, society, and each other.

Previous Studies on Discourse of Language Learning Materials

At the national level, material construction is emphasized, and the foreign language academic community also values academic research on materials (Jia Fan, 2022, pp. 83-92). Many scholars select different discourse theories to study the content of language materials. Currently, discourse research on language materials mainly falls into two categories:

(i) Using specific discourse analysis paradigms to conduct critical discourse analysis, multimodal discourse analysis, and ecological discourse analysis on materials. For example, Li Xi (2024) conducted a critical discourse analysis of college English textbooks under Fairclough's three-dimensional discourse theory framework; Liu Yan (2019) performed a multimodal discourse analysis on English listening and speaking

materials, providing design ideas for college English teaching based on the results; Wei Rong (2023) conducted an EDA research of the transitivity system in college English textbooks. Some researchers combine two discourse analysis models for material research (e.g., Chen Xiaojuan, 2021).

(ii) Investigating the pragmatic functions of material discourse based on a theoretical framework. For instance, Zhang & He (2009) used corpus methods to explore the orality of textbook dialogues; He & Huang (2011) and Zhang Xinran (2021) studied discourse markers in English textbooks, analyzing the educational concepts and functions embedded in the markers.

These scholars' research papers on textbook discourse are worth reading. However, the concept of language learning materials has expanded from textbooks to a broader sense as time goes by. Tomlinson & Masuhara (2018) argued that any material that promotes learning can be viewed as a material. This study selects middle and primary school English readers, a general material, as the research object for EDA.

Theoretical Foundation

The Ecosophy of "Diversity and Harmony, Interaction and Co-existence"

The concept of ecosophy was first introduced by the renowned Norwegian philosopher Arne Naess in 1973. It represents one's inner perspective on the ecological environment (Hu Longlong, 2023, pp. 195-198) and serves as an evaluation standard for EDA. "Diversity and Harmony, Interaction and Co-existence" was initially proposed by He and Wei (2018) as an ecosophy based on the relationship amid societies. It has been preliminarily demonstrated by linguists that "Diversity and Harmony, Interaction and Co-existence" can be a universally applicable value for EDA. Therefore, this ecosophy is also employed by this study as a criterion.

Transitivity System

Halliday (1994) pointed out that language is a social semiotic. The transitivity system, mood and modality system, and thematic information structure in the language system realize the corresponding three meta-functions: ideational function, interpersonal function, and textual function. Among these, transitivity reflects world experience, representing events or entities that occur or exist in the world (He et al., 2021). The transitivity system consists of three basic components: transitivity processes, participants, and circumstantial roles. He & Zhang (2017) argue that from the perspective of ecological linguistics, the precision of the transitivity system needs to be improved. The authors attempt to refine and expand systemic functional grammar and construct a more comprehensive theoretical framework for discourse analysis in their 2021 monograph *New Developments in Ecological Discourse Analysis*, to help researchers better interpret the ecological nature of discourse. In this theoretical framework, the various semantic configuration structures composed of transitivity processes, participants, and circumstantial roles result in different representations of ecological nature in discourse (see Figure 1).

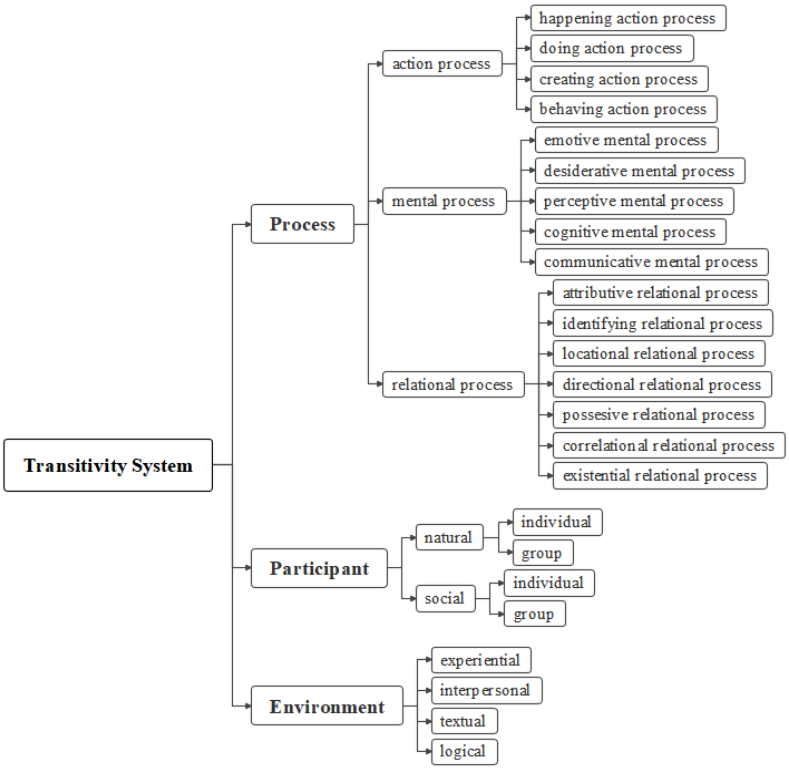

Figure 1. Transitivity System: Classification of Processes, Participants, and Environments.

Method

Research Questions

This study aims to address the following questions:

(i) What characteristics of the transitivity system (including transitivity processes, participants, and environmental roles) are reflected in the environmental texts of the *21st Century*?

(ii) What is the ecological orientation of the discourse in the environmental texts of the *21st Century*?

(iii) How to construct environmental discourse for the language learning materials?

Data Collection

This study selects environmental texts over the past five years from the *21st Century*, a well-known English publication under *China Daily*, creating a corpus of 13,148 words. The corpus will be imported into the software MAXQDA to encode and analyze it based on the EDA framework proposed by He et al (2021). This software is characterized by the full-featured and simple operation. It can analyze various types of data such as audios, documents and so on. Its various data visualization tools can present results in diverse forms. Therefore, this software can serve as the preferred tool for the corpus encoding work in this study.

Data Analysis

This study will combine quantitative analysis and qualitative description. After corpus annotation, the study will first use MAXQDA itself to view the frequency of transitivity processes, participants, and environmental elements in the corpus. Next, combined with the semantic configuration of these three

components, the ecological orientation of the discourse will be determined. All results will be exported in Excels, and specific data will be presented visually in charts. Among them, transitivity processes, as the core element of semantic structure, will be the focus of attention and will be analyzed in detail.

Results and Discussion

Transitivity Characteristics in the Corpus

Characteristics of transitivity process

Table 1 presents the usage of 16 transitivity processes in the environmental texts of the 21st Century. The corpus contains a total of 1,523 transitivity processes. Among them, relational processes are used most frequently, with 667 occurrences, accounting for 43.79% of the total; followed by action processes, which appear 648 times, constituting 42.55% of the total; mental processes have a lower proportion, accounting for 13.66%. To better understand the distribution differences of these processes in the corpus, we need to use software for logarithmic likelihood ratio and chi-square tests to compare each two processes within the same corpus (Zhi Yongbi, 2021). The P-value for the comparison between relational and action processes in the corpus is 0.60, indicating no statistically significant difference ($P \geq 0.05$). However, the P-values for the comparison between these two processes and mental processes are both 0 ($P < 0.01$), suggesting a significant difference in the frequency of use between them. This implies that in the environmental texts of the 21*st Century*, the action and relational processes, which represent objective facts, constitute the main part, while mental processes, which represent subjective perceptions and inner activities, are used less frequently.

Table 1:
Distribution of Processes in the Corpus

Transitivity Process		Frequency	Proportion
Relational	locational relational process	54	3.55%
	correlational relational process	27	1.77%
	existential relational process	45	2.95%
	attributive relational process	216	14.18%
	possessive relational process	58	3.81%
	directional relational process	46	3.02%
	identifying relational Process	221	14.51%
	Subtotal	**667**	**43.79%**
Action	doing action process	470	30.86%
	behaving action process	4	0.26%
	creating action Process	33	2.17%
	happening action process	141	9.26%
	Subtotal	**648**	**42.55%**
Mental	communicative mental process	66	4.33%
	emotive mental process	30	1.97%
	desiderative mental process	17	1.12%
	perceptive mental process	55	3.61%
	cognitive mental process	40	2.63%
	Subtotal	**208**	**13.66%**
Total		**1523**	**100%**

Example 1: The Gobi Desert **is (attributive relational process)** stony, with little sand. It**'s (attributive relational process)** dry because the Himalayas stop rain clouds from reaching the desert. There are cold winters and hot summers. It can get down to -40 C in winter and it **is (attributive relational process)** as hot as 50 C in summer.

In Example 1, three attributive relational processes are used to describe the basic natural conditions of the Gobi Desert. Attributive relational processes represent things or events having certain characteristics (He et al. 2021). The use of attributive relational processes in this paragraph is to provide objective information, thus belonging to ecological ambiguous discourse. The inanimate physical participants used in the sentence allow readers to view things from the perspective of nature, enhancing the ecological ambiguity of the discourse.

Example 2: Today, half of the canal is still working. Some people say that if the Great Wall **is (identifying relational process)** the backbone of China, then the Grand Canal **is (identifying relational process)** the bloodline. It flows through the hearts of Chinese people.

The quoted part reflects the affirmation of the great role of the Grand Canal by people and the deep affection of the Chinese people for the canal. The Grand Canal is a precious heritage passed down from ancestors, and the excerpt, with strong emotional coloration, promotes the culture of the Grand Canal, which is beneficial for establishing a harmonious relationship between people and water. It undoubtedly belongs to ecological beneficial discourse.

Example 3: To protect the planet many countries and regions **take (doing action proces**s) action. China **is going to ban (doing action process)** plastic bags in major cities by the end of 2020. It **is also going to ban (doing action process)** plastic tableware and straws.

Example 3 continuously uses three doing action processes, mainly about measures taken by countries against plastic pollution, such as banning plastic bags, plastic tableware, and straws. Doing action process mainly represent direct actions. This segment takes "many countries and regions" and "China" as agents, plastic products as patients, and "to protect the planet" as a purpose, reflecting that countries are advocating a green lifestyle to improve the environment of the planet we live on. This is a heartening phenomenon, and the discourse calls on primary and secondary school readers to pay attention to the moderate use of disposable plastic products to reduce environmental pollution, spreading a powerful ecological beneficial discourse to the public.

Characteristics of participant role

The coding results of participant roles in this study are shown in Table 2. As can be seen from the table, the corpus tends to select group-type participants to form clauses, which account for 70.42%. Meanwhile, natural types of participants play a more significant role, accounting for 57.40%.

Table 2:
Ecological Attributes of Participant Roles

Participants		Frequency	Proportion
social	group	598	27.22%
	individual	338	15.38%
natural	group	949	43.20%
	individual	312	14.20%
total		**2197**	**100%**

Example 4: Many companies (S-G) think of **building floating houses (S-I)**. Instead of using electricity, **floating houses (S-G)** will use **solar power (N-G)**. **They (S-G)** can rise, fall and turn in different directions with the moving water. **People (S-G)** can also grow **plants (N-G)** on roofs. How do **they (S-G)** water **the plants (N-G)**? By recycling waste water!

Example 4 primarily discusses the characteristics of future housing. The paragraph, starting from the second sentence, consists of action processes, which predominantly employ social group participants as agents and natural group participants as goals. This effectively represents the rational use of clean energy by future residents and their harmonious relationship with the natural environment. The green development approach depicted in the paragraph aligns with the ecological philosophy of "Diversity and Harmony, Interaction and Co-existence," and all the discourse falls under the category of ecological beneficial discourse, capable of guiding readers to improve their behavior, conserve resources, and contribute to the construction of a sustainable society.

Characteristics of environment role

The coding of environmental components in the transitivity system in this study referred to the classification principles of adverbials proposed by He & Wang (2019). A clear observation of Table 3 reveals that experiential environments are the primary environmental components, with logical environments appearing second most frequently. Interpersonal or textual environments are almost non-existent. This indicates that these texts describe objective events or the context in which events occur, such as time, location, purpose, etc., and they almost entirely lack subjective elements, which is conducive to presenting the true nature of the environment to the readers.

Table 3:
Types of Environmental Roles

Environments	Frequency	Proportion
experiential	611	65.28%
interpersonal	1	0.11%
textual	12	1.28%
logical	312	33.33%
total	**936**	**100%**

Example 5: A group of researchers studied plants in southern Spain **over three months (Experiential) this summer (Experiential)**. The plants grew **in very poor soil (Experiential)**, **with little nutrients or water (Experiential)**. **However (Logical)**, the researchers found that the plants helped each other deal with these difficulties.

The paragraph uses four consecutive experiential environments and one logical environment. The first two experiential environments describe the research on plants in southern Spain, reflecting the meticulousness of the study. The next two experiential environments depict the harsh survival environment of the region's plants, forming ecologically destructive clauses together with processes and participants. Subsequently, the discourse employs the logical environment element "however" to lead a turn in the discourse, highlighting that despite the poor survival conditions of local plants, they help each other. This interdependent relationship aligns with

the ecological philosophy of "Diversity and Harmony, Interaction and Co-existence," making the last sentence an ecological beneficial clause.

Ecological Orientation in the Corpus

In order to determine the ecological orientation, this study carefully read the context of the clauses, combined with the situational context of the discourse, to judge whether the transitivity processes, participants, and environmental components align with the ecological philosophy of "Diversity and Harmony, Interaction and Co-existence." The statistical results are presented in Table 4. Among them, ecological ambiguous discourse accounted for 45.63%, the most frequent ecological orientation. Ecologically beneficial discourse followed, accounting for 38.02%. Ecologically destructive discourse appeared the least, less than half the frequency of ecologically beneficial discourse, accounting for 16.35%. According to the chi-square test results, there were statistically significant differences in the occurrence of these three ecological orientations ($P<0.01$).

Table 4:
Ecological Orientation in the Corpus

Types	Frequency	Proportion
Destructive	249	16.35%
Ambivalent	695	45.63%
Beneficial	579	38.02%
Total	**1523**	**100.00%**

Beneficial discourse

Example 6: The invention of plastic saved many wild animals, such as elephants, In 1860s, billiards were popular around the world. At that time, billiard balls were made of elephant ivory. After the birth of plastic, people began to use this new material to make the balls. In this way, the elephants were saved.

Example 6 can alter people's stereotypical perceptions of plastic. It primarily discusses the beneficial impact of the invention of plastic on animals. The sentence employs several instances of "save," connecting elephants, ivory, and plastic products as participants, illustrating how plastic replaced ivory as the primary material for billiard balls, preventing the killing of elephants and playing a significant role in the recovery of animal populations. This can awaken people's consciousness of animal protection and inform them of the rational use of plastic products, achieving a dual effect. Therefore, this study categorizes the excerpt as ecologically beneficial discourse.

Ambivalent discourse

Example 7: At the top of the volcano, there is a green lake. The water in the lake is full of hydrochloric acid. This gives the lake a green color. The lake is the world's largest of its kind.

The excerpt lacks any emotional tone, merely stating the basic characteristics of the hydrochloric acid lake on the Kawah Ijen volcano's top through relational and action processes. This does not conform to nor follow the ecological philosophy of "Diversity and Harmony, Interaction and Co-existence," thus falling under the category of ecologically ambiguous discourse.

Destructive discourse

Example 8: A big population means the use of more resources. Today, our demand on Earth is 1.75 times what our planet can make. When the world's population reaches 10 billion, Earth will have more problems. For

example, we would make three times more CO_2 than now. Also, the world temperature would rise by three degrees .

Example 8 predominantly uses phrases like “A big population,” “the use of more resources,” “our demand on Earth” as participants to represent the role of population growth or expanded human activities, and employs relational or action processes to list a series of data, realistically conveying the burden that population growth places on the Earth to the readers. The segment analyzes various problems caused by population growth, such as resource scarcity, air pollution, and global warming, from different perspectives. The discourse induces feelings of panic in readers without delineating solutions or discussing optimization effects, thus manifesting a distinctly destructive quality.

Suggestions on Environmental Discourse Construction

Based on the encoding and analysis of environmental texts from the *21st Century*, this study found that the publication demonstrates many commendable highlights in constructing environmental protection discourse and disseminating the concept of ecological civilization, with significant positive guiding significance. However, there are also aspects that need further optimization. After sorting out the statistical data, this study attempted to clarify the writing characteristics of natural ecological texts, providing several suggestions for the arrangement of environmental discourse in subsequent primary and secondary school materials, for reference by contributors and authors: First, while ensuring a certain proportion of relational processes and action processes, the use of mental processes can be appropriately increased. This will allow for a genuine emotional expression while objectively describing the ecological environment, arousing strong emotional resonance with readers. Second, it is advisable to choose physical and non-human participant roles as the main theme as much as possible, and to alternate their use. This will organize information from a nature-oriented perspective, guiding primary and secondary school readers to view the relationship between humans and nature correctly. Third, the rational use of ecologically destructive discourse can serve as a strong warning (He & Shen, 2023, pp. 7-15), while for ecologically ambiguous discourse, it is suggested to adjust the wording to develop the discourse in a beneficial direction.

Conclusion

Guided by the ecosophy of “Diversity and Harmony, Interaction and Co-existence,” this study conducted an EDA research on environmental texts from the *21st Century* over the past five years using corpus encoding software MAXQDA. From the statistical results, the following can be summarized: First, in terms of the use of transitivity system, the texts contain a large number of relational processes and action processes, which enhance the authenticity and authority of the discourse, thus providing readers with a comprehensive understanding of the natural ecological environment. Second, overall, in the past five years, the publication has a minority of ecologically destructive discourse, with a majority of ambiguous and beneficial discourse. Lastly, on this basis, further efforts can be made to transform ambiguous discourse into beneficial discourse, promoting the harmonious development of the relationship between humans and nature.

The findings of this study have certain theoretical and practical significance in the fields of linguistics and primary and secondary education. First, in terms of theoretical significance, this study is an attempt in the Chinese context of ecological linguistics. Based on the EDA framework constructed by He Wei, it interprets the

ecology of discourse from multiple perspectives, explores the construction strategies of eco-friendly discourse in the publication's environmental texts, and demonstrates the feasibility and universality of the EDA model in *New Developments in Ecological Discourse Analysis*. Secondly, in practical terms, this study provides useful references for the writing of environmental discourse in primary and secondary language learning materials, promoting the widespread popularization of ecological conservation education, establishing the ecological concept of "harmonious coexistence between humans and nature." This study also has certain limitations. Future research can expand the scope of the study to conduct a diachronic study of environmental texts in the *21st Century*. It is also advisable to select different publications for comparative studies of their ecological attributes. Finally, it is hoped that more youth publications can follow the ecological philosophy of "Diversity and Harmony, Interaction and Co-existence," to construct more beneficial ecological discourse and help cultivate a new generation with a strong sense of ecological protection.

References

Alexander, R., & Stibbe, A. (2014). From the analysis of ecological discourse to the ecological analysis of discourse. *Language Sciences, 41*(41), 104-110.

Chen, X. J. (2021). Research on gender representation in the 2004 and 2019 editions of the People's Education Edition high school English textbook (MA Thesis: Central China Normal University).

Cheng, M. (2022). Theoretical framework for ecological discourse analysis: a summary of new developments of ecological discourse analysis. *Journal of World Languages, 8*, 188-226.

Halliday, M. A. K., & Matthiessen, C. M. I. M. (2014). *Halliday's introduction to functional grammar* (4th ed.). London: Routledge.

He, W., & Shen, W. (2023). Representation of animal discourse in language textbooks from an ecological linguistic perspective. *Foreign Language Teaching, 44*(4), 7-15.

He, W., & Wei, R. (2018). Pluralistic harmony, interactive symbiosis—Construction of an ecological philosophical perspective for international ecological discourse analysis. *Foreign Language Journal*, (06), 28-35.

He, W., & Zhang, R. J. (2017). Construction of an ecological discourse analysis model. *China Foreign Languages*, (5), 9.

He, W., Gao, R., & Liu, J. H. (2021). *New developments of ecological discourse analysis*. Beijing: Tsinghua University Press.

Hu, L. L. (2023). Analysis of the ecological nature of environmental news discourse from the perspective of ecological linguistics. *Journal of Culture*, (11), 195-198.

Jia, F. (2022). 30 years of research on Chinese foreign language textbook evaluation (1990-2020). *Contemporary Foreign Language Studies*, (01), 83-92.

Liu, Y. (2019). Multimodal research on English listening and speaking textbooks under the framework of visual grammar. *Journal of Shanxi Datong University (Social Science Edition), 33*(03), 99-101.

Ma, J. X., & Liang, M. X. (2021). Ecological discourse analysis of Wordsworth's natural poetry—Taking "To the Cuckoo" as an example. *Journal of Xuchang College*, (06), 69-73.

Tomlinson, B., & Masuhara, H. (2017). *The complete guide to the theory and practice of materials development for language learning*. Hoboken: John Wiley & Sons, Inc.

Wang, Z. H. (2013). Selection and application of teaching materials for English newspaper reading courses—Taking "21st Century" as an example. *Guangdong Science and Technology*, (22), 206+213.

Xin, Z. Y., & Huang, G. W. (2013). Systemic functional linguistics and ecological discourse analysis. *Foreign Language Teaching*, (03), 7-10+31.

Zhang, Y. L., & He, A. P. (2009). Exploration of the orality of English textbook dialogues. *Foreign Language Teaching Theory and Practice*, (02), 61-67.